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Effects of Tetrahydrocannabinol Content on Marijuana Smoking Behavior, Subjective Reports, and Performance

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HEISHMAN, S J, M L STITZER AND J E YINGLING *Effects of tetrahydrocannabinol content on marijuana smoking behavior, subjective reports, and performance* PHARMACOL BIOCHEM BEHAV 34(1) 173–179, 1989 —This study investigated the smoking topography of marijuana and its effect on heart rate, subjective reports, and cognitive/psychomotor task performance Male subjects (N = 12) with histories of moderate marijuana use smoked ad lib one cigarette containing 0, 1 3, or 2 7% Δ^9-THC on separate days Smoking topography measures revealed smaller puff and inhalation volumes and shorter puff duration for the high marijuana dose compared to the low dose No other smoking behavior differed between the active doses Heart rate was increased dose dependently over placebo levels Active marijuana also increased subjective reports of drug effect over placebo, but not dose dependently Significant memory impairment was observed on a forward and reverse digit span task, and performance was impaired on the digit symbol substitution task by the high, but not low, dose of marijuana Performance on a divided attention task was not affected by marijuana Thus, although subjects adjusted their smoking of cigarettes varying in THC content, dose-related effects of marijuana were obtained on several measures The observed differences and individual variation in smoking topography measures suggest that precise control of smoking behavior would improve the accuracy of marijuana dose delivery

Marijuana THC Smoking topography Subjective effects Performance effects Cognitive tasks Psychomotor tasks Human behavioral pharmacology

MARIJUANA is, by far, the most widely used illicit drug in the United States Estimates indicate that 62 million Americans have used marijuana at least once, and 18 million are current users (27) Virtually all of this marijuana use is by smoking. In studying the behavioral and subjective effects of marijuana, it is important to accurately control dosage. This is difficult with inhaled drugs because individual differences in smoking styles and/or attempts to adjust smoke inhalation can produce a wide range of delivered doses and thus make experimental results difficult to interpret

The most common means of manipulating marijuana dosage in experimental studies has been through the use of cigarettes varying in Δ^9-tetrahydrocannabinol (THC) content, typically from 1 to 4%, and placebo marijuana cigarettes from which the active cannabinoids have been chemically extracted The majority of studies investigating the effects of marijuana have allowed subjects to smoke the cigarettes ad lib or until a desired "high " Some of these studies reported orderly dose-related effects (2, 19, 24, 32), but others have not observed significant differentiation between active marijuana doses (25,34) In an attempt to standardize the dosing procedure, other studies have adopted a paced smoking procedure in which number of puffs, breath hold duration, or interpuff interval were controlled by the experimenter (5, 11, 13, 16, 30) Although these studies reported significant differences between active and placebo marijuana on a variety of physiological and behavioral measures, again, consistent orderly differentiation was not seen among the active marijuana doses

A possible explanation for this lack of dose differentiation is that individuals may adjust their smoking behavior according to the potency of the marijuana cigarette similar to that observed with ad lib smoking of tobacco cigarettes varying in nicotine yield (12,15) To our knowledge only three studies have examined the adjustment of smoking behavior by directly measuring the smoking topography of multiple active marijuana doses Cappell *et al* (3) found no significant differences in duration of lung exposure, puff number, puff duration, and interpuff interval between cigarettes containing 0 2, 0 4, and 0.8% THC. Perez-Reyes *et al* (31) also found no evidence for smoking adjustment using marijuana with greater THC concentrations (1.32, 1 97, and 2.54% THC). In contrast, Herning *et al* (14) reported that subjects took more puffs and inhaled greater volumes of air, a measure not assessed by the former studies, while smoking a 3.9% compared to a 1 2% THC cigarette The increased inhalation volume was interpreted as an

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attempt to dilute the marijuana smoke from the more potent cigarette However, slower burn characteristics of the high potency cigarette and the lack of standard instructions regarding when to puff and inhale during the breathing cycle may have confounded their results Thus, the issue of behavioral adjustment during marijuana smoking remains equivocal

We have begun to investigate the smoking of marijuana cigarettes using a detailed topographical assessment, which measures puff duration, puff volume, lung exposure duration, inhalation volume, and other behavioral aspects of smoking The purpose of this study was to examine smoking behavior across multiple doses of marijuana in order to characterize potential behavioral adjustments This study improved on previous studies by incorporating more topography measures, by using marijuana cigarettes that had similar burn characteristics, and by standardizing instructions to subjects concerning puff initiation during the breathing cycle In addition to measuring smoking topography, dose and time course effects of marijuana on heart rate, subjective reports, and cognitive/psychomotor tasks were assessed

METHOD

Subjects

Participants were 12 healthy, male community volunteers who were recruited through newspaper advertisements and ranged in age from 23 to 43 (mean = 31 1, SD = 5 8) Prior to participation, subjects were medically screened, provided a drug-free urine specimen, and gave written informed consent about the study and its risks They were paid $5 .0 per hour of participation At intake interview, subjects gave a detailed history of past and current drug use All reported past use of various illicit drugs, however, the majority of participants reported current use (within the past month) of four drugs caffeine (100% of subjects), alcohol (92%), marijuana (83%), and nicotine (67%) One subject reported infrequent current use of sedative/hypnotics, tranquilizers, and opiates (codeine) No one reported current use of amphetamines, inhalants, LSD, or PCP, and none of the subjects reported ever being treated for alcohol or drug abuse In terms of marijuana experience, all subjects reported previous use, and the 83% current users reported using it an average of 7 8 times per month, smoking an average of 2 1 joints on each occasion

Marijuana Cigarettes

Marijuana cigarettes were supplied by the National Institute on Drug Abuse (NIDA) Research Technology Branch Each cigarette was approximately 85 mm in length × 25 mm in circumference and weighed an average of 835 mg. As assayed by NIDA, cigarettes contained either 0 (placebo), 1 3, or 2 7% THC The 1 3 and 2 7% THC cigarettes were estimated to contain 12 and 21 mg THC, respectively To determine burn characteristics, five cigarettes from each of the three potencies were mechanically smoked in an apparatus providing continuous draw The length of time for 70 mm of plant material to burn was recorded Burn times (mean seconds ± S E M) were 683 ± 61, 683 ± 60, and 657 ± 43 for 0, 1 3, and 2 7% THC cigarettes, respectively There was no difference in burn time between the three potencies, $F(2,12) = 0\ 093$, n s The moisture content of the cigarettes was raised by humidification at room temperature over a saturated sodium chloride solution in a closed humidifier at least 12 hours before machine and human smoking

Experimental Procedures

Subjects were informed that the purpose of the study was to investigate how people smoke marijuana cigarettes and the effects of smoked marijuana on physiological responses, mood, and performance Before the first experimental session, subjects were trained in the smoking procedure to begin a puff at the end of an exhalation and to inhale immediately after each puff This served to standardize puffing and inhalation patterns across subjects and allowed valid and reliable measurement of puff and inhalation volumes. Subjects also practiced the computerized tasks until a stable level of performance was reached This smoking and task practice usually involved 2–4 hours over two days Subjects then participated in three experimental sessions from 9 00–11 00 a m , which were separated by at least 48 hours During each session, subjects smoked one cigarette containing either 0, 1 3, or 2 7% THC Doses of marijuana were administered in counterbalanced order according to a 3 × 3 Latin Square design under double-blind conditions Subjects remained at the laboratory until any residual drug effects had dissipated before they were released Subjects were instructed not to use drugs or alcohol within 24 hours, not to smoke marijuana within 48 hours, and not to smoke tobacco cigarettes within 1 hour of experimental sessions A breathalyzer and urine specimen were obtained before each session to assess and encourage compliance with these rules

Experimental sessions began by connecting subjects to the smoking topography measurement system and heart rate (HR) monitoring equipment Subjects then completed a 10-minute computerized battery of subjective reports and performance tasks The topography system was calibrated, followed by a 5-minute baseline HR measurement Immediately before smoking, the first of two expired air carbon monoxide (CO) samples was taken Subjects then smoked ad lib a single marijuana cigarette, they were stopped after the eighth puff was exhaled This resulted in complete or nearly complete pyrolysis of each cigarette Number of puffs was standardized in order to increase the probability of detecting compensatory adjustments on other topography measures The second expired air CO sample was obtained 2 minutes after smoking ended The battery of subjective reports and performance tasks was repeated at 5, 25, 45, and 65 minutes postmarijuana

Smoking Topography

The smoking topography system has been described in detail previously (35,36) Briefly, an Apple IIe microcomputer displayed and measured puffing and respiratory topography parameters in real time by simultaneously sampling at high rates the analog output of two peripheral systems a flowmeter cigarette holder modeled after an ADL Smoke Dosimeter (Arthur D Little, Inc , Cambridge, MA) and a respiratory inductive plethysmograph (Respitrace, Non-Invasive Monitoring Systems, Inc . Ardsley, NY)

Five puffing topography parameters were measured 1) interpuff interval, 2) puff duration, 3) puff volume, 4) maximum flow rate/puff, and 5) average flow rate/puff The flowmeter mouthpiece was connected to a pressure-sensitive switch that signaled puff onset and offset, the microcomputer timed the interval between switch onset and offset for the puff duration measure and the interval between switch offset and subsequent onset for interpuff interval A differential pressure transducer also connected to the flowmeter detected pressure changes during puffing, which were proportional to the rate of smoke flow through the flowmeter The computer integrated these flow rates over the duration of the puff to yield puff volume Puff volume measurement was calibrated each day by drawing 50 ml of air from an unlit cigarette with a syringe If puff volumes deviated from 50 ml by more than 6%, the system was adjusted The highest flow rate

during each puff was selected by the computer as the maximum flow measure. Average flow rate/puff was calculated by dividing puff volume by puff duration. In addition to these puffing topography parameters, the duration of smoking each cigarette was measured.

Inhalation volume and lung exposure duration were the two respiratory topography parameters measured. Two elastic cloth bands containing folds of multistrand wire were placed around the subject's thoracic and abdominal regions. The Respitrace system monitored the changing electrical signal produced by movement of the bands as subjects breathed and measured inhalation volume directly by comparing signal changes with those obtained during a presmoking calibration procedure using a known 800-ml volume of air. To control for differences in lung size, inhalation volumes were expressed as percent of vital capacity, a measure of lung size. Vital capacity (VC) was measured for each subject at the beginning of experimental sessions by having them take three deep breaths and exhaling as much as possible of the third breath into a water spirometer (Vitalometer; W. E. Collins, Inc., Braintree, MA). Mean VC for the 12 subjects was 4375 ml, ranging from 3075 ml to 6000 ml. Lung exposure duration was measured by the computer as the temporal interval from puff offset to the trough of the electrical signal generated by the end of the following exhalation.

TABLE 1

MARIJUANA SMOKING TOPOGRAPHY MEASURES*

	Placebo	1.3% THC	2.7% THC
General Characteristics			
Smoking duration (min)	5.9 (0.5)	6.9 (0.5)	6.6 (0.5)
Harshness rating†	4.4 (1.0)	5.8 (0.6)	6.8 (0.7)
Carbon monoxide (ppm)	14.6 (1.3)	14.7 (1.5)	13.0 (1.3)
Puffing Parameters			
Interpuff interval (sec)	52.3 (5.2)	56.5 (4.4)	54.2 (4.5)
Puff duration (sec)	1.9 (0.2)	2.1 (0.2)	1.7 (0.1)‡
Puff volume (ml)	63.9 (6.2)	67.9 (7.3)	59.1 (6.8)‡
Maximum flow rate (ml/sec)	45.4 (4.6)	48.5 (6.2)	48.0 (5.6)
Average flow rate (ml/sec)	34.2 (3.0)	33.6 (3.2)	34.8 (3.1)
Respiratory Parameters			
Inhalation volume (% VC)§	23.8 (2.8)	29.5 (4.4)	23.9 (3.5)‡
Lung exposure duration (sec)	11.2 (1.0)	11.3 (0.9)	10.4 (0.9)

*Data are means (N = 12) with 1 S.E.M. in parentheses. Carbon monoxide data are postsmoking minus presmoking differences.
†Response range was 0 to 10.
‡$p < 0.05$ versus 1.3% THC dose.
§VC = vital capacity.

Physiological Measures

Heart rate was measured throughout experimental sessions using an EKG amplifier (3 leads) and Schmitt trigger, which measured the temporal interval between successive R-waves to give an average HR each minute. Continuously updated HR values were displayed in real time on the video monitor during baseline, smoking, and nontask periods. Expired air CO samples were obtained by having subjects fully exhale, inhale and hold their breath for 20 seconds, and then exhale successively into two 1-liter polyvinyl bags. The CO content of the second bag, which contained alveolar air, was measured directly in parts per million using an Ecolyzer 2000 (Energetics Science, Inc., Elmsford, NY).

Subjective Report Measures

Nine subjective report questions appeared individually on the video monitor. Subjects answered the questions by using a joystick to move a pointer along a 15-cm visual analog line scaled from 0 (not at all) to 100 (extremely). The questions assessed the following: drug high, stoned, impaired performance, energetic, clear-headed, anxious, sluggish, confused, and relaxed. Immediately following smoking, subjects (N = 9) were asked to verbally rate the harshness of the marijuana cigarette on a scale from 0 (not harsh at all) to 10 (extremely harsh).

Performance Task Battery

Three computerized cognitive/psychomotor tasks were presented in the following order: digit span, divided attention, and digit-symbol substitution task (DSST). The digit span task was adapted from the Wechsler Adult Intelligence Scale (WAIS) and is a test of memory. On the video monitor, subjects were first presented a series of seven digit spans, beginning with a span of three digits and increasing by one to a span of nine digits. The randomly selected digits were presented one at a time at 1-second intervals. Immediately following the last digit of each span, subjects were given 15 seconds to enter the span of digits in the correct order of presentation using a numeric keypad. This was the forward component of the task. The reverse component involved presentation of another seven spans, beginning with two digits and increasing to eight, which subjects attempted to enter in reverse order. In each component, the number of correct spans and the longest correct span before an error was made were recorded.

The 2-minute divided attention task involved a pursuit tracking component located in the upper half of the video monitor and a visual search component in the lower half. In the tracking component, a diamond-shaped target (9-mm tall, 9-mm wide) moved randomly along a horizontal line. Subjects attempted to track it as closely as possible with a plus-sign cursor (7 × 7 mm), which they controlled with a joystick. The average distance off target was measured in pixels. Simultaneously, in the visual search component, subjects were required to search four numbers, which changed at random intervals, for a target number. Each of the four numbers was positioned at one corner of a 3 × 16.5-cm rectangle; the target number was positioned in the center and displayed continuously throughout the task. Each time the target number was identified, subjects pressed a button on the joystick manipulandum. The number of correct responses and the latency to respond were recorded.

The automated DSST, also adapted from the WAIS, has been described previously (20) and is considered a measure of associative and motor ability. Briefly, randomly selected digits appeared in the center of the video monitor. Subjects used a numeric keypad to reproduce a geometric pattern associated with the digit by using the digit-symbol code presented continuously at the top of the video screen. Each digit-symbol association constituted one response. The number of correct responses was recorded during the 2-minute task.

Data Analysis

The following smoking behaviors were analyzed using one-way analysis of variance: five puffing parameters (interpuff interval, puff duration, puff volume, maximum flow rate/puff, and average flow rate/puff), two respiratory parameters (inhalation volume and lung exposure duration), smoking duration, harshness rating, and CO boost. Puffing and respiratory parameters were

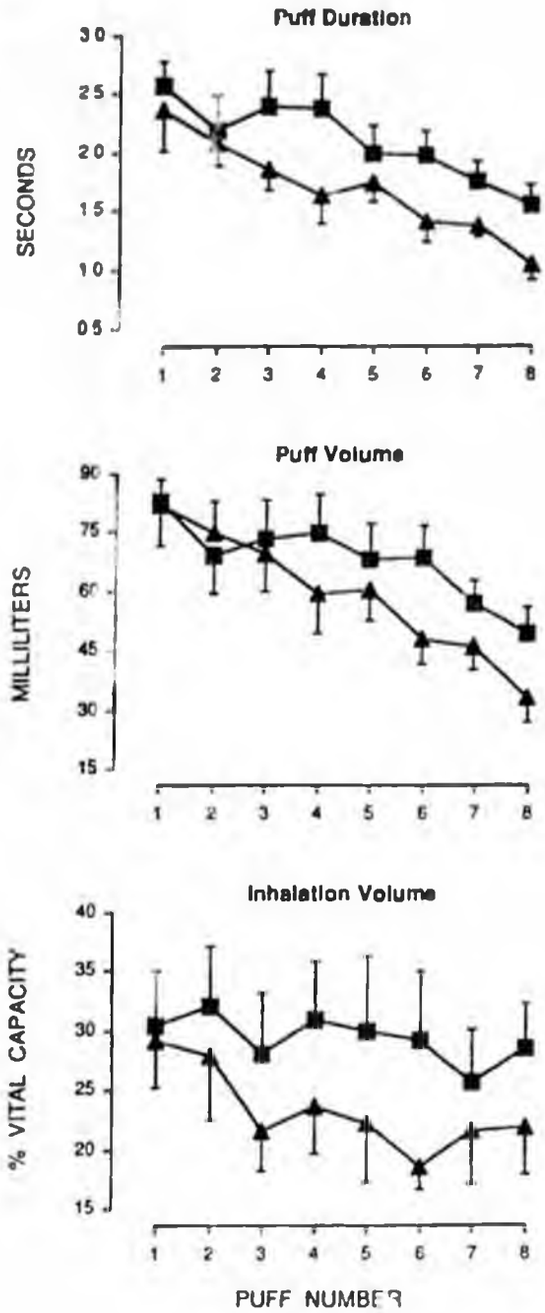


FIG 1 Mean smoking topography parameters that differed significantly between 1 3% THC marijuana (squares) and 2 7% THC marijuana (triangles) as a function of successive puff number Each data point represents the mean of 12 subjects ± 1 S E M

averaged over the eight puffs of each cigarette The difference in expired air CO levels from presmoking to 2 minutes postsmoking was used as the measure of CO boost To assess whether smoking behavior changed as a function of THC concentration, planned comparisons were conducted between the two active marijuana doses on the above smoking measures The placebo condition was included primarily as a control for subjective, performance, and HR data Visual analog subjective report, task performance, and HR data were analyzed using two-way, repeated measures analysis

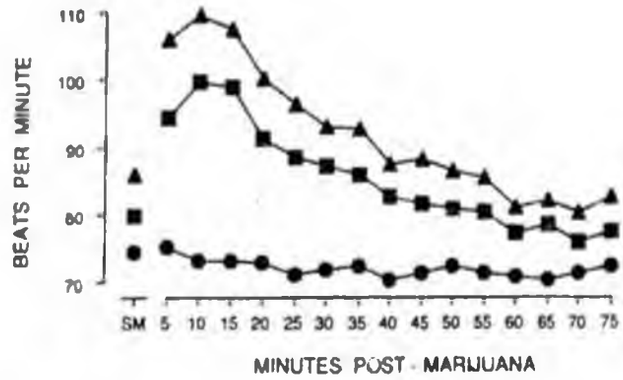


FIG 2 Effect of placebo marijuana (circles), 1 3% THC marijuana (squares), and 2 7% THC marijuana (triangles) on heart rate averaged over the smoking period (SM) and in 5-minute intervals during the session Data points are adjusted for premarijuana baseline values and represent means of 12 subjects

of covariance with marijuana dose and time postmarijuana as the factors The premarijuana baseline value was used as the covariate for each measure For continuously recorded HR, the baseline value was the average of the 5-minute premarijuana resting HR, postmarijuana HR data were averaged in 5-minute blocks of time Huynh-Feldt adjustments of repeated measures degrees of freedom were used to correct for violations of the sphericity assumption Post hoc analysis of subjective, performance, and HR data was made using the Tukey method with scores averaged over the postmarijuana session For all statistical tests, effects were considered significant if $p<0.05$

RESULTS

Smoking Topography

Mean smoking parameter values for the three marijuana doses are shown in Table 1 Planned comparisons indicated no significant difference between the active doses in smoking duration, harshness rating, and CO boost In terms of puffing parameters, there were no significant differences in interpuff interval and maximum and average flow rate However, puff duration and puff volume were significantly less for the 2 7% compared to the 1 3% THC dose Lung exposure duration also did not differ between the active doses, but inhalation volume was significantly less for the 2 7% dose

Figure 1 illustrates these differences between the 1 3% and 2 7% THC doses by showing mean puff duration, puff volume, and inhalation volume as a function of successive puff number The first puff from both cigarettes was about 83 ml in volume and 2 5 seconds in duration, subjects inhaled to about 30% VC Beginning with the third or fourth puff, puff duration and volume of the 2.7% THC cigarette became less than that of the 1 3%, and both then declined in parallel over the rest of the cigarette Inhalation volume of the 1 3% dose remained at about 30% VC over successive puffs However, beginning with the third puff, inhalation volume of the 2 7% dose shifted to a lower range (18–24% VC), which remained relatively constant for the remainder of the cigarette

Heart Rate

Figure 2 displays mean HR values for each marijuana dose averaged over the smoking period and in 5-minute intervals

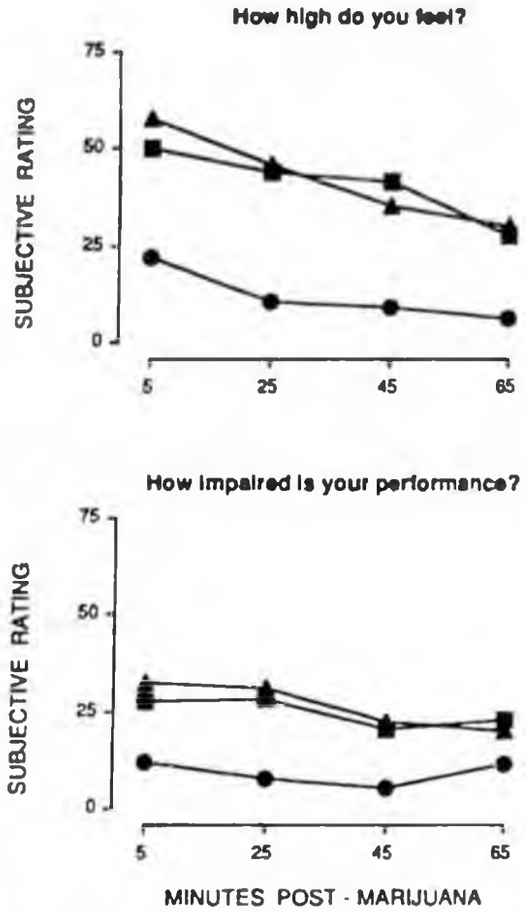


FIG 3 Effect of placebo marijuana (circles), 1 3% THC marijuana (squares), and 2 7% THC marijuana (triangles) on visual analog ratings of two subjective report questions as a function of time postmarijuana Data points are adjusted for premarijuana baseline values and represent means of 12 subjects

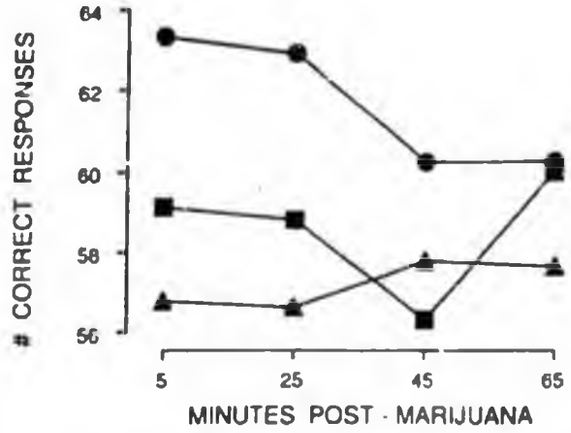


FIG 4 Effect of placebo marijuana (circles), 1 3% THC marijuana (squares), and 2 7% THC marijuana (triangles) on number of correct responses on the DSST as a function of time postmarijuana Data points are adjusted for premarijuana baseline values and represent means of 12 subjects

postmarijuana Active marijuana clearly increased HR over placebo levels, as indicated by a significant dose × time interaction, $F(30,330) = 12\ 47$, $p<0\ 001$ Post hoc analysis revealed that both active doses were significantly elevated over placebo and that the active doses were significantly different from each other, producing an orderly dose-dependent effect. This dose dependency was already evident during the smoking of the cigarette Peak increases of 35 beats per minute for the 2 7% THC dose and 25 beats per minute for the 1 3% dose occurred 10 minutes after smoking and declined gradually during the experimental session.

Subjective Measures

Average subjective ratings on two of the visual analog questions are shown in Fig 3 for each marijuana dose as a function of time postmarijuana Significant dose effects were observed for drug high, $F(2,21) = 9\ 83$, $p<0\ 001$, and impaired performance, $F(2,21) = 6\ 07$, $p<0\ 01$ Post hoc analysis indicated that for both questions, both active marijuana doses produced ratings significantly different from placebo, but not from each other Maximal ratings of drug high occurred at 5 minutes postsmoking and declined gradually toward placebo levels during the session, whereas ratings of impaired performance remained consistently elevated throughout the session Subjective responses for stoned revealed a significant dose effect, $F(2,21) = 12\ 96$, $p<0\ 001$, and were identical in time course to ratings for drug high Scores on clear-headed were significantly decreased by active marijuana relative to placebo, $F(2,21) = 3\ 72$, $p<0\ 05$ No other questions were significantly affected by marijuana.

Performance Measures

Table 2 shows scores on the digit span task averaged over the session for each marijuana dose In the forward component, significant dose effects were observed for number of correct spans, $F(2,21) = 4\ 62$, $p<0\ 05$ and longest correct span before an error was made, $F(2,21) = 5\ 72$, $p<0\ 01$ Post hoc analysis indicated that for both measures, recall was significantly impaired only with the 1 3% THC dose Similarly, in the reverse component, significant dose effects were seen for number of correct spans, $F(2,21) = 10\ 70$, $p<0\ 001$ and longest correct span before an error, $F(2,21) = 8\ 14$, $p<0\ 01$ Post hoc analysis revealed that only the 2 7% dose significantly impaired recall compared to placebo on both measures. Time course data (not shown) indicated that, in both components, recall memory was most impaired at the 5- and 25-minute assessments, recovering to placebo levels by the end of the experimental session.

TABLE 2

EFFECTS OF MARIJUANA ON DIGIT SPAN TASK*

	Placebo	1 3% THC	2 7% THC
Forward Component			
Number of correct spans	4 9	4 2†	4 7
Longest correct span before error	6 0	4 6†	5 8
Reverse Component			
Number of correct spans	5 0	4 6	4 0†
Longest correct span before error	5 5	5 0	4 3†

*Data are adjusted for predrug baseline values and represent means of 12 subjects

†$p<0\ 01$ versus placebo

Mean number of correct responses on the DSST for each marijuana dose as a function of time postmarijuana are shown in Fig 4 Active marijuana significantly decreased scores compared to placebo. $F(2,21) = 5\ 09$, $p<0\ 05$ Post hoc analysis indicated that only the 2 7% dose significantly impaired performance relative to placebo Performance was impaired at 5 minutes postsmoking and remained relatively unchanged throughout the session Marijuana had no effect on the divided attention task Mean scores of distance off the target in the tracking component were 9 8, 9 0, and 10 2 for 0, 1 3, and 2 7% THC, respectively In the visual search component, mean number of correct responses was 11 6, 11 9, and 11 5 out of a possible 12, and latency to respond was 1 4, 1 5, and 1 5 seconds for 0, 1 3, and 2 7% THC, respectively

DISCUSSION

This study demonstrated that subjects adjusted their smoking of marijuana cigarettes differing in THC content On average, subjects took puffs from the high potency cigarette (2 7% THC) that were smaller in volume and shorter in duration, and inhaled a smaller volume of air with each puff compared to the low potency cigarette (1 3% THC) Carbon monoxide boost, an indirect measure of amount of smoke inhalation, was not significantly different between the two potencies, although the trend of a lower CO boost for the high dose of marijuana was consistent with the significantly lower puff and inhalation volumes

This finding of differences in smoking topography conflicts with previous studies reporting no evidence of behavioral adjustments while subjects smoked active marijuana varying in potency (3,31) However, these latter studies did not measure puff and inhalation volume, which were the primary topographical components that differed in the present study Herning *et al* (14) found evidence for adjustment of smoking behavior, reporting that subjects inhaled a 46% greater volume of air from high (3 9% THC) versus low (1 2% THC) potency marijuana cigarettes This contrasts with our finding that subjects inhaled about 23% less air while smoking the high compared to the low potency cigarette This discrepancy may be explained by the fact that their subjects were allowed to puff and inhale at any point in their normal breathing cycle (R I Herning, personal communication) With no control over the timing of a puff and subsequent inhalation during the breathing cycle (and thus no control over volume of lung air at the beginning of an inhalation), data concerning inhalation volume as a measure of smoking topography are difficult to interpret

Previous studies of smoking topography have reported that puff duration decreased progressively over successive puffs from marijuana (30) and tobacco (8, 28, 29) cigarettes The present study replicated this finding regarding puff duration and extended it to puff volume There was a close correspondence between the decline in puff duration and puff volume across successive puffs of the low ($r = 96$) and high ($r = 99$) potency THC cigarettes In contrast, inhalation volume remained relatively constant after the second puff from both potencies

Although average puff and inhalation volume differed between the two marijuana doses, the range of values for each measure was large Puff volumes ranged from 29 to 117 ml for the low dose and 26 to 115 ml for the high dose of marijuana Inhalation volumes ranged from 14 to 64% VC and 14 to 53% VC for the low and high doses, respectively These large individual differences during ad lib smoking argue strongly for experimental control over smoking parameters if uniform dose delivery of smoked marijuana is desired The extent of each subject's adjustment in smoking behavior basically reflected the mean data For most subjects, smoking topography values of one dose were predictive of the other dose, as indicated by positive correlations between the two THC potencies for puff volume ($r = 84$) and inhalation volume ($r = 81$) However, three subjects took puffs or inhalations from the high potency cigarette that were equal to or larger than those from the low potency cigarette

It is possible that the observed differences in smoking behavior were due to the THC content of the cigarettes Chait *et al* (6) reported that subjects were able to discriminate between active and placebo marijuana cigarettes after only two puffs based on the characteristic marijuana "high" Interestingly, in the present study, topography measures of the active doses began to diverge after the second or third puff (Fig 1) However, the general lack of subjective discriminability between active marijuana doses observed in this and other (9, 13, 16, 30, 31) studies suggests that nonpharmacological factors are also involved in smoking adjustments In this study, harshness ratings tended to increase with increasing THC dose Cigarette harshness or other sensory cues potentially correlated with THC potency (e g , heat, draw, or taste) may have contributed to the observed differences in smoking topography

In spite of behavioral adjustments in smoking, we obtained dose-dependent effects on several measures, particularly heart rate, a measure that has been shown by many investigators to reflect dose-related effects of acute marijuana exposure (2, 13, 19, 24, 32) Marijuana also increased subjective ratings of drug high and stoned compared to placebo values, however, no differences between 1 3% and 2 7% THC marijuana were observed An absence of dose-related subjective effects has also been reported in studies testing a comparable range of marijuana doses in which subjects smoked marijuana either ad lib (9,31) or by following an experimenter-controlled paced smoking procedure (13, 16, 30) This suggests that subjective effects within this dose range of marijuana are difficult to discriminate This possibility is supported by the human drug discrimination work of Chait *et al* (6) They successfully trained subjects to discriminate 2 7% THC marijuana from placebo and found that cigarettes containing 1 4% THC substituted completely for the 2 7% THC training dose, whereas 0 9% THC marijuana produced placebo-appropriate responding Thus, subjects experienced the stimulus effects of 1 4% and 2 7% THC marijuana as subjectively similar

The most consistently reported behavioral effect of marijuana in humans is a disruption of memory processes (23) In the present study, marijuana impaired immediate recall as measured by the digit span task, although effects were related in an orderly way to increasing marijuana dose only for the reverse component of the task This disruption in memory is consistent with numerous past studies reporting marijuana-induced impairment in immediate or delayed recall of digit spans (22,33), short stories (17), and word lists (4, 7, 24, 26) In the present study, marijuana also impaired associative ability and psychomotor skills as assessed by the DSST This finding agrees with most previous research (2, 13, 34) Two studies reporting that smoked marijuana did not impair DSST performance (7,18) used the traditional paper and pencil DSST, which may be less sensitive to the performance-impairing effects of marijuana than the automated version, and one (18) tested a relatively low dose of marijuana (0 9% THC) in subjects with a heavy history of marijuana use In the present study, DSST was the task most sensitive to marijuana dose effects Finally, performance on a divided attention task was not affected by marijuana in the present study This contrasts with previous reports of marijuana-induced impairment on divided attention tasks involving tracking and visual search components (1,11) or dual visual search components (5,21) It is likely that the divided attention tasks used in these studies were more difficult than the one reported here Complex tasks requiring rapid, decisional responses are most sensitive to the behavioral effects of marijuana (10) Our subjects also reported that they enjoyed the divided

attention task the most of the three performance tasks, which may have increased their motivation to perform well

In conclusion, this study found that moderate marijuana users smoked a 2 7% THC cigarette less vigorously than a 1.3% THC cigarette by taking smaller and shorter puffs and inhaling less air with each puff. Studies of tobacco smoking topography have reported similar dose-related compensatory changes during ad lib smoking of cigarettes varying in nicotine yield (12,15) In spite of adjustments in smoking behavior, dose-related effects of marijuana were observed, particularly on heart rate, whereas differences between effects of the low and high dose were less apparent on subjective report and performance measures The dose-related differences in puffing and inhalation parameters and the large intersubject variability in puff and inhalation volume support the need for precise methods of control over marijuana smoking patterns to improve the accuracy of dosage delivery

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Effects of Varying Marijuana Potency on Deposition of Tar and Δ^9-THC in the Lung During Smoking

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MATTHIAS, P., D. P. TASHKIN, J. A. MARQUES-MAGALLANES, J. N. WILKINS AND M. S. SIMMONS. *Effects of varying marijuana potency on deposition of tar and Δ^9-THC in the lung during smoking.* PHARMACOL BIOCHEM BEHAV 58(4) 1145–1150, 1997.—To determine whether smoking more, compared to less, potent marijuana (MJ) cigarettes to a desired level of intoxication ("high") reduces pulmonary exposure to noxious smoke components, in 10 habitual smokers of MJ, we measured respiratory delivery and deposition of tar and Δ^9-tetrahydrocannabinol (THC), carboxyhemoglobin (COHb) boost, smoking topography, including cumulative puff volume (CPV) and breathholding time, change in heart rate (ΔHR) and "high" during ad lib smoking of 0, 1.77, and 3.95% MJ cigarettes on 3 separate days. At each session, subjects had access to only a single MJ cigarette. On average, smoking topography and COHb boost did not differ across the different strengths of MJ, while THC delivery, as well as HR, were significantly greater ($p < 0.01$) and tar deposition significantly less ($p < 0.03$) for 3.95% than 1.77% MJ. Although individual adaptations in smoking topography for 3.95% compared to 1.77% MJ were highly variable, three subjects with the lowest 3.95% MJ:1.77% MJ ratios for CPV also displayed the lowest 3.95% MJ:1.77% MJ ratios for tar deposition. In vitro studies using a standardized smoking technique revealed a mean 25% lower tar yield from 3.95% than 1.77% MJ ($p < 0.05$), but no difference between 1.77% and 0% marijuana. Under the conditions of this study, we conclude that tar delivery is reduced relative to THC content in a minority of subjects, and this reduction appears to be due to a reduced intake of smoke (decreased CPV) and/or a reduced tar yield from the stronger MJ preparation. © 1997 Elsevier Science Inc.

Marijuana Δ^9-tetrahydrocannabinol (THC) Smoking topography Tar yield Tar deposition Lung Carboxyhemoglobin boost "High"

WE have previously shown that compared to tobacco smoking, marijuana smoking results in an approximately fourfold greater deposition of tar in the lung and a four- to fivefold larger boost of carboxyhemoglobin (COHb) in the blood when equivalent quantities of the two substances are smoked (12,16). These differential effects appeared to be mainly due to less filtration of marijuana than tobacco cigarettes, resulting in a relatively greater tar yield from marijuana (13), and the longer breathholding time following inhalation of the smoke of marijuana than that of tobacco, resulting in a greater fractional retention in the lung of the inhaled tar and a greater absorption of carbon monoxide (13,16). These findings suggest that, at least for equivalent weights of plant material smoked, marijuana joints might have a greater potential than tobacco cigarettes for adverse health effects related to the carcinogenicity and respiratory irritant effects of components in tar (6) and the reduced myocardial oxygen delivery (1) and reduced maternal and fetal tissue oxygenation caused (8) by an elevated COHb.

It has been hypothesized that the health hazards from toxic components in marijuana smoke could be reduced if habitual marijuana users smoked higher potency marijuana (4). This hypothesis assumes the following: 1) that smokers are able to "titrate" the amount of THC absorbed during marijuana smok-

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ing in a manner that will result in decreasing their cumulative puff volume of inhaled smoke when smoking a more potent compared to a less potent preparation, to achieve a given desired level of intoxication; and 2) that the yield of tar relative to Δ^9-tetrahydrocannabinol (THC) from marijuana preparations of different potency always decreases as the THC concentration of the preparation increases. To test this hypothesis and these assumptions, we evaluated the effects of varying THC concentrations in marijuana cigarettes (0, 1.77, and 3.95%) on the deposition of tar in the lung, carboxyhemoglobin boost, and subjective and physiological measures reflecting the bioavailability of THC in ten habitual smokers of marijuana.

METHODS

Subjects

We studied 10 male habitual marijuana smokers [mean age (± SD), 23.2 ± 2.3 years], who smoked an average of 12.7 ± 11.5 joints/week and reported a cumulative lifetime smoking history of 27.2 ± 46.5 joint-years (number of marijuana joints per day times the number of years of marijuana smoking). All were in good general health and had normal values for routine pulmonary function tests. None reported intravenous drug abuse or smoking illicit substances other than marijuana. Three were current tobacco cigarette smokers (14.0 ± 13.9 cigarettes/day) and four were ever-smokers of tobacco with a cumulative lifetime smoking history of 3.6 ± 1.1 pack-years (number of packs of cigarettes per day times the number of years of tobacco smoking). The study was approved by the UCLA Human Subject Protection Committee and the California Research Advisory Panel. All subjects signed an approved informed consent form prior to their participation in the study.

Study Protocol and Procedures

Each subject was studied on 3 separate days approximately 1 week apart after refraining from smoking tobacco for ≥1 h and marijuana for ≥6 h. During each study session, subjects smoked a marijuana cigarette (85 mm length × 25 mm circumference) containing either 0.000 ± 0.002% THC (mean weight 833 mg; range 808–864 mg), 1.77 ± 0.01% THC (mean weight 832 mg; range 789–924 mg) or 3.95% THC (mean weight 734 mg; range 687–774 mg), according to a crossover design. The order of assignment of the three different strengths of marijuana to each subject was randomized and subjects were masked to the assignment. All marijuana cigarettes were prepared from Mississippi-grown Mexican marijuana and were supplied by the National Institute on Drug Abuse; the 0% THC preparation was prepared by ethanol extraction. Marijuana cigarettes were stored at 4°C to minimize chemical degradation and were maintained in a humidifier at 60% humidity and 21°C for 24 h before the study to reduce harshness.

Subjects were asked to smoke each marijuana cigarette ad lib but were specifically instructed to stop smoking once they had achieved their desired level of intoxication ("high"). Peripheral venous blood was withdrawn anaerobically immediately before and 2 min after each cigarette was smoked for measurement of the percentage of COHb saturation using a CO-oximeter (Model 282, Instrument Laboratory, Lexington, MA). Immediately prior to smoking at 2, 5, 15, 30, and 45 min after smoking, heart rate was measured electrocardiographically and subjects were asked to rate their level of intoxication on a scale of 0 to 10, with 10 representing the greatest "high" they had ever achieved.

Smoking topographic measures were determined, as previously described (16). Briefly, the volume and number of puffs and the interpuff interval were measured using a (0 Fleisch pneumotachygraph (resistance 0.0068 cm H_2O; linear from 5 to 100 ml/s) connected through a differential pressure transducer (Model 282 MP54-3, Validyne, Northridge, CA) (range ± 2 cm H_2O) to a 12-channel oscilloscopic recorder with a differential integrator-computer and a rapid infrared writer attachment (Honeywell Simultrace Recorder, Model VR-12, White Plains, NY). The pneumotachygraph was connected through 1-cm diameter Tygon tubing (length 70 cm) to the distal end of a glass cylinder (diameter 5 cm; length 12 cm) that contained two 1-cm diameter ventilation ports and was sealed at its proximal end by a rubber stopper. The marijuana cigarette was held in a small plastic holder inserted through the rubber stopper. During a puff, the ventilation ports were occluded by rubber stoppers so that the entire volume of air drawn through the cigarette could be measured by the pneumotachygraph. Between puffs, the ventilation ports were uncovered to prevent extinction of the cigarette or accumulation of carbon monoxide. The volume of smoke and air inhaled into the lungs ("inhaled volume") in association with each puff was measured using inductive plethysmography (Respitrace-Plus, NonInvasive Monitoring Systems, Miami Beach, FL). During calibration maneuvers, inhaled volumes calculated from inductive plethysmography agreed with measurements obtained by spirometry within ±10%. The amount of time the inhaled smoke was retained in the lungs ("breathholding time") was calculated as the interval between the times corresponding to one-third of the maximum inhaled volume and two-thirds of the maximum volume exhaled following breathholding.

The amount of inhaled insoluble smoke particulates (tar) was measured by a previously described proportional smoke-trapping device (10) that was connected to the plastic cigarette holder at the proximal end of the puff-volume measuring apparatus (1). From the plastic cigarette holder, mainstream smoke was diverted into two parallel pathways, one containing one capillary tube and a Cambridge filter pad ("high-resistance" pathway) and the other containing [illegible]n parallel capillary tubes ("low-resistance" pathway). The filter pad trapped the smoke that passed through the high-resistance pathway. The tar (including THC) trapped by the filter was extracted with methanol. The tar content (total insoluble particulate matter) was analyzed by means of a spectrophotometer (wavelength 400 nm). THC concentrations were determined by injecting dilutions of the methanol wash into a Waters high performance liquid-chromatograph outfitted with a diode array detector according to modifications of ElSohly et al. (2). Ion pair technology was employed using a Beckman ultrasphere C18 column, a water:acetonitrile mobile phase of 15:85, and isocratic flow of 2 ml/min. Ultraviolet detection was performed at 220 nm with standards obtained from Alltech, Inc. (San Jose, CA). Because a constant fraction of the tar (approximately 12.5%) was retained in the filter over a wide range of puff volumes and flow rates, the actual quantity of inhaled tar, as well as inhaled THC, could be calculated by multiplying the amount of particulates and THC trapped in the Cambridge filter pad in the high-resistance pathway by the term ([1 ÷ 0.125] − 1), or 7 (10). At the end of the period of breathholding after each puff, subjects exhaled the smoke into a megaphone device, the distal end of which (4.5-cm diameter) was fitted with another Cambridge filter pad attached to a vacuum system (5,16) to trap the exhaled particulates. Following methanol extraction, the latter were also quantitated by spectrophotometry and the ex-

haled THC by HPLC (3) as detailed earlier. The amount of tar or THC retained (deposited) in the lung was calculated by subtracting the amount of exhaled from the amount of inhaled tar or THC.

The amount of tar delivered to the lung from different strengths of marijuana cigarettes is dependent not only on smoking technique but also on the actual tar yield of the cigarettes, which could vary with the potency of the preparation. We, therefore, measured the amount of tar in mainstream smoke generated from five 0%, five 1.77%, and five 3.95% marijuana cigarettes under standardized smoking conditions using a syringe with a 50-ml puff volume, 2-second duration and 30-s interpuff interval to uniform butt lengths of 25 mm. All the tar in the mainstream smoke was captured in a Cambridge filter interposed between the syringe and the cigarette and measured spectrophotometrically after methanol elution, as described above.

DATA ANALYSIS

For each subject, topographic measurements (puff volume, interpuff interval, inhaled volume, breathholding time) were averaged for each cigarette smoked. These mean values, as well as the number of puffs, cumulative puff volume (the product of the mean puff volume and the number of puffs for each cigarette), butt length, and the amounts of inhaled and retained tar and THC were averaged for all 10 subjects for each potency of marijuana smoked. COHb "boost," peak changes in heart rate from baseline and peak subjective ratings of degree of intoxication after smoking each strength of marijuana were also averaged for all subjects. In addition, for each subject, each measurement variable was expressed as a ratio of that variable determined in relation to smoking 3.95% marijuana to that determined for 1.77% marijuana; these ratios served as indicators of the relative pattern for each subject of smoking active marijuana of two different strengths. The Hotelling's T^2 test, a multivariate test for within-subject differences in repeated measures models, was used to determine the significance of differences in smoking patterns, delivery, and deposition of particulates and THC, and the "boost" in COHb and change in heart rate among the different strengths of marijuana cigarettes (9). Multiple comparisons were then performed using paired t-tests, where appropriate. Because the subject's levels of "high" were based on an ordinal scale, these data were analyzed for differences between the THC concentrations using Friedman's nonparametric two-way analysis of variance (7). Differences for all tests were considered significant for p values <0.05. Statistical analyses were performed using SAS (11) and BMDP (2) software.

RESULTS

Smoking topography, pulmonary deposition of tar and THC, COHb boost, and psychophysiologic responses to smoking all showed similarly wide variability across subjects for each strength of marijuana. The extent of this variability is illustrated for cumulative puff volume, breathholding time, tar deposition, and THC retention in Fig. 1, which shows the individual values for these variables for each type of marijuana preparation smoked.

Mean values (±SE) for cumulative puff volume (CPV), inhaled volume (Vol_I), breathholding time, butt length, amount of tar and THC retained in the lung, COHb boost, peak change in heart rate, and peak level of intoxication for each potency of marijuana smoked are shown in Table 1. As expected, both "active" marijuana preparations (1.77% and 3.95% THC) delivered significantly more THC, $F(2, 8) = 51.7$, $p < 0.001$; Hotelling's T^2, to the lung and resulted in a significantly greater change (increase) in heart rate, $F(2, 8) = 24.0$, $p < 0.001$; Hotelling's T^2, than the "inactive" (0% THC) preparation, although neither active preparation elicited a significantly greater "high" than "inactive" marijuana ($p = 0.12$; Freedman nonparametric two-way ANOVA). No differences in any of the measured smoking topographic variables [cumulative puff volume; average puff volume, number of puffs, or interpuff interval (data not shown); inhaled volume; breathholding time; butt length], nor in COHb boost, were noted across the different potencies of marijuana. On the other hand, despite the lack of any mean difference in smoking pattern for the different strengths of marijuana, the average amount of tar delivered to and retained in the lung from the most potent preparation (3.95% THC) was significantly lower than that from both the 0% THC and 1.77% THC preparations ($p < 0.03$). Moreover, the THC delivered to and retained in the lung from 3.95% marijuana was significantly greater than that deposited in the lung from 1.77% marijuana ($p < 0.001$); this difference is reflected in the significantly greater heart rate increase ($p < 0.01$) following the more potent "active" preparation.

The mean percent of inhaled (delivered) tar that was not exhaled and was thus deposited in the respiratory tract was comparable across the different strengths of marijuana (80.7 ± 2.1%, 86.9 ± 3.2%, and 83.6 ± 2.4% for the 0, 1.77, and 3.95% preparations, respectively). Likewise, the average percent of inhaled (delivered) THC that was retained in the lung was similar for the 0, 1.77, and 3.95% potencies (74.1 ± 5.0%, 83.6 ± 3.8%, and 76.5 ± 4.5%, respectively). Consequently, the differences between the amounts of tar (or THC) delivered to the lung between any two strengths of marijuana were similar to the differences between the amounts of tar (or THC) de-

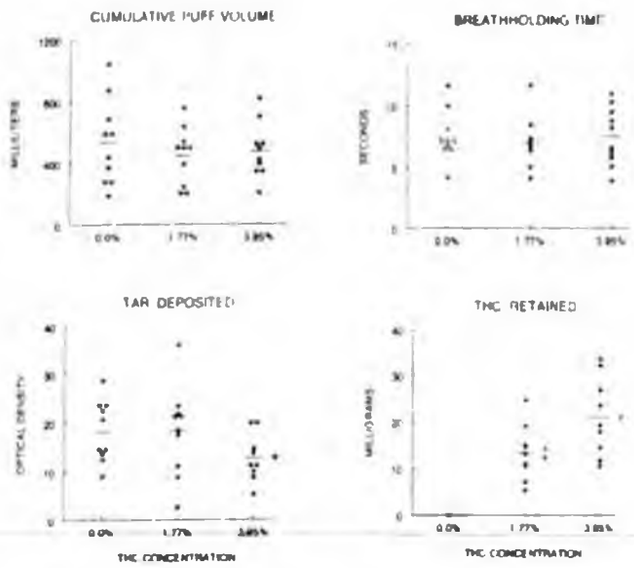


FIG. 1. Individual values for cumulative puff volume (ml) and breathholding time (s) and for amount of tar [optical density (O.D.) units] and amount of THC (mg) deposited in the respiratory tract for 0.0, 1.77, and 3.95% marijuana. Horizontal lines represent mean values. *$p < 0.03$ (compared with 1.77% and 0% THC); †$p < 0.01$ (compared with 1.77% and 0% THC); ‡$p < 0.001$ (compared with 0% THC).

TABLE 1

MEAN VALUES (±SE) FOR SMOKING TOPOGRAPHY, TAR, AND THC DEPOSITION IN THE LUNG, BLOOD CARBOXYHEMOGLOBIN BOOST, AND PSYCHOPHYSIOLOGIC RESPONSES TO THC DETERMINED DURING AND AFTER SMOKING MARIJUANA CIGARETTES OF DIFFERENT THC CONCENTRATION

	TAR O.D.	THC mg	BHT sec	CPV ml	Vol_t liters	Butt length mm	COHb %	High (0–10)	ΔHR min^{-1}
0% THC	18.9	0.1	7.5	534	2.52	16.7	2.6	3.0	6.2
	(2.1)	(0.0)	(0.6)	(87)	(0.28)	(4.3)	(0.5)	(0.7)	(1.6)
1.77% THC	19.9	13.4*	7.0	447	2.17	19.3	2.0	4.3	30.2*
	(2.6)	(2.0)	(0.6)	(5.9)	(0.33)	(4.7)	(0.4)	(0.7)	(3.8)
3.95% THC	13.6[†§]	21.0*[‡]	7.5	479	2.11	19.0	2.0	6.0	39.0*[‡]
	(1.5)	(2.8)	(0.7)	(57)	(0.20)	(7.2)	(0.3)	(0.6)	(4.3)

Definition of abbreviations: Tar = respiratory tar deposition, O.D. = optical density units; THC = respiratory retention of Δ^9-tetrahydrocannabinol; BHT = breathholding time; CPV = cumulative puff volume; Vol_t = inhaled volume of smoke and air; COHb = carboxyhemoglobin saturation; ΔHR = change in heart rate from pre-smoking baseline

*Significantly different from 0% THC; $p < 0.001$

†Significantly different from 0% THC; $p < 0.02$

‡Significantly different from 1.77% THC; $p < 0.01$.

§Significantly different from 1.77% THC; $p < 0.03$.

posited (retained) in the lung between the same two potencies of marijuana.

The ratio of values for the variables shown in Table 1 for 3.95% marijuana to those for 1.77% marijuana were calculated for each subject and averaged across all subjects. The distributions of the individual values for most of these ratios across the 10 subjects are illustrated in Fig. 2. Deviations of these ratios from 1.0 would imply a difference between the more and less potent "active" marijuana preparation with respect to smoking technique, delivery of smoke contents to the lung or the physiological effects of such delivery. The broad range of these ratios, which straddled 1.0 for all variables except the amount of THC delivered to and retained in the lung, reflects the large degree of variability across subjects in differential smoking technique and in subjective and physiological responses to THC between the two strengths of marijuana (Fig. 2). On average, ratios of values for smoking pattern, including cumulative puff volume, breathholding time, and inhaled volume, were close to 1.0. On the other hand, ratios for THC deposition, change in heart rate and "high" were always or mostly above 1.0, while ratios for tar deposition were mostly less than 1.0.

The individual tar yields determined using a standardized, syringe-simulated smoking technique for each of the five cigarettes of each strength that were tested are shown in Fig. 3.

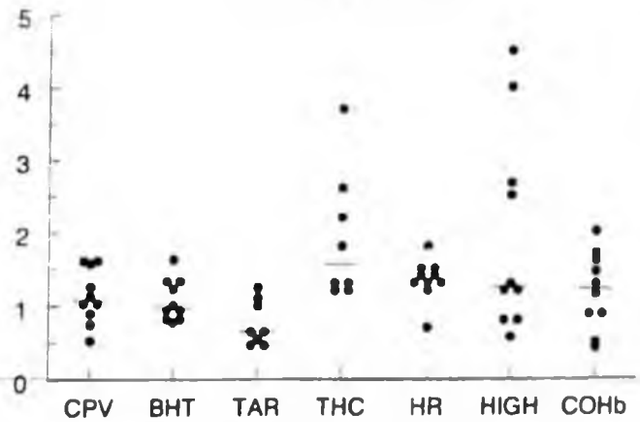


FIG. 2. Individual ratios of values for cumulative puff volume (CPV), breathholding time (BHT), respiratory tar deposition (TAR), respiratory retention of THC (THC), heart rate increase over presmoking baseline (HR), level of intoxication (HIGH) and carboxyhemoglobin boost (COHb) determined for 3.95% marijuana to those determined for 1.77% marijuana (3.95% MJ:1.77% MJ).

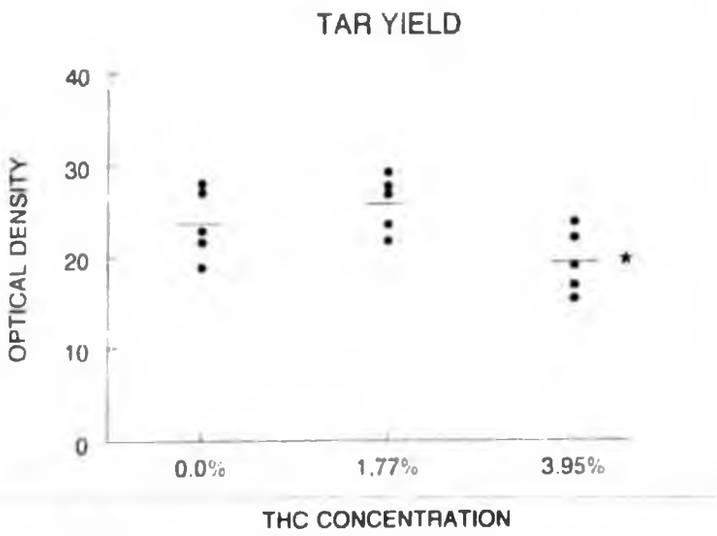


FIG. 3. Individual values for amount of tar (O.D.) in mainstream smoke generated from five 0.0%, five 1.77% and five 3.95% marijuana cigarettes using a syringe with a 50-ml puff volume, 2-s duration and 30-s interpuff interval to butt lengths of 25 mm. Horizontal lines represent mean values *$p < 0.05$ (compared with 1.77% and 0% THC).

The average tar yield from the 3.95% marijuana cigarette was 19.3 ± 1.6 (SEM) optical density (O.D.) units, which was significantly lower ($p < 0.05$) than the tar yields from both the 1.77% preparation (25.2 ± 1.4 O.D.) and the 0% preparation (23.5 ± 1.6 O.D.).

DISCUSSION

The major findings from this study are that, in a small number of healthy, habitual marijuana smokers asked to smoke different strengths of marijuana to a desired level of intoxication, the amount of tar delivered to and deposited in the lung from the most potent marijuana preparation tested was significantly reduced compared to that of less potent preparations, despite the lack of demonstrable overall differences in smoking topography, including cumulative puff volume, across the different strengths of marijuana (Table 1). In contrast, no difference in COHb boost was observed between more and less potent marijuana cigarettes, while THC delivery and lung retention were significantly greater for 3.95% than 1.77% marijuana, as reflected in a significantly greater heart rate increase ($p < 0.01$) following the 3.95% than the 1.77% preparation (Table 1).

Differences in THC delivery and the related physiological responses to smoking marijuana of different strengths were found despite instructions to the subjects to smoke only to their desired level of intoxication. Possible reasons for the observed differences in THC delivery are 1) that subjects were generally unable to "titrate" THC delivery to achieve a uniform "high" from the 1.77 and 3.95% marijuana cigarettes; or 2) that their desired level of intoxication was greater than that which could be achieved with the weaker of the two active marijuana preparations under the conditions of the experiment, in which they were constrained to smoking only a single marijuana cigarette. In favor of the former possibility is that maximum levels of intoxication were not attained in the majority of subjects (7 of 10) until at least 5 min, and in some subjects (4 of 10) as long as 15 min, after completion of smoking, thus compromising their ability to self-titrate intake of smoke (and thus THC) based on levels of "high" perceived during active smoking. On the other hand, it is still possible that adjustments could be made during smoking with the expectation of delayed peak "highs" based on previous experience. The alternative possibility, namely that the single 1.77% preparation was insufficient, even if consumed to the maximum extent tolerable, to produce the desired level of intoxication, appears inconsistent with the finding that mean butt lengths of the smoked 1.77% and 3.95% marijuana cigarettes were nearly identical (19.3 mm and 19.0 mm, respectively). On the other hand, in 3 of the 10 subjects, butt lengths of the 1.77% marijuana cigarette were substantially shorter than those of the 3.95% preparation and, in 2 additional subjects, both preparations were nearly completely consumed (butt lengths 2–4 mm). Therefore, the possibility remains that in this subset of subjects the weaker of the two active preparations was insufficient to yield the desired level of intoxication, even when smoked to a relatively short butt length, in the absence of access to more than one marijuana cigarette.

The observation that the amount of tar deposited in the lung tended to be reduced for 3.95% marijuana compared to 1.77% marijuana (Table 1 and Fig. 1) is difficult to explain solely on the basis of differences in smoking topography, because smoking topography, including the variables that have been found to correlate best with the amount of tar delivered to and retained in the lung (cumulative puff volume and breathholding time) (13) were, on average, nearly identical for both the higher and lower strengths of active marijuana. Smoking marijuana down to a longer butt length would be expected to decrease tar delivery partly due to the increased filtration through the longer shaft of the cigarette (14); because average butt lengths were similar for the two active strengths of marijuana that were studied, however, this factor could not have accounted for the generally lower tar delivery from the more potent cigarette. On the other hand, considerable interindividual variability was observed in the 3.75:1.77% marijuana ratios both for tar delivery and deposition and for cumulative puff volume and breathholding time (Fig. 2). For the most part, those subjects who exhibited lower cumulative puff volumes when they smoked 3.95% marijuana than 1.77% marijuana also deposited lower amounts of tar in their lungs when they smoked the more potent preparation. A similar relationship between breathholding time and respiratory tar delivery for the two active strengths of marijuana was not observed. These observations suggest that, at least in some subjects, the reduced tar delivery to the lung from the higher potency marijuana preparation might be accounted for, at least in part, by adjustments in smoking technique that result in a lower cumulative puff volume.

Reduced tar delivery from more potent marijuana cigarettes could also occur if the actual tar yield from stronger preparations were reduced relative to that from the same quantity of weaker preparations, when smoking technique was standardized. To evaluate this possibility, we measured the amount of tar in mainstream smoke generated from the different strengths of marijuana cigarettes using a standardized in vitro smoking technique. As shown in Fig. 3, the average tar yield from the 3.95% marijuana cigarette was significantly lower ($p < 0.05$) than the tar yields from both the 1.77% and the 0% preparations. Consequently, a reduced tar yield from stronger preparations of marijuana might contribute, at least partly, to less delivery of tar to the lung. On the other hand, no difference was noted between the tar yields of the 0 and 1.77% preparations, so that a linear relationship between the potency of a marijuana cigarette and its tar yield was not apparent over the entire range of potencies (0.00–3.95% THC) of the preparations that we tested. Data from a recent preliminary Australian study on the relative yields of condensed particulate matter (tar) and THC from different samples of seized marijuana ranging in potency from 0.57 to 13.0 % (mean 3.42%; median 1.8%) (Hall, W., National Drug and Alcohol Research Centre, Kensington, Australia; Personal Communication) show a weak relationship between THC content and tar yield for preparations with THC concentrations ≤2.5% and inconsistently lower tar yields for the few preparations tested with THC concentrations >5%. Consequently, had we been able to evaluate the influence of smoking marijuana cigarettes with THC concentrations >5%, we might have found greater reductions in respiratory tar delivery than we demonstrated in the present study for 3.95% compared to 1.77% marijuana.

Mainstream smoke from marijuana or tobacco is a highly concentrated aerosol of liquid particles that is formed by complex chemical reactions, including hydrogenation, pyrolysis, oxidation, decarboxylation, dehydration, chemical condensation, distillation, and sublimation (15). The smoke aerosol is composed of a large variety of organic and inorganic chemicals dispersed in a gaseous medium of nitrogen, oxygen, hydrogen, carbon dioxide, carbon monoxide, and a number of volatile and semivolatile organic chemicals. The tar phase consists of total particulate matter minus water and contains a

number of constituents, including tumor initiators, carcinogens, and cocarcinogens that contribute to the health hazards of smoking. Several factors influence the tar yields of tobacco cigarettes (15) that might also be relevant to marijuana. These include plant genetics and growth conditions that affect chemical composition and physical properties of the leaf, moisture content, the curing and fermentation process, burning temperature, the quality of the cigarette paper (e.g., porosity), and the presence or absence of a filter. Which of these factors may be responsible for the apparently lower tar yield from more potent preparations of marijuana is unclear.

The mean percentage of inhaled tar deposited in the lung in the present study from marijuana cigarettes of different potency (80.7–86.9%) is similar to that previously reported from our laboratory from 0.00 and 1.24% marijuana cigarettes (84.4–86.1%) and higher than that deposited from tobacco cigarettes (64.0%) (16). The greater percentage deposition of inhaled tar from marijuana than tobacco cigarettes is attributable to the longer breathholding time characteristic of marijuana smoking compared to tobacco smoking (13,16). The similarity in mean breathholding times observed in the present study during the smoking of marijuana cigarettes of different strengths (Table 1) is consistent with the comparability in mean percentage of delivered tar that was deposited in the lung across the different potencies of marijuana.

In summary, in a small number of habitual marijuana users studied during the smoking of single marijuana cigarettes of varying potency up to a maximum THC concentration of 3.95%, adjustments of smoking topography to the different strengths of marijuana were highly variable between subjects. Under the conditions of the experiment (limited maximum potency of marijuana and a limit of a single cigarette), smokers generally appeared unable to titrate THC delivery to achieve a uniform "high," so that the level of intoxication and heart rate were often more increased after smoking cigarettes of higher than lower potency. Tar delivery from 3.95% marijuana was reduced relative to that from 1.77% marijuana in 3 of 10 subjects, and the reduction in tar delivery appeared to be related to reduced intake of smoke (lower cumulative puff volume) in these few subjects, as well as to the reduced tar yield during combustion of the stronger marijuana preparation. COHb boost was not affected by the potency of the marijuana smoked. We conclude that, compared to lower potency marijuana cigarettes, stronger preparations appear to lead to a modest reduction in exposure of the lung to tar in some smokers but not to carbon monoxide. We did not assess the influence of varying THC content on the respiratory delivery of volatile constituents other than carbon monoxide in the gas phase of marijuana smoke, some of which are known to be biologically hazardous. Although it is possible that relatively reduced exposure to carcinogenic components in the tar phase of marijuana from smoking cigarettes with a higher THC content might reduce the carcinogenic risk of marijuana smoking, the true health implications of these findings are as yet unclear.

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Long-term effects of exposure to cannabis

Leslie Iversen

The long-term use of cannabis, particularly at high intake levels, is associated with several adverse psychosocial features, including lower educational achievement and, in some instances, psychiatric illness. There is little evidence, however, that long-term cannabis use causes permanent cognitive impairment, nor is there is any clear cause and effect relationship to explain the psychosocial associations. There are some physical health risks, particularly the possibility of damage to the airways in cannabis smokers. Overall, by comparison with other drugs used mainly for 'recreational' purposes, cannabis could be rated to be a relatively safe drug.

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Abbreviations
THC Δ^9-tetrahydrocannabinol

Introduction

Cannabis is the most commonly used illicit drug. In many countries, more than 50% of young people have used it at least once and it is widely perceived as relatively safe. Many people believe that there are genuine medical uses for cannabis-based medicines and it seems likely that such products will gain official approval in several Western countries. Concurrently, there is a move towards relaxation of the criminal penalties associated with the recreational use of cannabis — ranging from the down-grading of criminal penalties in the UK to the possibility of full legalization in Canada and Switzerland. In light of these changes in attitude, it is timely to consider again the adverse effects associated with long-term cannabis use over a period of years, as no drug can ever be considered completely safe.

Effects on cognition

Several studies have addressed the question of whether severe deficits in cognitive function develop in chronic heavy users of cannabis, or in animals treated for prolonged periods with the drug. Most reports have shown that there are deficits in the performance of complex cognitive tasks in long-term cannabis users, although there is little evidence that these are qualitatively or quantitatively more severe than those seen after acute drug use [1].

More controversial is the question of whether long-term cannabis use can cause irreversible deficits in higher brain function that persist after drug use stops. Human studies are fraught with difficulties, as described in detail by Earleywine [1]. Indeed, many studies have suffered from poor design. One confounding factor in human studies is that comparisons have to be made between groups of drug users versus non-users; however, it is usually impossible to compare the baseline performance of these groups before cannabis use to see if they are properly matched. Pope *et al.* [2], for example, tested 69 early-onset heavy cannabis users (who began smoking before the age of 17) in a battery of neuropsychological tests after a two-week period of abstinence. The group performed significantly worse than late-onset users or controls, but also displayed a lower verbal IQ. When the data were adjusted for this, all differences between early-onset users and others ceased to be significant.

It is not sufficient to identify a group of cannabis users and simply to test them after stopping cannabis use. One study, for example, recruited 63 current heavy users who had smoked cannabis at least 5000 times in their lives and 72 control subjects [3]. The subjects underwent a 28-day washout from cannabis use, monitored by urine assays. At days 0, 1 and 7, the heavy users scored significantly below control subjects on a battery of neuropsychological tests, particularly in recall of word lists. However, by day 28, there were no differences between the groups in any of the test results, and no significant association between cumulative lifetime cannabis use and test scores. The fact that drug-induced effects on cognitive performance can persist for up to a week after stopping the drug (perhaps because of the persistence of Δ^9-tetrahydrocannabinol [THC] in the body, or because of a subtle withdrawal syndrome) means that many earlier studies that did not allow a sufficiently long washout period might be invalid.

One way of assessing cognitive function is to measure IQ. Fried *et al.* [4] tested the effects of cannabis use in a group of 70 young people by subtracting each person's IQ score at nine years of age (before drug use) from their score at age 17–20 years. Current cannabis use was found to be significantly correlated in a dose-dependent manner with a decline in IQ scores. However, no such decline was seen

in subjects who had formerly been heavy cannabis users and had stopped taking the drug. The authors concluded that cannabis does not have a long-term effect on global intelligence.

This general conclusion was also supported by a review of the 40 published studies that met adequate criteria, which failed to detect any consistent evidence of persisting neuropsychological deficits in cannabis users — although some studies reported subtle impairments in the ability to learn and remember new information [5].

Cannabis and psychiatric illness

There has been a long-standing concern that cannabis use might precipitate mental illness in some users. It is clear that an acute schizophrenia-like psychosis can occur in response to a high dose of cannabis [6•], but whether cannabis use can cause persistent psychiatric illness in people who had not previously shown psychotic symptoms remains contentious. A recent re-analysis of the results of a large scale study of >50 000 Swedish men (age 18–20 years) conscripted into the Swedish army between 1969 and 1970 suggested that those who had used cannabis >50 times before the age of 18 years had a 6.7-fold increased risk of developing schizophrenia in later life [7]. A review of this and four other longitudinal cohort studies also concluded that early cannabis use might be a causal factor for schizophrenia-like illness in later life [8••]. However, the interpretation of such studies is fraught with many difficulties, as reviewed by Macleod *et al.* [9••]. These authors highlighted that proof of a causal relationship is subject to many confounding factors. When known confounding factors were applied to the Swedish army data, for example, the odds ratio was reduced from 6.7 to 3.1 [7]. This, in turn, suggests that other residual unidentified confounding factors are also likely to exist. The published studies show that the existence of 'prodromal' symptoms of psychosis clearly increased the risk of subsequent psychiatric illness in cannabis users [8••]. This factor was adequately controlled for in only one of the five published longitudinal studies [10]. In this New Zealand cohort, even when those exhibiting prodromal symptoms of psychosis were eliminated, those who started cannabis use by age 15 years (but not those who started later) showed a fourfold increase in the risk of developing schizophrenia-like illness by age 26 years. However, the number of subjects involved was small (there were 26 15-year old cannabis users, of whom three developed mental illness) so the statistical power of this study was limited. Degenhardt *et al.* [11] sought to test the hypothesis of a causal relationship between cannabis use and schizophrenia by a careful examination of the incidence of schizophrenia in Australia during the past 30 years. Although the prevalence of cannabis use had increased markedly during this period, there was no evidence of a significant increase in the incidence of schizophrenia. The question of whether cannabis use can precipitate psychiatric illness in a vulnerable minority of previously well people remains unanswered. One could equally argue that a tendency to psychotic illness might increase the likelihood of early cannabis use [9••]. It is possible that cannabis may precipitate schizophrenic illness earlier in vulnerable people who exhibit 'schizophreniform' tendencies. Such a conclusion is supported by the results of a study of 122 newly admitted schizophrenia patients in the Netherlands, which showed a strong association between cannabis use and the age of onset of the first psychotic episode in men, with users experiencing their first psychotic episode 6.9 years earlier than non-users [12].

Other studies have explored the association between cannabis use and depression. One longitudinal study in Australia reported that daily use of cannabis by teenage girls (but not boys) led to an approximately twofold increased risk for depression/anxiety in later life [13]. A review of other studies of this type suggested that heavy cannabis use may increase depressive symptoms in some users, but whether this represents a causal relationship is again unclear [14].

Psychosocial sequelae of cannabis use

Apart from the potential risk of mental illness, there has been a long standing concern that adolescent use of cannabis could lead to reduced educational achievement and reduced motivation — sometimes referred to as an 'amotivational syndrome' [1].

Cherek, *et al.* [15] attempted to assess this experimentally in a study in which human participants earned money by responding on a complex lever-pressing schedule. There was a significant reduction in the number of responses, time spent and money earned when the subjects were retested while smoking cannabis, indicating a drug-induced reduction in motivation.

Various longitudinal studies have sought to establish the relationship between cannabis use and subsequent educational achievement. A study of 1265 New Zealand children [16] showed that cannabis use was dose-dependently related to an increased risk of leaving school without qualifications, failure to enter university and failure to obtain a university degree. A similar conclusion was reached in reviews of other published studies of this type [9••,17]. The review by Macleod *et al.* [9••] was particularly comprehensive; the authors studied 48 published longitudinal studies on the use of cannabis, of which 16 were considered to provide the most robust evidence. Their conclusions for cannabis use were, firstly, a consistent association with reduced educational achievement; secondly, a consistent association with use of other drugs; thirdly, an inconsistent association with psychological problems of various types; and finally, an inconsistent association with antisocial or other

problematic behaviours. They concluded that "Available evidence does not support an important causal relation between cannabis use and psychosocial harm, but cannot exclude the possibility that such a relation exists".

Whatever the nature of the association, it seems clear that long-term heavy cannabis use carries a variety of negative attributes. A case control study compared 108 heavy-use long-term cannabis users, who had on average smoked 18 000 times, with 72 age-matched controls who had smoked cannabis <50 times [18••]. The heavy-use cannabis smokers reported significantly lower educational attainment and lower income than did controls. When asked to rate the subjective effects of cannabis on cognition, memory, career, social life, physical and mental health and various quality-of-life measures, a large majority of heavy-use cannabis smokers reported negative effects of their drug use.

Cannabis and substance dependence

Although it was previously thought that cannabis was not a drug of addiction, it is now recognized that cannabis use can lead to substance dependence in perhaps as many as 10% of regular users, according to the internationally accepted DSMIV definition of 'substance dependence' [6•]. In both animals and humans, a clear withdrawal syndrome can be identified [6•]. In rodents, chronic administration of THC or synthetic cannabinoids leads to downregulation and desensitization of cannabinoid CB_1 receptors in the brain [19]. This might partly explain the tolerance that develops in both animals and humans on repeated use of the drug. In regular cannabis users, abstinence leads to a withdrawal syndrome characterized by negative mood (irritability, anxiety, misery), muscle pain, chills, sleep disturbance and decreased appetite. A placebo-controlled study showed that these symptoms were significantly reduced by oral administration of THC, suggesting that the withdrawal syndrome and underlying substance dependence were related to effects of THC on the cannabinoid CB_1 receptor, rather than to any other component of herbal cannabis [20].

Other potentially toxic effects of long-term cannabis use

Some of the most serious adverse effects of smoked cannabis are on the respiratory system. Although little progress has been made recently in quantifying such risks, warnings continue to be issued about the potential for long-term damage or even malignancy in the airways [21]. It is known that lung macrophages isolated from cannabis smokers exhibit impaired anti-bacterial activity, and one experimental study showed that this might be caused, in part, by reduced expression of inducible nitric oxide synthase and decreased production of nitric oxide [22]. A review of the evidence for immunosuppressant effects of cannabis concluded that, with the exception of the effects of cannabis smoking on broncho-alveolar immunity, there is no evidence that cannabis causes any other serious immunosupression in users [23]. The authors suggested that the effects on lung macrophages might be related to the ability of cannabis in animal studies to cause a shift from Th1 to Th2 cytokine production.

With increasing use of cannabis, there remains a concern that cannabis use during pregnancy might impair foetal development. Reviews of data from humans, however, suggest that such effects are minimal for cannabis users when compared with the well-documented adverse effects of tobacco or alcohol use [24,25•]. Nevertheless, treatment of pregnant rats with high doses of THC did lead to significant reductions in expression of neural adhesion molecule L1 in the foetal brain — a key protein for brain development [26].

Conclusions

A review of the literature suggests that the majority of cannabis users, who use the drug occasionally rather than on a daily basis, will not suffer any lasting physical or mental harm. Conversely, as with other 'recreational' drugs, there will be some who suffer adverse consequences from their use of cannabis. Some individuals who have psychotic thought tendencies might risk precipitating psychotic illness. Those who consume large doses of the drug on a regular basis are likely to have lower educational achievement and lower income, and may suffer physical damage to the airways. They also run a significant risk of becoming dependent upon continuing use of the drug. There is little evidence, however, that these adverse effects persist after drug use stops or that any direct cause and effect relationships are involved.

In contrast, cannabis might have beneficial effects in some medical indications. There is considerable literature obtained from animal studies to suggest that cannabis has analgesic effects [27]. Until recently, however, there has been a dearth of controlled clinical studies to validate such effects in patients. This has now changed, with the publication in the past two years of a number of double-blind placebo-controlled trials showing the effectiveness of cannabinoids in relieving chronic neuropathic pain [28,29] or pain associated with multiple sclerosis [30••, 31]. The largest of these trials involved 630 multiple sclerosis patients and showed significant pain relief after 15 weeks of treatment with either pure THC or cannabis extract [30]. It seems likely that medicinal cannabis will re-enter the Pharmacopoeia.

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The Report of the National Commission on Marihuana and Drug Abuse

Marihuana: A Signal of Misunderstanding

Commissioned by President Richard M. Nixon, March, 1972

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Letter of Transmittal

National Commission on Marihuana and Drug Abuse

801 19th Street N.W.

Washington, D.C. 20006

March 22, 1972

To The President and Congress of the United States:

As Chairman of the National Commission on Marihuana and Drug Abuse, I am pleased to submit to you our first year Report in conformance with the mandate contained in Section 601 of Public Law 91-513, The Comprehensive Drug Abuse Prevention and Control Act of 1970.

This Report "Marihuana, A Signal of Misunderstanding" is an all-inclusive effort to present the facts as they are known today, to demythologize the controversy surrounding marihuana, and to place in proper perspective one of the most emotional and explosive issues of our time. We on the Commission sincerely hope it will play a significant role in bringing uniformity and rationality to our marihuana laws, both Federal and State, and that it will create a healthy climate for further discussion, for further research and for a continuing advance in the development of a public social policy beneficial to all our citizens.

Whatever the facts are we have reported them. Wherever the facts have logically led us, we have followed and used them in reaching our recommendations. We hope this Report will be a foundation upon which credibility in this area can be restored and upon which a rational policy can be predicated.

By Direction of the Commission

Raymond P. Shafer

The President

The President of the Senate

The Speaker of the House

Marihuana: A Signal of Misunderstanding

Introduction

This is the first of two Reports by the National Commission on and Drug Abuse. Public Law 91-513 requires that we report to the President, Congress and the public initially on marihuana and then on the broader issue of drug abuse in the United The second Report will include a review of the marihuana issue with particular attention to studies which have been conducted in the interim.

In large measure, the marihuana issue is a child of the sixties, the visual and somewhat pungent symbol of dramatic changes which have permanently affected our nation in the last decade. Some have that our mandate has placed the cart before the horse, and that we should have focused first on the wider social issue and assessed marihuana's impact on society within that context. much thought and investigation, we now believe that Congress was wise in focusing this Commission's attention first on marihuana. separating it from the rest of the drug controversy, we have been better able to analyze the unique position marihuana occupies in our society.

Our mandate was a broad one, covering, for example, the nature and scope of use, the effects of the drug, the relationship of marihuana use to other behavior and the efficacy of existing law. Realizing that marihuana had never before in the American experience been the subject of a concentrated, authoritative governmental study, we launched a comprehensive research and fact-finding effort. We sought.. to evaluate and supplement existing material, to fill knowledge voids. and to assess the so-called truths commonly posed in the marihuana debate.

Soon after funds became available on March 22, 1971, we commissioned more than 50 projects, ranging from a study of the effects of marihuana on man to a field survey of enforcement of the marihuana laws in six metropolitan jurisdictions. Of particular importance in our fact-finding effort were the opinions and attitudes of all groups in our society.

Through formal and informal hearings, recorded in thousands of pages of transcripts, we solicited all poi: .s of view, including those of public officials, community leaders, professional experts and students. We commissioned a nationwide survey of public beliefs, information and experience referred to in this Report as the National Survey. In addition, we conducted separate surveys of opinion among', district attorneys, judges, probation officers, clinicians, university health officials and free clinic personnel.

This inquiry focused on the American experience. However, we have been well aware from the outset that the scope of marihuana use in the United States differs considerably from that in other countries where the drug has been used for centuries. Accordingly, the Commission sought to put the American experience in perspective by seeing the situation first hand in India, Greece, North Africa, Jamaica, Afghanistan. and other countries.

Because of our initial concentration on marihuana. certain issues common to marihuana and other drugs have been deferred for more complete coverage in the second Report. For

example, a detailed analysis of educational programs about marihuana and its use will be considered when we evaluate drug education programs in general.

Further, we do not discuss the rehabilitation of the problem marihuana user since no such specialized programs exist; we found the subject is best approached from a broader perspective of rehabilitation programs for problem users of all non-narcotic drugs. An examination of federal and state organizational response to the drug issue, as well as an in-depth study of general law enforcement strategies, have both been undertaken and will continue, but will not be reported fully until the second year.

Officers of the Federal Government have set a high priority on fuller understanding of the marihuana issue and appropriate governmental action. President Nixon has frequently expressed his personal and official commitment to providing a rational and equitable public response to the use and misuse of drugs. Similarly, Congress has shown its concern in passing the Comprehensive Drug Abuse Prevention and Control Act of 1970. In appointing this Commission, both the President and Congress have recognized the need for an independent, nonpartisan appraisal of the nature of marihuana and the consequences of its use, for a similar appraisal of the abuse of all drugs, and for appropriate recommendations for public policy as a result of both studies.

The Commission decided early in its deliberations to write a Report that was complete but not overly technical so that the reader could understand the points discussed without analyzing detailed studies. Some. studies and supporting data are included in an Appendix to the Report, which is published separately. For the researcher and others interested in greater detail, the Appendix provides the necessary technical data.

This Report focuses on marihuana, the popular name for a mixture of stems, leaves and flowering tops of the Indian hemp plant, Cannabis Sativa L. This Report presents the most significant information gathered to date about the drug and its users, concluding with the Commission's recommendations concerning the most appropriate public response to marihuana usage in our society.

I -- marihuana and the problem of marihuana

"There are no whole truths; all truths are half-truths. It is trying to treat them as whole truths that plays the devil."

Alfred North Whitehead (1953)

We are a nation of problem-solvers. We are restless and impatient with perceived gaps between the way things are and the way we think ought to be. Understandably, such an impulse toward self-correction never leaves us wanting for social problems to solve. Although it is a prerequisite to social progress, this problem-solving orientation misdirects our attention. In order to maximize public awareness we are apt to characterize situations as being far worse than they really are. Because any activity is commonly regarded as a move toward a solution, rhetoric and stopgap legislation sometimes substitute for rational reflection. We become so impressed with social engineering that we overlook inherent human limitations.

Since the mid-sixties, American society has been increasingly agitated by what has been defined as a marihuana problem. The typical sequences of "a national problem" have resulted: exaggeration, polarization and the inevitable demand for a solution. The appointment of this Commission and the publication of this Report reflect the escalation of marihuana use into the realm of social problem. Since the beginning of our official life, we have grappled with the threshold question: Why has the use of marihuana reached problem status in the public mind?

Origins of the Marihuana Problem

Marihuana has been used as an intoxicant in various parts of the world for centuries and in this country for 75 years. Yet use of the drug has been regarded as a problem of major proportions for less than a decade. We will not find the reasons for contemporary social concern in pharmacology texts or previous governmental reports, for we are dealing with two separate realities: a drug with certain pharmacologic properties and determinable, although variable, effects on man; and a pattern of human behavior, individual and group, which has, as a behavior, created fear, anger, confusion, and uncertainty among a large segment of the contemporary American public. The marihuana behavior pattern is the source of the marihuana controversy.

The most apparent feature of the behavior is that it is against the law. But inconsistency between behavior and the legal norm is not sufficient, in itself, to create a social problem. Marihuana, has been an illegal substance for several decades; and the widespread violation of laws against gambling and adultery have not excited the public to the same extent as has marihuana-smoking in recent years.

At the same time, we suspect that illegality may play an important role in problem definition where drugs are concerned. Alcohol is of proven danger to individual and societal health and the public is well aware of its dangers, yet use of this drug has not been accorded the same problem status. Marihuana's illegality may have been a necessary condition for the marihuana problem, but the increased violation of the legal proscription does not by itself explain the phenomenon.

The Commission believes that three interrelated factors have fostered the definition of marihuana as a major national problem. First, the illegal behavior is highly visible to all segments of our society. Second, use of the drug is perceived to threaten the health and morality not only of the individual but of the society itself. Third, and most important, the drug has evolved in the late sixties and early seventies, as a symbol of wider social conflicts and public issues.

VISIBILITY

More than anything else, the visibility of marihuana use by a segment of our population previously unfamiliar with the drug is what stirred public anxiety and thrust marihuana into the problem area. Marihuana usage in the United States has been with us for a very long period of time, dating back to the beginning of the century. For decades its use was mainly confined to the underprivileged socioeconomic groups in our cities and to certain insulated social groups, such as jazz musicians and artists. As long as use remained confined to these groups and had a negligible impact on the dominant social order, the vast majority of Americans remained unconcerned. From the other side, the insulated marihuana user was in no position to demand careful public or legislative scrutiny.

However, all this changed markedly in the mid-1960's. For various reasons, marihuana use became a common form of recreation for many middle and upper class college youth. The trend spread across the country, into the colleges and high schools and into the affluent suburbs as well. Use by American servicemen in Vietnam was frequent. In recent years, use of the drug has spanned every social class and geographic region.

The Commission-sponsored National Survey, "A Nationwide Study of Beliefs, Information and Experiences," indicated that some 24 million Americans have tried marihuana at least once and that at least 8.3 million are current users.

Other surveys uniformly indicate that more than 40% of the U.S. college population have tried marihuana, and in some universities the figure is much higher. Also, use of the drug has become almost as common among young adults out of college, and among older teenagers in high school. The National Survey indicates that 39%, of young adults between 18 and 25 years of age have tried marihuana. The stereotype of the marihuana user as a marginal citizen has given way to a composite picture of large segments of American youth, children of the dominant majority and very much a part of the mainstream of American life.

Public confusion, anger, and fear over this development became increasingly apparent during the mid and late 1960's. Such mass deviance was a problem and the scope of the problem was

augmented by frequent publicity. The topic of the usage of marihuana by the young received considerable attention from newspapermen and television reporters. The drug's youthful users abetted the media in this regard by flaunting their disregard of the law, Few of us have not seen or heard of marihuana being used en masse at rock concerts, political demonstrations and gatherings of campus activists.

In addition, new scientific and medical interest in marihuana and its use was stimulated by the sudden public interest. For the first time in the American experience, the drug became the subject of intensive scrutiny in the laboratories and clinics. Unfortunately, this research was conducted in the spotlight of public controversy. Isolated findings and incomplete information have automatically been presented to the public, with little attempt made to place such findings in a larger perspective or to analyze their meanings.

Any new marihuana research has had ready access to the news spotlight and often has been quickly assimilated into the rhetoric of the marihuana, debate. Science has become a weapon in a propaganda battle. Because neither the reporters nor the public have the expertise to evaluate this information, the result has been an array of conflicting anecdotal reports, clinical studies on limited populations, and surveys of restricted utility.

Visibility, intense public interest, and fishbowl research are all important components of the marihuana problem.

PERCEIVED THREATS

Although marihuana is taken by most users for curiosity or pleasure, the non-using public still feels seriously affected by use of the drug. Several decades ago it was popularly asserted that the drug brought about a large variety of social and individual ills, including crime and insanity. As a result it was prohibited by federal law in 1937. The marihuana explosion of the mid-sixties occurred within the context of 30 years of instilled fear. Although based much more on fantasy than on proven fact, the marihuana "evils" took root in the public mind, and now continue to color the public reaction to the marihuana phenomenon. Even beyond the violation of law, the widespread use

of marihuana, is seen as a threat to society in other ways. And the threats grow proportionately as the controversy swells.

It has been astutely observed that any statement frequently repeated in public assumes the status of fact. With so many people continually arguing about marihuana, the public has understandably become alarmed and confused.

On the basis of the National Survey, we have tried to identify the ways in which the public feels threatened by marihuana use. Essentially these threats fall into three general categories: threats to the public safety, threats to the public health, and threats to the dominant social order.

In terms of public safety, the concern is with the relationship between marihuana and aggressive behavior, crime and juvenile delinquency. Threats to the public health usually refer initially to the impact of marihuana on the user. Lethality, psychosis, addiction potential and effects of chronic long-term use, are major concerns. Additionally, the fear exists that marihuana leads to the use of more dangerous drugs, especially LSD and heroin.

The threat which marihuana use is thought to present to the dominant social order is a major undercurrent of the marihuana problem. Use of the drug is linked with idleness, lack of motivation, hedonism and sexual promiscuity. Many see the drug as fostering a counterculture which conflicts with basic moral precepts as well as with the operating functions of our society. The "dropping out" or rejection of the established value system is viewed with alarm. Marihuana becomes more than a drug; it becomes a symbol of the rejection of cherished values.

SYMBOLISM

The symbolic aspects of marihuana are the, most intangible of the items to which the Commission must address itself, and yet they may be at the heart of the marihuana problem. Use of marihuana was, and still is, age-specific. It was youth-related at a time in American history when the adult society was alarmed by the implications of the youth " movement": defiance of the established order, the adoption

of new life styles, the emergence of "street people," campus unrest, drug use, communal living, protest politics, and even political radicalism. In an age characterized by the so-called generation gap, marihuana symbolizes the cultural divide.

For youth, marihuana became a convenient symbol of disaffection with traditional society, an allure which supplemented its recreational attraction. Smoking marihuana may have appealed to large numbers of youth who opposed certain policies or trends, but who maintained faith in the American system as a whole. In ;a time when symbolic speech is often preferred to the literal form, marihuana was a convenient instrument of mini-protest. It was also an agent of group solidarity, as the widely-publicized rock concerts so well illustrate.

For the adult society, the decade of the sixties was a distressing time. The net effect of racial unrest, campus disruption, political assassination, economic woes and an unpopular war was widespread uneasiness. Attending a general fear that the nation was witnessing its own disintegration was a desire to shore up our institutions and hold the line. That line was easy to define where drugs, particularly marihuana, were concerned.

Use of drugs, including marihuana, is against the law. For many, marihuana symbolized disorder in a society frustrated by increasing lawlessness. Insistence on application of the law tended also to harden views, thereby escalating still further the use of marihuana as a symbolic issue.

The social conflicts underlying the drug's symbolic status have dissipated somewhat in the past few years; and in some ways, the Commission has similarly noted a partial deflation of the marihuana problem and of the emotionalism surrounding it. We are hopeful that our attempt to clarify the scientific and normative dimensions of marihuana use will further deemphasize, the problem orientation and facilitate rational decision-making.

The Need for Perspective

This Commission has the task of exploring the marihuana

controversy from as many vantage points as possible in its attempt to make sound, realistic and workable policy recommendations. Because we are dealing essentially with a complex social concern rather than a simple pharmacologic phenomenon, any social policy decision must discuss the realities of marihuana as a drug, marihuana use as a form of behavior, and marihuana as a symbol.

Particularly important is the determination of the longevity of the behavior. Are we dealing with a behavior that is becoming rooted in our culture or are we experiencing an aberration, a fad that will in time, of its own accord, pass away?

The vortex of the marihuana controversy is the present, but the prudent policy planner must not be blinded by the deluge of recent statistics. It is important that we scan the past for clues about the meaning of certain behavior and the promise offered by various social policy responses. We are convinced that a wider historical understanding will also go a long way toward deflating marihuana as a problem.

HISTORICAL PERSPECTIVE

When viewed in the context of American society's ambivalent response to the non-medical use of drugs, the marihuana problem is not unique. Both the existing social policy toward the drug and its contemporary challenge have historical antecedents and explanations. Somewhat surprisingly, until the last half of the 19th century, the only drugs used to any significant extent for non-medical purposes in this country were alcohol and tobacco.

American opinion has always included some opposition to the nonmedical use of any drug, including alcohol and tobacco. From colonial times through the Civil War, abstentionist outcries against alcohol and tobacco sporadically provoked prohibitory legislation. One 18th century pamphleteer advised against the use of any drink "which is liable to steal away a man's senses and render him foolish, irascible, uncontrollable and dangerous." Similarly, one 19th century observer attributed delirium tremens, perverted sexuality, impotency, insanity and cancer to the smoking and chewing of tobacco.

Despite such warnings, alcohol and tobacco use took deep root in American society. De Tocqueville noted what hard drinkers the Americans were, and Dickens was compelled to report that "in all the public places of America, this filthy custom [tobacco chewing] is recognized." Nonetheless, the strain in our culture opposed to all non-medical drug use persisted and in the late 19th century gained ardent adherents among larger segments of the population.

Beginning in earnest around 1870, abstentionists focused the public opinion process on alcohol. As science and politics were called to the task, public attention was drawn to the liquor problem. "Liquor is responsible for 19% of the divorces, 25% of the poverty, 25% of the insanity, 37% of the pauperism, 45% of child desertion and 50% of the crime in this country," declared the Anti-Saloon League. "And this," it was noted, "is a very conservative estimate."

The Temperance advocates achieved political victory during the second decade of the 20th century. By 1913, nine states were under statewide prohibition, and in 31 other states local option laws operated, with the ultimate effect that more than 50% of the nation's population lived under prohibition. Four years later, Congress approved the 18th Amendment and on January 16, 1919, Nebraska became the 36th state to ratify the Amendment, thus inscribing national Prohibition in the Constitution.

Although on a somewhat smaller scale and with lesser results, public attention was simultaneously attracted to a growing tobacco problem. Stemming partly from the immediate popularity of cigarette-smoking, a practice introduced after the Civil War, and partly from riding the coattails of abstentionist sentiment, anti-tobacconists achieved a measure of success which had previously eluded them. The New York Time editorialized in 1885 that:

The decadence of Spain began when the Spaniards adopted cigarettes and if this pernicious habit obtains among adult Americans, the ruin of the Republic is close at hand. . . .

Between 1895 and 1921, 14 states banned the sale of cigarettes.

Although though there has been some posthumous debate about the

efficacy of alcohol Prohibition as a means of reducing excessive or injurious use, the experiment failed to achieve its declared purpose: elimination of the practice of alcohol consumption. The habit was too ingrained in the society to be excised simply by cutting off legitimate supply.

In addition, the 18th Amendment never commanded a. popular consensus; in fact, the Wickersham Commission, appointed by President Hoover in 1929 to study Prohibition, attributed the Amendment's enactment primarily to public antipathy toward the saloon, the large liquor dealers and intemperance rather than to public opposition to use of the drug.

Subsequent observers have agreed that Prohibition was motivated primarily by a desire to root out the institutional evils associated with the drug's distribution and excessive use; only a minority of its supporters opposed all use. And in this respect, Prohibition succeeded. Upon repeal, 13 years after ratification, liquor was back, but the pre-Prohibition saloon and unrestrained distribution had been eliminated from the American scene.

Both the scope of the alcohol habit and the ambivalence of supporting opinion are manifested in the internal logic of Prohibition legislation. The legal scheme was designed to cut off supply, not to punish the consumer. Demand could be eliminated effectively, if at all, only through educational efforts. Only five states prohibited possession of alcohol for personal use in the home. Otherwise, under both federal and state law, the individual remained legally free to consume alcohol.

The anti-tobacco movement was not propelled by the institutions outrage or the cultural symbolism surrounding the alcohol problem It never succeeded on a national scale. Local successes were attributable to the temporary strength of the abstentionist impulse, together with the notion that tobacco-smoking was a stepping-stone to alcohol use Lacking the consensus necessary to reverse a spreading habit, tobacco "prohibition" never extended to possession. Insofar as the anti-tobacco movement was really a coattail consequence of alcohol Prohibition, is not surprising that all 14 states which had prohibited sale repealed their proscriptions by 1927.

By the early 1930's, the abstentionist thrust against alcohol and tobacco had diminished. State and federal governments contented themselves with regulating distribution and extracting revenue. When the decade ended, the general pu lic no longer perceived alcohol and tobacco use as social problems. The two drugs had achieved social legitimacy.

A comparison between the national flirtation with alcohol and tobacco prohibition and the prohibition of the non-medical use of other drugs is helpful in analyzing the marihuana issue. In 1900, only a handful of states regulated traffic in "narcotic" drugs--opium, morphine, heroin and cocaine even though, proportionately, more persons probably were addicted to those drugs at that time than at any time since. Estimates from contemporary surveys are questionable, but a conservative estimate is a quarter of a million people, comprising at least 1% of the population. This large user population in 1900 included more females than males, more whites than blacks, was not confined to a particular geographic region or to the cities, and was predominantly middle class.

This 19th century addiction was generally accidental and well hidden. It stemmed in part from over-medication, careless prescription practices, repeated refills and hidden distribution of narcotic drugs in patent medicines. Society responded to this largely invisible medical addiction in indirect, informal ways. Self -regulation by the medical profession and pharmaceutical industry, stricter prescription practices by the state governments and regulation of labeling by the Federal Government in 1906 all combined in the early years of the new century to reduce the possibility of this accidental drug addiction.

About this same time, during the late 19th and early 20th centuries, attention within the law enforcement and medical communities was drawn to another use of narcotics----the "pleasure" or "street" use of these drugs by ethnic minorities in the nation's cities. Society reacted to this narcotics problem by enacting criminal legislation, prohibiting the non-medical production, distribution or consumption of these drugs. Within a very few years, every state had passed anti-narcotics legislation, and in 1914 the Federal Government passed the Harrison

Narcotics Act.

The major differences between the temperance and anti-narcotics movements must be, emphasized. The temperance, movement was a matter of vigorous public debate; the anti-narcotics movement was not. Temperance legislation was the product of a highly organized nation-wide lobby; narcotics legislation was largely ad hoc. Temperance legislation was designed to eradicate known problems resulting from alcohol abuse; narcotic--, legislation was largely anticipatory. Temperance legislation rarely restricted private activity; narcotics legislation prohibited all drug-related behavior, including possession and use.

These divergent policy patterns reflect the clear-cut separation in the public and professional minds between alcohol and tobacco on the one hand, and "narcotics" on the other. Use of alcohol and tobacco were indigenous American practices. The intoxicant use of narcotics was not native, however, and the users of these drugs were either alien, like the Chinese opium smokers, or perceived to be marginal members of society.

As to the undesirability and immorality of nonmedical use of narcotics, there was absolutely no debate. By causing its users to be physically dependent, the narcotic drug was considered a severe impediment to individual participation in the economic and political systems. Use, it was thought, automatically escalated to dependence and excess, which led to pauperism, crime and insanity. From a sociological perspective, narcotics use was thought to be prevalent among the slothful and immoral populations, gamblers, prostitutes, and others who were already "undesirables." Most important was the threat that narcotics posed to the vitality of the nation's youth.

In short, the narcotics question was answered in unison: the nonmedical use of narcotics was a cancer which had to be removed entirely from the social organism.

Marihuana smoking first became prominent on the American scene in the decade following the Harrison Act. Mexican immigrants and West Indian sailors introduced the practice in the border and Gulf states. As the Mexicans spread throughout the West and immigrated

to the major cities, some of them carried the marihuana habit with them. The practice also became common among the same urban populations with whom opiate use was identified.

Under such circumstances, an immediate policy response toward marihuana quite naturally followed the narcotics pattern rather than the alcohol or tobacco pattern. In fact, marihuana was incorrectly classified as a "narcotic" drug in scientific literature and statutory provisions. By 1931, all but two states west of the Mississippi and several more in the East had enacted prohibitory legislation making it a criminal offense to possess or use the drug.

In 1932, the National Conference of Commissioners on Uniform State Laws included an optional marihuana, provision in the Uniform Narcotic Drug Act, and by 1937 every state, either by adoption of the Uniform Act or by separate legislation, had prohibited marihuana use. In late 1937, the Congress adopted the Marihuana Tax Act, superimposing a, federal prohibitory scheme on the state scheme.

Not once during this entire period was any comprehensive scientific study undertaken in this country of marihuana, or its effects. The drug was assumed to be a 'narcotic' to render the user psychologically dependent, to provoke violent crime, and to cause insanity. Although media attention was attracted to marihuana use around 1935, public awareness was low and public debate non-existent. As long as use remained confined to insulated minorities throughout the next quarter century, the situation remained stable. When penalties for narcotics violations escalated in the 1950's, marihuana penalties went right along with them, until a first-offense possessor was a felon subject to lengthy incarceration.

With this historical overview in mind, it is not surprising that the contemporary marihuana experience has been characterized by fear and confusion on one side and outrage and protest on the other. As scientific and medical opinion has become better known, marihuana has lost its direct link with the narcotics in the public mind and in the statute books.

But extensive ambivalence remains about the policies for various drugs. Marihuana's advocates contend that it is no more or less

harmful than alcohol and tobacco and should therefore be treated in similar fashion. The drug's adversaries contend that it is a stepping-stone to the narcotics and should remain prohibited. At the present time public opinion tends to consider marihuana less harmful than the opiates and cocaine and more harmful than alcohol and tobacco.

Interestingly, while marihuana. is perceived as less harmful than before, alcohol and tobacco are regarded as more harmful than before. In some ways, the duality which previously characterized American drug policy has now been supplanted by an enlightened skepticism as to the variety of approaches to the non-medical use of various drugs.

Despite this shift in attitudes, however, the use of alcohol and tobacco is not considered a major social problem by many Americans, while marihuana use is still so perceived.

This remains true despite the fact that alcoholism afflicts nine million Americans. According to the National Institute on Alcohol Addiction and Alcoholism of the National Institute of Mental Health: alcohol is a factor in half (30,000) of the highway fatalities occurring each year; an economic cost to the nation of $15 billion occurs as a result of acoholism and alcohol abuse; one-half of the five million yearly arrests in the United States are related to the misuse of alcohol (1.5 million offenses for public drunkenness alone) ; and one-half of all homicides and one-fourth of all suicides are alcohol related, accounting for a total of 11,700 deaths annually.

Similarly, tobacco smoking is not considered a major public concern despite its link to lung cancer and heart disease. According to the Surgeon General in The Health Consequences of Smoking, 1972:

cigarette smoking is the, major "cause" of lung cancer in men and a significant "cause" of lung cancer in women; the risk of developing lung cancer in both men and women is directly related to an individual's exposure as measured by the number of cigarettes smoked, duration of smoking, earlier initiation, depth of inhalation, and the amount of "tar" produced by the cigarette; and data from numerous prospective and retrospective studies indicate that

cigarette smoking is a significant risk factor contributing to the development of coronary heart disease (CHD) including fatal CHD and its most severe expression, sudden and unexpected death.

CULTURAL PERSPECTIVE

Realizing the importance of social change in understanding the issues surrounding the use of marihuana and other drugs, the Commission decided early that an objective appraisal of cultural trends was vital for the development of policy recommendations. Since neither the increase in marihuana use nor its attendant controversy is an isolated phenomenon, we sought a wider cultural perspective. To this end, the Commission sponsored a wide-ranging seminar on "Central Influences on American Life." With the cooperation of the Council for Biology in Human Affairs of the Salk Institute, we elicited a three-day conversation among 13 exceptionally thoughtful and perceptive observers of American life.*

*The participants included Jacques Barzun, as moderator, Mary Bingham, Claude T. Bissell, Kenneth Boulding, Robert R. Bowie, Theodore Caplow, Jay W. Forrester, T. George Harris. Rollo May, Jay Saunders Redding, Jonas Salk, Ernest van den Haag, and Leroy S. Wehrle.

It is well beyond both our mandate and our competence to attempt a definitive presentation of the status of the American ethical system However, we shall try to suggest some of the more salient influence in our changing society, recognizing that only against the backdrop of society's fears, aspirations and values can a rational response to marihuana be formulated. Although we are not prepared to identify specific causal connections between these social trends and marihuana use, we do believe that some of the major points raised in the discussion of cultural change provide essential background in understanding the marihuana problem.

The Search for Meaning

One overriding influence in contemporary America is the declining capacity of our institutions to help the individual find his place in

society. As one of the participants at the Seminar observed:

A society is stable, peaceful, happy, not when it has rid itself of the tensions-because you never get rid of the tensions, because people's drives will be satisfied in ways that clash and so on-but when a very high proportion of the people feel fulfillment of some sort within the context which the society normally provides. The long-term problem now, for many many people, not just young people, is that this condition is not met.

Another noted:

What is wrong with our social system, it seems to me, is that it no longer inspires in people a feeling of purpose, meaningfulness and so on.

A number of institutional trends have joined to deprive the individual of a sense of communal inspiration. Perhaps most important is the economic element. Whereas the individual's economic achievement formerly gave his life broad social meaning and inspired his existence, automation and technological advance have tended to depersonalize the individual's role in the economy. Instead of the economic system being dependent on individual productivity, the individual is increasingly dependent on the system. As his work dwindles in significance to the total society, it diminishes in meaning for him. Moreover, as more and more of our people share the nation's affluence, Horatio Alger's example is no longer needed to climb the economic ladder.

A particularly emphatic manifestation of the declining economic demand on the individual is the institutionalization of leisure time. Whereas the economy used to require long hours of work, now it barely requires more than a five-day week. Expanding vacation time and reduced work-weeks tend to diminish the strength of the work ethic. The implications of enforced leisure time are only now becoming apparent, and the concept of "idle hands are the devil's plaything" has to be reexamined in terms of acceptable forms of non-work behavior. This new time component, allowing for the assertion of individuality, has produced both privileges and problems.

In the last decade we have seen the beginnings of the institutionalization of this leisure ethic. A leisure-time industry has sprung up to organize this time period for the individual. Many Americans, due to the nature of their jobs in an automated economic system, find little personal satisfaction in their work, and many are now searching for individual fulfillment through the use of free time. Where meaning is not found in either work or recreational pursuits, the outcome is likely to be boredom and restlessness. Whether generated by a search for individual fulfillment, group recreation or sheer boredom, the increased use of drugs, including marihuana, should come as no surprise.

Another social development which has chipped away at individual identity is the loss of a vision of the future. In an age where change is so rapid, the individual has no concept of the future. If man could progress from land transportation to the moon in 60 years, what, lies ahead? Paralleling the loss of the technological horizon is the loss of a vision of what the future, in terms of individual and social goals, ought to look like. Are times moving too fast for man to be able to plan or -to adjust to new ways and new styles? This sense of the collapsing time frame was best summed up by one of the Seminar participants:

.... there are great forces that have developed over the last several decades that cause one to lose sight of the distant future. Let me contrast a rural farm family of several decades ago which settled a farm. They expected their children to live there, they can imagine their grandchildren living there-there is an image of the future. There is really no one who [now] has any image of where his great grandchildren will he or what they will do. This comes about because of the nature of industrial society; it comes about because we have retirement plans instead of looking after one's own old age. There area whole set of these [factors].

Now the morality, the ethics get tied into it because ethics are really a long-time horizon concept. It's something you engage in because it's contrary to immediate reward and immediate gratification and so you look to some distant future. But as one loses sight of any future then I think the ethics and morality creep up to the very near term also . . . We have no one who has got an image of this country two

hundred years from now, who is trying to create a structure that be believes will exist that long. So a number of these things . . . tie together in terms of the long-term goals and how they have shifted. In any of our systems there tend to be a conflict between the short-term and the long-term goals. If the long-term goals are lost sight of then the short-term expediencies seem to be the things that well up.

To the extent that planning for the future no longer gives the individual his inspiration, he must look to the present. Such a climate is conducive to pleasure-seeking, instant gratification and an entire life-perspective which our society has always previously disclaimed A third force depriving the individual of a presumed place in society is the loss of a sense of community, a sense of belonging. Mobility, mass living and rapid travel all conspire to destroy the smaller community. The family moves from place to place and then separates with each child going his own way. This global thinking leaves little time for home-town concern.

The dissipation of geographic roots parallels a social uprooting. As one of our Seminar participants noted:

When you grow up with a small number of people with whom you have to live for a while, it does something which isn't done now. It forces you to face yourself. It forces you to ask what kind of pet-son you are, because you can't get away with it with a group you're going to have to live with. They know what you really are. The mobility has the effect of making it possible for people to live playing parts for years. It seems to me we see it among the youngsters: role playing as distinguished from being somebody. . . .

All of these social trends have their most potent impact on young people who are just beginning to develop their values, beliefs and commitments. The adult society has found it easier to adjust to the emergence of the leisure value. Having experienced it as a gradual process, they see it as a reward for previous toil. For many of our young, however, a substantial segment of leisure time may be considered an essential part of living; they have known no other experience. Similarly, an adult society, increasingly influenced toward the present, at least has developed an historical perspective. Also, adult values were internalized at a time when a future vision

was possible. For many of the young, however, the present weighs more, heavily. This notion is best reflected in the vociferous youth response to the Vietnam conflict, the embodiment of a war fought for the future,

Finally, all of these cultural changes have occurred, especially for the young, in an environment of affluence. The successful economic system has maximized individual freedom. But the individual has been given unlimited choices at exactly the time when a, value system within which to make such choices is in doubt. Because he has no sense of direction, the result is restlessness, boredom and an increase in the likelihood of present-oriented choices. Self-destructive drug-taking is one form such behavior may take. One of our Seminar participants observed in this connection:

It seems to me that you've got this affluence. So that while most of us grew up with the feeling that the channels within which we were going to have to move and make choices were very narrow, channels for these youngsters look absolutely open. It's an absolutely a, la carte menu-it's the biggest a la, carte menu you can imagine. [This occurs] in a situation in which this sense of radical change is going on so fast that you can't master it, together with a feeling that the society is being operated by very large organizations which you can't get a grip on, giving one a sense of helplessness, of not knowing where to take hold. All these things inherently are disorienting to youngsters and don't give them a, feeling of challenge, [but rather] a doubt as to the meaning of their own lives, of the significance of their being here, [a sense of] being atoms. So then they do act like children in the sense of behaving violently to call attention to themselves. They do a whole lot of other things which, it seems to me, are the sort of things you often see when people feel their lives have no meaning.

Skepticism

Another major influence in contemporary American life with substantial relevance to the marihuana problem is the uneasy relationship between the individual and society's institutions, particularly the state. For 50 years, there has been a continuing upward flow of power to large institutional units, whether they be

consequences of the social and economic changes which have occurred over the last several decades. The best example, and the one most germane to the youth, is the educational system. Two generations ago, the labor force could assimilate the large majority of the nation's youth. Neither a high school nor a college education was prerequisite to occupational choice or achievement. Increased educational attainment was presumed to be limited to either the privileged or the able and would be rewarded by certain careers.

Today, however, the labor force grows more quickly than the system is able to assimilate it, and the educational system now serves as custodian as well as teacher. Although we sincerely wish to achieve the democratic ideal of a highly educated populace, we also keep our children in school as long as possible because we have nothing else for them to do. The trend is strikingly apparent even in the last 20 years.

Percent enrolled in school

Age	**1950**	**1970**
14-15	94.7	98.1
16-17	71.3	90.0
18-19	29.4	47.7
20-24	9.0	21.5

This custodial function confronts educators with a dilemma. Attrition is not in society's best interest; thus, single-minded devotion to the highest levels of achievement would be dysfunctional. In a sense, because the system no longer wants to turn away its subjects, the notion of failure has lost its meaning. As one of the Seminar participants observed:

I think one of the problems is that there is no longer a penalty for failure. We-the educators-have had to lower standards in order to accommodate these people who need no longer fear failure. Of course this has been a cyclical thing, a wheel within a wheel. [If] there is no longer a penalty for failure, then there is no longer the need to acquire.

The changing function of education has been felt in both the secondary schools and in our institutions of higher learning. Numerous high school graduates cannot read. Colleges and junior colleges have sprung up overnight to accommodate the population, but many provide classrooms with little specific purpose. Only slowly is the educational system beginning to come to grips with its role in a changed society. At the university level, many educators have been appalled at sacrifices which have ensued from the custodial feature; rote learning, they contend, has supplanted citizen and character education.

Uncertainty about the role of the educational system has not escaped the students, particularly at the college level. Many of our youth, pressed into longer attendance, question its need or desirability. The demand for "relevance" is but another reflection of the search for meaning, for an understandable role in society. Drug use has perhaps provided an outlet for some members of this restless generation, uncertain of its place.

The Limits of Rationality

The social response to the individual's search for meaning has fostered an ambivalence, an unwillingness to act, a paralysis. In large measure, according to one Seminar member, this default of authority reveals the intensity of the search:

In the same way we are getting universities that can't teach, families that can't socialize and police forces that can't catch criminals. In every case, the same issue is involved: the subject of authority questions the legitimacy of authority and the exerciser of it is unable to find-very often doesn't even try to find-a defense, because he feels in himself a sympath as do so many parents, with the challenge.

To a significant extent, society is waiting, hoping that the impulse for change will settle around certain fundamental attributes of the American ethic. At the present time, however, no consensus about the nature of these fundamentals exists. We are all looking for values that have deep roots, as we attempt to sort out the durable from the ephemeral.

All of the participants at our Central Influences Seminar agreed that the unique feature of this search was its a rational quality. As one observer put it:

We have been discussing the question of how we change a society. I don't think it's changed by rational intention. As I understand societies, historically and our own, what really is required to change it is something on a deeper level that involves myth, ritual, sacrament-a number of these functions that have always been related to societies. On these you can't just suddenly make up your mind and then prescribe.

Regarding our problem of authority, you cannot really ask the question: why can't these people hang onto their authority? They can't hang onto it because what gave them authority is something not of themselves, but part of the society, part of a ritual, a sacrament: a way of behaving in the group which gave them authority, [whether] professorial, parental or policy authority. In each one of these cases, what we see is not the diminishing of these men so much but rather the developing emptiness, the lack of the particular ethic that gave them authority to start with. This is why we are in a terrible dilemma.

What is essentially lacking is a system of ethics, morality or religion that gives birth -to the myths, the rituals, the sacraments that are its

expression. These touch human beings on the unconscious level. These are the ways we see the world. They are not our conscious thought, but the ways we form ourselves, form each other, love each other or hate each other-in terms not so much of rational intention as a deeper unconscious-conscious and unconscious-which is my definition of a myth; much more of a feeling level, a living level. That is what is not present now.

What we need, below and above all of our deliberations, is the growth and development of an ethical system. We just do not have this now.

As we move into the 1970's, our society is collectively engaged in the task -of determining what America means, and how each individual should find fulfillment in `a changing age. From this wider perspective of flux emerges an uncertainty about what the increased prevalence of marihuana use means for the individual and the total society.

Formulating Marihuana Policy

Present symbolism, past implications, and future apprehensions all combine to give marihuana many meanings. These diverse notions of what marihuana means constitute the marihuana problem. In this atmosphere, the policy-maker's position is precarious insofar as no assumption is beyond dispute. Accordingly, the Commission has taken particular care to define the process by which a social policy decision should be reached.

In studying the arguments of past and present observers to justify a particular kind of marihuana policy, we conclude that a major impediment to rational decision-making in this area is oversimplification. As suggested earlier, many ingredients are included in the marihuana mix-medical, legal, social, philosophical, and moral. Many observers have tended to isolate one element, highlight it and then extrapolate social policy from that one premise. In an area where law, science and morality are so intertwined, we must beware of the tendency toward such selectivity.

SCIENTIFIC OVERSIMPLIFICATION

It is wrong to assume, as many have done, that a particular statement of marihuana's effects compels a given social policy or legal implementation. An accurate statement of the effects of the drug is obviously an important consideration, but it is conclusive only if the effects are extreme one way or the other. For example, if the use of a particular drug immediately causes the user to murder anyone in his presence, we have no doubt that a vigorous effort to eliminate use of that drug would be in order. On the other hand, if the effects of the drug are purely benign, presenting no danger whatsoever to the user or society, no reason would exist to suppress it.

We know of no psychoactive substance, including marihuana, which falls at either of these extremes. Thus, it begs the issue to contend, as some have done, that because we don't know enough about the effects of heavy, chronic use, we should maintain the status quo. We know a lot about the adverse effects of alcoholism and heavy cigarette smoking, and yet no responsible observer suggests that we should adopt total prohibition for these drugs. Similarly, previous estimates of marihuana's role in causing crime and insanity were based quite erroneous information; but to infer from this that marihuana should be considered totally benign and hence made freely available is also not logical. Both approaches are simplistic; both approaches fail to take into account the social context in which the drug is used and the dynamic factors affecting the role that marihuana use may or may not play in the future.

A similar manifestation of scientific oversimplification is the focus on causality. Many opponents of marihuana use feel compelled to establish a causal connection between marihuana use and crime, psychosis, and the use of other drugs, while, their adversaries focus the dispute on negating such relationships. The Commission believes that this tendency misses the mark.

The policy-maker's task is concerned primarily with the effects of marihuana on human behavior. For both philosophical and practical reasons, proof of causal relationships is next to impossible. At the same time, however, the extent to which marihuana use is associated with certain behaviors and whether any significant relationships exist

can offer important clues.

We must be cautious when dealing with such data. Yet we cannot afford to paralyze the decision-making process simply because absolute "proof " is lacking. Spokesmen on both sides of the marihuana debate should focus not on causation but instead on the relevance of the association between various behavioral effects and marihuana use.

PHILOSOPHICAL OVERSIMPLIFICATION

Some partisans stoutly maintain that the state has no right to interfere with essentially private conduct or that the state has no right to protect the individual from his own folly. Some of the greatest minds of the Western world have struggled over such philosophical issue always with the same outcome: a recognition of the need to draw a line between the individual and his social surroundings. That is, everything an individual does, in private or not, potentially may affect others. The issue is really to determine when the undesirable effect upon others is likely enough or direct enough for society to take cognizance of it and to deal with it. Coupled with this is the further question of whether the nature of the behavior and its possible effect is such that society should employ coercive measures.

Advocates of liberalization of the marihuana laws commonly contend either that the decision to use marihuana is a private moral decision or that any harm flowing from use of the drug accrues only to the user. Defenders of the, present restrictions insist that society not only has the right but is obligated to protect the existing social order and to compel an individual to abstain from a behavior which may impair his productivity. Unfortunately, the issue is not so simple and the line often drawn between the private conduct and behavior affecting the public health and welfare, is not conclusive or absolutely definable.

For example, a, decision to possess a firearm, while private is considered by many to be of public magnitude, requiring governmental control. A decision to engage in adulterous conduct, although generally implemented in private, may have public consequences if society believes strongly in the desirability of the

existing family structure. Similarly, excessive alcohol consumption, in addition to its adverse effects on individual health, may impair familial stability and economic productivity, matters with which the total society is concerned.

So, while we agree with the basic philosophical precept that society may interfere with individual conduct only in the public interest, using coercive measures only when less restrictive measures would not suffice this principle merely initiates inquiry into a rational social policy but does not identify it. We must take a careful look at this complicated question of the social impact of private behavior. And we must recognize at the outset the inherent difficulty in predicting effects on public health and welfare, and the strong conflicting notions of what constitutes the public interest.

Again and again during the course of our hearings, we have been startled by the divergence of opinion within different segments of our population. Sometimes the disagreement is quite vehement, and relates to the underlying social concerns of particular groups. For example, we were told repeatedly by leaders of the urban black communities that they wanted to purge all drug use from their midst, marihuana included, and that the "legalization" of marihuana would be viewed as part of a design to keep the black man enslaved.

On the other hand, we were informed repeatedly by the activist student element that the pre-sent social policy regarding marihuana was merely a tool for suppression of political dissent, and until the law was changed, there could be no hope of integrating the dissident population into the mainstream of American society.

Such statements reemphasize the degree to which marihuana is regarded as a symbol of a larger social concern.

The conflicting notions of the public interest by different segments of the population reinforced in the Commission's deliberations the realization that we have been called upon to recommend public policy for all segments of the population, for all of the American people. The public good cannot be defined by one segment of the population, the old or the young, users or non-users of marihuana, ethnic minorities or white majority. At the same time, the fears of

each of these groups must be taken into consideration in arriving at the basic social objectives of the Commission's public policy recommendation. Where such fears are real, they must be confronted directly; where they are imagined, however, they must be put in perspective and, hopefully, laid to rest.

SOCIOLOGICAL OVERSIMPLIFICATION

Public debate and decision-making in our society suffer from the glorification of statistical data. After a particular social phenomenon, such as marihuana use, has been defined as a problem, armies of social scientific researchers set out to analyze and describe the problem. A sophisticated computer technology instantly translates millions of bits of data into correlations, probabilities and trends. The most striking findings are then fed to a data-hungry public. The result is data overload.

Descriptive information about the nature and scope of marihuana use as a behavior is an essential component of the policy-maker's knowledge-base. However, such information does not in itself have social policy implications. The policy-maker must define goals and evaluate means; only after he asks the right questions will statistical data suggest useful answers. Unfortunately, a tendency exists in the marihuana debate to assign prescriptive meanings to descriptive data without testing the underlying assumptions. Further, the data have often been accumulating in a fragmented way. No overall plan was devised beforehand; the result has been an ad hoc use of available data triggered by individual research interests rather than by long-term policy needs.

What does it mean that 24 million people have tried marihuana? Some have suggested that it means marihuana ought to be legalized. But does it mean the same thing if 15 million tried the drug once and have decided not to use it again? And does it mean the same thing if popular interest in the drug turns out to be a passing fancy, which wanes as suddenly as it waxed?

On the other side of the controversy, what does it mean that a substantial percentage of the public would favor increased penalties for marihuana use? The prescriptive implications of a democratic

impulse may be offset by a preference for individual freedom of choice. Also, this segment of public opinion may have been influenced by incorrect information, such as unwarranted belief in marihuana's lethality or addiction potential. So, although the policy-maker must be aware of political realities, he must not allow his function to be supplanted by public opinion polls. This is an area which requires both awareness of public attitudes and willingness to assert leadership based on the best information available.

LEGAL OVERSIMPLIFICATION

Perhaps the major impediment to rational decision-making is the tendency to think only in terms of the legal system in general and of the criminal justice system in particular. This thinking is certainly understandable, given the history of marihuana's involvement with the criminal law. Nonetheless, the law does not exist in a social vacuum, and legal alternatives can be evaluated only with reference to the values and policies which they are designed to implement and the social context in which they are designed to operate.

Legal fallacies are apparent on both sides of the marihuana controversy. Many of the persons opposed to marihuana use look exclusively to the law for social control. This reliance on the law is stronger today because many of our fellow citizens are uneasy about the diminishing effectiveness of our other institutions, particularly when the non-legal institutions have been relatively lax in controlling drug related behavior. Increasing reliance is placed upon the legal system to act not only as policeman, but as father confessor, disciplinarian, educator, rehabilitator and standard-bearer of our moral code. Little or no thought is given to what impact this over-reliance on the law has on the viability of other social institutions, not to mention it's effect on the legal process.

A society opposed to marihuana use need not implement that policy through the criminal law. Non-legal institutions, such as the church, the school and the family, have great potential for molding individual behavior. Accordingly, the policy-maker must delicately assess the capacity of the legal system to accomplish its task and must consider the mutual impact of legal and non-legal institutions in achieving social objectives.

We recognize the short-sightedness of an absolute assumption that the criminal law is the necessary tool for implementing a social policy opposed to marihuana use. But equally short-sighted is the opposing contention which attempts to analyze the law separately from its underlying social policy objective. This argument assumes that if the law isn't working, or if the costs of enforcing the law outweigh its benefits, the law should, therefore, be repealed.

If society feels strongly enough about the impropriety of a certain behavior, it may choose to utilize the criminal law even though the behavior is largely invisible and will be minimized only through effective operation of other agencies of social control. Laws against incest and child-beating are good examples. In weighing the costs and benefits of a particular law, one must provide a scale and a system of weights. The scale is the normative classification of behavior, and the system of weights is the largely subjective evaluation of the importance of the values breached by the behavior. This weighing process is what is open to dispute.

In sum, no law works alone. Where an unquestioned consensus exists about the undesirability of a particular behavior and all social institutions are allied in the effort to prevent it, as is the case with murder and theft, the law can be said to "work" even though some murders and thefts may still be committed. Where society is ambivalent about its attitude toward the behavior and other institutions are not committed to its discouragement, the law cannot be said to be working, even though many people may not engage in the behavior because it is against the law.

The question is whether the social policy, which the law is designed to, implement, is being achieved to a satisfactory extent. To determine the role of law regarding marihuana, we must first look to society's values and aspirations, and then define the social policy objective. If we seek to discourage certain marihuana-related behavior, we must carefully assess the role of the legal system in achieving that objective.

The Report

In this Chapter, we have tried to put the marihuana problem in perspective. In the remainder of this Report, we explore several aspects of the phenomenon of marihuana use, its effects, its social impact and its social meaning, assessing their relative importance in the formulation of social policy.

In Chapter II, we consider the effects of the drug on the individual user, with particular attention to the size of the user population for whom various effects are relevant. The Commission emphasizes that this material is related only indirectly to its policy-making function. The social policy planner is concerned not about the effects on the individual per se, but about the impact of any adverse effect on his behavior and on the larger society and about the meaning of this behavior in the larger social perspective. The material in Chapter II serves primarily to educate and inform.

In Chapter III, the Commission evaluates the various threats which marihuana use is perceived to present to the public safety, public health, and dominant social order. This Chapter is designed to assess the social impact of marihuana use, the initial step in the policy making process.

In Chapter IV, we consider what role marihuana use plays and will play in the life of American society. This is the dynamic element of marihuana use and is the most intangible of the marihuana realities, but is particularly important from a policy-planning perspective. This consideration is the one most overlooked by contemporary observers and participants in the marihuana debate.

Because social meaning is not a directly measurable entity, we must examine the ways in which society responds to the behavior and whether such responses, both formal and informal, are fluid or static. After analyzing public opinion, law enforcement behavior and the reactions of medical, educational, and other segments of the population, we then discuss what marihuana use has come to mean and is likely to mean in the future. Particularly important in this highly speculative endeavor is the wider cultural perspective which we described earlier in this Chapter.

In Chapter V, we bring this information to bear on a policy-making process. After establishing the philosophical framework, we explore the spectrum of social policy options, choosing the one we judge most suitable to the present time. Then we consider the range of legal alternatives for implementing this chosen policy, and select the one we believe to be most appropriate for achieving it.

In an addendum to the Report, we present some ancillary recommendations. Some of these recommendations flow from our basic premise, others are a result of independent evaluation by the Commission of other areas of concern.

We ask the reader to set his preconceptions aside as we have tried to do, and discriminate with us between marihuana, the drug, and marihuana, the problem. We hope that our conclusions will be acceptable to the entire public, but barring that, we hope at the least that the areas of disagreement and their implications will be brought into sharper focus.

The National Commission on Marihuana and Drug Abuse

Marihuana - A Signal of Misunderstanding.

Chapter II

marihuana use and its effects

"Facts are stubborn things; and whatever may be our wishes, our inclinations, or the dictates of our passions, they cannot alter the state of facts and evidence." John Adams (1770)

The ultimate objective of the Commission is to evaluate the total impact of actual and potential marihuana use on contemporary American society. This endeavor involves three phases: first, an evaluation of the nature and scope of contemporary American marihuana use; second, a careful reevaluation of the pharmacological effects of the drug on the human body with special emphasis on the drug's capacity to alter or modify behavior; and third, an evaluation of the impact of marihuana use on society. This chapter deals with the first and second phases, and Chapter Three deals with the third.

The Marihuana User

Cannabis has been used widely for many centuries in nonindustrialized countries of Asia and Africa. Today, as in earlier years, use of drug is concentrated primarily among lower socioeconomic groups. in these countries, the practice is estimated to be confined to a tenth of the lower socioeconomic, male population. Although such use of the drug is well-established, it offers little direct comparison with the American experience.

Although the commercial, industrial and therapeutic value of the hemp plant was widely recognized and exploited in the United States from the earliest days of its history, knowledge and use of its intoxicating and psychoactive properties remained largely unknown until about 1900.

At that time, the custom of smoking marihuana was generally limited to groups of Mexican itinerant workers in the border states of the Southwest. By 1910, marihuana use began to emerge in other southern states and cities, particularly New Orleans, and in the port cities along the Mississippi River. In time, these cities became distribution centers for enterprising sailors. From there, marihuana use spread cross-country to other urban centers, mining camps, railroad construction sites, farm labor camps, "bohemian" communities of artists and jazz musicians, and various other groups outside the mainstream of American society.

Recently, of course, use of the drug has spread to young, white, middle class groups and especially to high school and college populations.

DEMOGRAPHIC CHARACTERISTICS

On the basis of the Commission-sponsored National Survey, we have concluded that contemporary marihuana use is pervasive, involving all segments of the U.S. population. The Survey estimated that about 24 million Americans over the age of 11 years (15% of the adults 18 and over, and 14% of the 12-17 year olds) have used marihuana at least once, referred to in this Report as ever-users. Until recently twice as many males as females had used it; the most up-to-date studies of high school students, college-age individuals, and young adults carried out by the Commission indicate that this sex differential appears to be diminishing. In many youthful populations use is almost equally distributed between males and females.

Marihuana use does not appear to vary significantly by race. With respect to the religious affiliation of the users, Jews and Catholics appear to be slightly overrepresented as compared to Protestants.

Usage is highest in cities, towns, and suburbs but not uncommon in rural areas. States in the Northeast and West have considerably higher rates of use than have the North Central states, which in turn have significantly higher rates than those in the South.

Use is found in all socioeconomic groups and occupations, though slightly more predominant among persons with above-average

incomes. A New York survey of the state's general population indicated that ever-use as well as regular use is almost equally prevalent among sales workers, clerical workers, skilled, semiskilled and unskilled workers, managers, owners, professionals and technical workers.

At the same time, the incidence of use seems to vary according to educational attainment. Among all adults not now in school, 5% of those with an eighth grade education or less have used the drug, contrasted with 11% of those who completed some high school, 14% of those who graduated from high school, 25% of those who completed some college and 21 % of those who graduated from college.

Age is presently one of the most significant correlates of marihuana use. Among the total population, those who have tried or used marihuana at least once, termed ever-users, are heavily concentrated in the 16-25 age bracket. Of all the ever-users, about half are in this group. At the same time, however, we should emphasize that use is by no means confined to teenagers and young adults.

The proportion of individuals in different age groups who have used marihuana is indicated in Figure 1.

The incidence of use is greatest among young people: 27% of the 16-17 year olds, 40% of the 18-21 year olds, and 38% of the 22-25 year olds have tried marihuana; at the low extremes, 6% of the 12-13 year olds and 6% of the over-50 generation have used the drug.

Among those now in school, incidence also seems to rise with increasing school level: Ever-users represent 44% of those persons now in college or graduate school; 30% of high school juniors and seniors; 17% of freshmen and sophomores; and 8% of students in junior high school.

At the same time, the use of the drug among adults is by no means confined to college students. Even among the 18-25 year olds, 75% of the ever-users are not now in school.

The initial patterns of contemporary marihuana use appear to be shifting; there is a trend toward increased use among college students as well as non-college students. Non-student users now span social class, income level and occupational classification. In addition, the proportion -of users increases during the teens, peaks during the young adult years and then falls off rapidly (Figure 1).

Having described the incidence of any use of marihuana ever, and demographic characteristics of the 24 million Americans who have tried the drug, we recognize the need to place this information into perspective. The policymaker must also be concerned with the patterns of use: frequency, amount consumed at each smoking, and duration of use.

PATTERNS OF USE

The most striking of the use patterns revealed in the National Survey is that 41 % of the adults and 45 % of the youth who have ever used marihuana reported that they no longer use the drug. Twenty-nine percent of the adults and 43% of the youth reported that they are still using marihuana (see Table 1). When asked why they bad terminated use, the overwhelming majority of adults (61%) specified, among other reasons, that they had simply lost interest in the drug.

Table I.-EXPERIENCE WITH MARIHUANA

Percent of ever-users

Frequency	Adults (18 and over)	Youth (12-17)	Designation
Have used marihuana but no longer use.	41	45	Experimenters.

Once a month or less 9 15

2-3 times pet month 8 10 Intermittent users.

Once per week 4 9 @

Several times per week 5 4 Moderate users.

Once daily 1 1 1

More than once daily 2 4 Heavy users.

No answer 30 12

These data indicate that at least 41% of the adults and 45% of the youth have used marihuana but have -discontinued use; 9% of the adults and 15% of the youth use the drug sporadically, once a, month or less. These persons can be characterized as experimental marihuana users.*

To ensure an understanding of this section of the Report, some definitions are required at this juncture. In this report, the Commission employs the following designations:

Frequency of Use

Experimental-At least one trial to once a month or less.

Intermittent-Two to 10 times monthly.

Moderate-11 times monthly to once, daily.

Heavy-Several times daily.

Very Heavy-Almost constant intoxication with potent preparations; brain rarely drug free.

Duration of Use

Short Term-Less than two years.

Long Term-Two to 10 years.

Very Long Term-Over 10 years.

Twelve percent of the adults and 19% of the youth who have ever used marihuana can be designated intermittent users; they continue to use the drug more than once a month, but less than several times a week, probably on weekends. Six percent of the adults and five percent of the youth are moderate users who continue to use marihuana several times a week to once daily.

Finally, 2% of the adults and 4% of the youth who have ever used marihuana are heavy users: they use the drug several times daily. A very small fraction of these heavy users may be very heavy users, who are intoxicated most of their waking hours and probably use very potent preparations of the drug.

In addition to frequency, duration of use is an important variable in discussing use patterns and especially when considering drug effects. Most users in this country have smoked the drug over a short term, that is, less than two years. Others have used the drug over a long term, two to 10 years. Very few Americans can be considered very long term users, that is, over 10 years.

Another important element of use is the amount of marihuana used on each occasion. Most intermittent and moderate users average about one-half to one cigarette per occasion, usually at night. Most heavy users smoke at least one to two cigarettes an occasion, with a few using as many as five consecutively.

As this brief description of use patterns suggests, marihuana use and the marihuana user do not fall into simple, distinct classifications. Although it is possible to sketch profiles of various marihuana-using populations, no valid stereotype of a marihuana user or non-user can be drawn. The spectrum of individuals who use or have used

marihuana varies according to frequency, intensity and duration of use. It is meaningless to talk of "the marihuana user" or "marihuana use" without first clarifying descriptive data.

*All respondents for the National Survey were asked to complete a self administered questionnaire. This instrument covered many sensitive areas, including a series of items on personal experience with marihuana and other drugs. Given the nature of the questions, the contractor took every precaution to insure that the interviewee responded honestly and that his responses were kept strictly confidential. Even the interviewer who orally administered the rest of the Survey was not permitted to view the written instrument.

One of the inevitable costs of such confidentiality is the risk that a certain percentage of respondents would not complete one or more of the questions. Where a significant number of questions remained unanswered, the questionnaire was not tabulated at all. However, in 30%, of the otherwise complete questionnaires, the adult respondents who had ever used the drug did not answer the question, "On the average, about how often do you use marihuana at the present time?"

Concerned about the meaning of this non-response rate, the, Commission directed the contractor to conduct a detailed analysis comparing the non-respondents with all respondents and with those individuals who had never used marihuana at all. On the basis of this analysis, we are confident that the overwhelming majority, if not all, of the non-respondents are experimenters.

In the first place, the demographic characteristics of the non-respondents coincide closely with those of the non-users and less frequent users. Very few of the young adults, where more frequent use is concentrated, failed to respond.

Secondly, the non-respondents are disproportionately located in the geographic regions where use was least prevalent and least frequent. For example, 50% of the ever-users in the North Central region failed to respond, compared to 71% in the West. Yet only 5% of the ever-users in the North Central region continue to use the drug more than once a week, compared to 21% in the West; and less than .5%

of the ever-users in the North Central region use the drug more than once a day, as compared to 4% in the West.

PROFILES OF USERS

Several studies by the Commission and many other recent college and high school surveys have elucidated a variety of personality types or categories of marihuana users. These profiles relate primarily to the patterns depicted above and to the meaning of marihuana use for various individuals. Essentially we will describe a continuum with much overlapping among the categories. The reader should understand that group identification is at best a hazardous occupation; the traits described are not exclusive to marihuana users. A much larger number of individuals who have not used the drug can be similarly described.

Experimental Users

The first and by far the largest group has been designated as "experimenters" because of their extremely infrequent or non-persistent marihuana usage. Experimentation with the drug is motivated primarily by curiosity and a desire to share a social experience. These experimenters are characteristically quite conventional and practically indistinguishable from the non-user in terms of life style, activities, social integration, and vocational or academic performance.

Disciplined, optimistic, and self-confident, experimenters appear to be as conventional, responsible, goal-oriented and orderly as non-users.

Intermittent Users

The intermittent users are motivated to use marihuana for reasons similar to those of the experimenters. They use the drug irregularly

and infrequently but generally continue to do so because of its socializing and recreational aspects. For the intermittent user, marihuana often contributes to the establishment and solidification of close social relations among users similarly inclined. The individual has a sense of belonging to an intimate group.

Investigations of behavioral aspects of marihuana smoking clearly demonstrate that marihuana smoking is a social activity, believed by intermittent users to enhance the enjoyment of shared activities, especially music, art, films and food.

In a Commission-sponsored study to determine the effects of repeat doses of marihuana, under free access conditions, the subjects smoked almost exclusively in groups. A certain number of these individuals tended to share much of their leisure time in common activities, and marihuana, smoking was the focal activity around which other types of social interactions revolved, such as conversation, watching TV, listening to music and playing games. The intermittent users studied exhibited an increased sense of well-being, relaxation, and friendliness during these activities. They were more inclined to seek and emphasize the social rather than personal effects of the drug.

Intermittent marihuana users, like the experimenters, are generally conventional in most respects. They are more liberal politically and socially and they tend to stress education for personal improvement rather than for recognition or high grades. Like many non-users, these individuals are likely to be self-expressive, intellectually and culturally oriented, creative, and flexible. Placing a high value on experimentation and responsible, independent decision-making, they often manifest a desire to search for new experiences, res' 'ting in some behaviors which depart from the norms of the larger society. Often accompanying their search is a sense of uncertainty about the future.

Moderate and Heavy Users

The final groups of marihuana users are the moderate and heavy users. This range is wide and includes indiv duals who use

marihuana more than 10 times a month to several times a day. Practically all of the American research effort to date has focused on the large majority of individuals who use less often, that is, the experimental and intermittent users. Consequently, not enough is known about characteristics and behavior of the moderate and the heavy users, so it is difficult to distinguish accurately between the two groups. We suspect however that the moderate users share traits with both the intermittent and the heavy users. Having already discussed the intermittent group, we will now turn to the characteristics of the heavy group.

Heavy users seem to need the drug experience more often. Their initial and continued marihuana use is motivated not only by curiosity and an urge to share a social experience but also by a desire for "kicks," "expansion of awareness and understanding," and relief of anxiety or boredom.

Generally, the heavy marihuana user's life style, activities, values and attitudes are unconventional and at variance with those of the larger society. These individuals are more pessimistic, insecure, irresponsible, and nonconforming. They find routine especially distasteful. Their behavior and mood are restless and uneven.

Heavy users place particularly strong emphasis on impulsive response in the interest of pleasure-seeking, immediate gratification, and individual expression. They tend to evidence social and emotional immaturity, are especially indifferent to rules and conventions, and are often resistant to authority. However, several surveys have also revealed that they tend to be curious, socially perceptive, skillful and sensitive to the needs of others, and possess broadly based, although unconventional, interests.

The Boston free-access study permitted the Commission to observe a group of individuals whose life styles, activities, values and attitudes are representative of a segment of the unconventional youthful subculture. The month-long period of controlled study during the fall prevented the participation of individuals who were married, steadily employed, or enrolled in school.

Individuals who smoked marihuana once a week or less were

sought by the researchers but were exceedingly unusual among the population available for the study. Consequently, the group studies contrasted with the student and full-time working populations in which weekly marihuana use is more common. For this reason, the intermittent users studied appeared to be similar to, rather than different from, the moderate and heavy users studied. Both groups had used marihuana for an average of five years.

Under the study's confined conditions, participants tended to smoke more marihuana than they did "on the outside." The intermittent users, who by our definition averaged eight times a month under outside conditions, averaged three cigarettes a day during the study. The range was from one-half to six cigarettes daily.

The moderate and heavy users, who "on the outside" averaged 33 times a month, now averaged six-and-a-half cigarettes a day. The range was three-and-a-half to eight cigarettes. In discussing the Boston study, we will call this group "daily" users.

Smoking usually occurred at night, sometimes during the afternoon and only occasionally upon awakening. The intermittent and heavy users usually smoked one cigarette a session. The daily users were more likely to smoke more than one a session. A few individuals in the daily group could have been considered constantly intoxicated on a few occasions during the 21 -day period.

The mean age of the subjects studied was 23. Based on IQ testing, they were superior intellectually, although they had completed, on the average, only two-and-a-half years of college. Their job histories were rather erratic, characteristic of a pattern of itinerant living. The intermittent users -were from a middle or upper class background, while the daily users generally shared a lower socioeconomic status. Broken homes and instances of alcohol or drug abuse were more common in the family backgrounds of the daily users.

Alcohol was rarely used by the subjects. Use of hallucinogens and amphetamines was significantly more widespread and had begun earlier in the daily user group. In contrast to the intermittent group, the daily users almost uniformly reported that marihuana smoking produced relaxation, noting **also** increased alteration **in** perception or

psychedelic-like effects. Similarly, they reported an increased sense of well-being, friendliness, carefreeness and decreased hostility. Additionally, the daily users appeared to demonstrate a moderate psychological dependence **on** the marihuana experience while the intermittent users demonstrated little or no psychological dependence.

Analysis of social-behavioral aspects of daily users' marihuana smoking clearly demonstrated that it is a pivotal social activity around which conversation, other personal interactions, and much of the users' lives revolve. Smoking almost exclusively occurred in groups and was the focal activity around which these groups formed. The daily users exhibited a readiness to take part in but not to initiate a smoking session.

In contrast to the intermittent users, all the daily users in a group smoked when marihuana was made available. Marihuana smoking appeared to be a primary means of reinforcing group solidarity. Yet these users were more inclined to seek the personal effects of the drug rather than the socializing effects sought by the intermittent users.

The social adjustment of the daily users, when judged from a traditional psychiatric standpoint, was impaired. Individuals tended to be more withdrawn and to interact less with each other than the intermittent users, regardless of the type of activity or state of intoxication. However, the daily users did appear to accommodate themselves better than the intermittent users to the effects of the intoxication on social interaction.

Despite a relatively high level of scholastic attainment and superior intelligence, many of the subjects were performing well below their intellectual capability, usually working at menial, mechanical or artisan tasks. They were not oriented toward achieving the traditional goals of the larger society.

Nonetheless, during the period of the Boston study, the subjects could not be characterized as displaying a general lassitude and indifference, carelessness in personal hygiene or lack of productive

activity, all supposed to be characteristic of very heavy use. Even during the periods of heaviest marihuana smoking, they maintained a high level of interest and participation in a variety of personal activities, such as writing, reading, keeping up on current world events, and participating in athletic and aesthetic endeavors.

Additionally, all of the subjects maintained a desire to complete all aspects of the research study. Although they could be labeled 'underachievers" in terms of the traditional standards of the larger society, these individuals were motivated to pursue actively the interests and activities of their **own** subculture.

Generally, most studies which have been undertaken indicate that individuals who are heavy marihuana users cannot find a place for themselves in conventional society. Their heavy marihuana use may reflect and perhaps perpetuate their unconventionality while providing social acceptance in one of the non-conventional subcultures.

Very Heavy Users

The Commission's analysis of frequency, quantity and duration of marihuana use suggest that the United States is at the present time in a fortunate position. All of the studies available to the Commission have indicated that only a minute number of Americans can be designated as very heavy marihuana users. These studies uniformly indicate that chronic, constant intoxication with very potent cannabis preparations is exceedingly rare in this country.

The Commission believes that important distinctions must be made between the daily (moderate and heavy) American marihuana user and the very heavy hashish or charas user in other parts of the world where cannabis is widely cultivated and its use deeply ingrained. Many of the North African and Asian users do not employ the drug only as an intoxicant in the western sense. Instead, it is frequently used in "folk medical practice," in religious rites and as a work adjunct particularly in those occupations which are physically demanding, monotonous, unintellectual, and offer little possibility of advancement.

In these countries, very heavy use is typically associated with young males from a lower socioeconomic background. Nonetheless, use is more widespread among all ages and elderly chronic users are not uncommon.

Generally, these very heavy users consume high amounts of very potent preparations continually throughout the day so that they are rarely drug-free. These individuals evidence strong psychological dependence on the drug, requiring compulsive drug-taking. Clear-cut behavioral changes occur in these extreme cases. The very heavy User tends to lose interest in all activities other than drug use. A common element of the behavioral pattern is lethargy and social deterioration. Not surprisingly, these users have been held in low esteem and very heavy use has been subject to societal disapproval in almost all countries.

BECOMING A MARIHUANA USER

Our attempt to classify marihuana users is primarily for descriptive purposes. It does not imply that all individuals who resemble any of the categories are necessarily marihuana users. Nor is it implied that all marihuana users fit neatly or precisely into these slots. There is no "typical" marihuana user, just as their is no typical American. The most notable statement that can be made about the vast majority of marihuana users-experimenters and intermittent users-is that they are essentially indistinguishable from their non-marihuana using peers by any fundamental criterion other than their marihuana use.

But if most users and non-users of marihuana essentially are indistinguishable, why have some people chosen to use the drug and others not, and why have some people continued to use it and others not? An important part of the explanation is that use of marihuana, like all human behavior, occurs within specific social and cultural settings. The individual's biological characteristics and personality probably play an important role in determining the pattern his use will take. However, the cultural and social setting play a larger role in determining whether be will use it at all.

Numerous studies have demonstrated that the young person who chooses to use marihuana differs in some important sociological respects from his peer who does not choose to do so. These differences relate to his willingness to experiment with a drug, especially a forbidden one. in short, the process of becoming a marihuana user is not a " seduction of the, innocent" as is often portrayed. Based on interrelated familial, social and cultural factors, persons, especially young persons, who may choose to use marihuana can be predicted statistically.

Parental Influence

The decision to use marihuana is related to parental life style.

Parents provide the most important example of acceptable drug-taking behavior for their children. That marihuana users frequently have medicine-taking, cigarette-smoking, or liquor-drinking parents has been demonstrated. In a series of Canadian studies, grade and high school students who said their mothers took tranquilizers daily were three times more likely to try marihuana than the students who did not so report.

Beyond the influence of a drug-taking example, parents have the primary influence on their childrens' acquisition of skills, values and attitudes necessary to be mature and responsible adults. Many parents have oriented their children toward becoming independent, competent, educated, and adaptive adults.

Simultaneously, many young people observe in their parents' lives the trend toward shorter work periods, earlier retirement and increased emphasis on leisure time activities. It appears that the incidence of adolescent marihuana use is strongly correlated with this trend toward increased leisure time.

Situational Factors and Behavioral Correlates

All studies of the ever user, including the Commission-sponsored National Survey, have established that marihuana smoking is

significantly correlated with a number of demographic variables. Males, college students, and residents of metropolitan areas, especially in the Northeast and West, are generally overrepresented in proportion to their percentage of the total population.

Among the behaviors statistically correlated with marihuana, use are radical politics, visits to psychiatrists, sexual freedom, and separate residences from parents. The most significant behavior seems to be use of legal drugs, especially alcohol and tobacco. Young people who choose to experiment with marihuana are fundamentally the same people, socially and psychologically, as those who use alcohol and tobacco. For example, in a study of high school youngsters, only 3% of all the nonsmokers in the sample had ever tried marihuana, compared with 50% of all the current cigarette smokers. Similarly, for alcohol drinking outside the family setting, only 2% of all the nondrinkers had tried marihuana, as compared to 27% of the drinkers. The National Survey tends to confirm the close association between marihuana use and cigarette smoking and alcohol use. Among all the adults sampled in the Survey, 71% had smoked cigarettes and 39% are current smokers. Similarly, of adult non-marihuana users, 70% have smoked cigarettes and 38% are current smokers. These percentages increase somewhat for marihuana users: 87 have smoked cigarettes and 54% are current cigarette smokers.

In regard to alcohol consumption, 40% of all the adults sampled indicated that they had not consumed beer or bard liquor in the 30 d..ys prior to the survey. Marihuana users tended to have consumed alcohol more often than non-marihuana users (Table, 2).

Table 2.-LIQUOR CONSUMPTION DURING 30-DAY PERIOD

	1-4 days	5-10 days	11 or more days	No answer
Percent of nonmarihuana users. .	**45**	**19**	**6**	**7**	**21**

Percent of marihuana users..... 26 30 12 8 24

Social Group Factors

One of the most influential factors in determining behavior in contemporary America among adolescents and young adults is peer group influence. Knowing other people who use marihuana predisposes the individual to use marihuana, and having marihuana-using friends provides the social opportunity for the curious. Ile individual who is already part of a, social group which uses marihuana indicates by this choice that his attitudes and values are already to some degree compatible with illicit drug use.

Social peer groups are especially influential upon individuals who have not yet become "successful" adults, such as adolescents, college students and young adults, who spend a great deal of time and effort competing for status in situations where status opportunities are minimal. The social peer group provides an opportunity for achieving status among equals by demonstrating competence and autonomy. Outstanding performance in athletics, organizations or academics demonstrates competence but not autonomy because these activities are adult-oriented and controlled. Additionally, only a relative few are able to excel.

Opportunity to prove oneself is more readily available in the peer group. Often, adolescents participate in forms of delinquent behavior, termed symbolic infractions, in order to demonstrate autonomy and competence to their peers. These include joy-riding, vandalism, sexual promiscuity, underage drinking, violation of rules of decorum and dress, and purposeless confrontation with authority.

Marihuana use has recently been added to the list of infractions and offers several advantages for adolescents and young adults. Most important, it provides a shared group experience which offers the, shy, lonely, socially awkward neophyte a means of entrance to the group, complete with its own ceremonial initiation. Repetition of the behavior serves to increase closeness and commitment to the group. Usually the experience is pleasurable and the individual is able to

control his level of intoxication. This delinquency is viewed as relatively harmless to oneself and others, although its symbolic impact on parents and authority is often greater than that of other common infractions.

Therefore, a, subtle process of acquiring attitudes favorable to drug use, of having friends and acquaintances who define the marihuana experience in acceptable and pleasurable terms, and of having a social belief system which prepares one to accept the conversion process to begin with, are all powerful complementary factors which direct a young person toward marihuana use. At this point, the use of marihuana provides further opportunities for acquiring new marihuana using friends and entering the social milieu of marihuana, users.

The Dynamics of Persistent Use

The cultural and social factors sketched above, in combination with the individual's somatic and psychic characteristics, determine the pattern of his drug behavior once he has chosen to experiment with it. The majority of individuals who reach this point progress no further and often discontinue marihuana use. The most common explanation for discontinuing use is loss of interest; the effect lost its novelty and became boring. Other less common reasons are fear of legal hazards, social pressure, and concerns over physical and mental drug effects. Among the infrequently noted reasons are: interference with other activities; replacement by alcohol; unavailability; cost; unpleasant experiences; fear of moral transgression; or progression to other forms of non-drug interests such as yoga, transcendental meditation, agrarian communes, esoteric religion and restrictive diets.

For those who continue use, psychosocial factors are important determinants of the use patterns. Many marihuana users are strongly committed to traditional society in which they desire to rise socially. They have chosen to participate fully in the traditional adult-oriented activities and the formal achievement-reward system. Their peer groups consist primarily of similarly oriented individuals. The infrequent use of marihuana by these persons is a social activity for fun and satisfies curiosity.

Those individuals who continue to use marihuana more frequently appear to be different types of people and oriented toward a different part of the social system. Most of them maintain stable career orientations and continue to function within the broader society. But they feel more burdened by the traditional system of social controls and more removed from contemporary society's institutions. These individuals tend to turn away from more traditional adult-oriented reward systems and intensify their peer-group orientation. Their interests and activities emphasize an informal "in-crowd," out-of-school or work orientation. The meaning of marihuana use by this peer group emphasizes the ideological character of usage. In contrast to the infrequent type of user, these individuals seem to build their self-identity around the marihuana-using peer group.

BECOMING A MULTIDRUG USER

The more one smokes marihuana, the more involved his interpersonal relationships are likely to become with his peers who share the experience with him. As he spends more time with this group, he begins to sever his contacts with conventional individuals and conventional routines. He may eventually view himself as a drug user and be willing to experiment with other drugs which are approved by his peer group. Only a small portion of the marihuana users who reach this stage are likely to become persistent, frequent users of these other drugs. The majority appear to experiment only.

Epidemiologic Studies

The Commission's studies have confirmed the association between marihuana usage and the consumption of other drugs for curiosity and pleasure. This association holds for all drugs, including over-thecounter and prescription pain relievers, tension relievers, sleeping pills, and stimulants as well as hashish, methamphetamines, cocaine, LSD and mescaline, and heroin. The National Survey showed that current marihuana users are about twice as likely to have used any illicit drugs than are those who have ceased using marihuana (Table

3).

Table 3.-ILLICIT DRUG USE BY ADULTS

Substance	Never used marihuana (percent)	Have used marihuana but no longer use marihuana (percent)	Currently using marihuana (percent)
Hashish	Less than 0.5 percent	28	63
LSD or mescaline	Less than 0.5 percent	11	28
Methamphetamine	Less than 0.5 percent	10	23
Cocaine	Less than 0.5 percent	4	10
Heroin	Less than 0.5 percent	1	4

The Commission additionally has contracted a study of 105 selected, middle class, young, working adults from California, who are marihuana smokers. Of this sample, 11% were daily marihuana users and 47% used it several times a week; 33% used it several times a month; 6% used it once to several times a year; and 3% had used it but were not currently using marihuana. The study indicates that while most of the subjects were frequent marihuana users, the incidence of other drug use was relatively low (Table 4).

Table 4.-FREQUENCY OF OTHER DRUG USE BY MARIHUANA USERS

Percent who use marihuana	Percent

Substance who	Once to	Several	Several
never	several times	times	Daily
used	times a month	a week	
marihuana	a year		
Hashish			
42			
31			
21			
5			
0			
LSD			
96			
4			
0			
0			
0			
Mescaline			
79			
19			
0			
0			
2			
Psilocybin			
96			
4			
0			
0			
0			
STP, DMT			
100			
0			
0			
0			
0			
Heroin			
98			
2			
0			
0			
0			

Codeine
87
11
0
0
2

Amphetamines
89
7
0
4
0

Barbiturates
86
10
4
0
0

Cocaine
75
19
2
4
0

Glue
100
0
0
0
0

With the exception of marihuana and hashish, no drug was used by more than 25% of this population and this use was almost exclusively experimental. Interestingly, the more exotic drugs, mescaline and cocaine were more frequently used (21% and 25% of this sample respectively) than the common dangerous drugs: LSD (4%), heroin (2%), codeine (11%), barbiturates (14%), and amphetamines (11%).

Among high school students, marihuana, is normally the, first illicit drug used, although several recent studies have suggested that a significant number of students initiate illicit use, with other drugs. Of the marihuana users, a majority have used no other illicit drug, and

they tend to be experimental or intermittent users of marihuana.

The more frequently the adolescent uses marihuana, the more likely he is to experiment with other drugs. For example, in one recent study of San Diego high school students of predominantly white middle socioeconomic background, 80% of the students who used marihuana weekly or more often had used other drugs, and 50% of this group had used LSD. In contrast, 33% of the less than weekly users bad used other drugs.

Profiles and Dynamics

The personality profile of the heavy marihuana user discussed earlier includes elements propelling him toward heavy involvement in the multiple-drug-using-subculture. Heavy drug use by these individuals may reflect and aggravate a total alienation and disaffiliation from American society and its institutions. This group hopes to find in drug use more than simple, fun or relief from boredom. The heavy use of drugs represents a shift into the drug subculture and an adoption of a totally new life style. Some observers feel that this shift provides a new identity which allows the individual to counteract his apathy and search for meaning in a society he views as unloving, lonely, and meaningless. He seeks to become involved with what he describes as the exciting, relevant, "real" experience of life. Additionally, he believes drug use provides new feelings and awareness needed to overcome barriers between himself, others, and the natural world.

The drug culture as a community also helps to meet the needs of the individual. It provides a ready supply of drugs, unites common experiences and secrets that enhance the drug experience, and protects the individual against undesired experiences and against "the outside world." Most important, the culture instills self-confidence by reassuring the individual that he has been wise in choosing this new identity.

Frequently, these are individuals who express feelings of loneliness, isolation and over-protection from their home and family. One frequent pattern involves an intimate, dominating mother and a

distant, unemotional father. In some cases, the drug-use ritual and the, sense of community closeness offered by the drug subculture appear to satisfy certain personal needs. Additionally, joining the subculture provides a release from sheltered life, a test of competence, an opportunity to participate, and a chance to express anger. When the anger is turned inward instead of directed at society and family, drug use becomes a form of passive, self-destructiveness.

Sociocultural Factors

After the individual views himself as a drug user and has become immersed in the drug-using subculture, the drugs he chooses to experiment with and his pattern of use are determined primarily by non-drug factors well beyond the simple properties of the psychoactive chemical. These factors are predominantly socioeconomic and sociocultural, although psychic and somatic factors also play a role in determining who will continue and how intensively.

The availability of a distribution system which stocks the other drugs is essential. Most often, contact with this distribution system is increased by having friends or acquaintances who use or sell other drugs. However, much of the marihuana selling takes place, at the customer level between friends, and involves little profit and relatively small quantities of the drug. The marihuana user who only buys has little contact with the professional multidrug dealing system. However, the user-buyer-seller of marihuana is more involved with the multidrug system, uses more himself and has more friends who use and sell other drugs. This factor of being a seller rather than only a buyer-user is influential in determining the degree of an individual's involvement with and commitment to the use of other drugs.

Marihuana use does not itself determine which drugs the heavily involved user will choose to use. Generally, the selection of other drugs is influenced by the social group. For example, blacks and whites have roughly equal rates of trying and using marihuana, but their choice of other drugs and the styles of drug use are quite different and distinctive, due to their frequently different sociocultural

backgrounds. Additionally, one recent study of white high school and college students revealed different patterns of further drug use among males and females. Men and women used marihuana in equal numbers, but the men who used other drugs tended to use hallucinogens while the women tended to use amphetamines.

An extensive survey of drug use among 3,500 liberal arts undergraduates attending 14 campuses in the New York area demonstrated the racial character of drug use among this population (Table 5).

Table 5.-RACIAL CHARACTER OF DRUG USE

Percentage tried drugs	Heroin	Cocaine	Meth-amphet-amine	Amphet-amine	Hallu-cinogens
Blacks	9	16	5	9	13
Whites	4	7	11	19	21

According to recent studies, heroin usage is not common among white marihuana users. Heroin is most strongly linked to marihuana use in black and Spanish-speaking ghettos where many feel they have little chance of personal advancement and self-fulfillment. In such communities, a segment of the population constructs new illegitimate but accessible avenues for social coping. For some this involves the hustle (non-violent stealing) and the excitement of obtaining and using heroin and cocaine. They regard marihuana as a "cool" drug and use it for its social and calming effects.

In contrast, studies have demonstrated that the psychedelics are more often used by the white, middle to upper middle class, collegeeducated populations. The typical use of these drugs in high school college and working populations is episodic and

experimental, and is usually discontinued rather rapidly in contrast with marihuana use, which for many persons is of long duration. In many instances, psychedelic drug use begins almost simultaneously with marihuana.

For a few, drug use becomes an ideologic focus, reflecting disillusionment with society and rejection of the "establishment." These and other motives, including mere pleasure-seeking, lead to continued use of LSD and other hallucinogens. Marihuana is viewed as a dilute LSD and is often used to enhance or prolong the effects of that drug. Sometimes it is encountered after first LSD use.

Methamphetamine, or "speed," use is more characteristic of those lower socioeconomic white, youth who are not school or work oriented. Living for the moment is the characteristic attitude of the speed scene. The speed user views marihuana as he does alcohol and uses it for fun or for its calming effects.

For these three groups of illicit drug users, marihuana use has different meanings and is secondary in importance to the use of the other drugs. Whether or not marihuana leads to other drug use depends on the individual, on the social and cultural setting in which the drug use takes places, and on the nature of the drug market. Its use, however, is neither inevitable nor necessary.

The Effects of Marihuana on the User

The previous section has attempted to paint a broad picture of the marihuana user. This section will deal with the, drug and its effects on these individuals.

The meaning of drug often varies with the context in which it is used. The physician would define a drug as any substance used as a medicine in the treatment of physical or mental disease. Today, due to the influence of many factors, the layman may focus on the negative connotations of drugs, such as the stupefying, poisoning, habit-forming misuse of the opiate drugs. The considerably wider and more scientific definition of a drug which will be used in this

section is: any chemical substance which has an action on living tissues.

A psychoactive drug is any substance capable of modifying mental performance and individual behavior by inducing functional or pathological changes in the central nervous system.

As defined, psychoactive drugs exert their major effect on the state of the mind including emotions, feelings, sensibility, consciousness and thinking. The definition implies neither positive nor negative meanings. Chemical substances are not inherently good or bad. All substances, including medicines and foods, which man has chosen to consume have certain desired effects (whether therapeutically beneficial or pleasurable) and undesired effects (whether detrimental or unpleasant). For example, eating food is certainly a necessary and pleasurable activity. However, obesity plays an important role in many diseases, including diabetes, high blood pressure and heart attacks, and tends to limit physical activities.

The classification of any drug effect as either beneficial or harmful often greatly depends on the values the classifier places on the expected effects. This is especially relevant with respect to the psychoactive drugs such as tranquilizers, stimulants, coffee, cigarettes, alcohol, marihuana and other licit or illicit drugs. For all of these drugs, the weights of benefit and harm are difficult to determine when viewed merely in terms of their stated effects.

BOTANY AND CHEMISTRY

Marihuana refers to a preparation derived from a plant, cannabis sativa L. The preparation contains varying quantities of the flowers and their resinous secretions, leaves, small stems and seeds. These plant parts contain many chemical substances. The chemical substance which produces the major drug effects is tetrahydrocannabinol (THC). According to current information, the amount of THC present determines the potency of the preparation. Hereinafter, any reference to drug content or drug effect of marihuana will, for all practical purposes, mean that of

tetrahydrocannabinol.

The drug content of the plant parts is variable, generally decreasing in the following sequence: resin, flowers, leaves. Practically no drug is found in the stems, roots or seeds. The potency and resulting drug effect of marihuana fluctuates, depending on the relative proportions of these plant parts in the marihuana mixture.

Most marihuana available in this country comes from Mexico and has a THC content of less than 1%. Marihuana of American origin often contains less than two-tenths of 1% THC. Marihuana originating in Jamaica and Southeast Asia often has a 2% to 4% THC content.

Marihuana is the least potent preparation of the plant. Jamaican ganja, containing primarily the flower tops and the small leaves or bracts, has a THC content of about 4% to 8% depending on the mixture. Indian ganja is less potent. The most potent preparation is hashish (charas) which is composed of only the drug-rich resinous secretions of the flowers. Generally, the THC content of hashish is 5 % to 12 %.

FACTORS INFLUENCING DRUG EFFECT

A number of variable factors exert an important influence on the psychopharmacologic effects of marihuana in man, as is true for all drugs. Failure to take these factors into consideration probably accounts for a large part of the inconsistency and controversy surrounding the description of the drug effect.

Dosage

The dosage or quantity of the drug (tetrahydrocannabinol) consumed is the most important variable. As with most drugs, the larger the dose taken, the greater the physical and mental effect will be and the longer the effect will last. The effect of a high dose of marihuana on an individual would be quite different from the effect of a low, usual

"social" dose.

Method of Use

The method of use has a bearing upon the drug effect. The method is directly related to both dosage and time lapse before the drug effect is felt. Injection directly into a vein delivers the total dose immediately, producing a rapid, maximal response of minimal duration. Smoking and inhalation cause rapid but less efficient delivery of the dose; variable quantity of the drug is destroyed during burning or escapes into the air and does not reach the lungs. Oral ingestion produces different effects, according to the system in which the drug is dispersed. Generally, oral ingestion diminishes the drug effect, but prolongs it.

Metabolism

Another factor which influences the effect of the drug is metabolism. During the metabolic process, the body cells, principally in the liver and lungs, chemically alter drug substances, changing their activity and providing for their elimination from the body. Increasing evidence indicates that marihuana is first changed by the body in a way that activates or enhances the drug effect and is subsequently altered in a way that inactivates the drug prior to its removal from the body.

The rate and direction of these metabolic steps can significantly influence the effect of marihuana. For instance, individuals with extensive exposure to marihuana or other drugs metabolize more rapidly, and perhaps differently, from those individuals with no drug exposure.

Set and Setting

An important variable in discussing the effect of marihuana on the user is the social and emotional environment; that is, the individual's

"set" and "setting."

"Set" refers to a combination of factors that create the "internal environment" of the individual, including personality, life style, and philosophy, past drug experiences, personal expectations of drug effect, and mood at the time of the drug experience.

"Setting" refers to the external environment and social context in which the individual takes the drug. These factors are most influential when drugs are taken at low dosages and, like marihuana, produce minimal physical and subtle subjective mental effects. The effect of marihuana generally will be quite different for an intermittent social adult smoker from that of a youth deeply involved in the youthful drug subculture. These factors partially account for the belief of a marihuana user that he is experiencing a "high" in certain experiments even when he is given a non-marihuana substance (placebo) but is told it is marihuana.

Tolerance

Another important factor that determines the immediate effect of any drug is tolerance. Tolerance has two different connotations. The first, initial tolerance, is a measure of the amount of a drug which a subject must receive on first exposure to produce a designated degree of effect. A variety of innate and environmental factors contributes to initial tolerance among individuals. Different individuals require varying amounts of the drug to attain the same physical and mental effect.

The second connotation, which shall be referred to when we use the word tolerance, is that of an acquired change in tolerance. That is, within the same individual, as a result of repeated exposure to the drug, the same dose of the drug may produce a diminishing effect so that an increased amount of the drug is required to produce the same specified degree of effect.

Tolerance develops at differential rates to given effects of the same drug. If tolerance has developed to one specific effect, it has not necessarily developed to other specific effects.

By definition, the development of tolerance is neither beneficial nor detrimental. If tolerance develops rapidly to the desired mental effect of a "high" but slowly to the behavioral or physical effects, rapid increase in dose would be necessary in order to have the desired effect, and progressive behavioral and physical disruption would be seen. This is the pattern for amphetamines.

However, if tolerance develops slowly or not at all to the desired mental effects but more rapidly to the behaviorally or physically disruptive effects, no dosage increase or only a slight one would be necessary and the unpleasant and undesired effects would progressively diminish.

With regard to marihuana, present indications are that tolerance does develop to the behaviorally and physically disruptive effects, in both animals and man, especially at high frequent doses for prolonged time periods. Studies in foreign countries indicate that very heavy prolonged use of very large quantities of hashish leads to the development of tolerance to the mental effects, requiring an increase in intake to reach the original level of satisfaction. However, for the intermittent use pattern and even the moderate use pattern, little evidence exists to indicate the development of tolerance to the desired "high," although the high may persist for a shorter time period. During the Boston free-access study, no change was apparent in the level of the high produced by a relatively large dose of the drug over a 21-day period of moderate to heavy smoking.

The fact that some individuals smoke more of the drug than others may merely reflect a desire for a different level of "high." There is a tendency to develop a tolerance to the physical effects and behaviorally disruptive effects, especially the depressant effects, in heavy daily users. The development of such behavioral tolerance of this nature may explain the fact that experienced marihuana smokers describe a lower occurrence rate of undesirable drug effects. The development of tolerance may also explain why these smokers exhibit normal behavior and competent performance of ordinary tasks, while not appearing intoxicated to others even though they are at their usual level of intoxication.

Reverse Tolerance

Repeated exposure to marihuana has been said to cause an individual to need lesser amounts of the drug to achieve the same degree of intoxication. This "reverse tolerance" may be related to one's learning to get high or to the recognition of the subtle intoxication at low doses. Or perhaps, such tolerance reflects an increase in the body's ability to change the drug to an active chemical. To date, the existence of "reverse tolerance" has not been substantiated in an experimental setting.

Duration of Use

Tolerance development is only one of a variety of occurrences which possibly are related to repetitive use of marihuana. Any discussion of drug effect must also take into account the time period over which the drug use occurs. Immediate effects of a single drug experience must be contrasted with effects of short-term use and the effects of longterm use in order to detect any cumulative effects or more subtle, gradually occurring changes.

This issue of an individual's change over a period of years is quite complex; a multitude of factors other than marihuana use may affect his life. As previously defined, short-term refers to periods of less than two years, long-term to periods of two to 10 years, and very long-term to periods greater than 10 years. Most of the American experience involves short-term and long-term use, with low doses of weak preparations of the drug.

Patterns of Use

The drug effect of marihuana can be realistically discussed only within the context of who the user is, how long he has used marihuana, how much and how frequently he uses it, and the, social setting of his use.

In general, for virtually any drug, the heavier the pattern of use, the greater the risk of either direct or indirect damage. For purposes of this discussion, the patterns of use developed in the first section of this chapter will be utilized. Because frequency of use is presently the, primary determinant of use patterns in this country, we employ similar designations:

(1) The *experimenter* who uses marihuana, at most a few times over a short term and then generally ceases to use it, or uses once a month or less;

(2) The *intermittent user* who uses marihuana, infrequently, that is more than once monthly but less than several times a week;

(3) *The moderate user* who uses it from several times a week to once daily, generally over a long term;

(4) The *heavy user* who uses it several times a day over a long term and;

(5) The *very heavy user* who is constantly intoxicated with high tetrahydrocannabinol content preparations, usually hashish, over a very long term.

Again, these classifications are not intended to be rigid but are designed to facilitate a discussion of the many usage patterns.

Definition of Dependence

Before describing the effect of marihuana, on the user, two additional definitions are required. They concern the concept of *dependence* which has so clouded public and professional consideration of psychoactive drugs. Throughout the remainder of this report, we refer Separately to psychological and physical dependence, defined as follows:

Psychological dependence is the repeated use of psychoactive drugs leading to a conditioned pattern of drug-seeking behavior. The intensity of dependence varies with the nature of the drug, the method, frequency, and duration of administration, the mental and physical attributes of the individual, and the characteristics of the physical and social environment. Its intensity is at its peak when drug-seeking becomes a compulsive and undeviating pattern of behavior.

Physical dependence is the state of latent hyper-excitability which develops in

the central nervous system of higher mammals following frequent and prolonged administration of the morphine-like analgesics, alcohol, barbiturates, and other depressants. Such dependence is not manifest subjectively or objectively during drug administration. Specific symptoms and signs, the abstinence syndrome, occur upon abrupt termination of drug administration; or with morphinelike agonists by administering the specific antagonists.

EFFECTS RELATED TO PATTERN USE

Set out below is a brief summary of effects of marihuana, related to frequency and duration of use. The remainder of the Chapter discusses the effects of immediate, short-term, long-term and very long-term use of the drug.

Experimenters and

intermittent users ------ Little or no psychological dependence.

Influence on behavior related largely to

conditioning to drug use and its social

value to the user.

No organ injury demonstrable.

Moderate users ---------- Moderate psychological dependence in-

creasing with duration of use.

Behavioral effects minimal in stable per-

sonalities, greater in those with emo-

tional instability.

Probably little if any organ injury.

Duration of use increases probability of

escalation of all effects including shift

from moderate to heavy use.

Heavy users ---------- American "pot head."

Strong psychological dependence.

Detectable behavior changes.

Possible organ injury (chronic diminution of pulmonary function).

Effects more easily demonstrable with long-term use.

Very heavy users --------- Users in countries where the use of cannabis has been indigenous for centuries.

Very strong psychological dependence to point of compulsive drug seeking and use.

Clear-cut behavioral changes.

Greater incidence of associated organ injury.

IMMEDIATE DRUG EFFECTS

The immediate effects are those which occur during the drug intoxication or shortly following it. The user is aware of some of these effects, for they often cause him to use the drug. At the same time, many changes may occur in his body which can be measured by others but are not obvious to him.

Subjective Effects

A description of an individual's feelings and state of consciousness as affected by low doses of marihuana is difficult; the condition is not similar to usual waking states and is the result of a highly individual experience. Perhaps the closest analogies are the experience of day dreaming or the moments just prior to falling asleep. The effect is not constant and a cyclical waxing and waning of the intensity of the intoxication occurs periodically.

At low, usual "social" doses, the intoxicated individual may experience an increased sense of well-being; initial restlessness and hilarity followed by a dreamy, carefree state of relaxation; alteration of sensory perceptions including expansion of space and time; and a more vivid sense of touch, sight, smell, taste, and sound; a feeling of hunger, especially a craving for sweets; and subtle changes in thought formation and expression. To an unknowing observer, an individual in this state of consciousness would not appear noticeably different from his normal state.

At higher, moderate doses, these same reactions are intensified but the changes in the individual would still be scarcely noticeable to an observer. The individual may experience rapidly changing emotions, changing sensory imagery, dulling of attention, more altered thought formation and expression such as fragmented thought, flight of ideas, impaired immediate memory, disturbed associations, altered sense of self-identity and, to some, a perceived feeling of enhanced insight.

At very high doses, psychotomimetic phenomena may be experienced. These, include distortions of body image, loss of personal identity, sensory and mental illusions, fantasies and hallucinations.

Nearly all persons who continue to use marihuana describe these usual effects in largely pleasurable terms. However, others might call some of these same effects unpleasant or undesirable.

As discussed earlier, a wide range of extra-drug factors also influences marihuana's effects. The more the individual uses marihuana and the longer he has been using it, the more likely the experiences will be predominantly pleasurable, and the less likely the effects will be unpleasant. An increasing sensitization to those effects viewed as pleasant occurs as the user has more experience with the drug.

Persons subject to unpleasant reactions may eliminate themselves from the using group although the occasional experience of an unpleasant effect does not always discourage use.

Body Function

A large amount of research has been performed in man and animals regarding the immediate effect of marihuana on bodily processes. No conclusive evidence exists of any physical damage, disturbances of bodily processes or proven human fatalities attributable solely to even very high doses of marihuana. Recently, animal studies demonstrated a relatively large margin of safety between the psychoactive dose and the physical and behavioral toxic and lethal dose. Such studies seemed to indicate that safe human study could be undertaken over a wide dose range.

Low to moderate doses of the drug produce minimal measurable transient changes in body functions. Generally, pulse rate increases, recumbent blood pressure increases slightly, and upright blood pressure decreases. The eyes redden, tear secretion is decreased, the pupils become slightly smaller, the fluid pressure within the eye lessens and one study reports that the eyeball rapidly oscillates (nystagmus).

A minimal decrement in maximum muscle strength, the presence of a fine hand tremor, and a decrease in hand and body steadiness have also been noted. Decreased sensitivity to pain and overestimation of elapsed time may occur.

The effects of marihuana on brain waves are still unclear and inconsistent. Generally, the intoxication produces minimal, transient changes of rapid onset and short duration. Sleep time appears to increase, as does dreaming.

Investigation of the effects of marihuana on a wide variety of other bodily function indices has revealed few consistently observed changes.

These few consistently observed transient effects on bodily function seem to suggest that marihuana is a rather unexciting compound of negligible immediate toxicity at the doses usually consumed in this country. The substance is predominantly a psychoactive drug. The feelings and state of consciousness described by the intoxicated seem

to be far more interesting than the objective state noted by an observer.

Mental Function

Marihuana, like other psychoactive substances, predominantly affects mental processes and responses (cognitive tasks) and thus the motor responses directed by mental processes (psychomotor tasks). Generally, the degree of impairment of cognitive and psychomotor performance is dose-related, with minimal effect at low doses. The impairment varies during the period of intoxication, with the maximal effect at the peak intoxication. Performance of simple or familiar tasks is at most minimally impaired, while poor performance is demonstrated on complex, unfamiliar tasks. Experienced marihuana users commonly demonstrate significantly less decrement in performance than drug-naive, individuals.

The greater his past marihuana experience, the better the intoxicated individual is able to compensate for drug effect on ordinary performance at usual doses. Furthermore, marked individual variation in performance is noted when all else is held constant. The effect of marihuana on cognitive and psychomotor performance is therefore highly individualized and not easily predictable. Effects on emotional reactions and on volition are equally variable and are difficult to measure under laboratory conditions, but can be significant.

The Intoxicated State

Studies of intoxicated persons have suggested possible explanations for the subtle effects on mental processes produced by marihuana. Generally, a temporary episodic impairment of short-term memory occurs. These memory voids may be filled with thoughts and perceptions extraneous to organized -mental processes. Past and future may become obscured -as the individual focuses on filling the present momentary memory lapse. His sense of self -identity may seem altered if he cannot place himself in his usual time frame.

This altered state of mind may be regarded by the individual as pleasant or unpleasant. The important factors of dosage and set and setting play a most important role in this determination. When the nature of the drug-taking situation and the characteristics of the individual are optimal. the user is apt to describe his experience as one of relaxation, sensitivity, friendliness, carefreeness, thoughtfulness, happiness, peacefulness, and fun. For most marihuana users who continue to use the drug, the experience is overwhelmingly pleasurable.

Unpleasant Reactions

However, when these circumstances are not optimal, the experience may be unpleasant and an undesirable reaction to the marihuana intoxication occurs. In these instances, anxiety, depression, fatigue or cognitive loss are experienced as a generalized feeling of ill-being and discomfort. A heavy sluggish feeling, mentally and physically, is common in inexperienced marihuana smokers who overshoot the desired high or in persons who might orally ingest too large a dose. Dizziness, nausea, incoordination, and palpitations often accompany the "too stoned" feeling.

Anxiety States

"Novice anxiety reactions" or feelings of panic account for a majority of unpleasant reactions to marihuana. When the distortion of self image and time is recognized by the individual as drug-induced and temporary, the experience is viewed as pleasurable. Anxiety -and panic result when these changes cause the individual to fear that the loss of his identity and self-control may not end, and that he is dying or "losing his mind." These anxiety and panic reactions are transient and usually disappear over a few hours as the drug's effects wear off, or more quickly with gentle friendly reassurance.

The large majority of these, anxiety reactions occur in individuals who are experimenting with marihuana. Most often these individuals have an intense underlying anxiety surrounding marihuana use, such

as fears of arrest, disruption of family and occupational relations, and possible bodily or mental harm. Often they are older and have relatively rigid personalities with less desire for new and different experiences.

The incidence of these anxiety reactions may have decreased as marihuana use has become acceptable to wider populations, as the fears of its effects have lessened and as users have developed experience in management of these reactions.

Psychosis

Rare cases of full-blown psychotic episodes have been precipitated by marihuana. Generally, the individuals had previous mental disorders or had poorly developed personalities and were marginally adjusted to their life situation. Often the episode occurred at times of excessive stress. These episodes are characteristically temporary. Psychotherapy and sometimes medications are useful in prompt control and treatment of this psychological reaction. In addition, rare nonspecific toxic psychoses have occurred after extremely high doses. This state of nonspecific drug intoxication or acute brain syndrome is self-limited and clears spontaneously as the drug is eliminated from the body.

Conclusions

In summary, the immediate effect of marihuana on normal mental processes is a subtle alteration in state of consciousness probably related to a change in short-term memory, mood, emotion and volition. This effect on the mind produces a varying influence on cognitive and psychomotor task performance which is highly individualized, as well as related to dosage, time, complexity of the task and experience of the user. The effect on personal, social and vocational functions is difficult to predict. In most instances, the marihuana intoxication is pleasurable. In rare cases, the experience may lead to unpleasant anxiety and panic, and in a predisposed few, to psychosis.

SHORT-TERM EFFECTS

The effect of an enormous daily oral dose of the drug (up to about one hundred thousand times the minimal behaviorally effective human dose) was recently studied in rats and monkeys for three months. A severe, generalized nervous system depression was evident the first few days. Evidence of cumulative toxicity was observed at these doses. Severe central -nervous system depression produced fatalities in some rats in the first few days until tolerance developed. Later, extreme hyperactivity developed.

The monkeys experienced severe central nervous system depression and one group showed mild hyperactivity but all rapidly returned to normal behavior after the development of tolerance to these effects. Minimal dose-related toxic effects on bodily organs were noted at autopsy at the conclusion of the experiment. These non-specific findings of unknown meaning included bypocellularity of the bone marrow and spleen and hypertrophy of the adrenal cortex.

A 28-day study employing intravenous administration of from one to ten thousand times the minimal effective human dose to monkeys produced -similar findings clinically. In the high dose groups delayed deaths from acute hemorrhagic pneumonia were possibly caused by accumulation of clumps of THC in the lung producing irritation similar to that seen at the injection sites. No other organ pathology was noted. These animal studies illustrated that the margin of safety between active dose and toxic dose was enormous.

A few studies have recently been carried out to observe the effect of a few weeks of daily marihuana smoking in man. The amount smoked was a relatively large American dose. Frequency of use was once to several times daily.

During the 21-day Boston free-access study, no harmful effects were observed on general bodily functions, motor functions, mental functions, personal or social behavior or work performance. Total sleep time and periods of sleep were increased. Weight gain was uniformly noted.

No evidence of physical dependence or signs of withdrawal were noted. In the heaviest smokers, -moderate psychological dependence was suggested by an increased negative mood after cessation of smoking.

Tolerance appeared to develop to the immediate effects of the drug on general bodily functions (pulse rate) and psychomotor-cognitive performance (time estimation, short-term memory, and shootinggallery skill) but not to the "high." Marihuana intoxication did not significantly inhibit the ability of the subjects to improve with practice through time on these psychological-motor tasks.

Neither immediate nor short-term (21 day) high-dose marihuana intoxication decreased motivation to engage in a variety of social and goal-directed behaviors. No consistent alteration that could be related to marihuana smoking over this period of time was observed in work performance of a simple task, participation in aspects of the research study, or interest and participation in a variety of personal activities, such as writing, reading, interest and knowledge of current world events, or participation in athletic or aesthetic activities.

Marihuana smoking appeared to affect patterns of social interactions. Although use of the drug was found to be a group social activity around which conversation and other types of social behavior were centered, it was not uncommon for some or all of the smokers to withdraw from the social interaction and concentrate on the subjective drug experience.

During the first part of the smoking period, both intermittent and daily users demonstrated a marked decrement in total interaction. Total interaction continued to diminish among intermittent users but increased above presmoking levels among the daily users during the later parts of the smoking period. The quality of the interaction was more convivial and less task-oriented when marihuana was available to the group.

Additionally, an assessment of the effect of marihuana on risktaking behavior revealed that daily users tended to become more conservative when engaging in decision-making under conditions of

risk.

LONG-TERM EFFECTS

Our knowledge about marihuana is incomplete, but certain behavior characteristics appear to be emerging in regard to long term American marihuana use which, for the most part, is significantly less than 10 years. These impressions were confirmed in the Boston free-access study. The group of American young adults studied averaged five years (range 2-17 years) of intermittent or daily use, of marihuana.

No significant physical, biochemical, or mental abnormalities could be attributed solely to their marihuana smoking. Some abnormality of pulmonary function was demonstrated in many of the subjects which could not be correlated-with quantity, frequency or duration of smoking marihuana and/or tobacco cigarettes. (One other investigation recently completed uncovered no abnormalities in lung or heart functioning of a group of non-cigarette smoking heavy marihuana users). Many of the subjects were in fair to poor physical condition, as judged by exercise tolerance.

The performance of one-fifth of the subjects on a battery of tests sensitive to brain function was poorer on at least one, index than would have been predicted on the basis of their IQ scores and education. But a definite relationship between the poor test scores and prior marihuana or hallucinogen use could not be proven.

In the past few years, observers have noted various social, psychological and behavioral changes among young high school and college age Americans including many who have used marihuana heavily for a number of years. These changes are reflected by a loss of volitional goal direction. These individuals drop out and relinquish traditional adult roles and values. They become present rather than future oriented, appear alienated from broadly accepted social and occupational activity, and experience reduced concern for personal hygiene and nutrition.

Several psychiatrists believe they have detected clinically that some heavy marihuana-using individuals appear to undergo subtle changes

in personality and modes of thinking, with a resulting change in life style. In adopting this new life style, a troubled youth may turn toward a subculture where drug use and untraditional behavior are acceptable.

This youthful population resembles in many respects the marihuana smoker described in the Boston study. No evidence exists to date to demonstrate that marihuana use alone caused these behavioral changes either directly or indirectly. Many individuals reach the same point without prior marihuana use or only intermittent or moderate use; and many more individuals use marihuana as heavily but do not evidence these changes. For some of these young people, the drop out state is only a temporary phase, preceding a personal reorganization and return to a more conventional life style.

If heavy, long-term marihuana use is linked to the formation of this complex of social, psychological and behavioral changes in young people, then it is only one of many contributing factors.

VERY LONG-TERM EFFECTS OF HEAVY AND VERY HEAVY USE

Knowledge of the effects of very heavy, very long-term use of marihuana by man is still incomplete. The Commission has extensively reviewed the world literature as well as ongoing studies in Jamaica and Greece, and carefully observed very heavy, very long-term using populations in countries in other parts of the world, such as Afghanistan and India. These populations smoke and often drink much stronger drug preparations, hashish and ganja, than are commonly used in America. From these investigations, some observable consequences are becoming much clearer.

Tolerance and Dependence

Some tolerance does occur with prolonged heavy usage; large drug doses are necessary for the desired effects. Abrupt withdrawal does not lead to a specific or reproducible abstinence syndrome and physical dependence has not been demonstrated in man or in

animals. The very heavy users studied did evidence strong psychological dependence, but were able to cease use for short periods of time. In these users,

withdrawal does induce, symptoms characteristic of psychological dependence. The anxiety, restlessness, insomnia, and other non-specific symptoms of withdrawal are very similar in kind and intensity to those experienced by compulsive cigarette smokers.

Although the distress of withdrawal exerts a very strong psychogenic drive to continue use, fear of withdrawal is, in most cases, not adequate to inspire immediate criminal acts to obtain the drug.

General Body Function

In the Jamaican study, no significant physical or mental abnormalities could be attributed to marihuana use, according to an evaluation of medical history, complete physical examination, chest x-ray, electrocardiogram, blood cell and chemistry tests, lung, liver or kidney function tests, selected hormone evaluation, brain waves, psychiatric evaluation, and psychological testing. There was no evidence to indicate that the drug as commonly used was responsible for producing birth defects in offspring of users. This aspect is also being studied further.

Heavy smoking, no matter if the substance was tobacco or ganja, was shown to contribute to pulmonary functions lower than those found among persons who smoked neither substance. All the ganja smokers studied also smoked tobacco. In Jamaica, ganja is always smoked in a mixture with tobacco; and many of the subjects were heavy cigarette smokers, as well.

In a study of a Greek hashish-using population preliminary findings revealed poor dentition, enlarged livers, and chronic bronchitis. Further study is required to clarify the relationship of these to hashish use, alcohol or tobacco use, or general life style of this user population.

Social Functioning

Similarly, the Jamaican and Greek subjects did not evidence any deterioration of mental or social functioning which could be attributed solely to heavy very long-term cannabis use.

These individuals appear to have used the drug without noticeable behavioral or mental deviation from their lower socioeconomic group norms, as detected by observation in their communities and by extensive sociological interviews, psychological tests and psychiatric examination.

Overall life style was not different from non-users in their lower socioeconomic community. They were alert and realistic, with average intelligence based on their education. Most functioned normally in their communities with stable families, homes, jobs, and friends. These individuals seem to have survived heavy long-term cannabis use without major physical or behavioral defects.

Mental Functioning

The incidence of psychiatric hospitalizations for acute psychoses and of use of drugs other than alcohol is not significantly higher than among the non-using population. The existence of a specific longlasting, cannabis-related psychosis is poorly defined. If heavy cannabis use produces a, specific psychosis, it must be quite rare or else exceedingly difficult to distinguish from other acute or chronic psychoses.

Recent studies suggest that the occurrence of any form of psychosis in heavy cannabis users is no higher than in the general popula on. Although such use is often quite, prevalent in hospitalized mental patients, the drug could only be considered a. causal factor in a, few cases. Most of these were, short-term reactions or toxic overdoses. In addition, a concurrent use of alcohol often played a role in the, episode causing hospitalization.

These findings are somewhat surprising in view of the widespread belief that cannabis attracts the mentally unstable, vulnerable individual. Experience in the United States has not involved a level of heavy marihuana, use comparable to these foreign countries. Consequently, such long-lasting psychic disturbances possibly caused by heavy cannabis use have not been observed in this country.

Motivation and Behavioral Change

Another controversial form of social-mental deterioration allegedly related to very long-term very heavy cannabis use is the "amotivational syndrome." It supposedly affects the very heavy using population and is described world-wide as a, loss of interest in virtually all activities other than cannabis use, with resultant lethargy, amorality, instability and social and personal deterioration. The reasons for the occurrence of this syndrome are varied and hypothetical; drug use is only one of many components in the socioeconomic and psychocultural backgrounds of the individuals.

Intensive studies of the Greek and Jamaican populations of heavy long-term cannabis users appear to dispute the sole causality of cannabis in this syndrome. The heavy ganja and hashish using individuals were from lower socioeconomic groups, and possessed average intelligence but had little education and small chance of vocational advancement. Most were married and maintained families and households. They were all employed, most often as laborers or small businessmen, at a level which corresponded with their education and opportunity.

In general, their life styles were dictated by socioeconomic factors and did not appear to deteriorate as a result of cannabis use. The Jamaicans were working strenuously and regularly at generally uninteresting jobs. In their culture, cannabis serves as a work adjunct. The users believe the drug provides energy for laborious work and helps them to endure their routine tasks.

In contrast, others have described Asian and African populations where heavy to very heavy hashish or charas smoking for a very long time is associated with clear-cut behavioral changes. In these societies, the smokers are mostly jobless, illiterate persons of the lowest socioeconomic backgrounds. They generally begin to use the drug in their early teens and continue its use up to their 60's.

The users prefer to smoke in groups of two to 20, generally in a quiet place out of the reach of non-smokers. Weakness, malnutrition and sexual difficulties, usually impotence, a-re common. Some of them report sleep disturbances.

Most users who have used the drug for 20 to 30 years are lazy and less practical in most of their daily acts and reluctant to make decisions. However, their ability to perform non-complicated tasks is as good as non-smokers.

Although the smokers think they become faster in their daily work, a general slowness in all their activities is noticed by others. This user population is typically uncreative. They make little if any significant contribution to the social, medical or economic improvement of their community.

SUMMARY

Once existing marihuana, policy was cast into the realm of public debate, partisans on both sides of the issue over-simplified the question of the effects of use of the, drug on the individual. Proponents of the prohibitory legal system contended that marihuana, was a, dangerous drug, while opponents insisted that it was a harmless drug or was less harmful than alcohol or tobacco.

Any psychoactive drug is potentially harmful to the individual, depending on the intensity, frequency and duration of use. Marihuana is no exception. Because the particular hazards of use differ for different drugs, it makes no sense, to compare the harmfulness of different drugs. One may compare, insofar as the individual is concerned, only the harmfulness of specific effects. Is heroin less harmful than alcohol because, unlike alcohol, it directly

causes no physical in-jury? Or is heroin more harmful than alcohol because at normal doses its use is more incapacitating in a behavioral sense?

Assessment of the relative dangers of particular drugs is meaningful only in a wider context which weighs the possible benefits of the drugs, the comparative scope of their use, and their relative impact on society at large. We consider these questions in the next Chapter, particularly in connection with the impact on public health.

Looking only at the effects on the individual, there, is little proven danger of physical or psychological harm from the experimental or intermittent use of the natural preparations of cannabis, including the resinous mixtures commonly used in this country. The risk of harm lies instead in the heavy, long-term use of the drug, particularly of the most potent preparations.

The experimenter and the intermittent users develop little or no psychological dependence on the drug. No organ injury is demonstrable.

Some moderate users evidence a degree of psychological dependence which increases in intensity with prolonged duration of use. Behavioral effects are lesser in stable personalities but greater in those with emotional instability. Prolonged duration of use does increase the probability of some behavioral and organic consequences including the possible shift to a heavy use pattern.

The heavy user shows strong psychological dependence on marihuana and often hashish. Organ injury, especially diminuation of pulmonary function, is possible. Specific behavioral changes are detectable. All of these effects are more apparent with long-term and very long-term heavy use than with short-term heavy use.

The very heavy users, found in countries where the use of cannabis has been indigenous for centuries, have a compulsive psychological dependence on the drug, most commonly used in the form of hashish. Clear-cut behavioral changes and a greater incidence of associated biological injury occur as duration of use increases. At present, the Commission is unaware of any similar pattern in this

country.

National Commission on Marihuana and Drug Abuse

Marihuana: A Signal of Misunderstanding

Chapter III

Social Impact of marihuana use

"Man is a creature who lives not upon bread alone but principally by catchwords." -Robert Louis Stevenson,

Virginia Puerisque (1881)

Implicit in existing social and legal policy toward marihuana is the view that society suffers in some way from use of the drug. When the widespread practice of marihuana smoking appeared in the United States in the early decades of the 20th century, the medical, law enforcement, newspaper, and legislative communities immediately indicted the drug. They assumed that the drug posed serious dangers to individual health; but more importantly, they viewed it as a menace to the public order. Crime, insanity and idleness were thought to be the inevitable consequences of its use.

That some of these original fears were unfounded and that others were exaggerated have been clear for many years. Yet, many of these early beliefs continue to affect contemporary public attitudes and concerns. Consequently, one of the Commission's most important tasks is to evaluate carefully all data relevant to the social impact of marihuana use. We must determine whether and in what respects social concern is justified. What is myth and what is reality?

The literature pertaining to -the presumed effects and consequences of marihuana use still reveals a wide diversity of opinion about social impact. Careful scrutiny is inhibited by the prevalence of hearsay, rhetoric and undocumented assertions about the effects and consequences of marihuana use. Nonetheless, evidence is mounting and a number of significant trends have recently emerged. In the previous Chapter we explored the evidence regarding the nature and scope of contemporary marihuana use, and the effects of the drug on the individual user. Now we must consider the impact on society of behavior resulting from use of marihuana.

In dealing with the behavioral consequences of marihuana, use, the Commission has made, a concerted effort to review and evaluate the enormous body of existing popular and scientific literature, and has itself initiated new empirical research, including national surveys, retrospective studies and controlled laboratory experiments.

Awareness of the difficulties involved in investigating an inherently complex social phenomenon and applying its research findings to policy decisions has fostered particular sensitivity to the quality of previous and Commission-sponsored research. As such, considerable attention was given to such basic research questions as:

What behavioral effects are most relevant in assessing the consequences of marihuana use?

What measures produce the most valid data concerning given effects?

What reliance should be placed on various research techniques, such as self-reporting, controlled experiments, clinical observations and statistical relationships?

What generalizations can be made from particular populations studied?

What are the limits of given data in terms of inference, interpredation and attribution of cause?

With respect to the Commission's own research program, the process of selection and allocation of resources was indeed difficult, and some areas of inquiry have undoubtedly been either neglected or shortchanged. Nonetheless, we believe that the studies undertaken and information gathered will add significantly to our understanding of the conditions and circumstances under which marihuana use is likely to affect adversely the public safety, public health and welfare, and dominant social order.

Marihuana and Public Safety

The belief that marihuana is causally linked to crime and other antisocial conduct first assumed prominence during the 1930's as the result of a concerted effort by governmental agencies and the press to alert the American populace to the dangers of marihuana use. Newspapers all over the country began to publish lurid accounts of "marihuana atrocities." In the absence of adequate understanding of the effects of the drug, these largely unsubstantiated stories profoundly influenced public opinion and gave birth to the stereotype of the marihuana user as physically aggressive, lacking in self-control, irresponsible, mentally ill and, perhaps most alarming, criminally inclined and dangerous. The combination of the purported effects of the drug itself plus the belief that it was used by unstable individuals seemed to constitute a significant danger to public safety.

Now, more than 30 years later, many observers are skeptical about the existence of a cause-effect relationship between marihuana use and antisocial conduct.

MARIHUANA AND CRIME

Over the years, there have been several hypotheses about the relationship between marihuana and antisocial conduct. The earliest view was that marihuana causes or leads to the commission of aggressive and violent criminal acts such as murder, rape and assault. These acts are committed, it has been argued, because marihuana allegedly produces a relaxation of ordinary inhibitions, a weakening of impulse control and a concomitant increase in aggressive tendencies while the user is under its influence.

Marihuana's alleged criminogenic role is not always limited to violent or aggressive behavior. Some commentators also postulate that marihuana leads to or causes non-violent forms of criminal or delinquent conduct, ranging from sexual promiscuity to grand larceny. Underlying this second causal hypothesis are the assumptions that marihuana frequently impairs judgment, distorts reality and diminishes, at least temporarily, the user's sense of

personal and social responsibility. Regular or heavy use over an extended period of time is felt to interfere, perhaps irreversibly, with the orderly development of psychosocial and moral maturity.

As indicated above, however, a growing uncertainty prevails about ,the existence of a causal link between marihuana use and antisocial conduct. In fact, recent surveys, including several sponsored by the Commission, suggest that large segments of the professional public, particularly the law enforcement and criminal justice communities, are no longer willing to assert a, cause-effect relationship but observe, instead, the existence of a statistical association.

The Issue of Cause and Effect

The controversy over the cause-effect relationship between marihuana use and criminal, violent or delinquent behavior poses a number of serious problems for the investigators Proponents and opponents of the causal view tend to rely on different kinds of evidence and to call upon different types of experts, thereby differing substantially in the kinds of information they accept as relevant, reliable or valid.

Practitioners, such as police and probation officers for example, frequently cite case examples in which apprehended offenders are found to be in possession of marihuana at the time of arrest. The mere presence of the drug or the fact that an offender is a known user of marihuana is sometimes deemed sufficient to establish a causal link between the marihuana and the offense.*

Empiricists, on the other hand, would deny that the simple presence of the drug constitutes a satisfactory demonstration of a causal relationship between marihuana use and the crime in question. They would defer, instead, to the results of empirical studies designed explicitly to test the assertion. Essentially, they emphasize that even if some offenders do use marihuana, an equal or larger number of offenders do not, and there are certainly large numbers of marihuana users in the population-at-large who never engage in the kinds of antisocial conduct deemed to be related to or caused by the use of the drug.

Proving any positive and direct relationship, be it causal or otherwise, between two inherently complex social phenomena is fraught with enormous difficulties. The relationship of marihuana use to crime, violence, aggression or juvenile delinquency presents no exception. Before examining the evidence with respect to the existence of a causal connection, certain basic considerations deserve at least brief mention here.

To prove, the existence of a positive and direct relationship, one would be required to demonstrate that the alleged offender was, indeed, a marihuana, user; that he was under the influence of the drug at the time he committed the offense; and that the crime was directly attributable to the effects of the marihuana. The kinds of evidence necessary to establish these facts are not easy to obtain.

First, evidence of the use of marihuana by the accused is generally dependent upon either direct admission of use, hearsay evidence, or inferences derived from knowledge of possession (that is, the offender was found to have marihuana on his person or in his possession at the time of arrest).

Second, because no chemical tests presently exist outside the laboratory to identify the presence of marihuana in the body of the accused, it is difficult if not impossible to prove

that the offender was definitely under the influence of marihuana when he committed the offense.

Third, in order to prove that the marihuana represented the significant contributory or precipitating variable, all other factors possibly related to the offense would have to be examined and excluded.

The problems of validation are further compounded by additional variations in behavior attributable to: (a) the pharmacological potency of the drug; (b) possible adulteration of the marihuana; (c) the interaction of marihuana with other drugs simultaneously ingested; (d) differing individual response to similar dosage levels; (e) the time-action function; (f) the cumulative effect of marihuana use; and (g) various social, psychological and situational variables such as set and setting, individual expectations, personal predispositions or preexisting impulse disorders.

Despite the inherent complexities of the issue and the difficulties in securing reliable and valid evidence, a relatively large body of research is now available pertaining to the criminogenic effects of marihuana upon the individual and the nature and extent to which the drug constitutes a danger to public safety. In the following section, we present the available evidence and assess the strength and direction of the alleged relationships between marihuana use and violent or aggressive behavior and also non-violent forms of criminal and delinquent behavior.

In the widely publicized Licata case of the 1930's, for example, a 16-year-old cannabis user was charged with the ax murder of his family and the offense was directly attributed to the effects of marihuana. There was, however, no precise information available regarding the use of marihuana in relation to the crime. Nor, in the various accounts of the case, was there generally any reference to the fact that several of the boy's relatives had previously been committed to mental institutions; that the police had, about one year prior to the offense (and presumably before the youth's alleged use of marihuana) attempted to commit him for his bizarre behavior; or that shortly after the crime, the boy began to exhibit the symptoms of paranoid schizophrenia.

Marihuana and Violent Crime

As indicated earlier, the belief that marihuana causes or leads to the commission of violent or aggressive acts first emerged during the 1930's and became deeply embedded in the public mind. Until recently, however, these beliefs were generally based on the anecdotal case examples of law enforcement authorities, a few clinical observations and several quasi-experimental studies of selected populations comprised of military offenders, convicted or institutionalized criminals or delinquents and small groups of college students. Few efforts were made to compare the incidence of violent or aggressive behavior in representative samples of both user and non-user populations.

Even in these early observations and investigations, however, no substantial evidence existed of a causal connection between the use of marihuana and the commission of violent or aggressive acts. Indeed, if any relationship was indicated, it was not a positive and direct causal connection but in inverse or negative statistical correlation.

Rather than inducing violent -or aggressive behavior through its purported effects of lowering inhibitions, weakening impulse control and heightening aggressive tendencies,

marihuana was usually found to inhibit the expression of aggressive impulses by pacifying the user, interfering with muscular coordination, reducing psychomotor activities and generally producing states of drowsiness lethargy, timidity and passivity.

In fact, only a small proportion of the marihuana users among any group of criminals or delinquents known to the authorities and appearing in study samples had ever been arrested or convicted for such violent crimes as murder, forcible rape, aggravated assaultor armed robbery. When these marihuana-using offenders were compared with offenders who did not use marihuana, the former were generally found to 'have committed less aggressive behavior than the latter.

In an effort to accumulate data on the relationship between marihuana use and aggressive or violent criminal behavior, the Commission sponsored several studies designed to assess the purported causal relationship.

First, the Commission wanted to tap the unique experience of the law enforcement and criminal justice communities. Representative samples of prosecuting attorneys, judges, probation officers and court clinicians were asked their opinions about the relationship between marihuana use and the commission of aggressive or violent criminal acts. When asked to evaluate the statement that "most aggressive acts or crimes of violence committed by persons who are known users of marihuana occur when the offender is under the influence of marihuana," three-quarters of the judges, probation officers and clinicians indicated either that the statement was probably untrue or that they were unsure of its accuracy. Of these three groups, a greater proportion of clinicians (76.5%) thought the statement false than did the probation officers (60%)and judges (44.2%).

In a separate mail survey of the chief prosecuting attorneys in the 50 states-the group which has often supported the causal hypothesis-52% of the respondents stated that they either did not believe or were uncertain of the truth of the proposition that use of marihuana leads to aggressive behavior.

We have already noted that only a small fraction of the offender populations in past studies were found to have been arrested for crimes of violence. Similarly, in a Commission-sponsored study of 1,776 16to-21-year-olds arrested in five New York counties for marihuana law violations between 1965 and 1969, only a small percentage bad either previously or subsequently come to the attention of authorities for such offenses as assault or robbery. In fact, less than 1% of the offenders in this sample had been arrested for these offenses prior to their first marihuana arrest, and less than 3% were known to the Federal Bureau of Investigation for these offenses subsequent to their marihuana violation.

Perhaps more important than professional opinion or the incidence of violent offenses in an offender population, however, is the determination of the extent to which marihuana use is related to violent or aggressive behavior in the general population.

In a Commission-sponsored survey, face-to-face interviews were conducted with a representative sample of 559 West Philadelphia residents in order to ascertain the extent of marihuana use in this heterogeneous population and the relative involvement of marihuana users and nonusers in violent criminal behavior. In corroboration of the earlier findings, the researchers found no significant differences in the proportions of users and non-users; who stated that they had committed any of the aggressive or violent crimes enumerated.

Further, no findings indicated that marihuana was generally or frequently used immediately prior to the commission of offenses in the very small number of instances in which these offense's did occur. In contrast, however, the aggressive and violent offenders in this sample

did report with significantly greater frequency the use of alcohol within 24 hours of the offense in question.

These findings should be considered in fight of an earlier West Coast study of disadvantaged minority-group youthful marihuana users, many of whom were raised in a combative and aggressive social milieu similar to that found in several of the West Philadelphia sampled neighborhoods. The data show that marihuana users were much less likely to commit aggressive or violent acts than were those who preferred amphetamines or alcohol. They also show that most marihuana users were able to condition themselves to avoid aggressive behavior even in the face of provocation. In fact, marihuana was found to play a significant role in youth's transition from a "rowdy" to a "cool," non-violent style.

The Commission is aware of the claim that a few emotionally unstable or impulsive individuals have become particularly aggressive or impulsive under the influence of marihuana. As we have noted, some newspaper accounts have attributed sensational homicides or sexual assaults to marihuana-induced transitory psychotic states on the part of the user. No evidence exists, however, to indicate that marihuana was responsible for generating or creating excessive aggressiveness or impulsivity in individuals having no prior history of impulse or personality disorder. The most that can be said is that in those rare instances, marihuana may have aggravated a preexisting condition.

In sum, the weight of the evidence is that marihuana does not cause violent or aggressive behavior, if anything, marihuana generally serves to inhibit the expression of such behavior. Marihuana-induced relaxation of inhibitions is not ordinarily accompanied by an exaggeration of aggressive tendencies.

No evidence exists that marihuana use will cause or lead to the commission of violent or aggressive behavior by the large majority of psychologically and socially mature individuals in the general population.

Marihuana and Non-Violent Crime

A second hypothesis reflecting the statements of significant numbers of government officials is that marihuana plays a major role in the commission of other, essentially non-violent, forms of criminal and delinquent behavior.

In general, those espousing this more general cause-effect relationship assume that the drug frequently produces, in addition to the lowering of inhibitions, impairment of judgment, distortion of reality and at least temporary reduction of a sense of personal and social responsibility. Indeed, the earlier stereotype of the marihuana user was that of an immoral, physically debilitated, psychologically unstable and criminally marginal man whose state of severely and irreversibly underdeveloped psychosocial and moral maturity was said to derive directly from his continued use of marihuana.

As indicated earlier, neither the inherent complexities of the issue nor the previously inconclusive empirical evidence has deterred the formulation and expression of strong opinions about the relationship of marihuana use to crime and delinquency. Opinion in this area, quite apart from the empirical evidence, has long assumed critical importance in the development of social policy.

The Commission has addressed the issue in three different ways. One was to assess the state of current public and professional opinion relative to the general proposition that

marihuana causes or leads to the commission of criminal or delinquent acts. A second approach was to review the professional literature addressed to the issue, and a third was to initiate empirical investigations of our own.

The opinion surveys found that substantial numbers of persons raised serious questions about the existence of a causal relationship between marihuana use and criminal or delinquent behavior. Confusion and uncertainty about the existence of such a relationship have been expressed by both youth and adults, including practicing professionals in the criminal justice system.

Recent data suggest that some of this confusion may be the result of a fairly widespread misconception about the addiction potential of marihuana. To the extent that persons believe marihuana users are physically dependent on the drug, they may assume that, like the heroin user, the marihuana user commits his offenses in order to support what is perceived as a drug habit; and that, like the heroin model, offenses are committed more often in the desperate attempt to obtain the drug rather than under its influence following use. There is no evidence that this is the case, even for those who use the drug heavily.

In the Commission-sponsored National Survey, the respondents were asked whether they agreed or disagreed with the statement that "many crimes are committed by persons who are under the influence of marihuana." Fifty-six percent of the adult population and 41% of the youth indicated agreement. As in the Survey generally, there was a significant difference of opinion according to age in the adult population. While 69% of the over-50 age group agreed with this statement, only about one-third of the 18-to-25 age group and the 14-to-17-yearolds agreed. One of every four youth respondents and 18% of the adults said they were "not sure" of the existence of such a relationship between marihuana use and crime.

Much greater consensus exists, even between generations, regarding the association of alcohol and crime. While 56% of all adults expressed their belief that many crimes are committed by persons under the influence of marihuana, 69% of these same adults believed that alcohol was related in the same way. Only 7% felt unsure about the alcohol crime relationship, in contrast to 18% who expressed uncertainty about the relationship between crime and marihuana.

The Commission also surveyed opinion within the criminal justice community. A sample of 781 judges, probation officers and court clinicians replied to a questionnaire which asked respondents to indicate whether or not their professional experience led them to believe that "use of marihuana causes or leads to antisocial behavior in the sense that it leads one to commit other criminal or delinquent acts." Of all respondents, 27% believed this to be the case. Within each professional group, 34% of the judges, 18% of the probation officers and 2% of the clinicians indicated their agreement.

On the assumption that some, proportion, however small, of marihuana users might ultimately be arrested for non-drug offenses, these officials were also asked to assess the relative truth of the statement that "most non-drug offenses committed by persons who are known users of marihuana or are found to have marihuana on their person or in their possession occur when the offender is under the influence of marihuana." Seventy-one percent of the responding judges, 75% of the probation officers and 85% of the court clinicians either thought the statement false or were unsure of its accuracy.

Respondents likewise rejected, however, the proposition that these crimes perpetrated by marihuana users occur when the offender is attempting to obtain the drug rather than while under its influence; 65.6% of the judges, 64.6% of the probation officers and 78.3% of the court clinicians either denied or were unsure of the truth of this proposition.

In short, marihuana, is not generally viewed by participants in the criminal justice community as a major contributing influence in the commission of delinquent or criminal acts.

This increasing professional skepticism is buttressed by the weight of research findings. A comprehensive review of the literature revealed that in the various offender populations studied for this purpose, only a small percentage were marihuana users. In only a handful of cases did researchers report that criminal conduct followed the use of marihuana. Generally, the rate of self -reported, non-drug crime did not significantly differ between users and non-users.

Both of the Commission-sponsored studies (the New York and Philadelphia studies referred to earlier) corroborated this research consensus. In the Philadelphia study, for example, less than 10% of the sample were known to the police, and there were no significant differences among marihuana users and non-users in the sample who reported the commission of major criminal acts when statistical controls were applied. Further, most of the first offenses committed by users occurred prior to their use of marihuana, and only in rare instances did the offenses immediately follow (within 24 hours) upon the use of marihuana (five cases out of 741 first offenses and 19 cases out of 516 most recent offenses).

Likewise, the New York study revealed that about one-fifth of -the marihuana law violators arrested between 1965 and 1969 were found to have previous arrest records. Of those with previous arrests, the great majority of offenses (86%) involved traffic violations and minor violations of the vagrancy statutes. In but 10% of the cases the previous arrests were for assault, robbery, burglary or larceny.

In essence, neither informed current professional opinion nor empirical research, ranging from the 1930's to the present, has produced systematic evidence to support the thesis that marihuana use, by itself, either invariably or generally leads to or causes crime, including acts of violence,, juvenile delinquency or aggressive behavior. Instead the evidence suggests that sociolegal and cultural variable's account for the apparent statistical correlation between marihuana use and crime or delinquency.

A Sociocultural Explanation

The persistent belief that some relationship exists between marihuana use and crime is not without statistical support. Undoubtedly, the marihuana user of the 1920's and 1930's was overrepresented in the nation's jails and penitentiaries and in the general crime and delinquency statistics. Especially during the late 1920's and early 1930's when the nation was preoccupied with lawlessness, the translation of this statistical correlation into a causal hypothesis is not surprising.

The increasing incidence of use in the mid-sixties by white, affluent, middle class, high school youth, college students and adults has occasioned a reevaluation of the marihuana user and a reexamination of the crime issue. The overwhelming majority of the new marihuana offenders have had no previous arrests, and come from the normally low risk, middle and upper socioeconomic population groups.

Recent public opinion surveys suggest that considerable social disapproval is attached to the "hippie" life style, unconventional mode of dress and apparent disregard for the law

displayed by many of these individuals. Nonetheless, fewer persons are now willing to classify as criminal those marihuana users whose only contact with the law has been as a result of their marihuana use. Perceptions have undergone a change as a result of the increased usage of marihuana among youth of the dominant social class. Nonetheless, a statistical association remains.

First, the majority of both marihuana users and offenders other than actual marihuana law violators fall into the 14-to-25-year age group. Second, the majority of those arrested for marihuana law violations as well as other delinquent or criminal acts were, and to a much lesser degree, still are, drawn from the same "high risk" populations, such as minority groups, socially and economically disadvantaged, young, male, inner-city residents.

Third, various offender populations subjected to study often included a number of marihuana users, although it was not the marihuana violations per se but other, more serious criminal conduct that originally brought most of them to the attention of the authorities. Finally, during the past five years, marihuana law violators have increasingly swelled the crime and delinquency statistics; in most cases, their only contact with the law has been for these marihuanaspecific offenses.

The Philadelphia study corroborated this continuing statistical association. The simple relationship between using marihuana and committing offenses was positive and statistically significant, and there was also a high correlation between frequency of smoking marihuana and committing offenses. These direct associations were reduced to insignificance, however, upon further analysis of the data, and other explanations for the coincidence of marihuana use and crime became evident. These included: race, education, age, the use of other drugs, and having drug-using friends.

We conclude that some users commit crimes more frequently than non-users not because they use marihuana but because they happen to be the kinds of people who would be expected to have a higher crime rate, wholly apart from the use of marihuana. In most cases, the differences in crime rate between users and non-users are dependent not on marihuana use per se but on these other factors.

In summary, although the available evidence suggests that marihuana use may be statistically correlated with the incidence of crime and delinquency, when examined in isolation from the other variables, no valid evidence was found to support the thesis that marihuana' by itself, either inevitably, generally or even frequently causes or precipitates the commission of crime, including acts of violence, or juvenile delinquency.

Within this framework, neither the marihuana user nor the drug itself can be said to constitute a danger to public safety. For, as two researchers have so cogently stated for the Commission, "Whatever an individual is, in all of his cultural, social and psychological complexity, is not going to vanish in a puff of marihuana smoke."

MARIHUANA AND DRIVING

Within the context of public safety another issue which merits attention is the extent to which drivers under the influence of marihuana constitute a hazard on the nation's streets and highways. Although in recent years increasing attention has been given to this issue, at present little empirical evidence exists to inform discussion.

To assess the actual and potential impact of marihuana on traffic safety, a number of basic research questions must be answered.

the extent to which marihuana users actually drive while under the influence of the drug

the extent to which marihuana users driving while "high" commit traffic violations and are involved in traffic accidents

the amounts of marihuana consumed immediately prior to the commission of traffic violations or the involvement in traffic accidents and the drug's role in these events

the nature and extent to which marihuana actually impairs psychomotor skills, judgment and driving performance

To date, the generalizations made concerning the effects of marihuana on driving behavior have generally been based on statistical studies of traffic violations and accidents and inferences drawn from more general studies of the physiological and psychological consequences of marihuana use, such as changes in pulse rate, reaction time, neuromuscular coordination, time estimation and spatial perceptions.

Such studies pose serious limitations in the nature, reliability and validity of the data. The basic problems derive from difficulties in identifying and attributing cause. A major obstacle in such retrospective analysis is the inability to separate the effects of marihuana from those possibly engendered by the use of other drugs, such as alcohol, tranquilizers and amphetamines. Finally, conclusive analysis is impossible until a reliable technique is developed for measuring the level of marihuana present in the body of the driver at the time of his violation or accident.

Prospective experimental studies of actual reactions to road conditions and traffic emergency situations would undoubtedly provide the most reliable and valid data, but such studies would themselves endanger the public and have not been undertaken. Researchers have relied, therefore, on controlled laboratory simulator studies and direct interviews with those who have admitted to driving while under the influence of marihuana.

With respect to the simulator studies , the available evidence suggests that while, in some cases, marihuana has produced interference with certain motor or mental abilities which affect driving behavior, these effects were generally believed to be readily overcome by the exercise of extreme caution by the driver and a significant reduction in speed.

The few driving simulator tests completed to date have generally revealed no significant correlations between marihuana use and driving disabilities. Comparison of the simulator scores of users and nonusers, however, did reveal small but nonsignificant differences in the number of speedometer errors made.

These simulator studies also examined the comparative effects of alcohol and marihuana on driving scores. The findings of one study, though controversial, suggested that intoxication resulting from low doses of marihuana was less detrimental to driving performance than was the presence of alcohol at the legally prohibited blood level of .10%.

The methodological limitations of the study raise serious questions about the reliability and validity of the findings. As one critic has noted, "It does not follow automatically that lack of effect of a drug on the simulated task will correlate with lack of effect on the actual task."

Further , the use of dissimilar doses of alcohol and marihuana has led another critic to assert that "finding that a heavy dose of alcohol caused more impairment than a mild dose of marihuana is neither surprising nor helpful in assessing the relative effects of the two drugs in the relative doses in which they are normally used."

Recent research has not yet proven that marihuana use significantly impairs driving ability or performance. The Commission believes, nonetheless, that driving while under the influence of any psychoactive drug is a serious risk to public safety; the acute effects of marihuana intoxication, spatial and time distortion and slowed reflexes may impair driving performance. That the risk of injury may be greater for alcohol than for marihuana matters little.

Obviously, Much more research needs to be undertaken in this area. Hopefully, recent studies sponsored by the National Institute of Mental Health and other agencies will soon provide the concrete information that is needed.

Marihuana, Public Health and Welfare

As the feared threat to public safety through violent crime has diminished in recent years, policy-makers and the public have begun increasingly to view marihuana and other illicit drug use as a public health concern. The National Survey indicates that American adults regard drug abuse as the third most pressing problem of the day, closely following the economy and Vietnam. However, public attitudes reflect considerable confusion about the facts concerning marihuana and drugs in general.

This confusion has resulted from too little understanding of the motives for drug use as well as inadequate knowledge of the classification of drugs according to their main effects. Legal penalties have frequently mirrored this confusion, and the resulting inconsistencies cause, many young people to lose confidence in adult authority. Even in the medical profession, much uncertainty is evident, and for most of the general public there is no clear authority to whom they can turn for guidance.

A PUBLIC HEALTH APPROACH

The Commission broadly defines public health concerns as all health problems which affect people en masse and are thereby difficult to treat on a traditional physician-to-patient basis. This category would include social and economic dependence and incapacity. A health problem which spreads to other susceptible members of the society cannot be controlled by the individual physician. This view coincides with the concept of preventive medicine, recognizing that all public health problems must be dealt with on both an individual and societal level.

To illustrate, the increasing incidence of deaths due to lung cancer subsequent to chronic, heavy tobacco usage is a major public health concern. In this instance, prevention of smoking and ascertaining the cause of the malignancies, rather than the individual treatment of each case by a physician, define the public health dimension. A major concern exists because the population at risk is large and growing, and the risk of harm is great.

In addition to the risk of large numbers of the populace being affected, the issue of contagion must also be examined. Unlike infectious diseases such as influenza and

smallpox, where the person affected " catches" the ailment unintentionally, those individuals who use marihuana choose to come into contact with it. The contagion model is relevant only insofar as social pressure from proselytizing friends and social contacts play a role in spreading the use of the, drug. This dimension exists with marihuana, as well as alcohol and tobacco.

After assessing the potential harm to .he individual and society, the size of the population at risk and the contagion aspect, society must determine the nature of the control mechanism used to deal with the problem, and how nine]) of its health resources, manpower and facilities will be allocated to meet the perceived threat to the public health. Therefore, an analysis of the relative risk of marihuana use must be undertaken. We must examine not only the effects of the drug on the individual but also determine which groups are at risk and why.

Practically all substances consumed by man are potentially dangerous to the physical or mental health of the individual if used irresponsibly or by particularly sensitive persons. Certain substances are sufficiently complex in their effects that societal control is necessary to reduce risk, for example, fluorides added to the water supply, prescription drugs, and food additives. The degree of concern and control varies, depending on relative public health dangers.

The Population At Risk

Before the dangers can be assessed, the population at risk must be defined. Viewing the public health picture on a large scale, the United States in 1972 may still be considered fortunate with regard to marihuana usage. While it is the third most popular recreational drug, behind alcohol and tobacco, it has not been institutionalized and commercialized.

Most of the Americans who have used marihuana have been merely experimenting with it. As noted in Chapter 1, there are 24 million Americans who have tried marihuana at one time or another, with 8.3 million still using it. Of those who have quit, most say they have simply lost interest in it. The same Survey shows that experience with marihuana peaks in the 18-to-25-year-old group and falls off sharply thereafter. A fact of some significance is that at least 71% of all adults (18-years and older) and 80% of youth (12-to-17-years) have never used marihuana at all.*

The Survey also indicates that the majority of those youth and adults who continue to use marihuana do so intermittently, that is, between one and 10 times a month. These individuals are classified as intermittent marihuana smokers who use the drug for its socializing effects. They are, for the most part, ordinary Americans who are either in school or are employed.

About 2% of those who have ever used marihuana, or 500,000 people, now use the drug heavily. They use the drug several times a day. These individuals use marihuana for its personal drug effects in addition to its socializing effects. Generally, their life styles, values, attitudes, behaviors and activities are unconventional. Marihuana plays an important role in their lives. Because the risk of psychological, and perhaps physical, harm from marihuana increases with the frequency quantity and duration of its use, these heavy marihuana users constitute the greatest at-risk population in the United States today.

The heavy marihuana user presents the greatest potential concern to the, public health. It is the Commission's opinion that these heavy marihuana users constitute a source of contagion

within American society. They actively proselytize others into a drug-oriented way of life. The effectiveness of peer group pressure has been described earlier in Chapter II

We anticipate that this at-risk population would increase in number should a policy of institutionalized availability be adopted toward marihuana. Although marihuana is readily available illicitly in the United States today, a policy permitting its legal distribution could be expected to bring about an increase in users, with some percentage of them becoming heavy users. It is the availability of the drug, coupled -with a governmental policy of approval or neutrality, that could escalate this group into a public health and welfare concern. While this is speculative, it is a concern which cannot be dismissed. The experience with the rise in the use of tobacco and alcohol makes clear the probable consequences of commercial exploitation.

Another concern of the Commission is the experience of other countries which have large heavy user populations. While the pattern of behavior in one country is not automatically similar to a pattern of behavior in another country, the existence of heavy user populations constitutes a serious public health concern which must be avoided in this country. The availability of the drug alone does not seem to determine increased usage; supply and governmental inaction appear to tip the balance toward increased use. The proportion of our population susceptible to this pattern of use is conjectural but good preventive public health requires limiting the number to an irreducible minimum.

*In the self-administered instrument, several separate questions were utilized to elicit the respondent's experience with marihuana. This technique permitted an analysis of consistency of responses, and also minimized the possibility of nonresponse. Nevertheless, 14% of the adults and 6% of the youth did not respond to enough of these questions to ascertain whether they had ever tried marihuana or not.

Percentage who-	Adult	Youth
Ever used	15	14
Never used	71	so
No response	14	6

Confusion and Fact

One of the primary sources of confusion surrounding the use of marihuana and other psychoactive drugs is the ambiguity of the term "drug abuse." In many quarters the excessive use of any drug is considered drug abuse, regardless of the effect of the drug on the individual or his behavior. In order to clarify this issue the Commission defines psychoactive drug abuse as follows:

Drug abuse is the use of psychoactive drugs in a way likely to induce mental dysfunction and disordered behavior.

It should be emphasized that demonstrable pathology of organ systems, including the brain,

is not a necessary characteristic of psychoactive drug abuse. There are numerous non-psychoactive drugs which can induce extensive organ pathology but do not modify behavior; such drugs leave their imprint primarily on the individual, not on society. The Commission believes that many of the perplexing issues relating to psychoactive drugs, including marihuana, can be clarified if drug abuse refers only to the impact of drug-induced behavior on society.

Three types of such drug-induced behavior are considered unacceptable in most organized societies: (1) aggressiveness leading to violence; (2) loss of psychomotor control; (3) mental or physical disorder leading to social and economic incapacity or dependency.

This is not to say that society is unconcerned about the harmful effects of psychoactive drugs on the individual, or that such effects do not merit the attention of public health officials. Cigarette smoking, although affecting primarily the individual, is surely a matter of public health concern. We believe, however, that the term drug abuse, with its attendant societal disapprobation, should be reserved for drug taking which has a more direct effect on society through disordered behavior.

Beyond the confusion surrounding the term drug abuse, a rational evaluation of the public health impact of marihuana use is also inhibited by extensive misinformation about the drug. Recently, a great deal of research has increased significantly our knowledge about marihuana. Further research data are necessary before a conclusive statement about marihuana and public health can be made. However, enough is known today to discuss some of the public perceptions in detail. And sufficient data are presently available to allow for rational decision-making.

ASSESSMENT OF PERCEIVED RISKS

The Commission believes that marihuana is perceived by the American public to present the following risks to the public health:

lethality

potential for genetic damage or teratogenicity

immediate adverse physical or mental effects

long-term physical or mental effects including psychosis and "amotivation" syndrome

"addiction" potential

* progression to other stronger drugs, especially heroin

Lethality

The Commission's National Survey revealed that 48% of adults believe that some people have died from marihuana use. A careful search of the literature and testimony of the nation's health officials has not revealed a single human fatality in the United States proven to have resulted solely from ingestion of marihuana. Experiments with the drug in monkeys

demonstrated that the dose required for overdose death was enormous and for all practical purposes unachievable by humans smoking marihuana. This is in marked contrast to other substances in common use, most notably alcohol and barbiturate sleeping pills.

Of comparative note, 89% of all adults in the same Survey believe that some people have died from using alcohol. This indicates that public opinion regarding alcohol and its potential lethality is more accurate than it is for marihuana. At the same time, factual knowledge regarding the inherent danger in using a substance, for example alcohol, seemingly does not deter many persons from using it irresponsibly.

Potential For Genetic Damage

The thalidomide tragedies of the 1950's have taught us to ponder carefully the possibility of genetic damage subsequent to any drug use. The much publicized controversy regarding LSD and subsequent genetic damage has led investigators to study marihuana and its possible genetic effects. Although a number of studies have been performed, at present no reliable evidence exists indicating that marihuana causes genetic defects in man.

Early findings from studies of chronic (up to 41 years), heavy (several ounces per day) cannabis users in Greece and Jamaica also failed to find such evidence. In all its studies, the Commission found no evidence of chromosome damage or teratogenic or mutagenic effects due to cannabis at doses commonly used by man. However, since fetal damage cannot be ruled out, the use of marihuana like that of many other drugs, is not advisable during pregnancy.

Immediate Effects

The intoxicant effects of marihuana on the mental function of the user does have potential health significance both for the individual and others with whom he may come in contact. Because marihuana is a psychoactive drug, it is important to examine the acute toxic effects which may occur in certain predisposed individuals and which increase with the potency of the preparation.

The Commission has reviewed numerous clinical studies describing acute panic reactions and transient psychotic-like episodes which occur as acute effects of the drug intoxication. In addition, a predisposed individual might experience aggravation of a latent psychotic state or other underlying instability. Although severe abnormal psychological states are rare when compared to the total number of marihuana users, lesser problems are not rare, and they may endanger both the individual and those around him at the time of their occurrence. The individual contemplating use is not capable of predicting whether he is predisposed by his particular circumstances to an undesirable mental reaction. The undesirable consequences occurring while an individual is involved in complex tasks such as driving or operating machinery or tasks requiring fine psychomotor precision and judgment are all too imaginable.

From a public health point of view, the immediate effects of marihuana intoxication on the individual's organs or bodily functions are of little significance. By and large these effects, which have been carefully outlined in Chapter 11 of the Report, are transient and have little or no permanent effect upon the individual.

Effects Of Long-Term, Heavy Use

To determine the long-term chronic effects of heavy marihuana use, the Commission has carefully reviewed the world literature and contemporary studies of heavy, chronic (up to 41 years) cannabis users in the world. In addition, lower socioeconomic populations in Afghanistan, Greece, and Jamaica have been examined.

Effects On The Body

These recent studies in Greece and Jamaica report minimal physical abnormalities in the cannabis users as compared with their non-using peers.

Minimal abnormalities in pulmonary function have been observed in some cases of heavy and very heavy smokers of potent marihuana preparations (ganja or hashish). However, one study concluded the cause was smoking in general no matter what the substance. The other study could not express any conclusion because of the absence of a control population. Such decrements in normal pulmonary capacity may represent early warning signals in the development of chronic lung disease. They must be considered in any program of early prevention of disease and future disability.

No objective evidence of specific pathology of brain tissue has been documented. This fact contrasts sharply with the well-established brain damage of chronic alcoholism.

Effects On The Mind

No outstanding abnormalities in psychological tests, psychiatric interviews or coping patterns have been conclusively documented in studies of cannabis users in other countries of the world. Further research in this important area is necessary before definite conclusions can be drawn relating or linking marihuana to mental dysfunction because available psychological tests do not measure certain higher mental functions very accurately.

Cannabis use has long been known to precipitate short-term phychotic-like episodes in predisposed individuals or those who take excessive doses. Some observers report that the prevalence of shortterm psychoses as well as the psychotic episodes of longer duration in heavy cannabis users are compatible with the prevalence rate of psychosis in the general population and, therefore, may not be attributable to cannabis use. In fact, some believe that in populations under stress where marihuana is widely used, occurrence of the acute psychotic-like episodes occur less often than one would expect in such a population. Other researchers have disagreed with these conclusions, and the matter is still controversial.

Effects On Motivation

The Commission is deeply concerned about another group of behavioral effects that have been described in other nations as being associated with the heavy, long-term use of cannabis. This behavioral condition has been termed the "amotivational syndrome." An

extreme form has been reported in populations of lower socioeconomic males in several developing nations. These reports describe lethargy, instability, social deterioration, a loss of interest in virtually all activities other than drug use. This state of social and economic disability also results in precipitation and aggravation of psychiatric disorders (overt psychotic behavior) and possible somatic complications among very heavy, very long-term users of high potency cannabis products. However, in the populations so far observed in Jamaica, Greece, and Afghanistan, physical and psychosocial deterioration was not reported. The life styles of these populations appeared to be conditioned by cultural and socioeconomic factors. Some researchers believe cannabis' may serve to keep these individuals stratified at this lower socioeconomic level.

The occurrence of a similar, though less intense, syndrome has been identified recently with heavy marihuana use among young persons in the Western world, including the United States. Some clinicians have described the existence of a complex of subtle social, psychological and behavioral changes related to a loss of volitional goal direction in certain individuals, including some long-term heavy users of marihuana. Such persons appear to orient only to the present. They appear, alienated from generally accepted social and occupational activities, and they tend to show a reduced concern for personal hygiene and nutrition.

Some clinicians believe that this picture is directly caused by the action of marihuana. However , other behavioral scientists believe that among impressionable adolescents, marihuana-induced suggestibility may facilitate the rapid adoption of new values and behavior patterns, particularly when the drug is taken in a socially alienated subculture that advocates and strongly reinforces such changes.

Whichever interpretation one accepts, the fact is apparent that the chronic, heavy use of marihuana may jeopardize social and economic adjustments of the adolescents We believe this is one concern which merits further research and evaluation. On the basis of past studies, the chronic, heavy use of marihuana, seems to constitute a high-risk behavior, particularly among predisposed adolescents. This consideration is especially critical when we consider the adolescent who is in the throes of a normally turbulent emotional process. The Commission has reviewed numerous reported studies and heard the testimony of several clinicians dealing with heavy users of marihuana who exhibit this particular behavior pattern. Although the United States does not, at the present time, have a large number of such persons within its population, the incidence is too frequent to ignore. Expanded epidemiologic studies are imperative to obtain a better understanding of this complex behavior.

Addiction Potential

Unfortunately, fact and fancy have become irrationally mixed regarding marihuana's physiological and psychological properties. Marihuana clearly is not in the same chemical category as heroin insofar as its physiologic and psychological effects are concerned. In a word, cannabis does not lead to physical dependence. No torturous withdrawal syndrome follows the sudden cessation of chronic, heavy use of marihuana. Although evidence indicates that heavy, long-term cannabis users may develop psychological dependence, even then the level of psychological dependence is no different from the syndrome of anxiety and restlessness seen when an American stops smoking tobacco cigarettes.

Progression To Other Drugs

As noted in Chapter 11, to say marihuana leads to any other drug avoids the real issue and reduces a complex set of variables to an oversimplified premise of cause and effect. If any one statement can characterize why persons in the United States escalate their drug use patterns and become polydrug users, it is peer pressure. Indeed, if any drug is associated with the use of other drugs, including marihuana, it is tobacco, followed closely by alcohol. Study after study which the Commission reviewed invariably reported an association between the use of tobacco, and, to a lesser extent, of alcohol with the use of marihuana and other drugs.

The fact should be emphasized that the overwhelming majority of marihuana users do not progress to other drugs. They either remain with marihuana or foresake its use in favor of alcohol. In addition, the largest number of marihuana users in the United States today are experimenters or intermittent users, and 2% of those who have ever used it are presently heavy users. Only moderate and heavy use of marihuana is significantly associated with persistent use of other drugs.

Some persons in our society are interested in experimenting with a series of drugs, and there is no uniformity regarding which drug these multidrug users take first. In some cases, the drug used is a matter of preference; in others, a matter of availability; and in further instances, it matter of group choice.

Citizens concerned with health issues must consider the possibility of marihuana use leading to use of heroin, other opiates, cocaine or hallucinogens. This so-called stepping-stone theory first received widespread acceptance in 1951 as a result of testimony at Congressional hearings. At that time, studies of various addict populations repeatedly described most heroin users as marihuana users also. The implication of these descriptions was that a causal relationship existed between marihuana and subsequent heroin use. When the voluminous testimony given at these hearings is seriously examined, no verification is found of a causal relationship between marihuana use and subsequent heroin use.

Again, we must avoid polarity on this issue. To assume that marihuana use is unrelated to the use of other drugs would be inaccurate. As mentioned earlier, the heavy or very heavy marihuana users are frequently users of other drugs. The stepping-stone theory holds that the adolescent begins the use of illicit drugs with marihuana, and later proceeds to heroin in the search for greater thrills. The opposing viewpoint holds that the large majority of marihuana users never become heroin addicts and denies the validity of a causal relationship.

In the National Survey, among the adult respondents, 70% thought that marihuana makes people want to try stronger drugs such as heroin; 56% of the youth in the 12-to-17-year-old category agreed with the same statement. These perceptions contrast with another finding in the same Survey which revealed that 4% of current marihuana users have tried heroin. On the other hand, very few respondents perceived alcohol and tobacco to be precipitants of other drug use.

Studies of the escalation process demonstrate that the rates of progression vary from one group to another and from one segment of the population to another. There is no set proportion of marihuana users who "escalate" to the use of other drugs. The other drugs which some marihuana smokers use vary according to the social characteristics of the population in question. Within some groups, heroin may be the choice; in other groups, it may be LSD.

Marihuana use per se does not dictate whether other drugs will be used; nor does it determine the rate of progression, if and when it occurs, or which drugs might be used. As discussed in Chapter II, the user's social group seems to have the strongest influence on whether other drugs will be used; and if so, which drugs will be used.

PREVENTIVE PUBLIC HEALTH CONCERNS

The hallmark of a good health care delivery system is preventing as much illness as possible. This objective is achieved by means of immunizations, regular routine checkups, and educational programs.

Education programs regarding marihuana have been notably ineffective, partly due to an exaggeration of the effects of using the drug and partly because the effects of the opiates and marihuana have been compared inaccurately. As a result, many persons have developed a conscious or unconscious denial of nearly all dangers associated with marihuana use. Some educators believe that drug programs merely sharpen the curiosity of children and tempt them to use drugs which they otherwise would not use. Others believe that the responsibility should not be lodged with the schools but rather with the home or the community.

Because of the uncertainty about the efficacy of these, programs, education programs dealing with drug usage simply do not exist in the school systems of a number of major cities; in others, token programs are offered in response to the demand that something be done. Health educators have the responsibility to help this vulnerable group of Americans become aware of all options so that they are able to make enlightened choices.

The educational role of physicians and other clinical health personnel should not be underestimated. The National Survey shows that the public believes young people should receive information concerning marihuana first from schools and second from family physicians. The health professional has a unique position as both teacher and confidant to an individual struggling with a "drug abuse" problem. Honest, sincere, and confidential guidance from a physician may prevent later difficulties to both the individual and the society. The Commission believes that action must be taken to inform and support the physician in his role as confidant and counsellor to those seeking assistance.

Considering the current patterns of marihuana use in the United States, the need for treatment and/or rehabilitation does not appear necessary for the vast majority of persons who are experimenting with the drug or using it intermittently. Rather, these persons need to be realistically educated regarding the potential hazards they face. To this end, a comparison of the personal and public health risks of marihuana and those of heroin, cocaine, amphetamines, and other drugs would be useful.

A concern for public health also requires thoughtful consideration of the consequences of any change in public policy. We have objectively appraised the present scope of public health concerns concluding that the most serious risk lies with the population of heavy users, which is, at this time, quite small in this country.

Now, we must soberly consider the likely effect of adoption of a social policy of neutrality or approval toward marihuana use. Any legal policy which institutionalizes availability of the drug carries with it a likely increase in the at-risk population. This factor is not necessarily conclusive in itself , but it does weigh heavily for the policymaker. Even though the

proportion of heavy users in the total using population might not increase if such a social or legal policy were adopted, the absolute number of heavy users would probably increase. Thus, we would have an increase in the at-risk segment of the populace. A greater stress would thereby be placed on the general health care delivery system in all the areas of health concern described earlier.

Regardless of emerging social policy, greater emphasis must be placed on educating our youth regarding the prospective dangers inherent in expanded marihuana use. This anticipatory guidance can serve to defuse or at least forestall a potentially serious social phenomenon.

Summary

From what is now known about the effects of marihuana, its use at the present level does not constitute a major threat to public health. However, this statement should not lead to complacency. Marihuana is not an innocuous drug. The clinical findings of impaired psychological function, carefully documented by medical specialists, legitimately arouse concern. These studies identify marihuana-related problems which must be taken into account in the development of public policy. Unfortunately, these marihuana-related problems, which occur only in heavy, long-term users, have been over generalized and overdramatized.

Two percent of those Americans who have ever used marihuana are now heavy users and constitute the highest risk group. Strong evidence indicates that certain emotional changes have taken place among predisposed individuals as a result of prolonged, heavy marihuana use. The clinical reports in the literature describing transient psychoses, other psychiatric difficulties, and impairment of cognitive function subsequent to use of marihuana and of other drugs do not prove causality but cannot be ignored.

The causes of these emotional difficulties are much too complex to justify general conclusions by the public or the press. The mass media have frequently promoted such clinical reports to appear as far reaching events affecting the entire population. The clinician sees only the troubled Population of any group. In evaluating a public health concern, the essential element is the proportion of affected persons in the general group. The people responsible for evaluating public health problems must concern themselves with the proportion of people out of the total population who are affected by any specific condition. The highest risk groups should be identified as the source of primary concern. A recognition that a majority of marihuana users are not now a matter of public health concern must be made so that public health Officials may concentrate their attention where it will have maximum impact.

The concept of relative risk is crucial to an evaluation of the impact of marihuana on public health. We believe that experimental or intermittent use of this drug carries minimal risk to the public health, and should not be given overzealous attention in terms of a public health response. We are concerned that social influences might cause those who would not otherwise use the drug to be exposed to this minimal risk and the potential escalation of drug-using patterns. For this group, we must deglorify, demythologize, and deemphasize the use of marihuana and other drugs.

The Commission reemphasizes its concern about the small minority of heavy, long-term marihuana users who are exposed to a much greater relative risk of impaired general functioning in contemporary America. Public health officials should concentrate their

efforts on this group. Fortunately, the group has to date not grown sufficently in size to warrant its being considered a major public health concern.

We retiterate, too, the public health implications of an increase in the at-risk population. We suspect that such an increase is most likely if a sudden shift in social policy significantly increased availability of the drug. One of the factors we consider in Chapter V when evaluating the various social policy options and legal implementations is the effect of each policy on incidence and patterns of use. Regardless of how heavy this particular variable will weigh in that process, we must state that a significant increase in the at-risk population could convert what now a minor public health concern in this country to one of major proportions.

Marihuana And The Dominant Social Order

For more than 30 years it has been widely assumed that the marihuana user constitutes a threat to the well-being of the community and the nation. Originally, the users were considered to be "outsiders" or marginal citizens. Included were such people as hustlers, prostitutes, itinerant workers, merchant seamen, miners and ranchhands, water-front day laborers and drifters, many of whom were drawn from the lower socioeconomic segments of the population.

Concerns about marihuana use expressed in the 1930's related primarily to a perceived inconsistency between the life styles and values of these individuals and the social and moral order. Their potential influence on the young was especially worrisome. When marihuana was first prohibited, a recurrent fear was that use might spread among the youth. And in the late 1930's and 1940's, the attraction of young people to jazz music was thought to be in part related to marihuana use by this "outsider" population.

Throughout this early period, American society, in reaction to its fear of the unfamiliar, translated rumor about the criminality and immorality of the marihuana user into "unquestioned fact" which, in turn, was translated into social policy.

From the mid-thirties to the present, however, social perceptions have undergone significant change in response to the emergence of new and challenging social problems. As marihuana, use has spread to include the affluent, middle class, white high school and college-age youth as well as minority group members of lower socioeconomic circumstances in urban core areas, the concept of marginality has become blurred.

Also, as the use of marihuana has increased, those individuals formerly labeled as marginal and threatening have been replaced by a more middle class, white, educated and younger population of marihuana smokers. A stereotyped user no longer exists, and therefore, the question now properly focuses on who poses a threat to the dominant order.

The Adult Marihuana User

Despite the fact that substantial numbers of adults use marihuana, society does not appear to feel greatly threatened by this group, probably because included in the group are a considerable number of middle class individuals who are regularly employed and whose occupational and social status appear to be similar to those of peers and colleagues who do not use marihuana.

In the course of its fact-finding effort, the Commission has met with several groups of socially and economically "successful" marihuana users in the professions of law, medicine, banking, education and business. In most cases, these persons, in their external appearances, seemed to be mature and responsible adults whose social attitudes and behavior did not mark them as radical ideologues or essentially irresponsible individuals.

For the most part, use of marihuana by adults has been found to be more directly related to the facilitation of social interaction (much like the adult use of alcohol in social gatherings) than to any other factor. Although their marihuana smoking behavior is illegal, most adult users are not ordinarily considered by their peers to be criminal nor is their use generally likely to result in arrest.

Because the adult user generally maintains low visibility, is primarily a recreational user, is not usually involved in radical political activity and maintains a life style largely indistinguishable from his non-using neighbors, he is not ordinarily viewed as a threat to the dominant social order. In short, aside from his use of marihuana, the adult recreational user is not generally viewed as a significant social problem.

The Young Marihuana User

The widespread use of marihuana by millions of young people of college and high school age has been viewed by many as a direct threat to the stability and future of the social order.

Many parents, adults in general, and government officials have expressed concern that young people who use marihuana often reject the essential values and traditions upon which the society is founded. Some have suggested that youthful marihuana use is, in itself, an indication of the rejection of responsibility and a sign of reckless hedonism which may well interfere with an orderly maturation process. Others see youthful marihuana use as part of a pattern of conduct which produces dropping out, underachievement and dependency.

In short, the mass character of youthful marihuana use has been frequently interpreted as a rejection of the institutionalized principles of law and a lack of concern for individual social responsibility, which threatens the social and political institutions.

Implicit in this view is the assumption that a young person who uses marihuana in spite of the law cannot be expected to assume an individually and socially responsible, adult role. The strength of this fear is drawn largely from the vocal and visible "counterculture" to which marihuana is often tied. Not surprisingly, the concerns posed by an alternate youthful life style are extended to the drug itself.

Threats to the social order are often seen, for example, in the character of youthful leisure time activities, such as attendance at rock concerts, occasioned by the high mobility and affluence of today's youth. They are also seen in the new modes of speech and dress and in the seemingly casual manner of their day-to-day living. Equally troublesome for many, however, is the idea of intentional intoxication for purposes of recreation.

Such conduct and the more casual attitude toward sexual relationships as well as participation in radical politics have provoked increasing concern throughout the adult society. The National Survey illustrates the extent to which the older adult perceives youthful marihuana use as part of a much larger pattern of behavior which bodes ill for the future of the nation.

First, the older the adult respondent, the more likely he was to picture the marihuana user as leading an abnormal life. Only 9% of the over-50 generation agreed with the statement that "most people who use marihuana lead a normal life." Nineteen percent of the 35to-49 age group and 29% of the 26-to-34-year-olds were of the same belief. Conversely, half of the young adults (18-to-25) considered most marihuana users normal. This fact is not surprising since many of their contemporaries are marihuana users.

Second, the marihuana user, as envisioned by adults, is typically a youthful dropout from society. He doesn't like to be with other people, is uninterested in the world around him, is usually lazy and has an above-average number of personal problems.

Third, the less optimistic the adult respondent was about the nation's youth, the more likely he was to oppose alteration of the marihuana laws and to envision major social dislocations if the laws were changed. Fifty-seven percent of the adult population in general agreed with the statement, "if marihuana were legal, it would lead to teenagers becoming irresponsible and wild." Among those adults who most disapproved of youthful behavior in general, 74% agreed with the quoted statement. Similarly, 84% of the non-approving adults favored stricter laws on marihuana.

As we discussed in Chapter I, marihuana's symbolic role in a perceived generational conflict has brought marihuana use into the Category of a social problem. Today's youthful marihuana user is seen as a greater threat to the social order than either the marginal user of earlier times or the adult user of the present. Since the concerns about marihuana today relate mostly to youth, the remainder of this section will focus on these youth-related issues.

THE WORLD OF YOUTH

Youth of today are better fed, better housed, more mobile, more affluent, more schooled and probably more bored with their lives than any generation which has preceded them.

Adults have difficulty understanding why such privileged young people should wish to offend by their language and appearance and spend so much effort trying to discredit those institutions of society which have made possible the privileges which those youth enjoy. Many adults perceive the present level of youthful discontent to be of a greater intensity than has been true of past generations.

Marihuana has become both a focus and a symbol of the generation gap and for many young people its use has become, an expedient means of protest against adult values.

Adults in positions of authority, parents, teachers, policy officials, judges, and others often view marihuana use as the sign of youth's rejection of moral and social values and of the system of government under which they live. The problem is that both youth and adults tend to make pronouncements and are frequently unable to reason together in logical fashion. Instead they overstate their positions in such a way that effective resolution of their differences becomes very difficult.

In effect, each group takes the rhetoric of the other at face value. For youth, however, marihuana use plays many roles, only one of which is a symbolic assault on adult authority and values.

Marihuana use, for many young people, has become a part of a ritual. It takes on the aspect of participating in a shared experience which, for some if not all, is enjoyable in itself. For many, it becomes an even more interesting experience because it is forbidden.

Some of the rituals concerned with the purchase, storage, preparation, and use of marihuana take on a mystique similar to the time of Prohibition when people went through certain rituals necessary to get a drink in a speak-easy. The three knocks and "Joe sent me" cues have been replaced by the not-so-secret handshakes, the new vocabulary of youth and other exclusionary devices to delineate the "in" group.

The use of marihuana is attractive to many young people for the sense of group unity and participation which develops around the common use of the drug. This sense tends to be intensified by a sense of "common cause" in those circumstances where users are regarded as social or legal outcasts.

They know, too, that many of their peers who share the marihuana experience and also share the designation of lawbreaker are, in reality, productive and generally affirmative individuals who are interested neither in promoting the downfall of the nation nor in engaging in acts which would harm the general well-being of the community.

In short, many youth have found marihuana use to be a pleasurable and socially rewarding experience. They have found that the continuance of this behavior has brought them more pleasure than discomfort, more reward than punishment.

Youth have increasingly come to see law enforcement activity directed at marihuana use as an unreasonable and unjustifiable rejection of their generation. Most of these youth have grown up with a positive image of the police as protectors of society. Now, many are confronted with the possibility of police intrusion into their private lives and the threat of a criminal record. The unfortunate result, in many instances, has been a blanket rejection and distrust of both the agents and institutions of government.

In part, marihuana use as a social behavior is an unintended byproduct of the formal and informal educational process. Some persons even suggest that youthful drug usage is a "success" in terms of the educational and socialization process. Our society values independence of thought, experimentation, and the empirical method, often reinforcing this attitude by such advertising cliches as "make up your own mind," "be your own man..... judge for yourself."

Although experimentation with regard to drugs should not be considered a "success, the Commission does believe that the educational efforts necessary to discourage this curiosity, which may be valuable in other matters, have not succeeded. We understand why teenagers and young adults encouraged over the years to make up their own minds have not been restrained by exaggerated accounts of marihuana's harmful effects, or by the more recent assertions that a true evaluation of marihuana uses requires more research. The Scottish verdict of "not proven" does little to restrain youthful curiosity.

In the previous Chapter, we emphasized the difference between the vast majority of experimenters and intermittent users and the small group of moderate and heavy users who generally use drugs other than marihuana as well. The former do not differ significantly from non-users on many indices of social integration. Various studies indicate that they maintain normal patterns of living and social interaction, and are employed, competent citizens.

On the other hand, there undoubtedly are a number of persons who have used marihuana

and have exercised poor judgment, performed inadequately, or behaved irresponsibly while under the drug's influence, thus jeopardizing themselves or others. The fact remains, however, that a certain number of these persons were immature and irresponsible individuals even prior to marihuana use, who would be expected to have poor or impaired judgment whether or not marihuana was involved.

The marihuana user is not, for the most part, a social isolationist or a severely disturbed individual in need of treatment or confinement. Most users, young or old, demonstrate an average or above-average degree of social functioning, academic achievement and job performance. Their general image of themselves and their society is not radically different from that of their non-marihuana-using peers. The majority of both groups tends to demonstrate equal interest in corporate concerns.

Based upon present evidence, it is unlikely that marihuana users will become less socially responsible as a result of their marihuana use or that their patterns of behavior and values will change significantly.

WHY SOCIETY FEELS THREATENED

Society appears to be concerned about marihuana use primarily because of its perceived relationship to other social problems. We noted in the discussion of marihuana and public health that the focus of social concern should be the heavy users and the possibility that their numbers will increase. Here we consider the perceived impact of marihuana use upon the institutions and proclaimed goals of the society.

Dropping Out

Many parents have a genuine fear that marihuana use leads to idleness and "dropping out." During the 1960's, marihuana use, as well as the use of other psychoactive drugs, became equated with unconventional youth life styles. When a number of young people adopted unconventional life styles, many adults tended to view long hair, unkempt appearance and drugs as symbols of counterculture.

They concluded that anyone who allowed his hair to grow or gave little attention to his clothing or appearance was probably a drug user with little or no motivation to achieve and no interest in conventional goals.

A number of researchers and clinicians have observed the use of marihuana or hashish in other societies, particularly among poor, lower class males. Some have observed that many of these individuals are generally unmotivated and ordinarily appear to show little aspiration or motivation to improve their way of life, regardless of whether they are judged by the standards of the more prosperous members of their own society or by middle class standards of contemporary American society.

One of the problems with this type of analysis is that it fails to perceive the social and cultural realities in which the phenomenon takes place. In the Middle East and in Asia where hashish is used, the societies, in all instances, are highly stratified with people in the lower classes having virtually no social or economic mobility. Poverty, deprivation and disease were the conditions into which these people were born and in which they remain, regardless of whether they use cannabis. In this context, a person's resignation to his status in life is

not likely to be caused or greatly influenced by the effects of cannabis. Any society will always have a certain number of persons who, for various reasons, are not motivated to strive for personal achievement or participate fully in the life of the community. Therefore, the determination is difficult to make whether cannabis use influences a person to drop out and, if it does, to what extent.

Some individuals possess particular personality as well as psychosocial characteristics which in specified instances could produce amotivation or dropping out. However, little likelihood exists that the introduction of a single element such as marihuana use would significantly change the basic personality and character structure of the individual to any degree. An individual is more likely to drop out when a number of circumstances have joined at a given point in his lifetime, producing pressures with which he has difficulty in coping. These pressures often coincide with situations involving painful or difficult judgments resulting from a need to adjust to the pressures of the social environment.

Many young people, particularly in the college population, are shielded in their earlier years from experiences which might be emotionally stressful or unpleasant. Some young people, so sheltered, are neither equipped to make mature and independent judgments nor prepared to enjoy the new-found freedom of the university or college in a mature and responsible way. Some of these students are often unable to cope with social or academic adversity. After being sheltered for so long, some of these young people may be easily attracted to experiences which promise new excitement and to fall under the influence of a peer group whose values and living patterns may be inimical to a productive, healthy and continuous process of personal growth and maturity. In these instances, marihuana serves as the medium by which these individuals encounter social and psychological experiences with which they are ill-equipped to cope.

Certain numbers of these young people have demonstrated what is described as amotivation long before the smoking of marihuana became fashionable. Adolescence is often a particularly difficult period of search in many directions at the same time. In addition to seeking a concept of "self" the adolescent is, at the same time, attempting to comprehend the nature of the world around him and to identify his status and role in society.

Different individuals, with different backgrounds, socialization patterns, belief systems and levels of emotional maturity cope with the period of transition from childhood to adulthood in different ways. For a small number, dropping out might be one of these coping mechanisms whether or not they use marihuana. For others, the response to the difficult adjustments of adolescence takes other forms, some of which are more acceptable, "normal" and easier for adults to understand.

The young person who does not find it possible to cope with the pressures of his adolescent developmental period in ways convenient to the understanding of adult society should not be rejected, stigmatized or labeled. He requires both support and understanding and the opportunity to participate in roles which have meaning for him and in ways in which he feels comfortable. For a certain number of young people, marihuana and the mystique of the experience eases this passage by helping them share their feelings, doubts, inadequacies and aspirations with peers with whom they feel safe and comfortable.

Dropping Down

Apart from the concern over youthful dropping out and idleness, there is also widespread concern about "dropping down" or underachieving.

Parents frequently express fear that marihuana will undermine or interfere with academic and vocational career development and achievement by focusing youthful interests on the drug and those associated with the drug subculture. Some parents make considerable sacrifices for their children to go to school, and the fears that marihuana might undermine the academic, emotional and vocational development of their young are quite understandable.

The Commission reviewed a number of studies related to marihuana use by high school and college youth. No conclusive evidence was found demonstrating that marihuana by itself is responsible for academic or vocational failure or "dropping down," although it could be one of many contributory reasons. Many studies reported that the majority of young people who have used marihuana received average or above-average grades in school.

In part, underachievement is related to a view of what one individual judges to be the achievement capacity of another. This judgment is often made without concern for what the individual himself feels about his potential, his interests and his goals. Perceptions about achievement also frequently fail to take into consideration the individual feelings about the goals of his peers and the values of the larger society, including the relative prestige and status attached to various academic programs, occupations and professions.

Youth and Radical Politics

Aside from the issue of unconventional life styles and the concerns evoked by them, the other major concern of the sixties which related to youth and drugs was radical politics.

During the latter half of the decade, youthful anti-war groups were organized on many of the nation's college campuses and high schools. These groups could be divided into two segments. The largest segment consisted of concerned, sometimes confused, frustrated and well-meaning petition signers and demonstrators. Within this large group there was a small coterie of individuals who constantly sought to turn the demonstration into a confrontation and to protest for peace by means of violence. The second segment consisted of organizations of individuals whose stated purpose was to undermine the social and political stability of the society through violent means.

What must be clearly understood, however, is that among the young people, and some not so young, who protested against the war in Vietnam, only a minority were bent on violence and manipulated and corrupted these otherwise peaceful demonstrations for their own purposes.

At the various gatherings, a number of the young people protesting in these mass groups did smoke marihuana. We will never know how many were initiated to marihuana use during the course of these peace demonstrations. The fact remains, however, that in the large campins, such as those in Washington, marihuana was involved in two ways. First, there was the "normal" use in which the smoking was part of the social experience. Individuals came together and smoked, in part, to acknowledge and strengthen group solidarity. Second, another quite different aspect of the marihuana use at these gatherings said, in effect, "we know it's illegal but go and arrest all of us for doing it. . . ." This aspect can perhaps best be characterized as a symbolic challenge to authority.

Unfortunately, however, the media, particularly television and some of the news magazines, sometimes portrayed the image of a group of young people plotting the overthrow of the

nation by violent means while under the influence of marihuana. In those relatively few instances where explosives and other violent means were employed, the evidence points to a cold and calculated plan which was neither conceived nor executed under the influence of marihuana.

As a result of these protests and demonstrations, therefore, radical politics has been seen by many as a mechanism through which large numbers of young people would be introduced to marihuana as well as to other drugs. Radical political activity or mass political protest is viewed by some as a threat to the welfare of the nation and is assumed to be aided and encouraged by our enemies.

The involvement of large numbers of youth in political activism and the concomitant public concern about drug use have beclouded the issue of marihuana use and have led to a broadening of the concerns about marihuana on the part of adults.

Some of the radical movement's leaders abetted this tendency by pointing out the alleged irrationality and unfairness of the marihuana laws to recruit members to their ranks. Not surprising is the fact that 45% of the adult respondents in the National Survey felt that marihuana is often promoted by people who are enemies of the United States. Nor is it surprising that this belief is a function of age. While 22% of all young people (12-to-17 years of age) and 26% of young adults (18-to-25 years) identified marihuana with national enemies, more than one-half (58%) of those persons 50 years and older did so.

Youth and the Work Ethic

Of the many issues related to youth and the use of marihuana, one that greatly troubles many adults, is youthful attitudes toward work. The work ethic in our society is based on a belief that work is a good and necessary activity in and of itself.

The traditional view holds that work is not only a right and moral act but that it keeps people from mischief and from wasting time on harmful recreational pleasures. The rationale for this thesis is that work in American society has served as the primary means by which persons acquired the treasured symbols of society.

In fact, throughout much of our history, with the exception of the small number who inherited or married wealth, no ethical alternative to work existed. In recent years, the increased emphasis placed upon leisure time activities has resulted in shorter work weeks, longer vacation periods and more paid holidays.

Among the concerns of the adults about today's youthful attitudes toward work and leisure are that young people seem to enjoy their recreational pursuits so much that they forget that to a considerable degree their enjoyment is paid for by the labor of others.

Many young people do not express the same level of concern as their parents did about preparing themselves for a career and "getting ahead in the world." In part, this attitude is attributable to the fact that increasingly, the results of this labor are not tangible, material goods. Service occupations generally do not produce such tangible products, and even in manufacturing industries the individual worker is usually too remote from the product to feel any pride or interest in it. In both instances, the traditional symbol of the "manhood" of work, a tangible product, is no longer present.

In sum, society has become increasingly disturbed by certain attitudes of today's youth

which seem to stress pleasure, fun, and enjoyment without a counterbalancing concern for a disciplined and sustained work effort. Nevertheless, the number of young people who view work as unimportant is small when compared to the total number of young people. The Commission has found no evidence to suggest that the majority of youth are unwilling or incapable of productive and disciplined work performance. In fact, the great majority of young people are performing their tasks in industry, the professions and education quite effectively.

Although many young people delay entry into the work force to enjoy the fruits of our prosperous society, this delay does not mean they will not one day contribute their best efforts to the continued growth and advancement of the nation.

The Changing Social Scene

The present confusion about the effects of youthful marihuana use upon the dominant social order is caused by a variety of interrelated social concerns, many of them emotionally charged issues, including anti-war demonstrations, campus riots, hippie life styles, the rising incidence of crime and delinquency and the increased usage of all illicit drugs. The focus of concern about marihuana is aggravated by the data overload mentioned in Chapter 1, by the outpouring of incidental information about the drug and its effects in a form and volume far beyond the capacity of the readers or listeners to assimilate or interpret. Rather than informing the public, much of the data disseminated has produced frustration and misinterpretation of the information presented.

Adult society, including parents and policy-makers, finds it difficult to comprehend and account for many of the attitudes and behavior of the young, including the use of marihuana. In many cases the adults are still influenced by the myths of an earlier period which overstated the dangers of the drug. At a time of great social change and turbulence, the tendency to depend on the "traditional wisdom," and its moral justification, is a strong one.

Just as youth must try to understand and appreciate the strengths of the institutions of our society, adults must try to understand the times through the eyes of their children. Where marihuana is concerned, society must try to understand its role in the lives of those who use it. The key to such understanding lies in the changes which have taken place in society within recent years and the effects these changes have had on succeeding generations of youth. The increased use of marihuana is only one of these effects.

One focal point in discussion between generations is the contrast between the use of marihuana and the use of alcohol. Many young people perceive that marihuana is less dangerous than alcohol in terms of its addiction potential and long-term physical and psychological consequences. Many believe also that marihuana - and other psychoactive drugs make it possible to expand their perceptions and see this as a perfectly legitimate objective.

Viewed against the background of the profound changes of recent years in the fields of economics, politics, religion, family life, housing patterns, civil rights, employment and recreation, the use of marihuana by the nation's youth must be seen as a relatively minor change in social patterns of conduct and as more of a consequence of than a contributor to these major changes.

When the issue of marihuana use is placed in this context of society's larger concerns,

marihuana does not emerge as a major issue or threat to the social order. Rather, it is most appropriately viewed as a part of the whole of society's concerns about the growth and development of its young people.

In view of the magnitude and nature of change which our society has experienced during the past 25 years, the thoughtful observer is not likely to attribute any of the major social problems resulting from this change to marihuana use. Similarly, it is unlikely that marihuana will affect the future strength, stability or vitality of our social and political institutions. The fundamental principles and values upon which the society rests are far too enduring to go up in the smoke of a marihuana cigarette.

The Report of the National Commission on Marihuana and Drug Abuse

Chapter IV

social response to marihuana use

"I find the great thing in this world is not so much where we stand, as in what direction we are moving: To reach the port of heaven, we must sail sometimes with the wind and sometimes against it-but we must sail and not drift, nor lie at anchor."

Oliver Wendell Holmes, The Autocrat of the Breakfast Table (1858)

A general interpretation of the National Survey indicates that roughly one-quarter of the American public is convinced that criminal sanctions should be withdrawn entirely from marihuana use. Another fourth of the public is equally convinced that existing social and legal policy is appropriate, and would ordinarily jail possessors, with the exception of young first offenders. Approximately half of the citizenry is confused about what marihuana means and ambivalent about what society ought to do about its use. This half of the population is unenthusiastic about classifying the marihuana user as a criminal, but is reluctant to relinquish formal control over him.

In considering social and legal policy alternatives, the Commission has analyzed the pattern of social response to marihuana use.

The Initial Social Response

As we noted in Chapter I, the initial social reaction to marihuana use was shaped by the narcotics policy adopted by the Federal Government. In the early legislation, marihuana was officially characterized as a narcotic on the basis of the widely shared assumption that it was a habit-forming drug, leading inevitably to a form of dependence. Although the medical community was aware that marihuana was distinguishable from the opiates in that it did not produce physical dependence, no functional distinction was drawn; it was assumed that most users were psychologically compelled to continue using the drug. As one psychiatrist noted in 1934, the marihuana "user wants to recapture over and over again the ecstatic, elated state into which the drug lifts him . . . The addiction to cannabis is a sensual addiction: it is in the services of the hedonistic elements of the personality."

The notion of psychological dependence is still ill-defined, and was understood even less in the early days of American marihuana use. The Commission has concluded that the automatic classification of marihuana as "addictive" was derived primarily from an

underlying social perception of the substrata of society which used the drug: aliens, prostitutes, and persons at the bottom of the socioeconomic ladder.

Additional characteristics of the opiates were also transferred to marihuana. Particularly important in this regard was the association of marihuana with aggressive behavior and violent crime. One district attorney in New Orleans, where marihuana use was particularly common, wrote in 1931:

It is an ideal drug to cut off inhibitions quickly . . . At the present time the underworld has been quick to realize the value of this drug in subjugating the will of human derelicts to that of a master mind. Its use sweeps away all restraint, and to its influence may be attributed many of our present day crimes. It has been the experience of the Police and Prosecuting Officials in the South that immediately before the commission of many crimes the use of marihuana cigarettes has been indulged in by criminals so as to relieve themselves from the natural restraint which might deter them from the commission of criminal acts, and to give them the false courage necessary to commit the contemplated crime.

By 1931, those states in which marihuana use was at all common had formally responded with a total eliminationist policy. They generally amended the preexisting narcotics legislation to include marihuana. Meanwhile, in 1929, the Federal Government already had classified marihuana officially as a "habit-forming drug along with the opiates and cocaine, in the legislation which established two federal "farms" for treating narcotics addicts in Fort Worth, Texas, and Lexington, Kentucky.

During the 1930's, the remaining states criminalized marihuana use by adopting the Uniform Narcotic Drug Act, in which the drug was included (optionally) in the definition of narcotic drugs. Then, in 1937, Congress adopted the Marihuana Tax Act, completing the initial period of official response to marihuana use.

A difference of opinion among historians still exists as to why policymakers thought national legislation was necessary at that time. Whatever the reason, however, Congress responded swiftly, without much attempt to learn the facts about the drug and its use. The assumptions underlying that legislation were summarized in the Report of the House Ways and Means Committee:

Under the influence of this drug the will is destroyed and all power of directing and controlling thought is lost. Inhibitions are released. As a result of these effects, it appeared from testimony produced at the hearings that many violent crimes have been and are being committed by persons under the influence of this drug. Not only is marihuana used by the hardened criminals to steel them to commit violent crimes, but it is also being placed in the hands of high-school children in the form of marihuana cigarettes by unscrupulous peddlers. Cases were cited at the hearings of school children who have been driven to crime and insanity through the use of this drug. Its continued use results many times in impotency and insanity.

When Congress escalated penalties for narcotics offenses in 1951 and again in 1956, marihuana was included, with the following effects:

Possession Minimum sentence

First offense ---------- ---------- 2 years

Second offense ---------- 5 years

Third and subsequent offense ---------- 10 years

Fine ---------- $20,000

Sale Minimum sentence

First offense ---------- 5 years

Second and subsequent offense ---------- 10 years

Sale to minor by adult ---------- 10 years

Parole or probation were made unavailable to all except first offenders in the possession category.

The perceptions of 1937 were perpetuated in the comments of Senator Price M. Daniel, Chairman of the Senate subcommittee considering the 1956 Act, although by now an important new factor had been added:

Marihuana is a drug which starts most addicts in the use of drugs. Marihuana, in itself a dangerous drug, can lead to some of the worst crimes committed by those who are addicted to the habit. Evidently, its use leads to the heroin habit and then to the final destruction of the persons addicted.

The Change

With the adoption of marihuana use by middle and upper class college youth in the mid-60's, the exaggerated notion of the drug's dangers and the social tension so widespread during this period combined to reopen the question of the impact of marihuana use. But governmental policy held to the appropriateness of existing law.

Arrests, prosecutions, convictions and sentences of imprisonment all increased at both the federal and state levels. Marihuana arrests by the U.S. Bureau of Customs increased approximately 362% from fiscal year 1965 to 1970. Arrests by the Bureau of Narcotics and Dangerous Drugs, an agency which concerns itself primarily with sale, rose 80% from 1965 to 1968. Because major responsibility for enforcing the possession laws lies at the state level, state arrests rose dramatically (1,000%) during the five years from 1965 to 1970. Although the data compiled by the Federal Bureau of Investigation are not comprehensive, the FBI sample tracks the continuing increase of state arrests (Table 6).

Table 6.-STATE MARIHUANA ARRESTS

Year
Arrests
Percentage increase

1965
18,815

1966
31,119
65.39

1967
61,843
98.73

1968
95,870
55.02

1969
118,903
24.02

1970
188,682
58.68

In the wake of this upsurge in marihuana arrests, the criminal justice system faced a far from usual "criminal" population. Nonetheless, judging from federal figures, the number of people prosecuted, convicted, and incarcerated did rise substantially as prosecutors and judges attempted to carry out the law.

Beginning in 1966, however, the proportion of defendants ultimately convicted declined gradually, as did the percentage of defendants who were incarcerated, and the average length of their sentences. This response reflected an attempt to -mitigate the harshness of the law as applied to this new user population. By 1968, the trend toward leniency seemed to have temporarily leveled off, before it accelerated again in 1969 (Table 7).

Paralleling the vigorous law enforcement effort between 1965 and 1968 was a punitive reaction in the schools and large numbers of students using marihuana were suspended, expelled or referred to the police. Similarly, the military's first reaction to the surge of marihuana use took the form of court-martial, administrative punishment, or discharge from the service.

Table 7.-DISPOSITION OF FEDERAL MARIHUANA ARRESTS

Year
Total defendants
Percent convicted
Percent incarcerated
Average length of sentence (in months)

1964

85
49

1965
523
90
52
58.2

1966
746
87
45
53.7

1967
941
80
38.5
51.0

1968
1,433
79
39.4
51.2

1969
2,189
76
34.3
52.6

1970
2,082
73
27.4
46.7

1971
3,323
60
28.5
39.9

The family, however, suffered the most from the sudden conflict between accepted norms and this expression of youthful independence. The use of drugs, particularly marihuana, became a significant barrier between parent and child. Many young people adopted marihuana as a symbol of their uneasiness with society's prevailing norms.

As noted in Chapter 1, the sudden increase in marihuana use precipitated extensive research by the medical and scientific communities. By 1969, a consensus emerged holding that many of the earlier beliefs about the effects of marihuana were erroneous. Available U.S. data seemed to indicate that dependence on the drug was rare, as was the incidence of psychosis among marihuana users. Particularly important was the recognition that there was little, if any, convincing proof that marihuana caused aggressive behavior or crime. As such findings accumulated, public attention was drawn increasingly to the consequences of existing policy: soaring arrests, convictions and in some states, lengthy sentences.

Policy-makers, in social institutions and government, as well as the public began to believe that the harshness of the criminal penalties was far out of proportion to the dangers posed by the drug. As users were incarcerated, newspapers and television stations often brought the matter to public attention, particularly when the arrested youngster came from a

prominent family.

Official response to this development was twofold: a trend toward leniency in marihuana cases within the legal system, and a recognition by policy-makers of widespread uncertainty regarding the effects of marihuana.

Reflecting the first response, the courts, prosecutors and police applied existing law more leniently, and the law-makers in most states and at the federal level changed the letter of the law, reducing the penalties for possession of marihuana, generally to a misdemeanor (up to a year in jail). In the process, they repealed the mandatory minimums which had been of major concern to the judiciary.

By June 1970, 24 states and the District of Columbia had reduced the penalties, although 34 states and the District still classified marihuana as a narcotic. Meanwhile, on the federal level, Congress had been considering the Nixon Administration's comprehensive proposal to overhaul the national government's patchwork of drug legislation.

Since the passage of the Harrison Narcotics Act in 1914, federal drug laws had taken the form of tax measures, an approach compelled for constitutional reasons. The Marihuana Tax Act of 1937 followed the same format. The result, however, was a complex set of offenses involving order forms and registrations. When the Supreme Court declared certain aspects of the Tax Act unconstitutional in 1969, revision of the law became essential. Taking up the challenge, the Administration proposed a major piece of legislation which tightened control over pharmaceutical distributions and also reappraised the penalty structure for narcotics and dangerous drug offenses.

Possession of all drugs, including marihuana, was reduced to a misdemeanor. Special treatment for first offenders was provided, allowing expungement of the record upon satisfactory completion of a probationary period. Casual transfers of marihuana were treated in the same manner as possession. After a series of wide-ranging hearings, Congress passed the Comprehensive Drug Abuse Prevention and Control Act, and on October 27, 1970, the President signed it into law.

After passage of the new federal drug law, the Conference of Commissioners on Uniform State Laws adopted a Uniform Controlled Substances Act, conforming in structure and emphasis to the federal law. Although the Uniform Act specifies no penalties, the Commissioners recommended that possession of all drugs be a misdemeanor.

At this writing, 42 of the states and the District of Columbia classify possession as a misdemeanor or have adopted special provisions so classifying possession of small amounts of marihuana. In half of the remaining eight jurisdictions, the courts have discretion to sentence possessors as misdemeanants.

In 11 jurisdictions, casual transfers are treated in the same manner as possession, and in 27 jurisdictions, conditional discharge is available to certain classes of offenders.

The second characteristic of the 1969-70 official response was its acknowledgment of uncertainty. No longer perceived as a major threat to public safety, marihuana use had now become primarily an issue of private and public health. Scientific researchers were asked to define the nature and scope of the health concern. In a sense, lawmakers took the minimum official action dictated by social and scientific realities, but were uncertain where to go from there. The need to know more about the effects of the drug, particularly its chronic, long-term effects, became the core of official response.

Many states appointed special task forces and commissions to report on marihuana and drug abuse in general. Congress directed the Department of Health, Education and Welfare to file annual Reports on Marihuana and Health and, in the Comprehensive Drug Abuse Prevention and Control Act of 1970, established this Commission.

The Current Response

In addition to an objective appraisal of the effects of marihuana use, this Commission was directed to evaluate the efficacy of existing law. The marihuana laws were and still are the focus of much public debate. We have recognized from the outset that a meaningful evaluation of the law is dependent upon an understanding of objectives and the social context in which the law operates. Particularly important in this connection are the attitudes and practices of society's non-legal institutions and the general direction of public opinion.

In order to comprehend the entire range of contemporary social response, the Commission launched a threefold inquiry. First, we designed a series of projects designed to ascertain opinion and behavior within the criminal justice system. Included were an analysis of all marihuana arrests during the last six months of 1970 in six metropolitan jurisdictions, a similar study of all federal marihuana arrests during 1970, an opinion survey of all local prosecuting attorneys, and a similar survey of attitudes among a representative sample of Judges, probation officers, and court clinicians.

We next focused on the practice and opinion of the medical, clerical, educational, and business communities. To this end, we solicited written responses from representative groups, invited various spokesmen to testify before us, made numerous field visits to secondary schools, colleges and universities and surveyed opinion in free clinics and university health services. We also launched a study of drug use and abuse in industry which will be covered in our second Report on drug abuse.

Finally, we commissioned the National Survey of public opinion about marihuana to which we have previously referred.

THE CRIMINAL JUSTICE SYSTEM

How does the criminal justice system respond when an enormous increase in an illegal conduct, of a primarily private nature, makes full enforcement of the law impossible, and when there is widespread doubt about the rationale for making the conduct illegal? This question guided our analysis of the responses and opinions from members of the criminal justice system.

Law Enforcement Behavior

On the basis of a detailed study of all federal marihuana arrests during 1970 and of a sample of state arrests during the last half of 1970 in Cook County, Illinois; Dallas, Texas; Omaha, Nebraska; Tucson, Arizona; San Mateo County, California; and the Washington, DC Metropolitan Area, we present the following findings.

FEDERAL The federal authorities make little or no effort to seek out violators of laws proscribing possession of marihuana. The Federal Government ceded responsibility for enforcement of possession laws to the states several years ago. However, in the course of general enforcement activity, the Federal authorities do make possession arrests. If a person is arrested at the Federal level for possession or casual transfer of small or moderate

amounts of marihuana, the case generally is either dropped or turned over to the states for prosecution.

The Bureau of Narcotics and Dangerous Drugs does not concentrate much of its energy on marihuana. By its own estimate, approximately 6% of its investigative efforts are directed at marihuana offenses. Most BNDD marihuana arrests occur as a result of the agency's general investigation into the commercial distribution of all drugs.

The overwhelming majority of all federal marihuana arrests occur at or near the borders, as the Bureau of Customs, sometimes in cooperation with the Border Patrol of the Immigration and Naturalization Service, attempts to interdict the importation of the drug.

State

At the state level, where enforcement of the possession laws is focused, about 93% of the arrests in our sample were for this offense. Yet, there was little formal investigative effort to seek out violators of the possession laws. Instead, 69% of all marihuana arrests arose from spontaneousor accidental situations where there had been no investigation at all. Well over half of these spontaneous arrests occurred when police stopped an automobile and saw or smelled marihuana. The remaining spontaneous arrests occurred when police stopped persons on the street or in a park and discovered marihuana.

In an additional 16% of the cases, the marihuana arrest resulted from police follow-up of a phoned tip or similar lead. In less than 11% of all the cases was there any significant police involvement. (Scope of investigation was unknown in about 4% of the cases).

Because of this enforcement pattern, arrests were concentrated among the young. Typically the arrestee was a white male, in school or employed in a blue collar job, without a prior record. Of those arrested at the state level:

* 58% were under 21; 30% were between 21 and 26; 10% were over 26 (2% unknown)

* 85% were male; 15% were female

* 77% were white; 21% were black; 2% were Spanish speaking

* 27% were students, 2% were military; 28% were employed in blue collar jobs; 15% were employed in white collar jobs; 11% were unemployed (16% unknown)

* 44% had not been arrested previously; 31% had been arrested previously (in 25% of the cases, the extent of prior contact was unknown) ; only 6% of the arrestees had been previously incarcerated

Such arrestees generally possessed only small amounts of marihuana. Of our entire sample of 3,071 arrests:

- 67% were for possession of less than one ounce (18% were for less than one gram; 23% were for between one and 5 grams; 26% were for between 5 and 30 grams)
- 7% were for possession of between one ounce and 4 ounces
- 8% were for possession of over 4 ounces
- 13% were for possession of unknown quantities
- 3 % were for transfer of less than one ounce
- 3% were for transfer of over one ounce.*

Offenders at the state level were generally arrested in groups.

* 29 % were arrested alone

* 24% were arrested with one other person

* 43% were arrested with two or more other persons (4% unknown) Faced with this population of offenders, the criminal justice System responded often by dismissing or diverting to a noncriminal institution the young first-offense possessor of small amounts.

Adult Cases

At least 48% of the cases were terminated in the defendant's favor:

The police themselves disposed of 10% of the cases, refraining from filing charges, or diverting the case, to some other institution.

The prosecution declined to file complaints in an additional 7% of the cases.

An additional 28% of the cases were dismissed in the course of pretrial judicial proceedings.

In 3% of the cases, the defendant was acquitted at trial.

*Because the figures have been rounded off, the total is not always 100%.

Juvenile Cases

At least 70% of the cases were terminated in the youth's favor:

The police themselves disposed of 21% of the cases, refraining from referring the youth to juvenile authorities or diverting the case to some other agency.

An additional 48% of the cases were dismissed either because the juvenile officer responsible for filing a delinquency petition refused to do so, or because the judge dismissed the case prior to trial.

in 1% of the cases, the juvenile was found innocent.

Of the entire sample of arrests, both adult and juvenile, 33% of those apprehended were ultimately sentenced,, after pleading guilty or being found guilty. (Since 11% of the 3,071 cases -were still pending at the time of our study, and disposition was unknown in 2% of the cases, the figure may be as high as 40% of all arrests).

Of those convicted for possession of marihuana, 24% were incarcerated, usually for a year or less. Most of the remaining persons were put on probation, although some were fined only. By comparison, of those convicted of sale (5% of the convicted individuals), 65% were incarcerated, usually for over a year.

In short, in the 2,610 cases where disposition was final and was available to 6% of those apprehended were ultimately incarcerated.

From this analysis of enforcement behavior, it appears that the law enforcement community

has adopted a policy of containment. Although effort is sometimes expended to seek out private marihuana use, the trend is undoubtedly to invoke, the marihuana possession laws only when the behavior (possession) comes out in the open. We were told by police officials in some cities, for example, that arrests are made only when marihuana use is flaunted in public.

The salient feature of the present law has become the threat of arrest for indiscretion. The high percentage of cases which, after arrest, are disposed of by dismissal or informal diversion attests to the ambivalence of police officials, prosecutors and judges about the appropriateness of existing law. Anyone processed through the entire system does run a risk of incarceration, especially when the individual had a prior record and the offense was sale or possession of a significant amount.

Law Enforcement Opinion

Prosecutorial opinion toward the existing system suggests both a containment objective and a, flexible, response. As to prosecution policy:

31% of the prosecutors state that they would not prosecute anyone one arrested at a private, social gathering of marihuana users who are passing a cigarette.

Large numbers of prosecutors admit that they consider factors other than strength of the evidence in deciding whether or not to prosecute a possession case; 41% cite age, 38% cite lack of prior record, 36% consider the amount of marihuana seized and 26% take into account the family situation of the accused; 31% thought one or another of these non-legal factors was most important in his decision

29% of the prosecutors acknowledge that they use informal probation in lieu of prosecution in some cases.

As to the efficacy of existing law, a majority of the prosecutors agree that the marihuana laws do not deter, or deter only minimally:

Persons under 30 from initiating use (53%)

Users from using regularly (56%)

Users from transferring small amounts for little or no remuneration (55%)

From the studies made by the Commission of enforcement practices, we consider this to be a realistic assessment.

Conversely, however, the prosecutors agree that the laws have a significant effect in deterring users from smoking marihuana openly (62%) and persons over 30 from initiating use (44%).

We also asked the district attorneys for their views on an appropriate legal policy concerning marihuana use. Their opinions tend to fall in three groups. One group, representing about 25% of the prosecutors, favors the status quo, and does not want any further reduction in penalties. A fifth of the prosecutors conclude, on the basis of their experience, that possession of marihuana, and perhaps sale of the drug, should be removed entirely from the criminal justice system.

The remaining prosecutors, a majority, is willing to consider mitigation of the harshness of

the law either by legislation or by benign exercise of discretion, but is reluctant to relinquish formal, criminal control. These prosecutors doubt the deterrent value of the law and are willing to be lenient in appropriate cases, but they believe some use of the legal system is necessary to prevent all increase in marihuana use.

Underlying these opinions are diverse attitudes about marihuana use and the efficacy of existing law. For example, prosecutors who doubt the efficacy of existing law and reject the "escalation" and "aggressive behavior" hypotheses, are generally willing to modify the laws by their enforcement policies and by legislative reform (Table 8).

The same general pattern of practice and opinion emerges at the judicial and dispositional level. Only 13% of the responding judges would jail an adult for possession of marihuana and only 4% said they would incarcerate a minor. Lesser proportions of probation officers and clinicians would imprison adults (8% and 1%) and minors (2% and %). Conversely, 11% of the Judges, 15.5% of the probation officers and 63.5% of the clinicians noted that they would assess no penalty for possession by adults. For minors, the proportions are 3%, 5%, and 35% respectively.

Table 8.-DISTRICT ATTORNEYS, OPINIONS

	Percent who	Percent who believe the	
	believe	believe marihuana	Percent
Change favored	marihuana	marihuana laws do not	who utilize
	leads to	leads to deter persons	informal
	hard drug	aggressive under 30	probation
	use	behavior from initi-	
		ating use	
None	87.1	47	51.3 28.5
Reduction of possession			
penalties	68.8	35.1	63.2 34.3
Preclusion of incarceration. .	64.7	33	59 33.2
Decriminalization of			
possession of small			
amounts	41.5	21.9	67.2 37.4
Legalization of marihuana. ..	32.2	11.1	69 37.8

How to read table: 87.1%, of the prosecutors who favor no change in existing law believe

that marihuana leads to the use of hard drugs; in contrast, 32.2% of the prosecutors who favor legalization believe that marihuana leads to the use of hard drugs.

With regard to appropriate legal policy, the judges exhibit the same inclination as the prosecutors to look for alternatives within a formal control system which would avoid the use of criminal penalties. We asked essentially the same question in two ways and received similar responses (Table 9).

The judges, as a group, are less enthusiastic about criminal control than the prosecutors, but are equally unwilling to relinquish formal control. By contrast, the probation officers and clinicians, who have more personal contact with these offenders and are perhaps more intensively aware of the control potential of the criminal justice system, are highly skeptical about formal control (Tables 10, -and 11).

In conclusion, as one proceeds through the criminal justice system, from district attorneys to court clinicians, the people responsible for the functioning of that system seem to be decreasingly enthusiastic about the appropriateness of criminal control and decreasingly insistent on any technique for formal control.

Table 9.*-JUDGES, OPINIONS

Types of control	Percent	Statutory schemes	Percent
Means of control for adult users who favored		Percent for possession who favored	
Informal control	33	Personal choice	11
		Informal social control	22
Non-criminal formal control	21	Required treatment	21
		Other	11
Criminal control	25	Criminal law	25

*Because of a small percentage of non-responses, figures do not always total 100%.

How to read table: When asked to identify the appropriate means of control for adult users, 33% of the judges opted for informal control (11% would rely on personal choice and 22%, would rely on informal social control). Similarly, when asked about the appropriate statutory scheme for possession, 24.3% of the judges preferred control outside the criminal justice system, a functional equivalent of "informal control."

Table 10.*-PROBATION OFFICERS' OPINIONS

Types of Means of control Percent Statutory schemes Percent

control for adult users who for possession who

favored favored

Informal Personal choice 21 Control outside 35.5

control Informal social 32.7 criminal justice

control system

Non-criminal Required treatment 11.8 Expungement of 54.5

formal Other 10 criminal record

control

Criminal Criminal law 15.5 Control within 9

control criminal justice

system

*Because of a small number of non-responses, the figures do not always total 100%.

To supplement our survey of behavior and opinion within the criminal justice system, we also solicited the views of the American Bar Association. The President of the A13A in turn urged the respective Committees of the Association to submit their views to us. The two Committees directly concerned with the drug area, the Committee on Alcoholism and Drug Reform of the Section oNn Individual Rights

Table II.*-CLINICIANS, OPINIONS

Types of Means of control Percent Statutory schemes Percent

control for adult users who for possession who

favored favored

Informal Personal choice 61.7 Control outside 74

control Informal social 21 criminal justice

control system

Non-criminal Required treatment 1 Expungement of 22.6

formal Other 10 criminal record

control

Criminal Criminal law 3.5 Control within 0

control criminal justice

system

'Because of a small number of non-responses, the figures do not always total 100%.

and Responsibilities, and the Committee on Drug Abuse of the Section on Criminal Law, were in essential agreement regarding the appropriate course of action.

Both Committees expressed doubt about the wisdom and legitimacy of existing policy and about the, capacity of the criminal justice system to deal with marihuana use. They both urged the Commission to recommend the removal of criminal penalties from possession of the drug for personal use and casual non-profit transfers. Both Committees suggested that a regulatory approach to distribution of the drug be given serious consideration.

THE NON-LEGAL INSTITUTIONS

Law enforcement authorities, given available and prospective resources, cannot possibly enforce the existing marihuana laws fully. The best they can do is keel) marihuana use contained and out of sight. In addition, many officials within the criminal justice system are reluctant to enforce the marihuana laws, being either uncommitted to the usefulness of this particular law or opposed to the law itself. The net result is for the legal system to leave much of the responsibility for social control to other social institutions such as family, schools, churches, and the medical profession. Since these other institutions themselves have relied heavily on the legal system for control, caution and confusion now dominate the social response to marihuana use.

The diminishing severity of the law enforcement response may not have occurred if the other institutions of society had continued to regard the marihuana user as a criminal. However, many of these institutions have come to view the marihuana user primarily in social or medical terms, and to recommend a form of social control in accord with their respective self-interests or orientations. In many cases, the attitudes of these other institutions mirror that of the criminal justice system: uncertainty about the proper role of formal legal control.

The Family

The most important institution for instilling social norms is the family. Parental attitudes generally parallel public opinion, and specific responses in our National Survey suggest an inclination among parents and non-parents to deal with youthful marihuana users through discussion and persuasion rather than harsh or punitive measures. When asked what action they would take upon discovering that one of their teenage children was smoking marihuana with friends, 47% of the adults responded that they would use persuasion and reason. Twenty-three percent favored a punitive approach. Interestingly, 9% of the latter group felt so strongly about the matter that they were willing to report their own child to the police. A considerable number, 35% indicated that they were uncertain about what to do, or failed to respond to this multiple response question.

The non-punitive trend was also apparent when the adults were asked what they would do if their teenage child was arrested for a marihuana offense. A substantial number (58%)

indicated they would attempt to extricate their child from the situation, many not wishing their child to have a police record, while 34% expressed the sentiment that the child's arrest would help him learn a lesson.

The Schools

Marihuana use continues to increase among high school and college students. The National Survey reveals that 30% of the high school juniors and seniors have used marihuana. The National Survey also reveals that 44% of those currently attending college at the graduate or undergraduate levels have used it, while other surveys indicate this figure is significantly higher in some major universities.

Not surprisingly, there has been, during the last two years, an appreciable change in the attitudes of school administrators, faculty and even of the boards of education and trustees toward marihuana use. Administrators at the secondary and college levels are generally more relaxed and tolerant toward marihuana use than they were during the mid-1960's, when support for a punitive response was common. After the initial shock of widespread use dissipated, many school officials came to believe that strong disciplinary action, including suspension and arrest, was counterproductive. In addition, as the evidence accumulated that marihuana was not as dangerous as had once been thought, parental and community pressures were sometimes brought to bear on school administrators to be less punitive and more understanding of marihuana use.

At the secondary level, the policies very somewhat from state to state and even within states. Nevertheless, school boards generally seem to have become less enthusiastic about suspension and arrest as an appropriate response to marihuana use. One school administrator in Philadelphia noted sarcastically that if all users were suspended or arrested, the high schools would become empty cells, with their entire clientele turned out onto the streets.

A West Coast official emphasized that student alcohol use was a much more serious problem than marihuana use; he even suggested that legalization of marihuana might reduce alcohol use among the young. The Commission ascertained that no suspensions for marihuana use had occurred during 1971 in the entire school system of a southern metropolitan area. Although security officers in that system did make 20 arrests, they were all for selling marihuana and other drugs.

At the secondary level, then, increased reliance is being placed on persuasion rather than discipline, as a means of discouraging marihuana use. Drug education programs, now being instituted in almost every school system, often include information about alcohol and tobacco. We will explore the various pedagogical techniques employed in such programs and will attempt to evaluate them in our next Report.

At the college level, the response is even more lenient. In many cases official neutrality or even protection against police intervention substitutes for the restraint common at the secondary level. Under formal or informal arrangements with local law enforcement officials, many schools bar on-campus arrests for marihuana use. Apparently they have concluded that enforcement of the marihuana laws causes more harm, than does use of the drug. In some cases, college authorities have substituted their own policy for society's official policy. The Commission learned at one of its hearings in Chicago, for example, that a major Midwestern university explicitly declared that students would be subject to university disciplinary action if they were found in possession of more than one week's supply of marihuana.

Control at the college level is usually considered a medical Concern and is handled either through the university health centers or free clinics. The trend toward leniency is also apparent in the policy responses of the representative sample of university health service and free clinic physicians. whose profession presumably brings them into contact with the population most it risk from marihuana. Among personnel of the free clinics, 62% of the respondents favor legalization; 5% would continue the present policy, and the remainder would either reduce penalties (11%) or await further research (22%).

Even among the "establishment-oriented" health service personnel, similar attitudes prevail. Nineteen percent would continue the present policy, and 16% would legalize. Of the remaining 55% (10% did not respond), 38% would reduce, penalties and 17% would await further research. This pattern of views bears a striking resemblance to that of the prosecuting attorneys, and indeed of the public at large. The large majority indicates uneasiness with the present system and opposition to legalization, but is uncertain about exactly what to do.

The Churches

The nation's churches play a major role in the process by which society's norms and values are transmitted to the young. Moral education, through individual and family counseling by church personnel, is influential in the process of social control, particularly for adolescents. Consequently, the Commission sought to learn the attitudes, responses and recommendations of the clergy.

The larger societal uncertainty about the social and moral implications of marihuana use is also reflected in the attitudes of religious institutions. For example, Dr. Thomas E. Price, speaking for the National Council of Churches of Christ in the U.S.A. before the Commission, referred to marihuana as a "tightly drawn moral knot." This uncertainty has led many religious groups to minimize a punitive and repressive response to marihuana use in their official statements and formal programs. Instead, they have concentrated on educational and rehabilitative programs.

Many church spokesmen have urged a reconsideration of social and legal policy. The range of their suggestions for change reflects, once again, widespread uncertainty. Some ask for some form of "adequate" punishment or supervision so as to discourage marihuana use. Others say "reform or elimination" of penalties for possession would be appropriate. And there are those who suggest legalization with some government regulation. Some church spokesmen have defended existing policy, recommending only that the law be more strictly and uniformly enforced.

The Medical Community

In contrast to the mixed opinions of other segments of society, the medical profession has a rather broad consensus at the present time. In a series of responses from various medical societies, associations and committees, we found certain recurrent themes. Every medical group emphasized the need for more research into the effects of marihuana. There was uniform emphasis on how marihuana, as a "drug," affects heart, head, blood, brain and so on, but not on how it affects society as a behavior. The consensus was that marihuana, the drug, poses some danger for the individual, physically or psychologically. The only major disagreement is about the degree of such danger.

The second recurrent theme was that marihuana should definitely not be legalized. Legalization would imply sanction, medical groups said, with a probable, increase in use as a result. One doctor compared legalization with the failure of Prohibition: "The fact [that]

Prohibition was a failure doesn't make alcoholism a good thing and the six million or so (alcoholics) we have are no bargain. Therefore, since there is no legitimate use for marihuana it seems rather silly to legalize its use to initiate a second headache." Another reason commonly given by physicians for opposing legalization is that such a step should be taken if and when it is proven that marihuana is not dangerous.

The third common theme of medical opinion was a call for a more. lenient approach toward users, again a position reflected in almost every quarter of society. One officer of a public health association told a convention: " (Our committee) deplores the strong punitive measures suggested by some because we feel that a jail sentence for the offense of smoking marihuana is not likely to solve the problem of eliminating marihuana use. On the contrary, a prison sentence is likely to do great damage to a young person's personality as well as to his future career." Another group called for prosecutors to use discretionary powers in handling youthful first offenders.

When discussing penalties, the medical community begins to take, a look at marihuana use as a form of social behavior rather than simply a drug which produces certain physical and psychological effects. One doctor wrote: "Because marihuana in present patterns of use is, by and large, a relatively innocuous drug and because its use has many motivations from simple curiosity to symbolism of hostility to the 'establishment', the legal penalties in many jurisdictions throughout the United States are excessively punitive."

Summary

Social institutional spokesmen now commonly recognize that control of marihuana is only partially a law enforcement problem. Opinions cluster around the propositions that society should not be punitive on the one hand, but should not make the drug available, at least for now. Beyond these points, however, uncertainty prevails. There is no common vision of an appropriate social control policy.

Each institution is going about the business of control in its own way. Parents emphasize mutual communication. The secondary schools emphasize health education. The colleges recognize personal freedom so long as it does not jeopardize the educational enterprise. Churches emphasize uncertainty about the moral implications of marihuana use. The medical fraternity stresses the need for further research into the health consequences of marihuana use. Uncertainly is the common denominator.

THE PUBLIC RESPONSE

For most Americans marihuana use is not an abstract phenomenon. Fifteen percent of the adult population, the National Survey revealed, has tried the drug and 44% of the non-trying adults personally know someone who has used the drug. Fourteen percent of the youth have tried the drug and 58% of the non-triers personally know someone who has used the drug. Indeed, six percent of the non-trying youth indicated that half or more of their friends used marihuana.

The public is also aware of the consequences of the existing system and concerned about its impact. Ninety-seven percent of the adults know that selling marihuana is against the law. Only a few less, 94%, know that possession is against the law. In fact, one fourth of the adults know someone who has been arrested on a possession charge. Ninety-two percent of the youth know that sale is prohibited, and four out of five know that possession is against the law. Fifty-three percent of the 16- and 17-year-olds actually know someone who has been arrested for possession.

Acutely aware of the legal consequences of use, the public is also cognizant of the difficulties encountered by the criminal justice system in its attempt to enforce a widely-violated law. Adults were asked whether they mostly agreed or mostly disagreed with a series of 12 selected propositions regarding the desirability of maintaining or altering the present system of marihuana control. The two propositions which received the most support relate to problems inherent in the existing laws.

Eighty-three percent of the adults mostly agreed with the statement that "because of marihuana a lot of young people who are not criminals are getting police records and being put in jail." And 76% agreed that "laws against marihuana are very hard to enforce because most people use it in private."

Marihuana use is more personal than most public issues, but it is also more confusing. Bombarded in recent years -with contradictory "findings" and statistics about the effects of marihuana, and with conflicting arguments about public policy, the public tends to believe everything, whether pro or con. Particularly important in this regard is the widespread acceptance of beliefs which have little basis in fact.

Approximately half of the adult public believes that "many crimes are committed by persons who are under the influence of marihuana," and that "some people have died from using it." Seven of every 10 adults believe that "marihuana makes people want to try stronger things like heroin." Although the probability that a person believes these statements increases with age, a significant percentage of all groups are represented.

The underlying confusion is strongly indicated in the contradictory attitudes toward various reasons for maintaining or changing the law. For example, 43% of the adults thought, in the context of an argument for making marihuana legal, that "it should be up to each person to decide for himself, like with alcohol or tobacco." Yet 75% of the adults agreed, in the context of an argument for keeping the laws the way they are, that "there are already too many ways for people to escape their responsibilities. We don't need another one."

Youth tend to be less convinced than adults that marihuana use may be fatal to the user, or cause him to commit crime or lead him to use other drugs; but young people as a group also are noticeably more uncertain about these matters. One of every four young people indicated that they were unsure whether marihuana caused death or crime, and one of every six expressed uncertainty regarding the progression to other drugs. Similarly, young people were more than twice as likely as adults to have "no opinion" about the various propositions regarding the need for legal change.

Public attitudes toward marihuana exhibit both doubt and tension. On the one hand, we note an acute awareness of the legal consequences of marihuana use and an appreciation of the adverse impact of processing users through the criminal justice system. On the other hand, we note some misconceptions about the dangers of marihuana and confusion about the consequences of changing or maintaining the present system.

Public responses on the basic questions of social and legal policy reflect the underlying ambivalence. The overwhelming majority of the public does not want to treat the marihuana user harshly. This attitude appeared repeatedly through the entire Survey. When asked "For the good of the country, which of the following courses of action would be the best thing to do about [marihuana use] ?" the public responded in the following manner:

Percentage Youth Adults* 12-17

Handle the problem mostly through the police and courts:

the process of arrest, conviction, punish-

ment ---------- 37 90

Handle the problem mostly through medical clinics:

the process of diagnosis, treatment, care ---------- 51 48

Don't worry about the use of marihuana, but spend time and money on preventing and solving other crimes

No opinion ---------- 5 20

*Some adults gave more than one answer.

Adults and youth were also asked to look at marihuana use from the perspective of the system, and to identify the appropriate penalty for possession of marihuana. Both groups were reluctant to put users in jail, especially for a first offense. Eighty-three percent of the adults and 64% of the youth would not incarcerate a youthful first offender; 54% of the adults and 41 % of the youth would not even give the young offender a police record (Table 12).

Table 12.-ADULTS' VIEWS ON POSSESSION PENALTIES

If defendant is teenager If defendant is adult

Penalty

First Previous First Previous

offense conviction offense conviction

(percent) (percent) (percent) (percent)

No penalty 20 Total 6 Total 13 Total 7 Total

Fine (no police record).. 34 83 11 37 28 64 6 24

Probation 29 20 23 11

Jail sentence

Up to a week 8 Total 20 Total 11 Total 14 Total

Up to a year 3 13 24 56 12 32 24 70

More than a year 2 12 9 32

No opinion 4 7 4 6

YOUNG PEOPLES, (age 12-17) VIEWS ON POSSESSION PENALTIES

	If defendant is teenager		If defendant is adult	
Penalty				
	First offense (percent)	Previous conviction (percent)	First offense (percent)	Previous conviction (percent)
No penalty	13	Total 6	Tota l 11	Tota l 7
Total				
Fine (no police record)..	28	64 9	35 21	50 7
27				
Probation	23	20 18	13	
Jail sentence				
Ur, to a week	8	Total 13	Tota l 16	Total 12
Tota l				
Up to a year	6	19 21	51 11	36 18
59				
More than a year	5	17 9	29	
No opinion	17	14 14	14	

Interestingly, the youth population as a whole was less lenient than the adult population as a whole. Within each group, however, the older teenagers and young adults were the most tolerant in all respects.

These statistics suggest that the l public generally prefers leniency when responding to questions specifically directed to marihuana use. But when asked about "control" or "the law" in general, ..e response often appears quite harsh. For example, when asked to consider a range of five alternative control schemes, most adults tended to resist change.

Thirty-one percent of the adults thought that making marihuana legally available through regulated channels (like alcohol) was acceptable but 67% thought it was unacceptable. Although 23% thought the removal of criminal sanctions from possession was acceptable, 74% thought this approach was unacceptable. On the other hand, 56% of the adults thought that the existing laws were, acceptable; yet 41% found the present law unacceptable. Finally, 72% thought "stricter laws" would be acceptable, while only 26% thought such a change would be unacceptable. Indeed 43% thought stricter laws were the "ideal solution" and 62% thought this was the best of the alternatives.

These responses seem to be contradictory. We are puzzled about what the respondents thought they meant when they expressed a preference for stricter laws.

They probably did not mean stricter penalties for possession. Such an interpretation would be entirely inconsistent with responses to questions aimed directly at appropriate policy toward users. Under existing law some states still treat first offenders as felons and most states treat multiple offenders as felons. But, only a third of the adult respondents would put an adult multiple offender in jail for more than a year.

The preference for stricter laws might be interpreted to mean heavier penalties for sale, or better enforcement of existing proscriptions against trafficking. Two-thirds of the adults did indicate that they preferred heavier penalties for sale than for possession. But penalties for selling for profit are already quite heavy in every jurisdiction.

We suspect that a majority of the public, including many of those favoring "stricter laws," is actually disturbed about the increase in marihuana use and would like a system which would work better than the existing system to discourage use. A majority of the adult public seeks a better system of control, albeit one which is not punitive toward the user. Apparently uneasy about the individual and social consequences of the present system, the large center of public opinion is nonetheless reluctant to relinquish formal control.

This insistence on maintenance of formal controls over the user rests upon two interrelated factors: respect for law and faith in the efficacy of legal control. First, the public does not believe the, legal order should wither away simply because many people choose to violate the laws against marihuana use. Obedience, of the, law is highly valued in our society.

This factor is illustrated clearly by the widespread public disagreement with the following arguments for changing the law: 76% of the adults disagreed with the statement that "young people would have more respect for the law if marihuana were made legal;" and four out of five adults disagreed with the statement that "so many people are using marihuana that it should be made legal."

Second, most adults believe that legal remedies, even though not punitive, are necessary to discourage use of the drug. This belief is tied largely to their understanding of the effects of the drug and is reflected in the response to the question about "the best way" to handle the use of marihuana. As we noted earlier, 51% of the public thought that marihuana use ought to be handled as a medical problem.

Also, the substantial majority of people who are reluctant to incarcerate possessors do prefer the imposition of fines without a police record or probation. Both of these alternatives retain formal control over the user and indicate faith in the deterrent value of the law. The public responses in this respect bear a striking resemblance to those of the judges and probation officers, who repeatedly indicated a preference for non-punitive formal control.

This interpretation of dominant opinion was drawn from ostensibly inconsistent responses to a long series of questions on appropriate social and legal policy. A substantial minority of the public, however, exhibited a consistent pattern of response to all questions. About a quarter of the public is convinced that the criminal sanction should be withdrawn entirely from marihuana use. Another quarter of the public prefers the criminal approach, even for the user.

In sum, the existing system is not supported by the consensus of public opinion that once existed. There is a consensus that punitive measures are generally inappropriate. There is also a predominant opinion that the legal system should not abandon formal control.

Chapter V

marihuana and social policy

"The difficulty in life is the choice."

George Moore (1900)

A constant tension exists in our society between individual liberties and the need for reasonable societal restraints. It is easy to go too far in either direction, and this tendency is particularly evident where drugs are concerned.

We have guided our decision-making by the belief that the state is obliged to justify restraints on individual behavior. Too often individual freedoms are submerged in the passions of the moment, and when that happens, the public policy may be determined more by rhetoric than by reason. Our effort has been to minimize the emotional and emphasize the rational in this Report.

Drugs In a Free Society

A free society seeks to provide conditions in which each of its members may develop his or her potentialities to the fullest extent. A premium is placed on individual choice in seeking self-fulfillment. This priority depends upon the capacity of free citizens not to abuse their freedom, and upon their willingness to act responsibly toward others and toward the society as a whole. Responsible behavior, through individual choice, is both the guarantor and the objective of a free society.

DRUGS AND SOCIAL RESPONSIBILITY

The use of drugs is not in itself an irresponsible act. Medical and scientific uses serve important individual and social needs and are often essential to our physical and mental well-being. Further, the use of drugs for pleasure or other non-medical purposes is not inherently irresponsible: alcohol is widely used as an acceptable part of social activities.

We do think the use of drugs is clearly irresponsible when it impedes the individual's integration into the economic and social system. A preference for individual productivity and contribution to social progress in a general sense still undergirds the American value structure, and we emphasize the policy-maker's duty to support this preference in a public policy judgment.

At the same time, in light of the emerging leisure ethic and the search for individual meaning and fulfillment noted in Chapter 1, we cannot divorce social policy from the questions raised by the recreational use of drugs. Productivity and recreation both have a place in the American ethical system. They are not inconsistent unless the individual's use of leisure time inhibits his productive role in society.

Drugs should be servants, not masters. They become masters when they dominate an individual's existence or impair his faculties. To the extent that any drug, including alcohol, carries with it risks to the well-being of the user and seriously undermines his effectiveness in the society, that drug becomes a matter of concern for public policy.

An essential step in the process of policy-formation is a determination of the circumstances under which use of any given drug' poses such risks. For some drugs, the risks may be so great that all permissible measures should be taken to eliminate use. For other drugs, such risks may be present only under certain specific circumstances, in which case society may defer to responsible individual choice on the matter of recreational use but take appropriate steps to minimize the incidence and consequences of oysfunctional use. In our Report next year, for which studies are already underway, we will consider from this perspective the whole range of drugs now used for non-medical purposes.

A Social Control Policy for Marihuana

In formulating a Marihuana policy, our strongest concern is with irresponsible use, whether it be too often, too much, indiscriminate, or under improper circumstances. The excessive or indiscriminate use of any drug is a serious social concern; and this is particularly true of marihuana since we still know very little about the effects of long term, heavy use. We have little doubt that the substantial majority of users, under any social control policy, including the existing system, do not and would not engage in irresponsible behavior.

In identifying the appropriate social control policy for marihuana, we have found it helpful to consider the following policy options:

I Approval of Use.

II Elimination of Use.

III Discouragement of Use.

IV Neutrality Toward Use.

APPROVAL OF USE

Society should not approve or encourage the recreational use of any drug, in public or private. Any semblance of encouragement enhances the possibility of abuse and removes, from a psychological standpoint, an effective support of individual restraint.

For example, so long as this society (not only the government, but other institutions and mass advertising as well) in effect approved of the use of tobacco, the growing medical consensus about the dangers of excessive use did not make a significant impression on individual judgment. With the Surgeon General's Report on Tobacco in 1964, Smoking and Health, a very real change has occurred in the way society now thinks about cigarettes.

The institutions of society definitely add their influences to the variety of social pressures

which persuade individuals to use any kind of drugs. Rational social policy should seek to minimize such social pressures, whether they come from peers, from the media, from social custom, or from the user's sense of inadequacy. Official approval would inevitably encourage some people to use the drug who would not otherwise do so, and would also increase the incidence of heavy or otherwise irresponsible use and its complications. On this basis we reject policy option number one, approval of use.

ELIMINATION OF USE

For a half-century, official social policy has been not only to discourage use but to eliminate it (option number two). With the principal responsibility for this policy assigned to law enforcement, its implementation reached its zenith in the late 1950's and early 1960's when marihuana-related offenses were punishable by long periods of incarceration. This policy grew out of a distorted and greatly exaggerated concept of the drug's ordinary effects upon the individual and the society. On the basis of information then available, marihuana was not adequately distinguished from other problem drugs and was assumed to be as harmful as the others.

The increased incidence of use, intensive scientific reevaluation, and the spread of use to the middle and upper socioeconomic groups have brought about the informal adoption of a modified social policy. On the basis of our opinion surveys and our empirical studies of law enforcement behavior, we are convinced that officialdom and the public are no longer as punitive toward marihuana use as they once were.

Now there exists a more realistic estimate of the actual social impact of marihuana use. School and university administrators are seldom able to prevent the use of marihuana by their students and personnel and are increasingly reluctant to take disciplinary action against users. Within the criminal justice system, there has been a marked decline in the severity of the response to offenders charged with possession of marihuana.

In our survey of state enforcement activities, only 11% of all marihuana arrests resulted from active investigative activity, and most of those were in sale situations. For the most part, marihuana enforcement is a haphazard process; arrests occur on the street, in a park, in a car, or as a result of a phone call. Among those arrested, approximately 50% of the adults and 70% of the juveniles are not processed through the system; their cases are dismissed by the police, by the prosecutors or by the courts. Ultimately less than 6% of all those apprehended are incarcerated, and very few of these sentences are for possession of small amounts for personal use.

In the law enforcement community, the major concern is no longer marihuana but the tendency of some users to engage in other irresponsible activity, particularly the use of more dangerous drugs. Official sentiment now seems to be a desire to contain use of the drug as well as the drug subculture, and to minimize its spread to the rest of the youth population. Law enforcement policy, both at the Federal and State levels, implicitly recognizes that elimination is impossible at this time.

The active attempt to suppress all marihuana use has been replaced by an effort to keep it within reasonable bounds. Yet because this policy still reflects a view that marihuana smoking is itself destructive enough to justify punitive action against the user, we believe it is an inappropriate social response.

Marihuana's relative potential for harm to the vast majority of individual users and its actual impact on society does not justify a social policy designed to seek out and firmly punish those who use it. This judgment is based on prevalent use patterns, on behavior exhibited

by the vast majority of users and on our interpretations of existing medical and scientific data. This position also is consistent with the estimate by law enforcement personnel that the elimination of use is unattainable.

In the case of experimental or intermittent use of marihuana, there is room for individual judgment. Some members of our society believe the decision to use marihuana is an immoral decision. However, even during Prohibition, when many people were concerned about the evils associated with excessive use of alcohol, possession for personal use was never outlawed federally and was made illegal in only five States.

Indeed, we suspect that the moral contempt in which some of our citizens hold the marihuana user is related to other behavior or other attitudes assumed to be associated with use of the drug. All of our data suggest that the moral views of the overwhelming majority of marihuana users are in general accord with those of the larger society.

Having previously rejected the approval policy (option number one), we now reject the eliminationist policy (option number two). This policy, if taken seriously, would require a great increase in manpower and resources in order to eliminate the use of a drug which simply does not warrant that kind of attention.

DISCOURAGEMENT OR NEUTRALITY

The unresolved question is whether society should try to dissuade its members from using marihuana or should defer entirely to individual judgment in the matter, remaining benignly neutral. We must choose between policies of discouragement (number three) and neutrality (number four). This choice is a difficult one and forces us to consider the limitations of our knowledge and the dynamics of social change. A number of considerations, none of which is conclusive by itself, point at the present time toward a discouragement policy. We will discuss each one of them separately.

1. User Preference Is Still Ambiguous

Alcohol and tobacco have long been desired by large numbers within our society and their use is deeply ingrained in the American culture. Marihuana, on the other hand, has only recently achieved a significant foothold in the American experience, and it is still essentially used more by young people. Again, the unknown factor here is whether the sudden attraction to marihuana derives from its psychoactive virtues or from its symbolic status.

Throughout this Commission's deliberations there was a recurring awareness of the possibility that marihuana use may be a fad which, if not institutionalized, will recede substantially in time. Present data suggest that this is the case, and we do not hesitate to say that we would prefer that outcome. To the extent that conditions permit, society is well advised to minimize the number of drugs which may cause significant problems. By focusing our attention on fewer rather than more drugs, we may be better able to foster responsible use and diminish the consequences of irresponsible use.

The more prudent course seems to be to retain a social policy opposed to use, attempting to discourage use while at the same time seeking to deemphasize the issue. Such a policy leaves us with more options available when more definitive knowledge of the consequences of heavy and prolonged marihuana use becomes available.

2. Continuing Scientific Uncertainty Precludes Finality

In 1933 when Prohibition was repealed, society was cognizant of the effects of alcohol as a drug and the adverse consequences of abuse. But, because so many people wished to use the drug, policy-makers chose, to run the risk of individual indiscretion and decided to abandon the abstentionist policy. There are many today who feel that if the social, impact of alcohol use had then been more fully understood, a policy of discouragement rather than neutrality would have been adopted to minimize the negative aspects of alcohol use.

Misunderstanding also played an important part when the national government adopted an eliminationist, marihuana policy in 1937. The policy-makers knew very little about the effects or social impact of the drug; many of their hypotheses were speculative and, in large measure, incorrect.

Nevertheless, the argument that misinformation in 1937 automatically compels complete reversal of the action taken at that time is neither reasonable nor logical. While continuing concern about the effects of heavy, chronic use is not sufficient reason to maintain an overly harsh public policy, it is still a significant argument for choosing official discouragement in preference to official neutrality.

3. Society's Value System Is In a State of Transition

As discussed in Chapter I, two central influences in contemporary American life are the individual search for meaning within the context of an increasingly depersonalized society, and the collective search for enduring American values. In Chapter IV, we noted that society's present ambivalent response to marihuana use reflects these uncertainties.

For the reasons discussed in the previous Chapters, a sudden abandonment of an official policy of elimination in favor of one of neutrality toward marihuana would have a profound reverberating impact on social attitudes far beyond the one issue of marihuana use. We believe that society must have time to consider its image of the future. We believe that adoption of a discouragement policy toward marihuana at this time would facilitate such a reappraisal while official neutrality, under present circumstances, would impede it.

4. Public Opinion Presently Opposes Marihuana Use

For whatever reasons, a substantial majority of the American public opposes the use of marihuana, and would prefer that their fellow citizens abstain from using it. In the National Survey, 64% of the adult public agreed with the statement that "using marihuana is morally offensive" (40% felt the same way about alcohol).

Although this majority opinion is not by any means conclusive, it cannot be ignored. We are well aware of the skeptics in with which marihuana user, and those sympathetic to their wishes, view the policy making process; and we are particularly concerned about the indifference to or disrespect for law manifested by many citizens and particularly the youth.

However, we are also apprehensive about the impact of a major change in social policy on that larger segment of our population which supports the implications of the existing social policy. They, too, might lose respect for a policy-making establishment which appeared to bend so easily to the wishes of a "lawless" and highly vocal minority.

This concern for minimizing cultural dislocation must, of course, be weighed against the relative importance of contrary arguments. For example, in the case of desegregation in the South, and now in the North, cult-Lire shock had to be accepted in the light of the fundamental precept at issue. In the, case. of marihuana, there is no fundamental principle supporting the use of the drug, and society is not compelled to approve or be neutral toward

it. The opinion of the majority is entitled to greater weight.

Looking again to the experience with Prohibition, when an abstentionist policy for alcohol was adopted on the national level in 1918, its proponents were not blind to the vociferous opposition of a substantial minority of the people. By the late 1920's and early 1930's, the ambivalence of public opinion toward alcohol use and the unwillingness of large numbers of people to comply with the new social policy compelled reversal of that policy. Even many of its former supporters acknowledged its futility.

With marihuana, however, the prevailing policy of eliminating use had never been opposed to any significant degree until the mid-1960's. Unlike the prohibition of alcohol, which had been the subject of public debate off and on for 60 years before it was adopted, present marihuana policy has not until now engaged the public opinion process, some 50 years after it first began to be used. Majority sentiment does not appear to be as flexible as it was with alcohol.

5. Neutrality Is Not Philosophically Compelled

Much of what was stated above bespeaks an acute awareness by the Commission of the subtleties of the collective consciousness of the American people, as shown in the National Survey. There is a legitimate concern about what the majority of the non-using population thinks about marihuana use and what the drug represents in the public mind. The question is appropriately asked if we are suggesting that the majority in a free society may impose its will on an unwilling minority even though, as it is claimed, uncertainty, speculation, and a large degree of misinformation form the basis of the predominant opinion. If we have nothing more substantial than this, the argument goes, society should remain neutral.

... deal with this contention, one must distinguish between ends and means. Policy-makers must choose their objectives with a sensitivity toward the entire social fabric and a vision of the good society. In such a decision, the general public attitude is a significant consideration. The preferred outcome in a democratic society cannot be that of the policy-makers alone; it must be that of an informed public. Accordingly, the policy-maker must consider the dynamic relationship between perception and reality in the public mind. Is the public consensus based on a real awareness of the facts? Does the public really understand what is at stake? Given the best evidence available, would the public consensus remain the same?

Assuming that dominant opinion opposes marihuana use, the philosophical issue is raised not by the goal but by how it is implemented. At this point, the interests of the unwilling become important. For example, the family unit and the institution of marriage are preferred means of group-living and child-rearing in our society. As a society, we are not neutral. We officially encourage matrimony by giving married couples favorable tax treatment; but we do not compel people to get married. If it should become public policy to try to reduce the birth rate, it is unlikely that there will be laws to punish those who exceed the preferred family size, although we may again utilize disincentives through the tax system. Similarly, this Commission believes society should continue actively to discourage people from using marihuana, and any philosophical limitation is relevant to the means employed, not to the goal itself.

FOR THESE REASONS, WE RECOMMEND TO THE PUBLIC AND ITS POLICY-MAKERS A SOCIAL CONTROL POLICY SEEKING TO DISCOURAGE MARIHUANA USE, WHILE CONCENTRATING PRIMARILY ON THE

PREVENTION OF HEAVY AND VERY HEAVY USE.

We emphasize that this is a policy for today and the immediate future; we do not presume to suggest that this policy embodies eternal truth. Accordingly, we strongly recommend that our successor policy planners, at an appropriate time in the future, review the following factors to determine whether an altered social policy is in order: the state of public opinion, the extent to which members of the society continue to use the drug, the developing scientific knowledge about the effects and social impact of use of the drug, and the evolving social attitude toward the place of recreation and leisure in a work-oriented society. In our second Report next year we will carefully review our findings to see if our perceptions have changed or if society has changed at that time.

Implementing The Discouragement Policy

Choice of this social control policy does not automatically dictate any particular legal implementation. As we noted in Chapter 1, there is a disturbing tendency among participants in the marihuana debate to assume that a given statement of the drug's effects, its number of users or its social impact compels a particular statutory scheme.

Law does not operate in a social vacuum, and it is only one of the institutional mechanisms which society can utilize to implement its policies. Consequently, the evaluation of alternative legal approaches demands not only logic but also a delicate assessment of the mutual relationship between the law and other institutions of social control, such as the church, the family and the school.

THE ROLE OF LAW IN EFFECTIVE SOCIAL CONTROL

Social control is most effectively guaranteed by the exercise of individual self-discipline. Elementary social psychology teaches us that restraint generated within is infinitely more effective and tenacious than restraint imposed from without.

One of the participants at our "Central Influences" Seminar observed:

When people grow up into a society, the principal aim is to internalize drives-that is, I assume they come up with certain drives which can be satisfied in many ways and you're trying to internalize, ways of satisfying those drives which will be compatible with life in a community and also satisfying to the individual. The external restraints can only complement this, they cannot possibly substitute for it.

The supplemental effect of external restraints, particularly legal restraints, must also be weighed against the nature of the control sought. It was put this way at our Seminar:

Think of the social welfare function as a mountain-the hill of the Lords really. Large parts of it are something of a plateau; that is you can be all sorts of places on it and be safe. You don't have to maximize. This is an economist's fallacy. You can have all sorts of variations, you can be Socialists, Capitalists, Mormons, Adventists and get away with it-even Liberals. But there are cliffs, and you can fall off of them. This is what we are worrying about today. We are nervous about these cliffs.

The "no-no's"-as the kids call them-are the fences on these cliffs. That is, we have set up taboos and say there's a cliff there. Now -one of the problems socially is that we set up "no-no's" where there are no cliffs. There are no cliffs and people jump over these [fences] and

they say, "No cliffs! See no cliffs!" [Then, over other fences-and] chop-chop-chop-crash! See, it's just as dangerous to set up fences without any cliffs as not have fences where there are cliffs.

To this functional consideration of external restraint, we must also add the philosophical faith in the responsible exercise of individual judgment which is the essence of a free society. To illustrate, a preference for individual productivity underlies this society's opposition to indiscriminate drug use, the fact that so few of the 24 million Americans who have tried marihuana use it, or have used it irresponsibly, testifies to the extent to which they have internalized that value.

The hypothesis that widespread irresponsibility would attend freer availability of marihuana suggests not that a restrictive policy is in order but rather that a basic premise of our free society is in doubt. We note that the escalation thesis, used as an argument against marihuana rather than as a tool for understanding individual behavior, is really a manifestation of skepticism about individual vulnerabilities. For example, one-half of the public agreed with the statement that "if marihuana were made legal, it would make drug addicts out of ordinary people."

At the same time, we do feel that the threat of excessive use is most potent with the young. In fact, we think all drug use should continue to be discouraged among the young, because of possible adverse effects on psychological development and because of the lesser ability of this part of the population to discriminate between limited and excessive use.

Social policy implementation in this regard is extraordinarily difficult. For example, although existing social policies toward tobacco, alcohol and marihuana alike oppose their use by the young, those policies are far from being fully effective. For example:

Tobacco

The National Survey (1971) indicates that of young people age 12-to-17,

- 50 % have smoked at one, time or another;
- 15% smoke now; and
- At least 8% smoke at least a half a pack a day.

In a 1970 sample of smoking habits in the 12-to-18 population conducted for the National Clearinghouse for Smoking and Health, it was found that:

- 18.5% of the boys and 11.9 % of the girls were regular smokers; and
- About 8% of the boys and 5% of the girls smoked more than a half a pack a day.

Alcohol

The National Survey also ascertained the drinking pattern during the previous month of young people aged 12-to-17, finding that:

- At least 23% had used beer during that month, at least 14% had used wine and at least 12% had used hard liquor; and
- 6% had used beer five or more days during the months 3% had used wine five or more days, and 3% had used hard liquor five or more days.

Marihuana

Of the 12-to-17 population, the Survey found that:

- 15% of this population had tried marihuana;
- At least 6 % still use it; and

- Less than 1% use it once a day or more

The inclination of so many young people to experiment with drugs is a reflection of a so-called successful socialization process on one hand, and of society's ambivalence to the use of drugs on the other. This entire matter will occupy much of our attention in the coming year, but it is essential that we make a few anticipatory comments now.

This nation tries very had to instill in its children independence curiosity and a healthy self-assurance. These qualities guarantee a dynamic, progressive society. Where drugs are concerned, however, we have relied generally on authoritarianism and on obedience. Drug education has generally been characterized by overemphasis of scare tactics. Some segments of the population have been reluctant to inform for fear of arousing curiosity in young minds. Where drugs are concerned, young people are simply supposed to nod and obey. -

This society has always been and continues to be ambivalent about the non-medical (in the strict sense) use of drugs. And this ambivalence does not escape our children. If we can come to grips with this issue, we might convince our youth that the curiosity that is encouraged in other aspects of our culture is undesirable where drugs are concerned.

The law is at best a highly imperfect reflection of drug policy. The laws proscribing sale of tobacco to minors are largely ignored. Prohibitions of sale of alcohol to minors are enforced sporadically. As to marihuana, there are areas throughout this nation where possession laws are not enforced at all. In other sections, such proscriptions are strictly enforced, with no apparent decrease in marihuana use.

As a guiding doctrine for parents and children, the law is certainly confusing when it imposes widely varying punishments in different states, and even in different courts of the same state, all for use of the same substance, marihuana. That marihuana use can be treated as a petty offense in one state and a felony in another is illogical and confusing to even the most sincere of parents.

The law is simply too blunt an instrument to manifest the subtle distinctions we draw between the motivations and the circumstances of use. At the same time, legal status carries a certain weight of its own, and other institutions must take account of the law in performing their functions.

In legally implementing our recommended social policy, we seek to maximize the ability of our schools, churches and families to be open and honest in discussing all drugs, including marihuana. The law must assist, not impede. In this respect, we note with concern the counterproductive tendency in our society to seek simple solutions to complex problems. Since the statutory law is a simple tool, the tendency in our society to look to the law for social control is particularly strong.

We have discussed the four basic social policy objectives of elimination, discouragement, neutrality and approval of marihuana use and have selected discouragement of use, with emphasis on prevention of heavy and very heavy use, as our generalized aim. We have considered three legal responses, each with a wide range of alternatives:

1. Total Prohibition.

2. Partial Prohibition.

3. Regulation.

TOTAL PROHIBITION

The distinctive feature of a total prohibition scheme is that all marihuana-related behavior is prohibited by law. Under the total prohibition response now in force in every state and at the federal level, cultivation, importation, sale, gift or other transfer, and possession are all prohibited acts. In 11 states and the District of Columbia, simply being present knowingly in a place where marihuana is present is also prohibited; and many states prohibit the possession of pipes or other smoking paraphernalia. For our purposes, the key feature of the total prohibition approach is that even possession of a small amount in the home for personal use is prohibited by criminal law.

From the very inception of marihuana control legislation, this nation has utilized a policy of a total prohibition, far more comprehensive than the restrictions established during the prohibition of alcohol.

Until recent years, society was operating under an eliminationist policy. The exaggerated beliefs about the drug's effects, social impact, and user population virtually dictated this legal approach. During this entire, period, total prohibition was sought through the use of heavier and heavier penalties until even first-time possession was a felony in every jurisdiction, and second possession offenses generally received a mandatory minimum sentence without parole or probation. Yet the last few years have seen society little by little abandoning the eliminationist policy in favor of a containment policy.

Under the total prohibition umbrella, this containment policy has been implemented by a unique patchwork of legislation, informal prosecutorial policy and judicial practice. Possession is now almost everywhere a misdemeanor. Although some term of incarceration remains as a penalty for possessors, it is generally not meted out to young first offenders or to possessors of small -amounts. Instead, most such offenders are dismissed or informally diverted to agencies outside the criminal system by those within the system who are trying to help them avoid the stigma of a criminal record.

Offenders who are processed within the criminal justice system generally receive fines and or probation. In many jurisdictions, enforcement officials make little or no effort to enforce possession proscriptions, concentrating instead on major trafficking. Possessors are generally arrested only when they are indiscreet or when marihuana is found incident to questioning or apprehension resulting from some other violation. From our surveys, state and federal, we have found that only minimal effort is made to investigate marihuana possession cases.

Such a tendency is a reflection of the adoption of a containment policy. By acting only when marihuana appears above ground, enforcement officials are helping to keep its use underground. The shift away from the elimination policy has been matched by a similar shift in legal implementation, but the distinctive feature of the total prohibition scheme still remains: all marihuana-related behavior, including possession for personal use within the home, is prohibited by criminal law.

Is such a response an appropriate technique for achieving the social control policy we outlined above? The key question for our purposes is whether total criminal prohibition is the most suitable or effective way to discourage use and whether it facilitates or inhibits a concentration on the reduction and treatment of irresponsible use. We are convinced that total prohibition frustrates both of these objectives for the following reasons.

1. Application of the Criminal Law to Private Possession Is Philosophically Inappropriate

With possession and use of marihuana, we are dealing with a form of behavior which occurs generally in private where a person possesses the drug for his own use. The social impact of this conduct is indirect, arising primarily in cases of heavy or otherwise irresponsible use and
from the drugs symbolic aspects. We do not take the absolutist position that society is philosophically forbidden from criminalizing any kind of "private" behavior. The phrase "victimless crimes," like "public, health hazard, has become a rhetorical excuse for avoiding basic social policy issues. We have chosen a discouragement policy on the basis of our evaluation of the actual and potential individual and social impact of marihuana use. Only now that we have done so can we accord appropriate weight to the nation's philosophical preference for individual privacy.

On the basis of this evaluation we believe that the criminal law is too harsh a tool to apply to personal possession even in the effort to discourage use. It implies an overwhelming indictment of the behavior which we believe is not appropriate. The actual and potential harm of use of the drug is not great enough to justify intrusion by the criminal law into private behavior, a step which our society takes only 'with the greatest reluctance.

2. Application of the Criminal Law Is Constitutionally Suspect

The preference for individual privacy reflected in the debate over the philosophical limitations on the criminal law is also manifested in our constitutional jurisprudence. Although no court, to our knowledge, has held that government may not prohibit private possession of marihuana, two overlapping constitutional traditions do have important public policy implications in this area.

The first revolves around the concept that in a free society, the legislature may act only for public purposes. The "police powers" of the states extend only to the "public health, safety and morals." In the period of our history when the people most feared interference with their rights by the government, it was generally accepted that this broad power had an inherent limitation. For example, early prohibitions of alcohol possession were declared unconstitutional on the basis of reasoning such as that employed by the Supreme Court of Kentucky in 1915 in the case of Commonwealth v. Campbell:

It is not within the competency of government to invade the privacy of the citizen's life and to regulate his conduct in matters in which alone is concerned, or to prohibit him any liberty the exercise which will not directly injure society.

Noting that the defendant was "not charged with having the liquor in his possession for the purpose of selling it, or even giving it to another," and that "ownership and possession cannot be denied when that ownership and possession is not in itself injurious to the public," the Kentucky court concluded that:

The right to use liquor for one's own comfort, if they use it without injury to the public, is one of the citizen's natural and inalienable rights.... We hold that the police power-vague and wide and undefined as it is-has limits. . . .

Even the perceived dangers of opium were not enough to convince some members of the judiciary that the government could prohibit possession. It is historically instructive to

consider these words, penned in 1890, by Judge Scott in Ah Lim v Territory:

I make no question but that the habit of smoking opium may be repulsive and degrading. That its effect would be to shatter the nerves and destroy the intellect; and that it may tend to the increase of the pauperism and crime. But there is a vast difference between the commission of a single act, and a confirmed habit. There is a distinction to be recognized between the use and abuse of any article or substance.... If this act must be held valid it is hard to conceive of any legislative action affecting the personal conduct, or privileges of the individual citizen, that must not be upheld.... The prohibited act cannot affect the public in any way except through the primary personal injury to the individual, if it occasions him any injury. It looks like a new and extreme step under our government in the field of legislation, if it really was passed for any of the purposes upon which that character of legislation can be sustained, if at all.

As a matter of constitutional history, a second tradition, the application of specific provisions in the Bill of Rights, has generally replaced the notion of "inherent" limitations. The ultimate effect is virtually the same, however. The Fourth Amendment's proscription of "unreasonable searches and seizures" reflects a constitutional commitment to the value of individual privacy. The importance of the Fourth Amendment to the entire, constitutional scheme was eloquently described by Justice Brandeis in 1928 in the case of Olmstead v U.S.:

The makers of our Constitution undertook to secure conditions favorable to the pursuit of happiness. They recognized the significance of man's spiritual nature, of his feelings and his intellect. They knew that only a part of the pain, pleasure and satisfaction of life are to be found in material things. They sought to protect Americans in their beliefs, their thoughts, their emotions and their sensations. They conferred, as against the Government, the right to be let alone-the most comprehensive of rights and the right most valued by civilized men.

Although the Fourth Amendment is itself a procedural protection, the value of privacy which it crystallizes is often read in conjunction with other important values to set substantive limits on legislative power. The Supreme Court, in the case of Griswold vs. Connecticut, held in 1965 that Connecticut could not constitutionally prohibit the use of birth control devices by married persons. Although the Justices did not agree completely on the reasons for their decision, Justice Douglas stated in the opinion of the Court:

The present case, then, concerns a relationship lying within the zone of privacy created by several fundamental constitutional guarantees. And it concerns a law which, in forbidding the use of contraceptives rather than regulating their manufacture or sale, seeks to achieve its goals by means of having a maximum destructive impact upon that relationship. Such a law cannot stand in light of the familiar principle, so often applied by this Court, that a "governmental purpose to control or prevent activities constitutionally subject to state regulation may not be achieved by means which sweep unnecessarily broadly and thereby invade the area of protected freedom." (citation omitted) Would we allow the police to search the sacred precincts of marital bedrooms for telltale signs of the use of contraceptives? The very idea is repulsive to the notions of privacy surrounding the marriage relationship.

Four years later, the Supreme Court, in Stanley v. Georgia, held that even though obscenity is not "speech" protected by the First Amendment, a state cannot constitutionally make private possession of obscene material a crime. The Court's reasoning is revealed in the following language:

[The] right to receive information and ideas, regardless of their social worth, (citation omitted), is fundamental to our free society. Moreover, in the context of this case- a prosecution for mere possession of printed or filmed matter in the privacy of a person's own home-that right takes on an added dimension. For also fundamental is the right to be free, except in very limited circumstances, from unwanted governmental intrusions into one's privacy ...

While the judiciary is the governmental institution most directly concerned with the protection of individual liberties, all policy-makers have a responsibility to consider our constitutional heritage when framing public policy. Regardless of whether or not the courts would overturn a prohibition of possession of marihuana for personal use in the home, we are necessarily influenced by the high place traditionally occupied by the value of privacy in our constitutional scheme.

Accordingly, we believe that government must show a compelling reason to justify invasion of the home in order to prevent personal use of marihuana. We find little in marihuana's effects or in its social impact to support such a determination. Legislators enacting Prohibition did not find such a compelling reason 40 years ago; and we do not find the situation any more compelling for marihuana today.

3. Total Prohibition Is Functionally Inappropriate

Apart from the philosophical and constitutional constraints outlined above, a total prohibition scheme carries with it significant institutional costs. Yet it contributes very little to the achievement of our social policy. In some ways it actually inhibits the success of that policy.

The primary goals of a prudent marihuana social control policy include preventing irresponsible use of the drug, attending to the consequences of such use, and deemphasizing use in general. Yet an absolute prohibition of possession and use inhibits the ability of other institutions to contribute actively to these objectives. For example, the possibility of criminal prosecution deters users who are experiencing medical problems from seeking assistance for fear of bring attention to themselves. In addition, the illegality of possession and use creates difficulties in achieving an open, honest educational program, both in the schools and in the home.

In terms of the social policy objective of discouraging use of the drug, the legal system can assist that objective in three ways: first, by deterring people from use; second, by symbolizing social opposition to use; and finally, by cutting off supply of the drug.

The present illegal status of possession has not discouraged an estimated 24 million people from trying marihuana or an estimated eight million from continuing to use it. Our survey of the country's state prosecuting attorneys shows that 53% of them do not believe that the law has more than a minimal deterrent effect in this regard. Moreover, if the present trend toward passive enforcement of the marihuana law continues, the law ultimately will deter only indiscreet use, a result achieved as well by a partial prohibition scheme and with a great deal more honesty and fairness.

A major attraction of the law has been its symbolic value. Yet, society can symbolize its desire to discourage marihuana use in many other, less restrictive ways. The warning labels

on cigarette packages serve this purpose, illustrating that even a regulatory scheme could serve a discouragement policy. During Prohibition, the chosen statutory implementation symbolized society's opposition to the use of intoxicating beverages; yet, most jurisdictions did not think it necessary to superimpose a proscription of possession for personal use in the home.

Finally, prohibiting possession for personal use has no substantive relation to interdicting supply. A possession penalty may make enforcement of proscriptions against sale a little easier, but we believe this benefit is of minimal importance in light of its costs.

The law enforcement goal repeatedly stated at both the federal and state levels has been the elimination of supply and the interdiction of trafficking. These avowed aims of law enforcement make sense, since they are the most profitable means of employing its manpower and resources in this area.

Indeed, the time consumed in arresting Possessors is inefficiently used when contrasted with the same amount of time invested in apprehending major dealers. Although a credible effort to eliminate supply requires prohibitions of importation, sale and possession-with intent-to-sell, the enforcement of a proscription of possession for personal use is minimally productive.

As noted, most law enforcement officials, district attorneys and judges recognize the ineffectiveness of the possession penalty, as a deterrent. Its perpetuation results in the making of what is commonly referred to as "cheap" cases that have little or no impact on deterring sale.

The marihuana supply system can be viewed as pyramid with the major bulk of marihuana entering the system at top of the pyramid and then descending to the base which represents the user population. Common sense dictates where law enforcement should devote its efforts. To remove the profit from the traffic requires arresting sellers, not users. The oft-heard argument that the police need possession penalties to compel users to reveal their sources is not convincing. "Turning informants" at the base of the pyramid is of marginal value and limited utility in reaching upwards toward the apex. Further, the National Survey showed that 60% of the users don't "buy" marihuana but get it from a friend. The volume of traffic in the drug at these levels is at best minimal.

In short, personal possession arrests and even casual sales, which account for more than 95% of the marihuana arrests at the state local level, occur too low in the chain of distribution to diminish supply very effectively.

In addition to the misallocation of enforcement resources, another consequence of prohibition against possession for personal use is the social cost of criminalizing large numbers of users. Our empirical study of enforcement of state and federal marihuana laws indicates that almost all of those arrested are between the ages of 18 and 25, most have jobs or are in school, and most have had no prior contact -with the criminal justice system. The high social cost of stigmatizing such persons as criminals is now generally acknowledged by the public at large as well as by those in the criminal justice system.

According to the National Survey, 53% of the public was unwilling to give young users a criminal record and 87% objected to putting them in jail. The nation's judges expressed an overwhelming disinclination to sentence and convict users for marihuana possession. Of these judges only 13% thought it was appropriate to incarcerate ail adult for possession and only 4% would jail a juvenile for marihuana possession. This disinclination is reflected in the low percentage of arrested users who are convicted, and the even lower percentage who

are jailed.

Even among the nation's prosecutors, a substantial majority favor the present trend toward avoiding incarceration for first offenders. Most jurisdictions have devised informal procedures for disposing of cases in lieu of prosecution. Our empirical study shows that 48% of the adult cases, and 70% of the juvenile cases, were dropped from the system at some point between arrest and conviction. The picture displayed is one of a large expenditure of police manpower to enforce a law most participants further along the line are not anxious to apply.

Other disturbing consequences of laws proscribing possession for personal use are the techniques required to enforce them. Possession of marihuana is generally a private behavior; in order to find it, the police many times must operate on the edge of constitutional limitations. Arrests without probable cause, illegal searches and selective enforcement occur often enough to arouse concern about the integrity of the criminal process.

Yet another consequence of marihuana possession laws is the clogging of judicial calendars. President Nixon has noted that one of the major impediments to our nation's efforts to combat serious crimes is the fact that the judicial machinery moves so slowly. Swift -arrests, prosecution, trial and sentence would significantly improve the deterrent effect of law. Yet the judicial system is overloaded with petty cases, with public drunkenness accounting for about 50% of all non-traffic offenses.

In his March 1971 address to the National Conference on the Judiciary, President Nixon said:

What can be done to break the logjam of justice today, to ensure the right to a speedy trial- and to enhance respect for law? We have to find ways to clear the courts of the endless stream of "victimless crimes" that get in the way of serious consideration of serious crimes. There are more important matters for highly skilled judges and prosecutors than minor traffic offenses, loitering and drunkenness.

To this list we would add marihuana possession, which accounts for a rising percentage, of judicial caseloads. In Chicago alone, during the last half of 1970, there were more than 4,000 possession arrests.

A final cost of the possession laws is the disrespect which the laws and their enforcement engender in the young. Our youth cannot understand why society chooses to criminalize behavior with so little visible ill-effect or adverse social impact, particularly when so many members of the law enforcement community also question the same laws. These young people have jumped the fence and found no cliff. And the disrespect for the possession laws fosters a disrespect for all law and the system in general.

On top of all this is the distinct impression among the youth that police may use the marihuana laws to arrest people they don't like for other reasons, whether it be their politics, their hair style or their ethnic background. Whether or not such selectivity actually exists, it is perceived to exist.

For all these reasons, we believe that the possession offense is of little functional benefit to the discouragement policy and carries heavy social costs, not the least of which is disrespect and cynicism among some of the young. Accordingly, even under our policy of discouraging marihuana use, the better method is persuasion rather than prosecution. Additionally, with the sale and use of more hazardous drugs on the increase, and crimes of violence escalating, we do not believe that the criminal justice system can afford the time and

the costs of implementing the marihuana possession laws. Since these laws are not mandatory in terms of achieving the discouragement policy, law enforcement should be allowed to do the job it is best able to do: handling supply and distribution.

A criminal fine or similar penalty for possession has been suggested as a means of alleviating some of the more glaring costs of a total prohibitory approach yet still retaining the symbolic disapproval of the criminal law. However, most of the objections raised above would still pertain: the possibilities of invasion of personal privacy and selective enforcement of the law would continue; possessors would still be stigmatized as criminals, incurring the economic and social consequences of involvement with the criminal law; the symbolic status of marihuana smoking as an anti-establishment act would be perpetuated.

On the other hand, a fine most likely would deter use no more than does the present possibility of incarceration. It would continue to impede treatment for heavy and very heavy use and would persist in directing law enforcement away from the policy's essential aim which is to halt illegal traffic in the drug.

For all these reasons, we reject the total prohibition approach and its variations.

REGULATION

Another general technique for implementing the recommended social policy is regulation. The distinguishing feature of this technique is that it institutionalizes the availability of the drug. By establishing a legitimate channel of supply -and distribution, society can theoretically control the quality and potency of the product. The major alternatives within this approach lie in the variety of restraints which can be imposed on consumption of the drug and on the informational requirements to which its distribution can be subject.

We have given serious consideration to this set of alternatives; however, we are unanimously of the opinion that such a scheme, no matter how tightly it might restrict consumption, is presently unacceptable.

1. Adoption of a Regulatory Scheme at this Time Would Inevitably Signify Approval of Use

In rejecting the total prohibition approach, we emphasized the symbolic aspects. In essence, we do not believe prohibition of possession for personal use is necessary to symbolize a social policy disapproving the use. Theoretically, a tightly controlled regulatory schemes with limited distribution outlets, significant restraints on consumption prohibition of advertising and compulsory labeling, could possibly symbolize such disapproval. Our regulatory policy toward tobacco is beginning to slowly to reflect a disapproval policy toward Cigarette smoking. Nonetheless, given the social and historical context of such a major shift in legal policy toward marihuana, we are certain that such a change would instead symbolize approval of use, or at least a position of neutrality.

The Commission is concerned that even neutrality toward use as a matter of policy could invest an otherwise transient phenomenon with the status of an accepted behavior. If marihuana smoking were an already ingrained part of our culture, this objection would be dispelled. However, we do not believe that this is the case,. We are inclined to believe, instead, that the present interest in marihuana is transient and will diminish in time of its own accord once the major symbolic aspects of use are deemphasized, leaving among our population only a relatively small coterie of users. With this possibility in mind, we are

hesitant to adopt either a policy of neutrality or a regulatory implementation of our discouragement policy. The law would inevitably lose its discouragement character and would become even more ambiguous in its rationale and its enforcement.

The effect of changing a social policy direction may be seen with tobacco policy. In recent years, society has ostensibly adopted a policy of discouraging cigarette smoking. This new policy has been implemented primarily in the information area through prohibition of some forms of advertising and through compulsory labeling. Yet, the volume, of cigarettes used increased last year. We believe that the failure of the new policy results from the fact that it supplants one that formerly approved use. This set of circumstances argues against any policy which would be regarded as approval of use, including a regulatory scheme. It is always extremely difficult to transform a previously acceptable behavior into a disapproved behavior.

2. Adoption of a Regulatory Scheme Might Generate a Significant Public Health Problem

We noted above that institutionalizing availability of the drug would inevitably increase the incidence of use, even though that incidence might otherwise decrease. Of greater concern is the prospect that a larger incidence of use would result in a larger incidence of long term heavy and very heavy use of potent preparations.

There are -now approximately 500,000 heavy users of less potent preparations in this country, representing about 2% of those who ever tried the drug. Even if the prevalence of - heavy use remained the same in relation to those who ever used, this at-risk population would inevitably increase under a regulatory scheme. If the emotional disturbances found in very heavy hashish users in other countries were to occur in this country, the adverse social impact of marihuana use, now slight, would increase substantially.

We have acknowledged that society, nonetheless, chose to run such a risk in 1933, when Prohibition was repealed. But alcohol use was already well-established in this society, and no alternative remained other than a regulatory approach. In light of our suspicion that interest in marihuana is largely transient, it would be imprudent to run that risk for marihuana today.

3. Adoption of a Regulatory Scheme Would Exacerbate Social Conflict and Frustrate a Deemphasis Policy

A significant segment of the public on both sides of the issue views marihuana and its "legalization" in a highly symbolic way. Any attempt to adopt a regulatory approach now would be counterproductive in this respect. The collision of values resulting from such a dramatic shift of policy would maintain the debate at a highly emotional level and would perpetuate the tendency to perceive marihuana use as a symbol of the struggle between two conflicting philosophies.

4. Not Enough Is Known About Regulatory Models In This Area

Advocates of legalization of marihuana are often inclined to propose a licensing scheme or an "alcohol model" without offering a specific program of regulation taking all the variables into account. Responsible policy planning cannot be so cursory. Consequently, we have

given serious study to the many issues presented by such a scheme and to the nation's experience with other drug licensing schemes. On the basis of our inquiry, we are convinced that such a step should not be taken unless a realistic assessment of the efficacy of existing schemes and their potential application to marihuana indicates it would be successful. Such an assessment raises a number of disturbing questions.

The regulatory approaches which this nation has used in the cases of alcohol and tobacco have failed to accomplish two of their most important objectives: the minimization of excessive use and the limitation of accessibility to the young. Despite the warning and restraints on distribution and consumption, more than 50 million Americans smoke cigarettes regularly, and more than nine million Americans are "problem" drinkers. We have previously cited data indicating how many of our children begin habits which have been legally forbidden to them. Since the young user and the chronic user of marihuana are of primary concern to our public health officials, the lack of success with alcohol and tobacco discourages an assumption that the regulation of supply would minimize use by the younger generation.

Another important purpose of a regulatory scheme is to channel the product through a controlled system of supply and distribution. In that way the quality and quantity of the substance can be regulated. The efficacy of such a scheme as applied to marihuana is questionable.

Cannabis can be grown easily almost anywhere in the United States with little or no human assistance. Even if a legitimate source of supply were established, it is likely that many persons would choose to ignore the legitimate source and grow their own, the purity of which would not be in question. If such a practice were illegal, the necessity for a concerted governmental eradication program is raised, which would involve a monumental law enforcement effort. According to the U.S. Department of Agriculture, there are presently an estimated five million acres of wild marihuana growing in this country and an undetermined number of acres under cultivation.

Yet, if such a practice were not forbidden, the revenue-raising, product-control and consumption-restriction features of a regulatory scheme would be threatened. Instructive to note is the fact that intensive regulation of alcoholic beverage production has not eliminated illicit production. During 1970, in fact, 5,228 illegal stills were destroyed by the Alcohol, Tobacco and Firearms Division of the U.S. Treasury and 5,279 persons were arrested. In 1971, 3,327 illegal stills were destroyed and 5,512 persons were arrested.

Another disturbing question is raised by the issue of potency regulation. Most advocates of legalization stipulate potency limitations as one feature of their scheme. Presumably they would limit the THC content of the regulated product. This is not an easy undertaking. Especially when cannabis is so easily grown and a black market is so easily created, we are dubious about the success of a regulatory scheme distributing only a product with low THC content. Again, attention must be paid the prospect of increased hashish use under a regulatory scheme; merely stipulating potency control is not sufficient. As we noted in Chapter II, the heavy, long-term use of hashish is a source of major concern to the Commission from both private and public health standpoints.

These are a few of the problems confronting the policy-maker if he seeks to devise an effective regulatory system of distribution for what is, in fact, a universally common plant. Our doubts about the efficacy of existing regulatory schemes, together with an uncertainty about the permanence of social interest in marihuana and the approval inevitably implied by adoption of such a scheme, all impel us to reject the regulatory approach as an appropriate implementation of a discouragement policy at the present time.

Future policy planners might well come to a different conclusion if further study of existing schemes suggests a feasible model; if responsible use of the drug does indeed take root in our society; if continuing scientific and medical research uncovers no long-term ill effects; if potency control appears feasible and if the passage of time and the adoption of a rational social policy sufficiently desymbolizes marihuana so that availability is not equated in the public mind with approval.

PARTIAL PROHIBITION

The total prohibition scheme was rejected primarily because no sufficiently compelling social reason, predicated on existing knowledge, justifies intrusion by the criminal justice system into the private lives of individuals who use marihuana. The Commission is of the unanimous opinion that marihuana use is not such a grave problem that individuals who smoke marihuana, and possess it for that purpose, should be subject to criminal procedures. On the other hand, we have also rejected the regulatory or legalization scheme because it would institutionalize availability of a drug which has uncertain long-term effects and which may be of transient social interest.

Instead we recommend a partial prohibition scheme which we feel has the following benefits:

Symbolizing a continuing societal discouragement of use;

Facilitating the deemphasis of marihuana essential to answering dispassionately so many of the unanswered questions;

Permitting a simultaneous medical, educational, religious, and parental effort to concentrate on reducing irresponsible use and remedying its consequences;

Removing the criminal stigma and the threat of incarceration from a widespread behavior (possession for personal use) which does not warrant such treatment;

Relieving the law enforcement community of the responsibility for enforcing a law of questionable utility, and one which they cannot fully enforce thereby allowing concentration on drug trafficking and crimes against persons and property;

Relieving the judicial calendar of a large volume of marihuana possession cases which delay the processing of more serious cases; and

Maximizing the flexibility of future public responses as new information comes to light.

No major change is required in existing law to achieve all of these benefits. In general, we recommend only a decriminalization of possession of marihuana for personal use on both the state and federal levels. The major features of the recommended scheme are that: production and distribution of the drug would remain criminal activities as would possession with intent to distribute commercially; marihuana would be contraband subject to confiscation in public places; and criminal sanctions would be withdrawn from private use and possession incident to such use, but, at the state level, fines would be imposed for use in public.*

Specifically, we recommend the following statutory schemes.

RECOMMENDATIONS FOR FEDERAL LAW

Under the Comprehensive Drug Abuse Prevention and Control Act of 1970, Congress provided the following scheme with respect to marihuana, by which was meant only the natural plant and its various parts, not the synthetic tetrahydrocannabinol (THC) :

- Cultivation, importation and exportation, and sale or distribution for profit of marihuana are all felonies punishable by imprisonment for up to five years for a first offense and by up to 10 years for a second offense (the available penalty is doubled for sale to a minor).
- Possession of marihuana with intent to distribute is a felony punishable by imprisonment for up to five years for the first offense and by up to 10 years for a second offense.
- Possession of marihuana for personal use is a misdemeanor punishable by up to one year in jail and a $1,000 fine for first offense and by up to two years in jail and a $2 000 fine for second offense (expungement of criminal record is available for first offenders).
- Transfer of a small amount of marihuana for no remuneration is a misdemeanor punishable by up to one year in jail and a $1,000 fine for first offense and by up to two years in jail and a $2,000 fine for second offense (Congress singled out marihuana in this way to allow misdemeanor treatment of casual transfers and permitted first offender treatment, as allowed for possession for personal use).

The Commission recommends only the following changes in federal law:

- POSSESSION OF MARIHUANA FOR PERSONAL USE WOULD NO LONGER BE AN OFFENSE, BUT MARIHUANA POSSESSED IN PUBLIC WOULD REMAIN CONTRABAND SUBJECT TO SUMMARY SEIZURE AND FORFEITURE.
- CASUAL DISTRIBUTION OF SMALL AMOUNTS OF MARIHUANA FOR NO REMUNERATION, OR INSIGNIFICANT REMUNERATION NOT INVOLVING PROFIT WOULD NO LONGER BE AN OFFENSE.

The Commission further recommends that federal law be supplemented to provide:

- A PLEA OF MARIHUANA INTOXICATION SHALL NOT BE A DEFENSE TO ANY CRIMINAL ACT COMMITTED UNDER ITS INFLUENCE, NOR SHALL PROOF OF SUCH INTOXICATION CONSTITUTE A NEGATION OF SPECIFIC INTENT.

* Commissioners Rogers, Congressman from Florida, and Carter, Congressman from Kentucky, agree with the Commission's selection of a discouragement policy and also agree that criminalization and incarceration of individuals for possessing marihuana for their own use is neither necessary nor desirable as a means of implementing that policy.

At the same time, both Commissioners feel that the contraband concept is not a sufficiently strong expression of social disapprobation and would recommend in addition a civil fine for possession of any amount of marihuana in private or in public.

Both Commissioners feel that the civil fine clearly symbolizes societal disapproval and is a simple mechanism for law enforcement authorities to carry out. If a person is found by a law enforcement officer to be in possession of marihuana, the officer would issue such person a summons to appear in court on a fixed day. Although a warrant would not issue for Research of a private residence unless there were probable cause to believe a criminal offense was being committed, a police officer legitimately present for other reasons could issue a civil summons for violation of the "possession" proscription.

Commissioners Rogers and Carter believe that the legal system must be utilized directly to discourage the person from using marihuana rather than being utilized only indirectly as In the case of contraband.

This civil fine would not be reflected in a police record, nor would it be considered a criminal act for purposes of future job consideration, either in the private sector or for government service.

Agreeing with the other Commissioners that the casual transfers of marihuana for no profit should be treated in the same manner as possession for one's own use, Congressmen Rogers and Carter do not agree that it should extend to transfers involving remuneration. They prefer the limiting language of the Comprehensive Drug Abuse Prevention and Control Act of 1970 which does not include the term "or insignificant remuneration not involving a profit."

Apart from the addition of the civil fine to the contraband recommendation in the respects set out above, Congressmen Carter and Rogers are in complete agreement with the statutory recommendations set out in the Report.

Commissioner Ware concurs completely with the statements made by Congressmen Rogers and Carter but wishes to reemphasize that the social policy and legal scheme adopted is applicable only to marihuana and should not be construed to embrace other psychoactive drugs. The policy set forth in this Report, subject to the already noted comments of the two Congressional Commissioners, makes sense for marihuana on the basis of what is known about the drug and in the absence of any conclusive showing which would verify some of the anecdotal law enforcement testimony heard by the Commission regarding criminal behavior exhibited while under the influence of marihuana.

Commissioner Ware feels that some penalty short of criminalizing the user, such as a civil fine or some type of intensive drug education, will act as a positive deterrent toward minimizing the incidence of marihuana use especially among the young. Further, he is opposed to the use of any drug for the express purpose of getting intoxicated, and includes alcohol within this category. The Commissioner feels that what is needed is an internalizing of discipline among our citizenry, with the legal system assisting this process through the use of disincentives.

Commissioners Hughes, Senator from Iowa, and Javits, Senator from New York, feel that the Commission has taken a major, highly laudable step in recommending that the private use of marihuana be taken out of the criminal justice system. They concur in its threshold judgment that overall social policy regarding this drug should seek to discourage use, while concentrating primarily on the prevention of irresponsible use. They disagree, however, with three specific recommendations relating to the implementation of this discouragement policy.

First, they would eliminate entirely the contraband provision from the partial prohibitory

model adopted by the Commission. They want it eliminated first because its legal implications are confusing and the subject of disagreement even among lawyers. Whether or not possession of a given substance is criminal, possession of material designated as contraband makes that possession unlawful. Also, marihuana designated as contraband would be subject to government search and seizure, even though the underlying possession is no longer criminal. The provision-which does not apply to marihuana held for personal use within the home is considered by both Commissioners to be an unnecessary "symbol" of the discouragement policy. It will not foster elimination of the misunderstanding and mistrust which is a hallmark of our current marihuana policy.

Commissioner Hughes and Javits seek to eliminate it also because as a practical matter it serves no useful law enforcement purpose within the overall partial prohibitory model. If marihuana held for personal use within the home is not contraband, why should marihauna held for personal use within one's automobile be contraband? The area of operation of the contraband provision is extremely narrow. if one possesses more than one ounce of marihuana in public, it may be seized without regard to the contraband doctrine since such possession is a criminal violation.

Since the contraband provision does not apply to marihuana possession and use in private, the only effective area covered by the contraband provision is the area of possession in public of less than one ounce. The Commission has chosen to remove the stigma of the criminal sanction in this kind of case. To impose instead a contraband provision, which it is argued is in the nature of a civil "in rem" seizure which does not operate against the person, is to cloud the issue and to weaken the force of the basic decriminalization. A persuasive justification simply has not been made.

Both Commissioners seek to eliminate it also because they believe that the voice of the Commission should be loud and clear that the preservation of the right of privacy is of paramount importance and cannot be casually jeopardized in the pursuit of some vague public or law enforcement interest which has not been defined and justified with clarity and precision.

The second area of disagreement with the Commission's recommendations concerns the casual distribution of marihuana and the not-for-profit sale. As understood:

(1) The totally donative transfer is not subject to criminal penalty, regardless of where it takes place.

(2) The transfer of small amounts for insignificant remuneration not involving a profit is not subject to criminal penalty (except if it is accomplished in public, in which case it is subject to crimin. ' sanction), but (3) The transfer of "large amounts" for "significant" remuneration not involving a profit is subject to criminal penalty.

Footnote 4 on page 158 of the Report the Commission refers to a Report of The Senate Judiciary Committee on the Comprehensive Drug Abuse Prevention and Control Act of 1970. In substance, it implies that within the meaning of the Act, transfers of -more than one or two marihuana cigarettes in return for 50 cents or one dollar to cover cost are not intended to be covered as casual transfers, but rather are to be treated as unlawful sales.

Commissioners Hughes and Javits feel that the Commission has failed to set forth a clear standard which will adequately inform the public of their obligations under the law. The recommendation and its discussion in the Report are confusing and fail to provide the individual with sufficient guidance to allow him to act without having to dodge in and out of

illegality. It also undermines a basic, stated objective of the Commission i.e., to concentrate the weight of the criminal sanction upon significant supply and distribution activities, rather than upon casual consumption.

Moreover, proscribing even the most casual not-for-profit transfers when they occur in public is, in their opinion, wrong. Such transfers are necessarily incident to private possession and use. To hold that they should be subject to criminal sanction is logically inconsistent with the Commission's rationale and recommendation on decriminalization of such private activities.

Instead, both Commissioners recommend that all not-for-profit sales be excluded from the criminal sanction. It Is fundamental that there be a clear separation between the serious, commercial, profit-making-seller, or "pusher" as he is known, and the individual who merely splits the cost of a reasonable supply of the drug with his friends or acquaintances.

Thirdly, exception is taken to the retention of the criminal sanction on public possession of more than one ounce. The individual who buys an ounce and a half would be a criminal when he buys on the corner, when he puts it in his pocket, when he gets in his car and drives home, when he is on his doorstep, but not when he crosses the threshold of his home. Commission policy should direct the attention of the law enforcement community to the person who sells the drug for profit, and not to the person who uses the drug privately.

If an individual has more than a few ounces in his possession, and there is probable cause to believe that he intends to sell it for profit, that activity is already covered under the Commission's recommendation that possession with intent to sell is illegal. Therefore, there is no need to further proscribe simple public possession.

All the component parts of the recommended policy of the Commission should be consistent with its objective of non-interference with casual transfers and possession and use which is essentially and fundamentally private and personal.

The contraband device, the not-for-profit sale, and public possession of some reasonable amount which should be presumed to be necessarily incident to private use should all be removed from the ambit of legal sanction. To do so would be to strike down "symbols" of a public policy which had never been adequately justified in the first instance. Such steps would in no way jeopardize the firm determination of the Commission that the use of marihuana ought to be discouraged.

RECOMMENDATIONS FOR STATE LAW

Under existing state marihuana laws, cultivation distribution and possession with intent to distribute are generally felonies and in most states possession for personal use is a misdemeanor. The Commission strongly recommends uniformity of state laws and, in this regard, endorses the basic premise of the Uniform Controlled Substances Act drafted by the National Conference of Commissioners on Uniform State Laws. The following are our recommendations for a uniform statutory scheme for marihuana, by which we mean, as under existing federal law, only the natural cannabis plant and its various parts, not the synthetic tetrahydrocannabinol (THC)

Existing Law

CULTIVATION, SALE OR DISTRIBUTION FOR PROFIT AND POSSESSION WITH INTENT TO SELL WOULD REMAIN FELONIES (ALTHOUGH WE DO RECOMMEND UNIFORM PENALTIES).

Private Activities

POSSESSION IN PRIVATE OF MARIHUANA FOR PERSONAL USE WOULD NO LONGER BE AN OFFENSE.

DISTRIBUTION IN PRIVATE OF SMALL AMOUNTS OF MARIHUANA FOR NO REMUNERATION OR INSIGNIFICANT REMUNERATION NOT INVOLVING A PROFIT WOULD NO LONGER BE AN OFFENSE.

Public Activities

POSSESSION IN PUBLIC OF ONE OUNCE OR UNDER OF MARIHUANA WOULD NOT BE AN OFFENSE, BUT THE MARIHUANA WOULD BE CONTRABAND SUBJECT TO SUMMARY SEIZURE AND FORFEITURE.

POSSESSION IN PUBLIC OF MORE THAN ONE OUNCE OF MARIHUANA WOULD BE A CRIMINAL OFFENSE PUNISHABLE BY A FINE OF $100.

DISTRIBUTION IN PUBLIC OF SMALL AMOUNTS OF MARIHUANA FOR NO REMUNERATION OR INSIGNIFICANT REMUNERATION NOT INVOLVING A PROFIT WOULD BE A CRIMINAL OFFENSE PUNISHABLE BY A FINE OF $100.

PUBLIC USE OF MARIHUANA WOULD BE A CRIMINAL OFFENSE PUNISHABLE BY A FINE OF $100.

DISORDERLY CONDUCT ASSOCIATED WITH PUBLIC USE OF OR INTOXICATION BY MARIHUANA WOULD BE A MISDEMEANOR PUNISHABLE BY UP TO 60 DAYS IN JAIL, A FINE OF $100, OR BOTH.

OPERATING A VEHICLE OR DANGEROUS INSTRUMENT WHILE UNDER THE INFLUENCE OF MARIHUANA WOULD BE A MISDEMEANOR PUNISHABLE BY UP TO ONE YEAR IN JAIL, A FINE OF UP TO $1,000, OR BOTH, AND SUSPENSION OF A PERMIT TO OPERATE SUCH A VEHICLE OR INSTRUMENT FOR UP TO 180 DAYS.

A PLEA OF MARIHUANA INTOXICATION SHALL NOT BE A DEFENSE TO ANY CRIMINAL ACT COMMITTED UNDER ITS INFLUENCE NOR SHALL PROOF OF SUCH INTOXICATION CONSTITUTE A NEGATION OF SPECIFIC INTENT.

A PERSON WOULD BE ABSOLUTELY LIABLE IN CIVIL COURT FOR ANY DAMAGE TO PERSON OR PROPERTY WHICH HE CAUSED WHILE UNDER THE INFLUENCE OF THE DRUG.

DISCUSSION OF FEDERAL RECOMMENDATIONS

The recommended federal approach is really a restatement of existing federal policy. From official testimony and record evaluation, we know that the federal law enforcement authorities, principally the Federal Bureau of Narcotics and Dangerous Drugs and the Bureau of Customs, do not concentrate their efforts on personal possession cases. The avowed purpose of both Bureaus is to eliminate major traffickers and sources of supply. For the most part, the federal agencies have left possession enforcement to the states. Underlying this approach is a need -to maximize the use of enforcement resources for major priorities and allow the states, in exercising their "police powers," to assume the responsibility for local activities, including possession for personal use.

By withdrawing the criminal sanction from possession for personal use we are, in effect, codifying official policy. In addition, such a scheme follows the model chosen for alcohol in the Volstead Act, and also revives the approach taken by Congress in the Drug Abuse Control Amendments (DACA) of 1965. We are in agreement with the original thrust of DACA, when Congress brought previously uncontrolled drugs, LSD, barbiturates and amphetamines, under control but did not assess criminal penalties for possession for personal use.

Instead, Congress placed on the prosecution the burden of proof that the possession was for purposes of sale. Regardless of whether or not Congress was wise in imposing a penalty in 1968 for possession for personal use, a subject we will consider in our next Report, we think the original DACA concept is enlightened where marihuana is concerned.

At the same time, present federal law classifies marihuana as contraband, and this feature should be maintained. The contraband concept serves the discouragement policy in two ways: it assists the removal of supply from the market and it symbolizes a continuing societal opposition to use. Accordingly, if a person is found in possession of marihuana in public and the government is unable to prove any intent to sell, it may nevertheless seize the marihuana and confiscate it is contraband.

The contraband provision would apply only to possession in public and would not extend to possession for personal use in the home. During Prohibition, the Federal Government and most of the states employed a similar statutory limitation. For example, the Volstead Act provided that a private dwelling could not be searched "unless it is being used for the unlawful sale of intoxicating liquor. . . ." 1 The impact of this contraband concept is that marihuana possessed or found in public can be summarily seized by law enforcement officials and forfeited to the state for subsequent destruction .2 The criminal justice system is not involved in the process. The individual receives no record of any kind; he simply loses the economic value of the marihuana.3

With regard to the casual distribution of small amounts of Marihuana for no remuneration or insignificant remuneration not involving a profit we are following the approach taken in the Comprehensive Drug Abuse Prevention and Control Act of 1970 which in essence treats such casual transfers as the functional equivalent of possession. In doing so, Congress recognized that marihuana is generally shared among friends and that not all people who distribute marihuana are "Pushers."*

'§ 39. Unlawful POssessior of liquor or property designed for manufacture thereof ; search warrants. It shall be unlawful to have or possess any liquor or property designed for the manufacture of liquor intended for use in violating this chapter or which has been so used,

and no property rights shall exist in any such liquor or property. A search warrant may issue as provided in [sections 611 to 631 and 633 of Title 181 and such liquor, the containers thereof, and such property so seized shall be subject to such disposition as the court may make thereof, if it is found that such liquor or property was so unlawfully held or possessed, or had been so unlawfully used, the liquor, and all property designed for the unlawful manufacture of liquor, shall be destroyed, unless the court shall otherwise order. No search warrant shall issue to search any private dwelling occupied as such unless it is being used for unlawful sale of intoxicating liquor, or unless it is in part used for some business purpose such as a store, shop, saloon, restaurant, hotel, or boarding 'house. 'Me term "private dwelling" shall be construed to include the room or rooms used and occupied not transiently but solely as a residence in an apartment house, hotel or boarding house. The property seized on any such warrant shall not lie taken from the officer seizing the same on any writ of replevin or other like process. (Oct. 28, 1919, e. 85, Title 11, § 25, 41 Stat. 315)

The federal and state provisions presently in force regarding the seizure and forfeiture of an automobile transporting marihuana would no longer be applicable. They would still remain in force for other controlled drugs classified as contraband.

3 See the views of Commissioners Rogers, Carter, Ware, Hughes and Javits expressed in the footnote on pages 151-156.

The accuracy of Congress' appraisal is underscored by the National Survey. When people who had used marihuana were asked how they first obtained the drug, 61% of the adults and 76% of the youth responded that it had been given to them. Only 4% of the adults and 8% of the youth said that they had bought it. When asked who their source had been, 67% of the adults and 85% of the youth responded that it had been a friend, acquaintance or family member.

The close association between the concepts of casual transfer and personal possession is also underscored by the fact that 56% of the prosecutors in our survey thought that the present law did not deter casual transfer at all or deterred it only minimally.

With regard to importation and exportation, we recommend no change in existing law and make the following observations. First, the United States must maintain its international standing and, as a member of the community of nations, this country should do everything in its power to restrict the exportation of marihuana to other countries and to penalize such international traffic.

As to importation of marihuana, the most effective way to discourage use is to cut off supply at the top of the pyramid. Recognizing that most of the marihuana consumed in the United States comes from abroad, we feel that the Bureau of Customs at the borders should have all necessary authority to halt and interdict supplies intended for consumption in this country. There has been a long-standing practice of excepting ports and borders from procedural rules applying within the United States. One example is that Customs officials are allowed to search without the showing of probable cause, even though such a showing is mandatory for searches conducted within the United States. We can see a legitimate reason for continuing this policy.

*In considering this relationship, the Senate, in the Report of the Committee on the Judiciary of the United States Senate regarding S. 3246 (a precursor bill to the new Federal law) stated:

The language "distributes a small amount of marihuana for no remuneration or insignificant remuneration not involving a profit" as contained in section 501 (c) (4) is intended to cover the type of situation where a college student makes a quasi-donative transfer of one or two marihuana cigarettes and receives 50 cents or a dollar in exchange to cover the cost of the marihuana.

Transfers of larger quantities in exchange for larger amounts of money, or transfers for profit are not intended to be covered by this section, but rather are to be covered by section 501 (c) (2) which deals with unlawful distribution. This language sketches a prototype situation which the Committee had in mind; however, the wording of the Federal Act and of our recommendations is not intended to establish inflexible rules. The objective in both provisions is to distinguish between commercial sellers and casual distributors. Ultimately the courts will have the responsibility of drawing this distinction according to the evidence in individual cases. The recommended provision intentionally establishes a loose standard not tied to specific amounts of marihuana or money.

See also the views of Commissioners Rogers, Carter, Ware, Hughes and Javits expressed in the footnote on pages 151-156.

DISCUSSION OF STATE RECOMMENDATIONS

The states have primary responsibility for enforcing the existing proscriptions against possession for personal use. Their present efforts are designed mainly to keep marihuana use contained, and in private. Such an enforcement policy is consistent with our social policy approach, and is an appropriate exercise of the states' obligations to maintain public order. So while we see no need for criminal sanctions against possession for personal use or against casual transfers, we recommend a number of provisions for confining marihuana use to the home.

The first point is that even marihuana possessed for personal use is subject to summary seizure and forfeiture if it is found in public. This concept is now applicable under federal law which we commend also to the states. In our view, the contraband feature symbolizes the discouragement policy and will exert a major force in keeping use private.

Another means of symbolizing the discouragement policy which has been suggested is the imposition of a civil fine on those possessing marihuana outside the home for personal use.* Under such an approach, a fine would be levied and processed outside the criminal justice system. Essentially, possession of marihuana would be the equivalent of a traffic offense in those jurisdictions where such an offense is not criminal.

Such a scheme would accomplish little more than that achieved under a partial prohibition scheme. Warrants would presumably not be issued for searches of private residences, and possession offenses would be detected only by accident or if the offender uses the drug in public. The more direct way to confront such behavior is a penalty against public use.

A further problem with the civil fine approach lies in the area of non-payment of the fine. With traffic tickets, or with civil fines levied against industrial polluters, society can compel compliance by withdrawing its permission to engage in regulated activity. For example, it can revoke the motorists' license to drive or the polluters' license to do business within the state. In short, the state has remedies beyond the criminal law to achieve its policy goal. The same would not be true for the marihuana user and enforceability of the statute would

ultimately require court action.

*See the views of Commissioners Rogers, Carter and Ware expressed in the footnote on pages 151-153.

As we have suggested, a central feature, of our statutory approach at the state, level would be a vigorously enforced prohibition of public use. No intoxicant should be used in public, both because it may offend others and because the user is risking irresponsible behavior if he should be under its influence in public. Moreover, where marihuana is concerned, continuing societal disapproval requires that the behavior occur only in private if at all. Public use, under the proposed scheme, would therefore be punishable by a fine of $100.

We also recognize the need for some prophylactic measure for anticipating distribution, even though there may be no intent to sell for profit. To this end, and in order to deter public use, possession and transfer, we have drawn a line at one ounce of marihuana. Possession in public of more than this amount would be punishable by a fine of $100.

For these same reasons, we believe the states should prohibit all transfers outside the home, whether or not for remuneration. A transfer for profit would be a felony, as under present law. A casual transfer of a small amount would be punishable by a fine of $100.

Taken together, the contraband feature, the proscriptions of public use and public possession of more than an ounce (even if for personal use) and the prohibition of public transfers will reflect the discouragement policy underlying the entire, scheme.

The remaining set of recommendations aims at irresponsible behavior under the influence of marihuana. Whatever the precise legal scheme employed, these provisions should be included.

First, the "drunk and disorderly" statutes presently in force in the states are useful tools for maintaining public order. We would suggest similar statutes in the case of marihuana, punishing offenders by up to 60 days in jail, a fine of $100, or both. Law enforcement authorities must have a means to halt antisocial behavior exhibited incidental to marihuana use.

The second aspect of irresponsible behavior is the operation of automobiles, other vehicles, or any potentially dangerous instrument while under the influence of marihuana. Such behavior is gross negligence in itself, risking harm to others unnecessarily. In addition to penalizing a person who "drives under the influence" as a serious misdemeanant, we would impose absolute civil liability on anyone who harms the person or property of another while under the influence of marihuana.

Finally, no one should be able to limit his criminal accountability by alleging that he was under the influence of marihuana at the time of the crime. Under both federal and state law, the defendant should not be able to negate the mental element of "specific intent," which some offenses carry, by pleading that he was under the influence of marihuana and was therefore unable to have formed such an intent. Unlike many users of heroin, the user of marihuana is not physically dependent on the drug. The use of the drug is usually a matter of choice. Although we believe on the basis of available evidence that there is no causal connection between marihauna use and crime, we would under no circumstances allow a person to escape the consequences of his actions by hiding behind the cloak of marihuana use.

DISCUSSION OF POTENTIAL OBJECTIONS

Having discussed our recommended scheme at the federal and state levels, we think it useful to answer some objections we anticipate will be raised. Possible objections are:

1. Partial prohibition is not a sufficient reflection of the discouragement policy.

2. Partial prohibition is logically inconsistent.

3. A possession penalty is necessary for effective enforcement of sale proscriptions.

4. Partial prohibition won't "work" for marihuana any more than it did for alcohol.

5. A possession offense is essential as a device for detecting problem users.

6. Retention of a possession offense is required by our international obligations.

7. A firm distinction should be drawn between less potent and more potent preparations.

1. The Partial Prohibition Approach Is a Sufficient Reflection of the Discouragement Policy

To those who would argue that a criminal sanction against use is a necessary implementation of an abstentionist policy, we need only respond that this country has not generally operated on that assumption. We would be astounded if any person who lived during the 1920's was not aware of a definite governmental policy opposed to the use of alcohol. Yet, only five states prohibited possession for personal use during Prohibition. The failure of the 18th Amendment, the Volstead Act and 43 state prohibition acts to criminalize private possession certainly did not signify official approval of or neutrality toward alcohol use.

As we pointed out in Chapter 1, our nation has not generally seen fit to criminalize private drug-related behavior; only in the narcotics area was possession made a crime and marihuana was brought within the narcotics framework because of unfounded assumptions about its ill effects. We think it is time to correct that mistaken departure from tradition with respect to marihuana. As during Prohibition, the drug will remain contraband, and its distribution will be prohibited.

Even as late as 1965, an abstentionist drug policy was not thought to require prohibition for personal use. At that time, Congress enacted the Drug Abuse Control Amendments, bringing LSD, amphetamines and barbiturates under federal control. National policy was clearly opposed to use of the hallucinogens and the non-prescription use of amphetamines and barbiturates, yet Congress did not impose a penalty for possession. Whether or not Congress' subsequent decision in 1968, to impose such a penalty was appropriate is an issue we will cover in our next Report after analyzing the individual drugs controlled. The important point now is that such a penalty is not a necessary feature of a discouragement policy for marihuana, regardless of its, propriety for other drugs.

1. The Partial Prohibition Approach Is Not Logically Inconsistent

It will. be, argued that a law which permits a person to acquire and use marihuana but does not permit anyone to sell it to him for profit is logically unsound. We do not agree. If we had recommended a social policy of approval or neutrality toward use, partial prohibition would indeed have been illogical. However, under a discouragement policy, such a, scheme is perfectly consistent.

Under partial prohibition, use is discouraged in three main ways. First, law enforcement authorities will make a concerted effort to reduce the supply of the drug. If a person wishes to use marihuana, he will have to seek out a person to sell it to him; and if his seller is in the business of distributing marihuana for profit, the seller is violating the law.

Second, the user will have to confine his disapproved behavior to the home. If lie uses the drug in public, he has committed an offense; if lie possesses it in public. it may be summarily seized as contraband.

Third, continuing efforts will be made by educators, public health officials, and official government spokesmen to discourage use. Realizing that educational efforts are not always successful, we would hope for a sound program. In any event, the law should be an ancillary rather than a focal consideration.

There is nothing theoretically Inconsistent about a scheme which merely withdraws the criminal sanction from a behavior which is not immoral but which is disapproved. The individual is being allowed to make his own choice. Hopefully, he will choose not to use marihuana. If he chooses to do so, however, he will have to do so discreetly and in private. Apart from its ultimate possession by the user, however, all marihuana-related activity is prohibited. The drug is contraband from its initial growth, through its harvest and distribution. It ceases to be contraband only when possessed and used in the home.

3. Prohibition of All Possession Is Not Essential to Prohibition of Sale

The other side of the "inconsistency" objection is the argument by law enforcement officials that they cannot adequately enforce proscriptions against sale without a possession penalty. We disagree. We have already explained that enforcement of a possession offense to some extent impedes the effort to reduce supply. Possession cases are generally regarded in the law enforcement community and by judges and prosecutors as "cheap" cases. Few seriously contend that prosecution of possessors reduces supply.

Some persons argue in response that the law should remain on the books as a tool not against the possessor but against the seller. They say that a possession offense is helpful in three ways. First, a prosecution can be used as a bargaining tool to encourage the possessor to reveal his source; this is called "turning an informant." Second, the police may know that a person is a seller, but may not be able to prove either sale or intent to sell, so they can at least charge such suspected sellers with simple possession.

Third, a corollary of the second argument is that the possession offense provides a useful tool in the "plea bargaining" process. That is, a seller may plead guilty to the lesser offense of possession, now generally a misdemeanor, instead of running the risk of trial and conviction of the more serious offense of sale, generally a felony. The prosecution may accept such a "bargain' if it is uncertain of the strength of the case, to avoid delay in

sentencing, to reduce judicial backlog or in return for information from the defendant.

From an institutional standpoint, we do not find these arguments persuasive. First, if a possession offense is on the books, possession is a criminal activity. We oppose criminalizing conduct when its purpose and intent is directed not toward that conduct but toward another behavior.

In answer to the informant argument, the marihuana user (and this may not be true of other drugs) is simply too low in the distributional chain to help very much. As indicated earlier, the National Survey shows most users receive their marihuana from their friends or acquaintances either as a gift or at cost. Rarely is the time spent on him or on his "source" a fruitful allocation of the law enforcement official's time. Also, it is institutionally improper to hold the criminal sanction over a person to force him to talk, when we otherwise would be unwilling to use that sanction.

As to the "lack of proof" and "plea bargaining" arguments, we believe they challenge a fundamental tenet of our criminal justice system. That is, under our law, a person is not guilty just because the police think he is guilty; his offense must be proven beyond a reasonable doubt to a judge or jury. If a possession offense were not on the books, the police would have to gather enough evidence to convict the seller of sale or of possession with intent to sell, and the prosecution would have to convince the judge beyond a reasonable doubt. The defendant, suspected seller or not, is entitled to due process of law.

The "lack of proof" argument is nothing more than a plea for an "easy out" when the police do not have enough evidence. This simply represents an admission that law enforcement officials want a possession offense which they can apply selectively, to people whom they think, but cannot prove, are sellers. Such a notion is inconsistent with the basic premise of our system of equal treatment under the law. If "simple" possession is not an offense for some, it is not an offense for all. A "known seller" is entitled to the same rights as anyone else: criminal conduct must be proved beyond a reasonable doubt. We do not favor coddling criminals. We do insist, as did the framers of the Constitution, that suspected criminal behavior be proved.

4. That Partial Prohibition Did Not "Work" For Alcohol Doesn't Mean It Won't For Marihuana

Prohibition failed to achieve its avowed purpose of eliminating the use of intoxicating liquors from American life. Risking an oversimplification, we think two reasons were essentially responsible for this failure: the unwillingness of a substantial minority, and probably a majority, of the American public to discard a habit deeply ingrained in their lives; and the inability of the law enforcement community to eliminate the bootlegging traffic which catered to this continuing demand.

As we have repeatedly noted, one of the reasons for adoption of a partial prohibition approach is uncertainty about the extent to which marihuana use is ingrained in American culture. Indeed, adoption of partial prohibition is the best way to find out for sure. If the social interest turns out to be only transient, this policy will prove particularly appropriate.

Similarly, an increase in marihuana use may be prevented by a concerted effort to eliminate major trafficking, the scope of which is presently only a small fraction of Prohibition bootlegging. We do not pretend that supply of a plant so easily grown can be eliminated. However, an intensive effort to eliminate commercial criminal enterprise should have some

impact on the extent of use.

5. The Possession Offense Is Not Required as a Detection Device

In addition to their deterrent and symbolic functions, the drug possession laws serve a third function not shared by most other criminal laws. Like laws against public drunkenness, they facilitate societal detection of drug-dependent persons. Ideally, such persons, although apprehended by law enforcement authorities, may be detained for purposes of treatment and rehabilitation.

Whatever the merits of such an argument for the opiates and alcohol, such an argument does not apply to marihuana. Only a very small percentage of marihuana users are drug-dependent or are in need of treatment. Their dependence is generally upon multiple drug use, not on marihuana. In any event, the existence of such a small population does not justify retention of the possession offense as a detection device.

6. International Obligations Do Not Require Maintenance of a Possession Penalty

Some have raised the possibility that removal of simple possession criminal penalties would contravene this country's obligations under the Single Convention on Narcotic Drugs (1961), to which it became a signatory in March, 1967. We do not believe the provisions of that Convention compel the criminalization of possession for personal use.

Nowhere in the Convention are its Parties expressly required to impose criminal sanctions on possession for personal use. Article 4 requires Parties to "take such legislative and administrative measures as may be necessary . . . . to limit exclusively to medical and scientific purposes the production, manufacture, export, import, distribution of, trade in, use and possession of drugs." Penal sanctions are not necessarily included in this formulation.

Article 36, which deals specifically with penal provisions, requires each party to adopt "such measures as will ensure" that the listed activities, including possession, "shall be punishable offenses." Some have argued that this provision requires prohibition of personal use.

However, from a comprehensive study of the history of the Convention, the Commission has concluded that the word "possession" in Article 36 refers not to possession for personal use, but to possession as a link in illicit trafficking. This interpretation is bolstered also by the failure to include "use" in Article 36 even though it has been included in Article 4.

Finally, we must consider Article 33, which provides that "the Parties shall not permit the possession of drugs except under legal authority." This Article also does not require the imposition of any sanctions on possession for personal use. Experts consulted by the Commission have indicated that this Article may, nevertheless, require that the Parties to limit possession and use to medical and scientific purposes. To affirmatively allow drugs to remain in the possession of persons for non-medical use would in this view contravene Articles 4 and 33 to read together. From this perspective our international obligations may require the classification of marihuana, as contraband. For this reason, together with a desire to symbolize our discouragement policy in a clear way, we have included the contraband feature in our legal implementation scheme.

In conclusion, our reading of the Convention is that a Party may legitimately decide to deal with non-medical use and possession of marihuana through an educational program and similar approaches designed to discourage use.

". No Potency Distinction is Necessary at the Present Time

Following the approach taken in the Comprehensive Drug Abuse Prevention and Control Act of 1970, we have drawn a line between the natural cannabis plant and the synthetic tetrahydrocannabinols. "Marihuana" is defined as any and all parts of the natural plant. That we choose this approach for purposes of statutory implementation does not mean that we are unaware of the difference between the less potent and more potent preparations of the natural plant.

As noted in Chapters II and III, the highest risk of cannabis use to the individual and society arises from the very long-term, very heavy use of potent preparations commonly called hashish. No such pattern of use is known to exist in the United States today.

The predominant pattern of use in the United States is experimental or intermittent use of less potent preparations of the drug. Even when hashish is used, the predominant pattern remains the same. In addition, whatever the potency of the drug used, individuals tend to smoke only the amount necessary to achieve the desired drug effect.

Given the prevailing patterns of use, the Commission does not believe it is essential to distinguish by statute between less potent and more potent forms of the natural plant. Reinforcing this judgment are the procedural and practical problems attending an effort to do so.

If the criminal liability of ail individual user is dependent on the THC content of tl substance, neither lie nor the arresting officer will know whether he has committed a crime until an accurate scientific determination is made. Even if such accurate determinations were feasible on a large scale, which is not now the case, such after-the-fact liability is foreign to our criminal laws.

Under present circumstances, then, a statutory line based on potency is neither necessary nor feasible. We emphasize also that any legal distinction is an artificial reflection of the Commission's major concern: the heavy use of the drug over a long term. The most emphatic element of official policy should be to discourage such use, especially of the more potent preparations. Unfortunately precise legislative formulations regarding the amount of the drug presumed to be for personal use do not assist this effort at all. Whether it is lawful to possess one ounce of hashish or a proportionate amount based on potency (for example, one-fourth ounce), an individual prone to use the drug heavily will do so. Society's resources should be committed to the task of reducing supply of the drug and persuading our citizens not to use it. Expenditure of police time and financial resources in an attempt to ascertain the THC content of every seized substance would make little, if any, contribution to this effort.

A Final Comment

In this Chapter, we have carefully considered the spectrum of social and legal policy alternatives. On the basis of our findings, discussed in previous Chapters, we have concluded that society should seek to discourage use, while concentrating its attention on

the prevention and treatment of heavy and very heavy use. The Commission feels that the criminalization of possession of marihuana for personal is socially self-defeating as a means of achieving this objective. We have attempted to balance individual freedom on one hand and the obligation of the state to consider the wider social good on the other. We believe our recommended scheme will permit society to exercise its control and influence in ways most useful and efficient, meanwhile reserving to the individual American his sense of privacy, his sense of individuality, and, within the context of all interacting and interdependent society, his options to select his own life style, values, goals and opportunities.

The Commission sincerely hopes that the tone of cautious restraint sounded in this Report will be perpetuated in the debate which will follow it. For those who feel we have not proceeded far enough, we are reminded of Thomas Jefferson's advice to George Washington that "Delay is preferable to error." For those who argue we have gone too far, we note Roscoe Pound's statement, "The law must be stable, but it must not stand still."

We have carefully analyzed the interrelationship between marihuana the drug, marihuana use as a behavior, and marihuana as a social problem. Recognizing the extensive degree of misinformation about marihuana as a drug, we have tried to demythologize it. Viewing the use of marihuana in its wider social context, we have tried to desymbolize it.

Considering the range of social concerns in contemporary America, marihuana does not, in our considered judgment, rank very high. We would deemphasize marihuana as a problem.

The existing social and legal policy is out of proportion to the individual and social harm engendered by the use of the drug. To replace it, we have attempted to design a suitable social policy, which we believe is fair, cautious and attuned to the social realities of our time.

The Report of the National Commission on Marihuana and Drug Abuse

Marihuana: A Signal of Misunderstanding

Commissioned by President Richard M. Nixon, March, 1972

addendum

The previous Chapter recommended a social policy oriented toward the discouragement of marihuana use and presented a set of proposals for the legal implementation of that policy. In addition to these legal recommendations for federal, and state action, the Commission believes certain other recommendations should be presented for action.

Ancillary Recommendations

These recommendations are pr sented in three categories: (1) legal and law enforcement, (2) medical, and (3) other. Some of these recommendations apply to other drugs as well and will be discussed further in our second Report. However, we consider it useful to make recommendations now so that policy planners can be informed of the implications of what has been studied to date.

Foremost among the Commission's conclusions is a need for consistency between federal and state laws affecting marihuana distribution and use, and uniformity of marihuana laws among the states. The administration of all marihuana laws must be mutally reenforcing so that total governmental response to marihuana is both equitable and understandable.

Legal and Law Enforcement Recommendations

1. Federal

RECOMMENDATION: FEDERAL LAW ENFORCEMENT AGENCIES, ESPECIALLY THE BUREAU OF NARCOTICS AND DANGEROUS DRUGS AND THE BUREAU OF CUSTOMS, SHOULD IMPROVE THEIR STATISTICAL REPORTING SYSTEMS SO THAT POLICIES MAY BE PLANNED AND RESOURCES ALLOCATED ON THE BASIS OF ACCURATE AND COMPREHENSIVE INFORMATION.

In an effort to obtain information relating to enforcement of the marihuana laws including arrest, prosecution, sentencing and conviction data, the Commission found that sufficient information was available about prosecution and court action, but not about the activities of the law enforcement agencies. We were confronted by and large with inadequate statistical information and little or no in-depth evaluation.

The statistical reporting procedures of the Bureau of Narcotics and Dangerous Drugs and

the Bureau of Customs are not uniform, making it extremely difficult to assess the effectiveness of the two principal drug enforcement agencies of the Federal Government. The Bureau of Narcotics and Dangerous Drugs keeps centralized files but the Bureau of Customs maintains its files on a regional basis. In both Bureaus, statistical information is kept only in its raw form; that is, number of arrests, number of seizures and so on. Very little analysis exists of the procedures leading to arrest, of the characteristics of persons arrested, and of the law enforcement strategies involved in the arrest. For law enforcement personnel to understand more fully how they are carrying out their functions so that internal assessments of particular policies can be made, sophisticated statistics must be maintained.

Both the Bureau of Narcotics and Dangerous Drugs and the Bureau of Customs are aware of these problems. Both were extremely helpful to the Commission and its research staff in seeking useful information from the mass of raw statistics. However, the information from the available statistics is incomplete and of limited utility for policy planning purposes.

In support of this priority recommendation, Congress is urged to provide additional and adequate funding for this area, at the same time requiring both agencies to utilize a common reporting system so that information can be more easily shared between them.

In addition, it is recommended that the Federal Bureau of Investigation, in its Uniform Crime Reports, requests the state agencies to identify marihuana cases separately from narcotic cases and report them as a separate component.

RECOMMENDATION: THE FEDERAL BUREAU OF NARCOTICS AND DANGEROUS DRUGS SHOULD INCREASE ITS TRAINING PROGRAMS OF STATE AND LOCAL POLICE WITH SPECIAL EMPHASIS ON THE TRAINING IN THE DETECTION OF TRAFFICKING CASES.

The Commission's interviews with state and local police, officials revealed a consistent desire to upgrade the quality of their investigations. Since the Federal Bureau of Narcotics and Dangerous Drugs, through its National Training Institute, has been performing this task well, it is recommended that the funds be granted by the Congress to extend the range of the educational program offered and increase the number of persons trained.

RECOMMENDATION: INCREASED BORDER SURVEILLANCE, A TIGHTENING OF BORDER PROCEDURES, AND A REALISTIC ERADICATION PROGRAM TO DIMINISH THE SUPPLY OF DRUGS COMING INTO THE COUNTRY, COUPLED WITH A MORE EFFECTIVE PROGRAM FOR DIMINISHING THE DOMESTIC PRODUCTION AND DISTRIBUTION OF MARIHUANA, ARE REQUIRED.

The Commission, as part of its mandate, studied drug trafficking patterns along the borders of the United States. An analysis of border marihuana seizures was also made. The results of both studies indicated that proportionately larger seizures were made along the borders at locations where, there were no manned checkpoints. The Commission therefore recommends that more vigorous effort be made by federal agencies to interdict smugglers along the entire border while continuing their efforts at the formal checkpoints.

In discussions with representatives of other countries, a common observation made by foreign officials has been this country's somewhat indifferent attitude about the eradication of our home-grown marihuana, an attitude that is not appreciated by other countries wider pressure from the United States to destroy their crops. Since this Administration has wisely made illicit trafficking in all drugs a foreign policy priority, we recommend that priority be supported by an equally assiduous effort to eradicate marihuana within our borders.

We recommend further that preclearance procedures be eliminated so that Customs personnel may more effectively control smuggling of marihuana and other drugs. Preclearance is a procedure whereby passengers and their baggage destined for the United States are inspected by U.S. Customs, Immigration and Agriculture officials prior to departure from a foreign location. This practice is in effect in Bermuda, Montreal, Nassau, Toronto, Vancouver, Winnipeg and the Virgin Islands. Other locations are petitioning for the same privilege.

An inherent weakness in the preclearance procedure is that Customs personnel stationed outside the United States have no authority for search, seizure and arrest. This fact is well-known to the professional smuggler who uses it to his advantage. Since we have been informed that preclearance creates a gap in Customs' interdiction process, reason dictates that the procedure be eliminated in the interest of tighter control.

H. State

RECOMMENDATION: ALL STATES SHOULD ADOPT THE UNIFORM CONTROLLED SUBSTANCES ACT TO ACHIEVE UNIFORMITY WITH REGARD TO MARIHUANA AND OTHER DRUG LAWS, WITH THE EXCEPTION THAT THE LEGAL RESPONSE TO POSSESSION FOR ONE'S OWN USE BE UNIFORMLY ADOPTED IN ACCORDANCE WITH OUR RECOMMENDATION IN CHAPTER V OF THIS REPORT.

As noted earlier, one of the greatest needs in the entire drug area is uniformity of state laws with regard to structure and penalties. While this recommendation applies to all drugs and not just marihuana, we feel it essential to make this recommendation now to help deemphasize the marihuana problem. Significant differences in penalties among the states constitute a valid source of irritation and conflict among various segments of our population. In an age of high mobility, it is unconscionable that penalties should vary so greatly in response, to the same behavior.

RECOMMENDATION: EACH STATE SHOULD ESTABLISH A CENTRALIZED COMPULSORY REPORTING AND RECORD-KEEPTNG AUTHORITY SO THAT ADEQUATE AND ACCURATE STATISTICS OF ARRESTS, SENTENCES AND CONVICTIONS ON A STATEWIDE BASIS ARE AVAILABLE.

Several states have systems for maintaining records of drug arrests on a statewide basis. Accurate reporting and compilation of these cases permit the state to assess accurately the impact of law enforcement on drug offenders. The Law Enforcement Assistance Administration of the Department of Justice should assist the states to establish compulsory statistical reporting centers so that individual state needs are met and a clearer picture of the national trends can be, ascertained. Efficient state record-keeping will have an additional benefit of increasing the reliability of the Uniform Crime Reports compiled by the Federal Bureau of Investigation.

RECOMMENDATION: THOSE STATES REQUIRING PHYSICIANS TO REPORT DRUG USERS SEEKING MEDICAL ASSISTANCE SHOULD CHANGE SUCH REQUIREMENTS TO INSURE THE CONFIDENTIALITY OF THE DRUG USER'S IDENTITY, SO THAT PERSONS NEEDING MEDICAL HELP WILL FEEL FREE TO SEEK IT.

Seventeen states* currently require physicians to report to a government agency information on those persons treated by them who are dependent on, or are habitual users of drugs. No common pattern emerges among these states.

*California, Connecticut, Hawaii, Idaho, Iowa, Massachusetts, Michigan, Montana, Nebraska, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Vermont, Virginia, Washington.

After reviewing these statutes, the Commission believes that the disadvantages of maintaining such reporting systems outweigh the benefits to society or the individual. Fear of disclosure to the police discourages many persons front seeking needed medical help. Furthermore, the requirement makes the physician an informant and an agent of law enforcement.

While a need exists for reliable statistics regarding the number and nature of those persons being treated, the Commission does not feel that identification of the individual user is necessary. We again emphasize that society should encourage persons in need of medical attention to seek out authorized practitioners wit'.out having to fear legal repercussions for such action.

III. International

RECOMMENDATION: IF THE UNITED STATES SHOULD BECOME A SIGNATORY OF THE PROPOSED PSYCHOTROPIC CONVENTION, WE RECOMMEND THAT CANNABIS BE REMOVED FROM THE EXISTING SINGLE CONVENTION AND CONSIDERATION BE GIVEN TO LISTING IT IN THE PSYCHOTROPIC CONVENTION AMONG DRUGS WHICH HAVE SIMILAR EFFECTS.

Under the Single Convention on Narcotic Drugs, 1961, of which the United States became a signatory in 1967, cannabis, with the exception of its leaves and stems, is included with narcotic drugs and cocaine. While that categorization had some justification in 1961 when knowledge about marihuana was more, limited, this justification no longer exists. More importantly, tetrahydrocannabinol (THC), the psychoactive ingredient in cannabis, is not included in the Single Convention and is proposed for inclusion in the Psychotropic Convention.

The Commission sees little sense in having the potent psychoactive ingredient in cannabis covered in one Convention and the natural supplying data from its major foreign studies of chronic cannabis users in Jamaica and Greece. For medical research purposes, an analysis of data derived from populations in other countries with 10, 20 or 30 years of experience with heavy marihuana use will provide useful information about probable consequences if the, incidence of marihuana use in the United States were to continue and increase, and if more people engaged in heavy, long term use.

IV. Therapeutic Uses

RECOMMENDATION: INCREASED SUPPORT OF STUDIES WHICH EVALUATE THE EFFICACY OF MARIHIUANA TN THE TREATMENT OF PHYSICAL IMPAIRMENTS AND DISEASE IS RECOMMENDED.

Historical references have been noted throughout the literature referring to the use of cannabis products as therapeutically useful agents. Of particular significance for current research with controlled quality, quantity and therapeutic settings, would be investigations into the treatment of glaucoma, migraine, alcoholism and terminal cancer. The NIMH-FDA Psychotomimetic Advisory Committee's authorization of studies designed to explore the therapeutic uses of marihuana is commended.

V. Community-Based Treatment

RECOMMENDATION: COMMUNITY-BASED TREATMENT FACILITIES SHOULD BE PROMOTED IN CARING FOR PROBLEM DRUG USERS UTILIZING EXISTING HEALTH CENTERS W EN POSSIBLE AND APPROPRIATE.

In studying marihuana, the Commission has obtained information about a number of treatment centers and services. The wide range of agencies and the variety of goals and techniques present a confusing array of services available to drug users, varying widely in their effectiveness. Uniform criteria for evaluating the "success" of these programs is urgently needed.

The medical members of the Commission believe that some of the techniques being used may pose as much potential harm as good. Many young people who are experiencing profound difficulties resulting from the use of drugs may suppose they are being treated and helped, when in reality they are not. In some cases, the short-term benefit may be disruptive to the long-term welfare of the individual. In the rush to provide treatment facilities, many programs have been given impressive credentials without meeting minimal medical standards. It is essential that treatment facilities have, as their primary orientation, the well-being of the individual under treatment.

VI. Training Programs

RECOMMENDATION: PUBLIC HEALTH COURSES ON THE SOCIAL ASPECTS OF DRUG USE SHOULD BE INCLUDED IN THE CURRICULA OF THE SCHOOLS OF THE HEALTH PROFESSIONS.

The Commission recommends that schools of the health professions include in their curricula courses on the social, public health and therapeutic aspects of drug use as appropriate to the educational purpose of the individual school. The National Survey indicated that the public views the family pl sician as an important source of information about drugs. Next to school personnel, physicians were mentioned most often in this connection. Persons involved in the health professions must be provided with information about nonmedical as well as the medical aspects of drug use.

Other Recommendations

1. Reclassification of Cannabis

RECOMMENDATION: THE COMMISSION RECOGNIZES THAT SEVERAL STATE LEGISLATURES HAVE IMPROPERLY CLASSIFIED MARIHUANA AS A NARCOTIC, AND RECOMMENDS THAT THEY NOW REDEFINE MARIHUANA ACCORDING TO THE STANDARDS OF THE RECENTLY ADOPTED UNIFORM CONTROLLED SUBSTANCES LAW.

Scientific evidence has clearly demonstrated that marihuana is not a narcotic drug, and the law should properly reflect this fact. Congress so recognized in the Comprehensive Drug Abuse Prevention and Control Act of 1970, as did The Conference of Commissioners on Uniform State Laws in the Uniform Controlled Substances Law.

In those states where the Uniform Controlled Substances Law has not yet been adopted, twelve of which continue to classify marihuana as a "narcotic", the Commission recommends that the legislatures distinguish marihuana from the opiates and list it in a

separate category. The consequence of inappropriate definition is that the public continues to associate marihuana with the narcotics, such as heroin. The confusion resulting from this improper classification helps to perpetuate prejudices and misinformation about marihuana.

II. Information

RECOMMENDATION: A SINGLE FEDERAL AGENCY SOURCE SHOULD DISSEMINATE INFORMATION AND MATERIALS RELATING TO MARIHUANA AND OTHER DRUGS. THE NATIONAL CLEARINGHOUSE FOR DRUG ABUSE INFORMATION SHOULD BE CHARGED WITH THIS RESPONSIBILITY.

A great proliferation of drug information materials has occurred in recent years. These, materials are currently distributed by a number of federal agencies. Some of these materials conflict with each other. The result is a confusion and uncertainty on the part of the, public about the accuracy of all these statements. The public should have one federal source from which to obtain drug information. The National Clearinghouse for Drug Abuse Information appears best suited to perform this task.

III. Education

RECOMMENDATION: THE SPECIAL ACTION OFFICE FOR DRUG ABUSE PREVENTION IN THE WHITE HOUSE SHOULD BE RESPONSIBLE FOR THE COORDINATION, DEVELOPMENT AND CONTENT REVIEW OF ALL FEDERALLY-SUPPORTED DRUG EDUCATIONAL MATERIALS ANT) SHOULD ISSUE A REPORT AS SOON AS POSSIBLE, EVALUATING EXISTING DRUG EDUCATION MATERIALS.

The Commission has studied many programs of drug education throughout the country. Some are irrelevant, others are poorly designed, still others are misleading, and a good many of them are, of questionable value. A few are excellent. The Federal Government must provide assistance to the states and school districts in this matter, and should provide the leadership in developing sample programs in cooperation with educational systems. An evaluation of existing programs by The Special Action Office for Drug Abuse Prevention of the White House could be very helpful in improving the standards of drug education.

IV. Voluntary Sector Participation

RECOMMENDATION: THE COMMISSION NOTES THE SIGNIFICANT ROLE PLAYED BY THE VOLUNTARY SEC TOR OF THE AMERICAN COMMUNITY IN INFLUENCING THE SOCIAL, RELIGIOUS AND MORAL ATTITUDES OF OUR NATION'S CITIZENS AND RECOMMENDS THAT THE VOLUNTARY SECTOR BE ENCOURAGED TO TAKE AN ACTIVE ROLE IN SUPPORT OF OUR RECOMMENDED POLICY OF DISCOURAGING THE USE OF MARIHUANA.

Already very active in drug education and prevention activities, the social agencies, service clubs, church groups, and other non-governmental bodies have, been extremely helpful in attending to the difficult problems of drug abuse. The local and personal nature of such organizations gives them an advantage over state and federal governments in the development of attitudes by our citizens.

The policy which we here recommend, indeed any policy which might be recommended, will inevitably encounter widespread and earnest objections. The fullest efforts of all citizens of good will be required to attend to the, massive problem of drug abuse in a calm, just, responsibie and effective manner. The help of the voluntary agencies in working toward this

end is earnestly invited and urgently needed.

Dear fellow Rhode Islander:

Imagine what it might be like to have a devastating illness—one that not only puts you in incredible pain, but that gradually erodes you. ability to do most basic things like grocery shopping, reading a newspaper, or just walking across your living room. And imagine there is a medicine that could help, a medicine that the American Nurses Association has found "has a wide margin of safety for use under prescribed supervision, and it is effective for numerous conditions." Now imagine that you could be jailed if you use this medicine—marijuana. For me, and many other Rhode Island patients, this is our reality. **You can help change this situation by signing and mailing the enclosed postcard to Governor Donald Carcieri, asking him to support medical marijuana in Rhode Island.**

When I was a practicing nurse, I felt it was my duty to fight for my patients ... many of whom could not fight for themselves. **As one of the more than 350,000 Americans living with MS, I know that no patient should have to choose between going without a safe and effective medicine and risking arrest and imprisonment for using it.** There are currently two bills—S.B. 710 and H.B. 6052—before the Rhode Island House and Senate that would remove the threat of arrest for registered patients who use marijuana according to their practitioners' advice. My colleagues in Rhode Island are continuing the proud tradition of standing up for patients—the Rhode Island Nurses Association, and the Rhode Island Medical Society both vocally support these bills. But this legislation may not become law without your help.

More than half of all Rhode Island state legislators have cosponsored this legislation, so I am very hopeful that the issue will make it to the governor's desk. However, Gov. Carcieri has not yet taken a stand on the issue. So I am asking you to urge him to sign the legislation, or, at the very least, allow it to pass into law without his signature.

Please take a few minutes to sign the enclosed postcard to Gov. Carcieri, place a stamp on it, and drop it into the mailbox.

While your voice is crucial to this effort, it will be far from alone. **In addition to the nurses association and the state medical society, AIDS Project Rhode Island, the United Nurses and Allied Professionals, and the Rhode Island ACLU have also called for the state to remove criminal penalties for medical marijuana.** And 69% of Rhode Island voters support medical marijuana, according to a 2004 Zogby International poll. Nationally, the American Nurses Association, the American Public Health Association, the American Academy of Family Physicians, and the American Academy of HIV Medicine all have positions supporting medical marijuana.

With your help, we can finally make this legislation a reality. Signing and mailing the postcard will take only a minute, but it could be the card that turns these bills into law

Thank you for your time and compassion.

Very Truly Yours,

Rhonda O'Donnell, RN

P.S. Please send the enclosed slip in the envelope provided to the Marijuana Policy Project (MPP), which is working to protect patients from arrest in Rhode Island and in other states. By doing so, you can help MPP track how many people have contacted Gov. Carcieri and more effectively lobby the legislature.

II. Biological Effects of Marihuana

Botanical and Chemical Considerations

Cannabis sativa is one of man's oldest and most widely used drugs. The substance has been used in various ways as long as medical history has been recorded and is currently used as a multipurpose drug throughout the world (Adams, 1942; Adams, 1941-1942; Grinspoon, 1969; Indian Hemp, 1969; Walton, 1938).

During the past few years, a resurgence of the use of marihuana by western society, its increased importance as a social issue and the development of more precise compounds and analytic techniques have sparked dormant scientific interest in the substance. However, this effort has added little to what was already known about the clinical syndrome produced by cannabis (Hollister, 1971) and described by investigators during the last 100 years (Hollister, 1971; Beaudelaire, 1861; Moreau, 1845; Lewin, 1964; Indian Hemp, 1969; Mayor's Committee, 1944).

Strongly held, diametrically opposed opinions exist about whether the ultimate effects of cannabis use are harmful, harmless, or beneficial to human functioning (Pillard, 1970).

Despite these conflicting opinions, from a scientific perspective, the literature on marihuana is as clear, if not clearer, than for many other botanical substances consumed by man. Most of the older reports suffer from multiple scientific defects such as biased sampling, lack of adequate controls, unsophisticated techniques, and use of unstandardized marihuana of unknown potency. Nevertheless, much is known about the use of cannabis by man. Marihuana has a unique position in the multitude of pharmaceuticals in that human experimentation has been greater than laboratory animal experimentation.

The crucial experiments about social effects from chronic use will be settled by close observation of those who use the drug. The issues of potential therapeutic utility; mechanisms of mental function alteration; and the relationship to mental illness will require more extensive laboratory experimentation (Hollister, 1971).

Botanical and Chemical Considerations

In the past several years considerable progress has been made in adding to the understanding of marihuana as a complex drug containing botanical substance. Much important information has been obtained from intensive investigation of marihuana of worldwide origin cultivated under Government contract by the University of Mississippi (Doorenbos et al., 1971).

Marihuana is a preparation derived from the hemp plant, Cannabis sativa. This plant is an annual which either is cultivated or grows freely as a weed around the world, including most of the United States. When cultivated in temperate climates, plantings are made in May to June. The seeds germinate in less than a week, in moist soil. After thinning, the plants grow as rapidly as two feet a week during the peak growing season. They can reach a height of up to 18 feet at maturity, approximately three to five months after planting. Growth is greatly inhibited by inadequate light, water or soil nutrients.

Marihuana is produced by cutting the stem beneath the lowest branches, air drying, and stripping seeds, bracts, flowers, leaves and small stems from these plants. Stems and seeds are variably removed using a mesh screen producing manicured marihuana. Hashish is produced by scraping the thick resinous material secreted by the flowers (Doorenbos et al., 1971).

Many morphological variations in branching and leaf structure are observed among plants produced by different seed types. The characteristic leaf is palmately-compound and contains an odd number of coarsely serrated leaflets. Plants of a given seed type generally grow at similar rates and resemble each other. Thus, botanists believe, Cannabis sativa represents a single species which has not stabilized and has many variations (Doorenbos et al., 1971).

Cannabis Sativa is a dioecious species with separate male and female plants, both producing flowers. Some monoecious variants are reported. Pollination appears to be accomplished by air currents. Bees are attracted by male flowers but not by female flowers. Sex cannot be established until flowering begins and the structure of the male and female flower is distinct. Male plants begin shedding leaves shortly after flowering, shied their pollen and die. Female plants lose their older leaves as the seed matures. After shedding their seed, they die. Contrary to popular belief, there is no significant difference in drug content between male and female plants at equivalent states of maturity (Fetterman et al., 1970; Ohlsson et al., 1971). Male plants mature earlier than the females, shed their pollen and die while the female plant is continuing to mature.

The drug content of the plant parts is variable. Generally, the, drug content decreases in the following order: bracts, flowers, leaves. Practically no cannabinoids are found in the stems, roots and seeds. Obviously, fluctuations in pharmacologic activity of a sample of Marihuana, depend on the mixture of these plant parts which is determined by the manicuring process (Fetterman et al., 1970).

Different variants of the plant contain different amounts of psychoactive drug. Variants of cannabis Sativa cover a spectrum of drug contents. Generally, they can be classified as either drug or fiber genotype. Drug type is high in THC and low in cannabidiol and the fiber type is the converse. This type is determined genetically and transmitted by the seed.

Thus, seeds from different geographical areas produce plants with a wide range of drug content. For example, when grown under similar conditions, plants grown from seeds from Mexico may contain 15 times more psychoactive drug than those grown from seeds from Iowa. Of course, individual plants of the same variant often contain greatly different drug content (Fetterman, et al., 1970).

Environmental factors are not as important as heredity in determining type, but they influence to some degree the drug content. However, environmental factors, including type of soil, water, growing space, temperature and light do play an important role in determining the size and vitality of the plant (Doorenbos et al., 1971; Ohlsson et al., 1971; Phillips et al., 1970).

This notorious variability of cannabis preparations causes many disadvantages for detailed and reproducible biological work. Consequently, much effort has been expended to provide a firm chemical basis in order to provide pure and well-defined substances for research.

The major naturally occurring active component of cannabis, 1-delta 9-trans tetrahydrocannabinol, was not isolated in a pure form and its structure illucidated until 1964

(Gaoni and Mechoulam, 1964; Mechoulam and Gaoni, 1967; Mechoulam et al., 1970). In addition, the A' isomer, which is usually present in small quantities in the natural product representing less than 10% of the combined THC content, has a similar spectrum of activity (Hively et al., 1966). These two chemicals, available by industrial synthesis (Fahrenholtz et al., 1967; Petrzilka and Sikemeier, 1967) or by extraction from the natural plant, can apparently reproduce fully the effects of the crude drug in animals and man. More than 20 natural cannabinoids have been identified in the plant (Figure 1) (Mechoulam, 1970; Shani and Mechoulam, 1970; Doorenbos et al., 1971).

All but Delta 11 and Delta 9 THC are inactive psychopharmacologically and do not seem to exert potentiating or other effects. However, new compounds, cannabinoids and non-cannabinoids, are being isolated from the plant and require further investigation. Several studies may indicate that some material present in natural marihuana may act synergistically with THC and potentiate its psychological effect Leniber (1972) Paton and Pertwee (1971) suggest cannabidiol may play this role.

The chemical nomenclature of tetra-hydrocannabinols is in a state of confusion due to the existence of two numbering systems. The dibenzopyran or formal system treats the compound as substituted dibenzopyrans (Delta 9 THC) while the monoterpenoid system considers them as substituted terpenes (Al THC). The formal system will be used hereafter (Figure 2).

Many of the natural cannabinoids are present in the plant as acids. These acids are believed to be psychopharmacologically inactive. However, they are converted rapidly when heated, and slowly when stored into their respective active neutral components (Figure 3) (Waller, 1971). This conversion (decarboxylation) does not apparently occur when the acids are absorbed after oral consumption (Mechoulam, 1970).

The proposed biogenesis (Figure 4) of All THC appears to proceed through cannabidiol (CBD). Cannabis variates of the fiber type apparently do not perform this conversion. Thus, cannabidiol is the cannabinoid present in the largest percentage in the non-drug variety (Phillips et al., 1970). Marihuana appears to lose its potency over time due to conversion of THC to cannabinol (CBN) (Mechoulam, 1970) and this also apparently occurs more quickly for hashish implying the presence of a stabilizing substance in the whole plant (Figure 5).

Recently, the n-propyl homologue, of Delta 9 THC has been isolated from crude marihuana. It has about 20% of the activity of Delta THC in mice, and probably makes only a small contribution to the total marihuana effect (Gill, 1971). Merkus (1971) and Vree et al. (1971) have recently identified propyl and methyl cannabinol homologues in hashish in extremely small quantities.

In addition, numerous other non-cannabinoids have been identified in the natural material. Most of these have little or no psychoactivity (Gill et al., 1970; Bercht et al., 1971). Recently, waxes, starches, oils, terpenes and simple nitrogenous compounds including muscarine, choline and trigonelline as well as volatile low-molecular weight piperdines have been isolated.

Additionally, four more complex nitrogenous containing compounds of the generally-accepted alkaloid type have been reported in marihuana leaves in minute concentrations (average 0.002%). These produced decreased activity but no acute toxicity in mice (Klein et al., 1971).

Another laboratory has isolated two steroids and triterpenes from. marihuana as well as tyramine amide derivatives from the roots (Doorenbos et al., 1971).

Analysis of the smoke obtained from marihuana has been investigated. As in the case of any combustible plant, a gas and particulate phase is produced. Both these phases are delivered to the lung. Both the gas and particulate phase consist of compounds present in approximately the same percentages as other burned cellulose containing materials except for the cannabinoid fraction. This includes carbon dioxide, carbon monoxide, and hydrogen cyanide gases. (Truitt et al. , 1970)

The remainder, the smoke condensate, consists of a complex mixture of relatively non-volatile compounds. Included in this mixture are the cannabinoids (16%), carbohydrates and alcohols (8%), fatty and aromatic acids (11%), polybasic acids (7%), aliphatic amines (1%), aromatic phenols (27%), aliphatic phenols (6%), tannin (6%), unidentified compounds (18%) (Truitt et al., 1970).

Another group of investigators (Magus and Harris, 1971) compared the tar collected from combustion of marihuana cigarettes with the tar yielded from tobacco cigarettes. They reported that the total tar yield from marihuana was slightly less than half that produced by an equal weight of tobacco. The tar contained similar constituents based on typical changes produced on skin of mice.

In addition, there a multitude of synthetic compounds related to the naturally occurring Delta 9 THC derivatives and much more potent (Figure 6). A large number of bomologues have been prepared all with similar activity but differing widely in their potency.

In general, the activity of these compounds increases dramatically over that of A' THC by lengthening the 3 alkyl side chain to 6 and 7 carbons, with additional branching in the alpha and beta positions. The dimethylheptyl analogue (EA1476 or DMHP) is the most active having 50 times the activity of A' THC. The 1-methyloctyl substitution (MOP, EA1465) is the next most potent, compound. The 1,2-dimethylortyl substitution resulted in a 251 fold decreased activity from DMHP. (Domino et al., 1972; Sim and Tucker, 1963)

Numerous variations of the basic structures in the cyclohexene moeity of the molecule, as well as the replacement of -both methyl groups-by-hydrogen resulted in partial and even complete, loss of activity (Domino et al., 1972; Sim and Tucker, 1963).

Mechoulam. (1971) has summarized the investigations related to the structure activity relationships of the cannabinoids as follows:

(1) The pyran ring with a hydroxyl group at 1 position and an alkyl group at the 3 position is an essential requirement for psychotomimetic activity, eg., cannabidiol is inactive.

(2) The aromatic hydroxyl group has to be f reo or esterified for activity.

(3) The presence of a carboxyl, acetyl or carbomethoxyl group in position 2 or 4 renders the compound inactive. Substitution with an alkyl .group at position 2 retains activity.

(4) Dextrorotary (+) delta-9-THC is inactive whereas its optical isomer levorotary (-) delta9-THC is active.

(5) Maximal activity is seen if the double bond is in the delta-9 or delta-8 position. The delta,-6a, 10a-THC is relatively inactive. 9 (6) The activity of the delta-6a, 10a-THC can be increased by replacement of the pentyl side chain with a hexyl side chain to form synhexyl

which is an active compound. Branching of the side chain may lead to considerable increase in potency. The substitution of a dimethylheptyl side chain for the pentyl side chain in the delta-6a, 10a analogue of THC to form DMHP or EA1476 results in a marked increase in pharmacologic activity.

(7) Substituents at the 9 and 10 position have to be in the plane of the ring (that is equatorial) in order that high activity be retained.

More detailed information on materials, chemistry, bioassays, analytical methods, and methodology for detecting THC or its metabolites in biological fluids may be obtained from The Metabolism of the Tetrahydrocannabinols (Lemberger, 1972) and The Secretary of Health, Education and Welfare, 1972 Report on Marihuana and Health.

History of the Intoxicant Use

The preceding history of the medical use of marihuana has provided an outline of how marihuana has been alleged to care diseases and relieve pain. This section discusses the non-medical use of cannabis. The survey includes a discussion of marihuana use in India, the rest of Asia, Africa, Europe, and the United States; and a concluding analysis of the intoxicant use in contemporary times.

Assessing marihuana's use as an intoxicant is difficult because for many people around the world, its importance as an intoxicant has been secondary to its use as a folk medicine or a ceremonial adjunct (Grinspoon, 1971: 173-174). Caffeine and nicotine apart, cannabis is second in worldwide popularity only to alcohol.

India

Marihuana was probably first used as an intoxicant in India around 1000 B.C., and soon became an integral part of Hindu culture (Snyder, 1970: 125). In China, where the marihuana plant had been used to make cloth and certain medicines for centuries, it was not recorded as an intoxicant. Explanations are unclear as to why marihuana was used as an intoxicant in India but not in China.

Marihuana was also used as an intoxicant in other parts of the world prior to 500 A.D. but was not as well documented as the use of opium. The drug "nepenthe" in Homer's Odyssey is believed by a number of scholars to have been a brew in which the most active ingredient was hemp (Brotteaux, 1967: 10). Galen wrote in the second century that it was customary to promote hilarity and happiness at banquets by giving the guests hemp (Reininger, 1967: 14-15).

Cannabis is used in three different preparations in India (Snyder, 1970: 27). The first is called bhang, comparable in potency to marihuana in the United States. It is made from the leaves and stems of uncultivated plants and blended into a pleasant tasting liquid concoction. The second is ganja, more potent than bhang, made from the tops of cultivated plants. The third and most potent preparation, charas, is similar to hashish or "hash" and is obtained by scraping the resin from the leaves of the cultivated plants. Hard blocks are pressed from this material which are converted for smoking.

High-caste Hindus are not permitted to use alcohol. But they are allowed bhang at religious ceremonials, and also employ it as an intoxicant at marriage ceremonies and family festivals. Bhang is used by laborers in India in much the same way as beer is used in the United States (Barber, 1970: 80).

The lower classes of India use either a few pulls at a ganja pipe or sip a glass of bhang at the end of the day to relieve fatigue (Grinspoon, 1971: 173), to obtain a sense of well-being, to stimulate appetite, and to enable them to bear more cheerfully the "strain and monotony of . . . daily routines" (Geller and Boas, 1969: 5). These types of users and objectives are frequently the reverse of those in the United States where marihuana users consider

themselves an exclusive and advanced "in-group" (Andrews and Vinkenoog, 1967: iii). A major intoxicant use in India is for religious purposes.

Asia and the Middle East

Cannabis spread from India to other parts of Asia, to the Middle East and then to Africa and South America, although some believe it may have originated independently in the latter two continents (Fort, 1969: 15). Cultural values may have played a part in determining its use. Opium and cannabis were equally available in pre-Communist China; but cannabis had no vogue as an intoxicant (Barber, 1970: 80). The Chinese spoke of the plant as the "Liberator of Sin." In India, it was called. the "Giver of Life" (Fort, 1970: 15). One author proposed that temperament may have also played a role in this determination, suggesting that perhaps the placid, practical Chinese did not appreciate the euphoria produced by cannabis (Snyder, 1070: 125).

Additional evidence of mid-Asian use comes from cuneiform tablet interpretations that ascribe use in Persia circa 700-600 B.C. and of the time of Ashurbanipal's Assyrian reign, 669-626 B.C. (Blum. and Associates, 1969, 1: 62).

The drug's popularity as an intoxicant spread to the Middle East and thoroughly permeated Islamic culture within a few centuries (Geller and Boas, 1969: 5). Because alcohol was prohibited to the followers of Mohammed, cannabis was accepted as a substitute.

The Myth of the Assassins

Two Muslim myths, one from the 10th century A.D. and the other from the 13th century A.D., have been the sources of some of the contemporary attitudes about the drug. The first myth deals with hashish as a magical eastern drug brought by the Arabs into Spain in the 10th century. These invaders confined its use primarily to themselves, taking it back to Africa when they left Spain. Although it did not become a European habit, some beliefs about the drug were left behind.

The existence of this "magical eastern drug" was probably known to Marco Polo, the Venetian traveler of the 13th century A.D. before he left on his journey to the East. Marco Polo returned to Europe with his own tale of cannabis which, in the potent form of hashish, was said to be used as an intoxicant by Hasan-I-Sabbah to send his ruthless followers on missions of murder. The word "assassin" was said to be derived from the word "hashish," or from Hasan (Geller and Boas, 1969: 6). Marco Polo had written about how this "Old Man of the Mountain" sent his men out on their missions with all the color and pageantry that Europeans associated with the East. As Marco Polo described:

In the territory of the Assassins there were delicious walled gardens in which one can find everything that can satisfy the needs of the body and the caprices of the most exacting sensuality. Great banks of gorgeous flowers and bushes covered with fruit stand amongst crystal rivers of living water.... Trellises of roses and fragrant vines cover with their foliage pavilions of jade and porcelain furnished with Persian carpets and Grecian embroideries.

Delicious drinks in vessels of gold or crystal are served by young boys or girls, whose dark unfathomable eyes cause them to resemble the Houris, divinities of that Paradise which the Prophet promised to believers. The sound of harps mingles with the cooing of doves, the murmur of soft voices blends with the sighing of the reeds. All is joy, pleasure, voluptuousness and enchantment.

The Grand Master of the Assassins, whenever he discovers a young man resolute enough to belong to his murderous legions . . . invites the youth to his table and intoxicates him with the plant "hashish." Having been secretly transported to the pleasure gardens the young man imagines that he has entered the Paradise of Mahomet. The girls, lovely as Houris, contribute to the illusion. After he has enjoyed to satiety all the joys promised by the-Prophet to his elect, he falls back to the presence of the Grand Master. Here he is informed that he can enjoy perpetually the delights he has just tasted If he will take part in the war of the Infidel as commanded by the Prophet (Geller and Boas, 1969: 6).

Another translation (Kitti, 1967: 24) begins the tale this way:

Now no man was allowed to enter the Garden save those whom he intended to be his ASHISHIN.

In reality, this was a religious situation and scholars have long since exposed Marco Polo's tale as being a myth, at best an imaginative embellishment of tales he had heard.

Africa

Use of cannabis in most parts of Africa developed slowly, most of it during the past 100 years (Blum and Associates, 1969, I: 73). A report from Africa in 1891 (Reininger, 1966: 141-142), dealt with a tribe that used hemp as an intoxicant in their newly formed religion and in preparation for battle. A similar use is described in the Congo, when Simba warriors in 1964 were said to use a cannabis-alcohol mixture in preparation for battle, to rouse themselves for the battle and to magically guarantee immunity from harm.

In Morocco, marihuana, called kif, has been used as an intoxicant by adult males for centuries; that custom continues today even though the drug is illegal (Mikuriya, 1970: 122-123).

Although moderate use appears to be tolerated in the areas of India, North Africa and the Middle East, excessive use is generally viewed as indicative of serious personality problems (Geller and Boas, 1969: 7).

Europe

One of the more suggestive parallels between 19th century France and the United States today is the fact that the French interest in cannabis at that time was aroused by the returning French soldiers and scientists of Napoleon's army in Egypt, a source of the drug. A similar interest occurred in the United States after the Korean conflict, and has intensified since Vietnam (Geller and Boas, 1969: 7).

During the 19th century, European interest in the drug was aided by two scientific reports, the first by W. B. O'Shaughnessy in 1839, and the second report by Queen Victoria's physician, Russell Reynolds. Both men recommended its medical use for a variety of ailments and as a mild euphoriant (Grinspoon, 1971: 56). Cannabis received highly laudatory testimonials from the medical profession of that day and was readily available without prescription (Snyder, 1970: 121).

Interest in cannabis was further kindled by popular writers who used and spoke of hashish

enthusiastically, including Charles Baudelaire, Arthur Rimbaud, and Pierre Gautier. Gautier and Baudelaire, in fact, were members of the Club des Hachischins, in which a number of writers and intellectuals gathered and experimented with hashish (Geller and Boas, 1969: 13).

Although the public delighted to read of the French writers' drug experiences, the public did not care to engage in the same kind of activity; to them the experiences were frightening and repugnant. "As a result, the smoking of hashish remained the sub-rosa province of a few European artists until the recent trans-Atlantic phenomenon of the American drug culture" (Geller and Boas, 1969: 8).

United States

The, events surrounding the introduction of cannabis use to the New World are entirely unclear. Some historians say the Spaniards brought the plant with them in the 16th century, other say marihuana smoking came in with the slave trade or with the Asian Indian migration of the late 18th century.

The hemp plant was cultivated in the United States for centuries, apparently without general knowledge of its intoxicating properties (Grinspoon, 1971: 10). Cannabis was an often used medicine in the United States in the 19th century. It was easily available without a prescription and was also widely prescribed by physicians (Snyder, 1970: 26). Hemp was used by the pioneers to cover their wagons. The plant was a major crop in Kentucky, Virginia, Wisconsin and Indiana, and was one of the more important southern agricultural products, after cotton.. It is still used to make rope, twine and textiles, while the seed is used as bird food (Geller and Boas, 1969: 16).

Marihuana use as an intoxicant in the United States began slowly in the early part of this century. Puerto Rican soldiers, and then Americans who were stationed in the Panama Canal Zone, are reported to have been using it by 1916. American soldiers fighting Pancho Villa circa 1916 also learned to use it. This follows the first reported use in Mexico in the 1880's (Blum and Associates, 1969, 1: 69-70). Intoxicant use in the United States is also traced to the large influx of Mexican laborers in the 1910's and 1920's (Geller and Boas, 1969: 14).

The 1933 Report of the "Military Surgeon" stated, regarding marihuana use among the soldiers in the Canal Zone, that:

Marihuana as grown and used on the Isthmus of Panama is a mild stimulant and intoxicant. It is not a "habit forming" drug in the sense that the derivatives of opium, cocaine, and such drugs, are as there are no symptoms of deprivation following its withdrawal.

Delinquencies due to marihuana smoking which result in trial by military court are negligible in number when compared with delinquencies resulting from the use of alcohol drinks, which is also classed as a stimulant and intoxicant (Geller and Boas, 1969: 147).

The report went on to say that marihuana presented no threat to military discipline, and "that no recommendations to prevent the sale or use of marihuana are deemed advisable."

Cannabis has been rejected in various societies on ascetic grounds. In such puritanical societies such as the Wahabil of Arabis and the Senussis of Libya, no smoking of any kind was tolerated, nor was coffee. In North Africa, social rank dictated use: the aristocratic

Moors scorned both hemp and tobacco smoking, preferring instead, as compatible with high status, opium eating (Blum and Associates, 1969, 1: 73).

One statement highlighting this kind of value conflict comes from a Nigerian journalist (Davies, 1966: 299-300) attempting to explain the 15-year prison sentences of foreign tourists for growing and smoking marihuana:

There is a growing trend in the more economically advanced countries to indulge at leisure in the exploration of the personality. At a certain stage of development, there is less need to produce and more time to spend consuming. This is healthy. If used properly, marihuana could be helpful at this stage of development. However, countries which are only beginning to develop a more complex economic structure must channel all their energies into creating a new system. This means that they must sacrifice more of their pleasure. People who smoke hemp seem on the whole to be less aggressive than people who drink alcohol. Hemp smoking may have a positive value for certain social functions....

One of the first acts of the Military Government was to issue a decree making it punishable by death to grow marihuana, and by up to twenty years of prison for merely being in possession of it . . . meantime, we Nigerian have to stop getting high for a while and develop our country.

In the United States, the decade of the 1960's has seen a spectacular and unprecedented spread of the use of marihuana, chiefly among the youth. An estimated 24 million persons have used marihuana and approximately 3.4 million are current users. The numbers involved and the fact that use spans all age groups and social classes in American life has produced marked public reaction and a need for more information on the drug.

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History of Marihuana Use: Medical and Intoxicant

From: Marihuana, A Signal of Misunderstanding, the Report of the US National Commission on Marihuana and Drug Abuse, 1972

The term "marihuana" is a word with indistinct origins. Some believe it is derived from the Mexican words for "Mary Jane"; others hold that "marihuana" comes from. the Portuguese word marigu-ano which means "intoxicant" (Geller and Boas, 1969: 14). This chapter outlines the many and varied uses of marihuana through history, and deals with its use in medicine and its use as an intoxicant.

The experience of the 1960's might lead one to surmise that marihuana use spreads explosively. The chronicle of its 3,000 year history, however, shows that this "explosion" has been characteristic only of the contemporary scene. The plant has been grown for fiber and as a source of medicine for several thousand years, but until 500 A.D. its use as a mind-altering drug was almost solely confined in India. The drug and its uses reached the Middle and Near East during the next several centuries, and then moved across North Africa, appeared in Latin America and the Caribbean, and finally entered the United States in the early decades of this century (Snyder, 1970: 129).

Meanwhile it had been introduced into European medicine shortly after the invasion of Egypt by Napoleon and had a minor vogue as an intoxicant for a time in France.

Regardless of which parts of the world are discussed, many of the same problems and concerns about cannabis are common to all, including the United States. Understanding its various uses during many centuries in diverse countries and continents can perhaps lead to a better understanding of marihuana in general.

History of the Medical Use

The history of cannabis products and their use has been long, colorful and varied. "To the agriculturist, cannabis is a fiber crop; to the physician, it is an enigma; to the user, a euphoriant; to the police, a menace; to the trafficker, a source of profitable danger; to the convict or parolee and his family, a source of sorrow" (Mikuriya, 1969: 34). The fact is that cannabis has been held simultaneously in high and low esteem at various times throughout recorded history, particularly in our own times.

The volume of information available on the medical application of cannabis is considerable. Occasionally certain references have been condensed or deleted, but this should not detract from the completeness of the report.

This historical survey of the medical uses of marihuana is introduced by abroad overview of its use, including brief notes on current and projected research, and then considers specific historical settings and circumstances in ancient China, moving on to Egypt, India, Greece, Africa, and the Western World.

Cannabis sativa has been used therapeutically from the earliest records, nearly 5,000 years ago, to the present day (Mikuriya, 1969: 34) and its products have been widely noted for their effects, both physiological and psychological, throughout the world. Although the Chinese and Indian cultures knew about the properties of this drug from very early times, this information did not become general in the Near and Middle East until after the fifth century A.D., when travelers, traders and adventurers began to carry knowledge of the drug westward to Persia and Arabia.

Historians claim that cannabis was first employed in these countries as an antiseptic and analgesic. Other medical uses were later developed and spread throughout the Middle East, Africa, and Eastern Europe.

Several years after the return of Napoleon's army from Egypt, cannabis became widely accepted by Western medical practitioners. Previously, it had had limited use for such purposes as the treatment of burns. The scientific members of Napoleon's forces were interested in the drug's pain relieving and sedative effects. It was used during, and to a greater extent, following his rule in France, especially after 1840 when the work of such physicians as O'Shaughnessy, Aubert-Roche, and Moreau de Tours drew wide attention to this drug.

With the rise of the literary movement of the 1840-1860 period in France (Gautier, Baudelaire, Dumas, etc.), cannabis became somewhat popular as an intoxicant of the intellectual classes.

In the United States, medical interest in cannabis use was evidenced in 1860 by the convening of a Committee on Cannabis Indica of the Ohio State Medical Society, which reported on its therapeutic applications (McMeens, 1860: 1). Between the period 1840-1890, Walton states that more than 100 articles were published recommending cannabis for one disorder or another.

Concern about cannabis as an intoxicant led the government of India to establish the India Hemp Commission of 1893-94 to examine the entire question of cannabis use in India.

Paralleling the question over cannabis use in the latter half of the 19th century was the growing medical use of other medications superior to cannabis in their effects and more easily controlled as to dose. Consequently, medical use of cannabis declined and cannabis began to lose support of the medical profession.

During the years between 1856-1937, cannabis lost its image as a medicine and was left with a disreputable image as an intoxicant. Strong public reaction coupled with a campaign in the public press led to a federal anti-marihuana law in 1937. (The drug was illegal in many states before 1937.) The issue of medical use remained active, however, and Dr. William C. Woodward, Legislative Counsel to the AMA, an opponent of cannabis use and the only physician to be a witness at the Taxation of Marihuana hearings, stated:

There are exceptions in treatment in which cannabis cannot apparently be successfully subsituted for. The work of Pascal seems to show that Indian Hemp has remarkable properties in revealing the subconscious; hence, it can be used for psychological, psychoanalytic and psychotherapeutic research (Hearings, House of Representatives, 1937: 91).

Although cannabis drugs are generally regarded as obsolete and rarely used in "western" medicine today, cannabis is "still used extensively in the Ayruvedic, Unani and Tibbi systems of medicine of the Indian-Pakastani subcontinent" ("The Cannabis Problem, 1962: 27). The Pharmacopoeias of India mention cannabis use in the recent past. Two preparations of cannabis, a liquid extract and a tincture, are listed in the 1954 and 1966 Pharmacopoeias of India which contain descriptions of cannabis and its extract and how it is made (Chopra & Chopra, 1957: 9).

A more recent source makes reference to the fact that "in contemporary India and Pakistan, there continues to be widespread indigenous medical, 'quasi-medical,' and illicit use of both opium and cannabis" (Chopra & Chopra, 1957: 12-13). Bouquet notes that hemp resin is occasionally used in the native medicines of the countries where it is collected. He points especially to India where, "the medical systems . . . make much use of cannabis as a sedative, hypnotic, analgesic, anti-spasmodic and anti-hemorrhoidal" (Bulletin on Narcotics, 1962:27).

According to the Canadian Commission of Inquiry into the Non-Medical Use of Drugs:

There is no currently accepted medical use of cannabis in North America outside of an experimental context. Although cannabis has been reported to produce an array of possibly useful medical effects, these have either not been adequately investigated, or can be replaced by using other more readily available and convenient drugs. The natural product's variability in potency and instability over time are among the factors which have led to its disfavor in Western 20th century medicine.... cannabis has often been employed in the past, and is currently used illicitly in North America, to reduce the secondary symptoms and suffering caused by the flue and the common cold. These . . . alleged therapeutic properties of cannabis have not been adequately studied in a scientific context, and their general medical potential remains a matter of conjecture (1970: 74).

Similar statements regarding cannabis are to be found in Marijuana, edited by Erich Goode, and in the textbook Pharmacological Basis of Therapeutics by Goodman and Gilman (1970: 300). Concerning therapeutic uses, the latter states:

Although cannabis was once used for a wide variety of clinical disorders and has even been demonstrated to have antibacterial activity, there are at present no well substantiated indications for its use. It is no longer an official drug. Preparations are rarely available (cannabis preparation and synthetic THC are obtainable only for research purposes), and prescriptions are regulated by special tax laws.

Hollister (1971: 27) lists a few difficulties of the therapeutic use of cannabis:

1. The onset of the action of oral doses of THC is often rather slow, contrary to that of conventional sedative-hypnotics.
2. Doses high enough to produce a marked hypnotic effect are almost always accompanied by some degree of psychotomimetic-like perceptual disorders, which many patients might find disagreeable.
3. The fine titration of dose required to provide sedative effects is likely to be difficult.
4. The drug does not have novel effects compared with other sedative-hypnotics.

The Department of Health, Education, and We] fare report to Congress in 1971, Marihuana and Health, repeats the statement of the Canadian Interim Report of Inquiry into the Non-Medical Use of Drugs, and states: "There is no currently accepted medical use of cannabis in the United States outside of an experimental context" (DHEW: 1971: 27). Allen Geller and Maxwell Boas (1969: 4) think that cannabis' "unsavory reputation has largely stymied further research."

Despite the many statements discounting cannabis' therapeutic usefulness, some authorities maintain that its medical value might be reborn through further research and/or use. David Solomon, in his foreword to The Marihuana Papers (1968: xxi) argues that:

Marihuana should be accorded the medical status it once had in this country as a legitimate prescription item. After 1937, with the passage of the Marihuana Tax Act and subsequent federal and state legislation, it became virtually impossible for physicians to obtain or prescribe marihua..a preparations for their patients. Thus, the medical profession was denied access to a versatile pharmaceutical tool with a history of therapeutic utility going back thousands of years.

In a 1970 article, "Pot Facing Stringent Scientific Examination," reference is made to Dr. Par who states that there are three areas in which "chemical and animal experiments are under way:"

(1) Analgesia-mood elevation plus analgesic power may make useful drug.

(2) Blood pressure reduction-hypertension may be helped by new drugs which lower the blood pressure by what seems to be action on the central nervous system.

(3) Psychotherapeutic-new compounds are antidepressants and antianxiety drugs (Culliton: 1970).

Mikuriya cites it studies concerning cannabis funded by the National Institute of Mental Health in 1961. The studies were "either specialized animal experiments, part of an observational sociologic study of a number of drugs, or explorations of chemical detection methods" (Mikuriya, 1969: 38).

Feinglass has pointed to four general categories into which the clinical studies of marihuana could be divided (1968: 206-208). They are:

1. Anticonvulsant effects-treatment of tetanus, convulsions of rabies, epilepsy, and infant convulsions.
2. Psychotherapeutic actions - appetite-stimulation, treatment of depression, and as a sedative and hypnotic in reducing anxiety; treatment of addiction.
3. Antibiotic properties.
4. Pain-affecting power.

Grinspoon suggests:

Very little research attention has been given to the possibility that marihuana might protect

some people from psychosis. Among users of the drug, the proportion of people with neuroses or personality disorders is usually higher than in the general population; one might therefore expect the incidence of psychoses also to be higher in this group. The fact that it is not suggests that for some mentally disturbed people, the escape provided by the drug may serve to prevent a psychotic breakdown (1969: 24).

Mikuriya lists many possible therapeutic uses of THC and similar products in his paper "Marihuana in Medicine: Past, Present and Future." He includes:

Analgesic-hypnotic, appetite stimulant, antiepileptic, antispasmodic, prophylactic and treatment of the neuralgias, including migraine and tic douloureaux, antidepressant-tranquillizer, anti-asthmatic, oxytocic, anti-tussive, topical anesthetic, withdrawal agent for opiate and alcohol addiction, child birth analgesic, and antibiotic (1968: 39).

China

The oldest known therapeutic description Of cannabis was by the Emperor Shen-Nung in the 28th century B.C. in China, where the plant had long been grown for fiber. He prescribed cannabis for beri-beri, constipation, "female weakness," gout, malaria, rheumatism and absentmindedness (Bloomquist, 1968: 19).

Egypt

In Egypt, in the 20th century B.C., cannabis was used to treat sore eyes. Additional medical usage was not reported until much later.

India

Prior to the 10th century B.C., bhang, a cannabis preparation, was used as an anesthetic and antiphlegmatic in India. In the second century A.D., a Chinese physician, Hoa-Tho, prescribed it as an analgesic in surgical procedures (Mikuriya, 1969: 34).

From the 10th century B.C. up to 1945 (and even to the present time), cannabis has been used in India to treat a wide variety of human maladies. The drug is highly regarded by some medical practitioners in that country.

The religious use of cannabis in India is thought to have preceded its medical use (Blum and Associates, II, 1969: 73; Snyder, 1970: 125). The religious use of cannabis is to help "the user to free his mind from worldly distractions and to concentrate on the Supreme Being" (Barber, 1970: 80).

Cannabis is used in Hindu and Sikh temples and at Mohammedan shrines. Besides using the drug as an aid to meditation, it is also used to overcome hunger and thirst by the religious mendicants. In Nepal, it is distributed on certain feast days at the temples of all Shiva followers (Blum & Associates, 1969, 11: 63).

The Hindus spoke of the drug as the "heavenly guide," "the soother of grief." Considered holy, it was described as a sacred grass during the Vedic period (Fort, 1969: 15). A reference to cannabis in Hindu scriptures is the following:

To the Hindu the hemp plant is holy. A guardian lives in bhang ... Bhang is the joy giver,

the sky filer, the heavenly guide, the poor man's heaven, the soother of grief ... No god or man is as good as the religious drinker of Mang. The students of the scriptures of Benares are given bhang before they sit to study. At Benares, Ujjain and other holy places, yogis take deep draughts of Mang that they may center their thoughts on the Eternal . . . By the help of Mang ascetics pass days without food or drink. The supporting power of Mang has brought many a Hindu family safe through the miseries of famine (Snyder, 1970: 125).

Greece

In ancient Greece, cannabis was used as a remedy for earache, edema, and inflammation (Robinson, 1946: 382-383).

Africa

Cannabis was used in Africa to restore appetite and to relieve pain of hemorrhoids, its antiseptic uses were also known to certain African native tribes (O'Shaughnessy, 1842: 431). Various other uses, in a number of countries, included the treatment of tetanus, hydrophobia, delirium tremens, infantile convulsions, neuralgia and other nervous disorders, cholera, menorrhagia, rheumatism, hay fever, asthma, skin diseases, and protracted labor during childbirth.

The 19th Century

Documents of the 19th century report on the use of cannabis to control diarrhea in cholera and to stimulate appetite. In his reports of the late 1830's and early 1840's, O'Shaughnessy (1842: 431) stated that tetanus could be arrested and cured when treated with extra large doses of cannabis.

John Bell, M.D., Boston, reported enthusiastically in 1857, about the effects of cannabis in the control of mental and emotional disorders as opposed to the use of "moral discipline" to restrain the mentally ill. Similarly, in 1858, Moureau. de Tours reported several case histories of manic and depressive disorders treated with hashish (Walton, 1938: 3).

The Ohio State Medical Society's Committee on Cannabis Indica, convened in 1860, reported that their respondents claimed cannabis successfully treated neuralgic pain, dysmenorhea, uterine hemorrhage, hysteria, delirium tremens, mania, palsy, whooping cough, infantile convulsions, asthma, gonorrhea, nervous rheumatism, chronic bronchitis, muscular spasms, tetanus, epilepsy and appetite stimulation (McMeens, 1860: 1).

The India Hemp Commission (1894: 174) likewise was informed of similar medicinal uses for cannabis. Specific reports included the use of cannabis as an analgesic, a restorer of energy, a hemostat, an ecbolic, and an antidiaretic. Cannabis was also mentioned as an aid in treating hay fever, cholera, dysentery, gonorrhea, diabetes, impotence, urinary incontinence, swelling of the testicles, granulation of open sores, and chronic ulcers. Other beneficial effects attributed to cannabis were prevention of insomnia, relief of anxiety, protection against cholera, alleviation of hunger and as an aid to concentration of attention.

MEDICAL USES IN THE 20TH CENTURY

Despite the fact that marihuana was made illegal in the United States in 1937, research has

continued on the medical uses of marihuana. The findings include various possible medical applications of cannabis and its chemical derivatives.

One of the most recent and interesting findings (Frank, 1972) concerns the effect of cannabis in reducing intraocular pressure. It was found that as the dose of marihuana increased, the pressure within the eye decreased by up to 30%. This occurred in normal persons as well as in those with glaucoma, a disease of the eye in which increased intraocular pressure may cause blindness. Much more research is necessary in connection with this experimental clinical finding before final judgment can be passed on such a possible therapeutic value.

During the past 20 years in western medicine, marihuana has been assigned antibiotic activity; as a result, several studies relating to this possibility have been undertaken. H. B. M. Murphy (1963: 20) reported investigations in Eastern Europe. He stated that "it is alleged to be active against gram positive organisms at 1/100,000 dilution, but to be largely inactivated by plasma, so that prospects for its use appear to be, confined to E. N. T. (ear, nose and throat) and skin infections."

Dr. J. Kabelikovi (1952: 500-503) and his coworkers carried out tests on rats, which were similar to tests carried out with penicillin in vitro. The alcohol extract of cannabis was bacterially effective against many gram-positive and one gram-negative microorganisms. It was also found that a paste form of external application was successful. According to Kabelikovi, "from a study of 2,000 herbs by Czechoslovakian scientists it was found that cannabis indica (the Indian Hemp) was the most promising in the realm of antibiotics."

In a 1959 publication of Pharmacie, Krejci stated: "From the flowering tips and leaves of hemp, cannabis sativa var indica bred in Middle Europe, were extracted a phenol and an acid fraction. From the acid fraction, two acids were obtained, of which one preserved its antibiotic properties" (p. 349). In another Czechoslovakian publication, Krejci (1961: 1351-1353) referred to two additional samples with antibiotic activity.

Sample I in Fig. 1 has been sufficiently identified as cannabidiolic acid and sample 9 as cannabidiol. Both fractions show antibiotic activity. The results of tests lead us to conclude that the antibacterial action of cannabis sativa is not identical to the hashish effect found, for example, in tetrahydrocannabinol. However, it was established that cannabis sativa is effective as an antibiotic for local infections.

Kabelik, Krejci, and Santavy (1960: 13) include in "Cannabis as a Medicant" the various microorganisms against which cannabis is effective.

Proof could be furnished that the cannabis extracts produce a very satisfactory antibacterial effect upon the following microbes: staphylococcus pyogenes aureus, steptococcus alpha haemolyticus, streptococcus beta haemolyticus, enterococcus, diplococcus pneumonia, B. anthracis, and corynebacterium diptheriae i.e., all of them gram-positive microorganisms. Noteworthy is the effect upon staphylococcus aureaus strains, which are resistant to penicillin and to other antibiotics.

These authors also mentioned that E. coli (gramnegative bacteria) were tested and found to be resistant to the cannabis extract. One of the conclusions was "the possibility of utilizing the antibiotics locally without any danger of producing resistant strains to other antibiotics administered at the same time throughout treatment" (Kabelik, et al., 1960: 13).

Veliky and Genest in "Suspension Culture of Cannabis Sativa," (1970) reported that "the ethanol extract of cultured cells exhibited antibiotic activity against Bacillus megatherium

staphlococcus aureaus and escherichia coli" (p. 493).

Other reports said that "a pronounced antibiotic effect has been observed in South America. where fresh leaves, after being ground, are used as a poultice for furuncles, and in folk medicine in Europe for treatment of erysipelas" (Kabelik, et al., 1960: 8).

This section on the -antibiotic uses of cannabis concludes with a summary of several reports from various countries. In Pharmacopee Arabe: "The ground-up seeds are mixed with bread for people with tuberculosis" (Andrews and Vinkenoog, 1967: 145). In Czechoslovakia: "A preparation from seed pulp was . . . introduced by Sirek to act as a roborant diet in treatment of tuberculosis" (Kabelik, 1960: 8). "In Southern Rhodesia the plant is used as an African remedy for malaria, anthrax, sepsis, black water fever, dysentery, blood-poisoning, tropical quinine-malarial haemoglobinuria, and a wart medicine" (Watt, 1961: 13). In Argentina:

Cannabis is considered a real panacea for tetanus, colic, gastralgia, swelling of the liver, gonorrhoea, sterility, impotency, abortion, tuberculosis of the lungs and asthma ... even the root-bark has been collected in spring, and employed as a febrifuge, tonic, for treatment of dysentery and gastralgia, either pulverized or in form of decoctions. The root when ground and applied to burns is said to relieve pain. Oil from the seeds has been frequently used even in treatment of cancer . . . (Kabelik, 1960: 8).

In 1949, Davis and Ramsey reported a study of the effect of THC on epileptic children. "The demonstration of anticonvulsant activity of the tetrahydrocannabinol (THC) congeners by laboratory tests (Loewe and Goodman, Federation Proc., 6: 3521 1947) prompted clinical trial in five institutionalized epileptic children" (David and Ramsey, 1949: 284-285). Of these five children, all had severe symptomatic grand mal epilepsy with mental retardation; three also had cerebral palsy; and three had focal seizure activity. The EEG tracings were reported to be grossly abnormal in all five children. The results after treatment with homologues of THC, were reported as follows:

Three children-responded at least as well as to previous therapy.

Fourth child-almost completely seizure free. Fifth child-entirely seizure free.

As a result of their study, David and Ramsey (1949: 284-285) felt that "the cannabinols herein reported deserve further trial in non-institutionalized epileptics."

Dr. Vansim of Edgewood Arsenal has written in a recently published book "Psychotomimetic Drugs," that the synthetic preparations of cannabis are of interest. There are three areas where they may be of definite use in medicine (Efron, 1969: 333-334). One concerns the use of a cannabis analogue which Dr. Walter S. Loewe reported very effective in preventing grand mal seizures if given in small doses.

The second use refers to cannabis as an antidepressant. Straub (Walton, 1938: 3), Adams (1942: 726-727), and Stockings (1947, 920-922) point to the possible use of cannabis and cannabis analogues in relieving dysphoria in depressed patients. Other authors (Parker and Wrigley, 1950: 278-279) had lesser success but recommended further research in this field.

A report from London in 1968 suggests that cannabis treats the symptoms and not the cause by focusing the user's attention on his anxieties and pains without helping him to resolve them (Report by the Advisory Committee, 1968: 11).

The third use is described by Douthwaite, who used hashish in 1947 "for reducing of anxiety and tension in patients with duodenal ulcer" (Pond, 1948: 279).

A report in a 1965 issue of Medical News ("Cardiac Glycocides," p. 6) suggests cannabis as treatment for a specific form of malignancy.

Cannabis is recognized as an appetite stimulant, which suggests that the drug might be useful in the treatment of pathological loss of appetite known as anorexia nervosa (Grinspoon, 1969: 21). Similar symptoms exist in terminal cancer patients who, when treated with cannabis over a short period of time, demonstrated stimulation of appetite, euphoria, increased sense of well-being, mild analgesia and an indifference to pain which reduced the need for opiates (DHEW, 1971: 11).

Cannabis has been recently proposed as an adjunct in the treatment of alcoholics and drug addicts. Roger Adams (1942: 726-727) and Todd Mikuriya (1970a: 187-191) noted that the substitution of smoked cannabis for alcohol may have rehabilitative value for certain alcoholics.

Regarding the use of cannabis analogue in the treatment of drug, alcohol and depressive state withdrawal, Thompson and Proctor (1953: 520523) report the following:

Depressive States:

20 cases of neurotic depression-4 improved (20%)

6 cases of psychotic depression-none improved (00%)

Post-Alcoholic Cases:

70 cases--59 reported clinical alleviation of symptoms (84%)

Drug Cases:

6 cases of barbiturate addiction-4 reported amelioration of symptoms (66%)

4 cases of dilaudid addiction-3 reported alleviation (75%)

2 cases of pantopan and one paregoric addiction-all reported smooth withdrawal (100%)

12 cases of Demerol addiction-10 withdrawals in one week (83%)

6 cases of morphine addiction-2 withdrawals without unpleasant symptoms (33%)

The doctors concluded that "Pyrahexyl (a synthetic cannabis-like drug) and related compounds are beneficial in the treatment of withdrawal symptoms from the use of alcohol to a marked degree, and in the treatment of withdrawal symptoms from the use of opiates to a less marked, but still significant degree" (Thompson & Proctor, 1953:520-523).

Drs. Allentuck and Bowman (1942) undertook a study of the use of marihuana in the morphine abstinence syndrome. They stated:

A series of cases were selected from among drug addicts undergoing treatment. . . .

Comparative results were chartered for the gradual withdrawal, total withdrawal, and marihuana derivative substitution, as methods of treatment. . . . 49 subjects were studied. The results in general, although still inconclusive, suggest that the marihuana substitution method ameliorated or eliminated (the symptoms) sooner, the patient was in a better frame of mind, his spirits elevated, his physical condition was more rapidly rehabilitated, and he expressed a wish to resume his occupation sooner (p. 250).

In his study of the medical application of cannabis for Mayor LaGuardia's committee, Dr. Samuel Allentuck reported "favorable results in treating withdrawal of opiate addicts with tetrahydrocannabinol (THC), a powerful purified product of the hemp plants" (Mikuriya, 1969: 38).

Roger Adams' detailed studies, as reported by Dr. C. K. Himmelsbach in his 1944 article "Treatment of the Morphine Abstinence Syndrome with a Synthetic Cannabis-Like Compound" (1944:26), indicated that "withdrawal manifestations were considered to be mild. The reported therapeutic value of marihuana was attributed to improved appetite, greater sleep, euphoria, and a reduction of the intensity or elimination of abstinence phenomena." Himmelsbach, however, had lesser success when he studied the effect of a "pyrahexyl" compound on the morphine abstinence syndrome, as noted by his conclusions that:

(1) Pyrahexyl compound appears to possess considerable cannabis-like effect when administered orally, but little or none when given intramuscularly.

(2) When given by mouth In definitely effective amounts pyrahexyl compound had no appreciable ameliorative effect on the opiate abstinence syndrome (P. 29).

The New York City Mayor LaGuardia's Committee on Marihuana (1944: 147-148) reported two possible therapeutic applications of marihuana:

The first is the typical euphoria-producing action which might be applicable in the treatment of various types of mental depression; the second is the rather unique property which results in the stimulation of appetite. In the light of this evidence and in view of the fact that there is a lack of any substantial Indication of dependence on the drug, It was reasoned that marihuana might be useful in alleviating the withdrawal symptoms in drug addicts. However, the studies here described were not sufficiently complete to establish the value of such treatment . . . .

A study was then undertaken at Riker's Island (N.Y.) Penitentiary involving 56 morphine or heroin addicted inmates. Two groups were equally matched according to age, physical condition, length and intensity of habit, etc. One group received no treatment or Magendie's solution, and the other received 15 mg. of THC and/or placebo.

"The impression was gained that those who received tetrahydrocannabinol had less severe withdrawal symptoms than those who received no treatment or who were treated with Magendie's solution" the report stated. However, the report further said that this alleged therapeutic use of marihuana should be "investigated under completely controlled conditions" before meaningful conclusions can be developed (New York City Mayor, AU: 147-148).

Some reports indicate that cannabis helps relieve labor pains. Such uses are reported among native tribes in South Africa and Southern Rhodesia: "The Suto tribe fumigates the

parturient woman to relieve pain;"the Sotho women of Basutoland "are reported as smoking cannabis to stupefy themselves during childbirth," and have also been known to "administer the ground-up achene with bread or mealiepap to a child during weaning" (Watt, 1962:13).

The use of cannabis in the treatment of leprosy has been described in a 1939 dictionary of Malayan medicine: "Seeds of Hydnocarpus anthelmintim ... form the basis of the Tai Foon Chee treatment of leprosy. After crushing and sieving, they are mixed with cannabis indica in the proportion of two parts of the seeds to one of Indian hemp" (Andrews and Vinkenoog, 1967: 146). Likewise, Watt and Breyer-Brandwijk quote Pappe that "the early colonist employed a decoction in the treatment of chronic cutaneous eruptions, possibly in leprosy (Andrews and Vinkenoog, 1967: 146).

Kabelik, Krejci, and Santavy have reported favorable results "in stornatitis aphtosa, gingivitis, and in paradentoses with a mouthwash of the following composition: Tinct. Cannabis 20.0, Tinct. Chamomillae, Tinct. jernmarum populi (or another tan for example, Tinct. Gallarum) aa 10.0 to be applied in the form of sprays or linaments to the inside of the mouth" (Kabelik et al., 1960: 13).

In reference to the use of cannabis, Chopra and Chopra (1957: 12-13) listed some preparations used in the practice of indigenous medicine in India in 1957. They summarize their article "The Use of the Cannabis Drugs in India" (1957: 12-13) by saying:

. . . with regard to the use of cannabis in Indian indigenous medicine at the present time, it may be said that It was and still is fairly extensively used in both the Ayurvedic (Hindu) and Tibbi (Mohammedan) systems of medicine as an anodyne, hypnotic, analgesic and antispasmodic, and as a remedy for external application to piles. It is also used in the treatment of dysmennorhoea, rheumatism, chronic diarrhoea of the sprue type, gonorrhoea, malaria and mental diseases on the advice of itinerant practitioners of Indigenous medicine as well as quacks who roam about the country. For medicinal purposes the drug is administered by mouth and hardly ever by smoking.

The use of cannabis drugs in indigenous medicine has greatly declined during recent years for two reasons-firstly, because of the rapid deterioration of the potency of cannabis drugs in storage, the specimens available on the market being often Inert and quite useless; secondly, because a number of potent and effective drugs of the type used In western medicine are now available on the market and are used quite extensively by the practitioners of indigenous medicine in place of cannabis, for the anodyne, sedative and hypnotic effects. In the rural areas of India, however, the practitioners of indigenous medicine still use cannabis quite extensively In their practice.

The same article lists a variety of uses in which cannabis is employed therapeutically in veterinary medicine.

Dr. R. N. Chopra (1940: 361) reports the following medicinal household uses of Indian Hemp:

The hemp drugs are popularly used as household remedies in the amelioration of many minor ailments. A mild beverage made from bhang leaves is believed to sharpen appetite and to help digestion. Indian hemp Is commonly used as a smoke and as a drink for its supposed prophylactic value against marihuana in malarious tracts. Bhang beverages form one of the popular household remedies for gonorrhoea and dysuria. On account of their mild diuretic and sedative properties these drinks probably give a certain amount of

symptomatic relief. Likewise, the use of bhang for dysmenorrhea, asthma, and other spasmodic conditions is not uncommon. A poultice made from fresh leaves is a common household remedy for painful affections of the eyes, conjunctivitis, swollen joints, orchitis, and other acute inflammatory conditions.

Tuberculosis, anthrax, tetanus, and menstrual cramps are among the miscellaneous medical uses of cannabis reported. Reports from Mexico indicate the use of marihuana smoking "to relax and to endure heat and fatigue" (Mikuriya, 1969: 37).

Kabelik et al. (1960: 13) also discuss other varied uses of cannabis.

In human therapy the best results have been obtained with the following medicaments combined with substances derived from cannabis: dusting powder together with boric acid (otitis), ointment (staphylococcus infected wounds, staphylodermia and so on), ear drops (otitis chron.), alcohol solutions with glycerine (treatment of rhagades on the nipples of nursing women-prevention of staphylococcic mastitis,) aqueous emulsions (sinusitis), dentin powder with the IRC (Isolated Resin from Cannabis) (caries). The preparations mentioned above have been already tested clinically, and will eventually be made available for production. . . . the experiments made in clinical practice, particularly in stomatology, otorhinolaryngology, gynecology, dermatology, phisiology, with some pharmaceutical preparations containing antibacterial substances from cannabis have been reported. Attention has been drawn to the advantageous utilization of the active substances from cannabis in veterinary medicine, and particularly in preventive medicine for anthropozoonoses.

Murphy (1963: 20) refers to an article by Lang, "Treatment of Acute Appendicitis with a Mixture of Ma Jen," which says "the drug has apparently been used in China for the treatment of appendicitis." The Xosa tribe in South Africa "employs it for treatment of inflammation of the feet" (Kabelik et al., 1960: 7), while the Mfengu and Hottentot use the plant as a snake-bite remedy (Watt, 1962: 13).

Other therapeutic uses attributed to marihuana are for the treatment of migraine headaches, as an analgesic, and as a hypnotic. Hollister (1971: 28) stated that "other uses which have been proposed for marihuana include the treatment of epilepsy, as prophylaxis for attacks of migraine or facial neuralgia, or as a sexual stimulant."

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Marihuana: A Signal of Misunderstanding

The Technical Papers of the First Report of the National Commission on Marihuana and Drug Abuse March, 1972

Preface

Congress created the Commission on Marihuana and Drug Abuse to separate fact from fiction, reality from myth, and to achieve a balanced judgment on the marihuana issue. The first report of the Commission is an attempt to clarify the essential issues and concerns of our society regarding marihuana and to extrapolate our findings and conclusions into a reasonable societal response.

In an effort to present these complex issues with a maximum of clarity, comprehension, and readability, the Commission Report does not include references. This Appendix, however, fully documents the methodological and substantive, issues presented in the Report. In addition to the technical data, the Appendix also contains the historical and philosophical matrix of the Report.

The papers of the Appendix are divided into six major parts. Part One deals with the biosocial aspects which relate to marihuana's effect on individuals as well as to the larger society.

It includes an historical survey of two types of marihuana use, medicinal and intoxicant, which constitutes a review of marihuana use in many parts of the world. An analysis of the accepted sociocultural parameters helps to put the American marihuana, user into perspective.

Part One also presents detailed and current reviews of the botanical, psychopharmacologic, physiologic, and behavioral effects of marihuana on man.

Part Two, the social aspects of marihuana use, discusses patterns of the individual user as well as the relationship of marihuana use to violent and non-violent crime.

One of the most controversial issues in the study of marihuana is its relationship to other drugs. The second chapter of Part Two deals specifically with this issue and explores, in depth and with careful consideration, the hypothesis that marihuana use leads to other drugs, especially heroin.

Part Three is concerned with the legal aspects of the marihuana controversy. In order to place marihuana, a psychoactive drug, in proper perspective, a history of the control of marihuana, alcohol and tobacco is presented.

This section of the Appendix also reviews the current marihuana laws at the international, federal and state levels including statutes that require physicians to report drug addiction. The section concludes with a description of trafficking and distribution patterns of the drug.

Part Four, the response of the criminal justice system, analyzes law enforcement behavior

with respect to marihuana use. The relationship between the opinions held by officials in the criminal justice system and their behavior toward marihuana offenders is also discussed.

Part Five presents the findings of the Commission-sponsored National Survey of public attitudes and behavior toward marihuana, other drug use and related social issues.

Part Six discusses the marihuana issue with respect to sociolegal policy practices and decisions. Included in the section is a discussion of the constitutional dimensions which form the basis for alternative models for the control of marihuana. A nationwide study of marihuana education presents policies and programs on a state-by-state basis and includes descriptions of ongoing marihuana education programs.

The Appendix concludes with a presentation of future research recommendations as suggested guidelines for various agencies, institutions and individuals engaged in research on marihuana.

Each of the papers contained herein represents the composite effort of the Commission members and staff, consultants, contractors and youth consultants.

Of necessity, space limitations precluded the publication in full of many excellent papers; many works are presented either in abridged form or integrated into the Commission's own presentation.

A list of all papers submitted to the Commission is presented at the conclusion of the Appendix. Should any reader wish to obtain a copy of a particular work, the request should be sent directly to the author and not to the Commission.

Factors Influencing Psychopharmacological Effect

A renewed interest in marihuana studies has been prompted by the recent clarification of the complexities of its chemistry, new techniques to quantity the amounts of active drug in natural materials, and the availability of purified tetrahydrocannabinols. These advances allow more precise scientific research on psychiopharmacological effect.

DOSE-RESPONSE RELATIONSHIP

A major advance has been a quantification of dose of THC in relation to clinically observable phenomena. This has been extensively studied over a wide dose range for marihuana (Rodin and Domino, 1970; Melges et al., 1970; Tinklenberg et al., 197O; Weil et al., 1968; Meyer et al., 1971; Clark and Nakashima, 1968; Clark et al., 1970; Jones and Stone, 1970; Mayor's Committee, 1944; Manno et al., 1970) and Delta 9 tetrahydrocannabinol (Isbell et al., 1967; Waskow et al., 1970; Hollister et al., 1968; Perez-Reyes and Lipton, 1971; Lemberger et -al., 1971; Dornbush and Freedman, 1971).

Investigations by Isbell et al. (1967), Kiplinger et al. (1971) and Renault et al. (1971) have clearly demonstrated that when reliable quantities of smoked marihuana or THC are delivered to the subject, a reproducible linear dose-dependent effect occurs on indices of physiologic, psychomotor, and mental performance as well as on mood and subjective experiences over a dose range of 12.50 to 200 micrograms of Delta 9 THC per kilogram of body weight.

In a 154 pound man this is comparable to consuming 0.88 to 17.5 milligrams of Delta 9 THC or 88 to 150 milligrams of marihuana containing one percent Delta 9 THC. It is generally assumed that good quality marihuana available in the United States contains 1% Delta 9 THC and an average marihuana cigarette consists of 500 milligrams of marihuana; thus, 5 milligrams of Delta 9 THC (Hollister, 1971).

As with most drugs, the larger the dose taken, the greater the psychopharmacologic effect. Isbell et al. (1967) noted that clinical syndromes vary from a mild euphoric feeling of relaxation at low doses (25 micrograms per kilogram) to an intensive hallucinogenic-like experience at high doses (250 micrograms per kilogram).

DOSE-TIME RELATIONSHIP

Similar time-action curves have been demonstrated for smoked Delta 9 THC and equivalent quantities of smoked marihuana (Hollister et al.,1968; Isbell et al., 1967 Renault et ai., 1971 Kiplinger et al., 1971). Symptoms began almost immediately after smoking (2-3 minutes). At lower doses, the peak effect is seen at 10 to 20 minutes and the duration of effect is 90 minutes to two hours. At higher doses, symptoms persist for three to four hours.

Therefore, as with most drugs, the larger the dose taken, the longer the action. The subjective symptoms experienced by the subject appear to parallel in time the subjective effects and some physiological indices such as pulse rate (Isbell et al., 1967; Hollister, 1968 - Renault and Schuster, 1971; Kiplinger et al., 1971; Galanter et al., 1972; Lemberger et al., 1971). Others such as reddening of the eyes have a delayed peak response and longer duration (Kiplinger et al., 1971).

ROUTE OF ADMINISTRATION

A second factor which influences the effect experienced by the user is the manner in which the substance is consumed. That is, whether it is smoked, swallowed or injected.

Isbell et al. (1967) demonstrated that smoked material is two and a half to three times as effective as orally consumed marihuana in the form of a 95% ethanolic solution in producing equivalent physiologic and subjective effects.

In addition, the oral time-action curve is extended with onset of symptoms one-half to one hour after administration. A peak effect is reached in two to three hours and the effect persists for three to five hours at low doses and six to eight hours at larger doses (Hollister et al., 1968; Isbell, et -al., 1967; Lemberger et al. 1971; Perez-Reyes, and Lipton, 1971).

In general, the effects produced by ingested THC or ingested marihuana extract are comparable to those produced by nearly one-third the amount of smoked and inhaled THC or marihuana (Hollister, 1971).

Recent work has been reported which clarifies these findings. Lemberger et a]. (1971) studied absorption into the blood utilizing radioactive labeled THC by three routes of administration: smoked, ingested in 95% ethanolic solution in cherry syrup, and intravenously injected. The first appearance of the drug into the, blood was immediate intravenously; almost immediate, by inhalation; and delayed for 15 to 30 minutes when ingested.

Perez-Reyes and Lipton (1971) using labeled AO THC demonstrated that rate of absorption by the gastrointestinal tract, and the duration of action is greatly influenced by the vehicle used to ingest the drug. Speed and completeness of absorption varied when the THC was dissolved in 100% ethanol or sesame oil or emulsified with a bile salt (sodium glycocholate), and administered to a subject who had fasted 12 hours. With the bile salt vehicle, the physiologic and subjective effects were noted between 15 to 30 minutes after ingestion and lasted two to three hours. In contrast, the effects, with ethanol or sesame oil, appeared after one ,hour and lasted four to six hours.

Hollister and Gillespie (1970) hypothesized that this delayed gastrointestinal absorption of THC might be accounted for by the nonpolar vehicle required to dissolve TUC or marihuana extracts.

Furthermore, Perez-Reyes and Lipton (1971) found that the peak levels and duration of radioactivity in the plasma paralleled the physiologic and subjective effects, although the plasma levels remained high for a longer period of time than the effect. Subjects receiving the drug emulsified in sodium glycocholate or dissolved in sesame oil had three times

higher plasma levels of radioactivity with much less excreted in the feces than those receiving the drug dissolved in ethanol.

These results indicate that the THC was poorly absorbed from the gastrointestinal tract when given in all alcoholic solution. The sesame oil solution and the glycocholic acid preparation allowed more complete absorption and the latter preparation was much faster. It is of interest that the degree of subjective high after ingestion of 37 milligrams Delta 9 THC also parallels the plasma radioactivity.

Thus, the subjects reported their experience, as intense and unpleasant both with the bile salt and the sesame oil, and as moderate and entirely pleasant with ethanol. (Perez-Reyes and Lipton, 1971) This correlates well with earlier findings of Hollister et a]. (1968).

QUANTIFICATION OF DOSE DELIVERED

The problem in quantifying the THC dose delivered by different routes of administration has been clarified by several studies using radioactive compounds. However, until a method for determining the THC blood concentration is developed, only estimates oil amount delivered are possible.

Radioautographic studies clearly demonstrate that intravenous injection gives the, most complete and consistent delivery (Lemberger et a]., 1971; Me Isaac et M., 1971; Ho et a]., 1971; Kennedy and Waddell, 1971; Idanpaan-Heikkila, 1971). These investigators have demonstrated that THC is poorly absorbed from the injection site after intraperitoneal or subcutaneous injection.

As discussed earlier, the completeness of absorption ocurring after oral administration of THC appears to depend upon the vehicle. Judged by radioactivity levels, almost complete absorption of the THC occurs with an oil or bile acid vehicle, but absorption is incomplete with an alcohol vehicle. (Perez-Reyes et al., 1971)

Recent animal studies performed for NIMH indicated that the oral dose necessary to produce comparable gross behavioral changes in lab animals is about three times higher than the intravenous dose (Marihuana and Health. 1971: 171). Ferraro (1971) demonstrated the comparability of effective oral doses of THC in chimpanzees and humans. Furthermore, preliminary work performed in the laboratories of M. Isaac (1971) and Harris (1971) and Mechoulam (1971) appear to indicate that the intravenously administered dose of Delta 9 THC necessary to produce detectable behavioral changes in monkeys (20 to 50 microgram/ kg) on conditioned learning tasks is comparable to that in man. (Kiplinger et a]., 1971; Lemberger et al., 1971).

The dose of THC absorbed from natural marihuana extracts ingested orally is uncertain. THC is present as an acid in variable quantities in natural marihuana. THC acid has not presently been proven to be active. Claussen and Korte (1968) reported that the THC carboxylic acid is converted to free THC during the smoking process. Whether these, acids are active themselves; are absorbed from the gastrointestinal tract or converted there into THC; or are decarboxylated in the, body is unknown presently.

Because inhalation is the most widely used route of administration of marihuana, several

laboratories have investigated the effect of combustion and smoking oil marihuana. Because techniques and conditions varied between laboratories, precise quantification of the delivery to the smoker's lungs is uncertain.

Manno, et al. (1970) calculated that about 50% of the THC contained in a marihuana cigarette would be delivered to the smoker's lungs for absorption if the entire cigarette were smoked in 10 minutes and each inhalation was retained for 30 seconds with no sidestream loss. Truitt (1971) and co-workers (Foltz et al., 1971) found that 50%c of THC was pyrolyzed and 6% was lost in the side stream while noting that almost 21% of the THC remained in the butt when three-fourths of the cigarette is consumed.

Agurell and Leander (1971) studied the transfer of THC using actual smoking subjects where only the main stream smoke was collected. They found that 14-29%% of the THC was transferred in the mainstream smoke for a cigarette and 45% for a pipe. However, they stated that this amount transferred would be comparable if no butt was left.

Agurell and Leander found that the amount transferred was not effected by depth of inhalation but that smokers using deep inhalation retained 80% of the transferred THC while those using superficial inhalation tended to exhale more than 20% of the transferred THC. Mikes and Waser (1971) also found about 22% in the mainstream smoke.

These divergent data appear to be comparable when corrected for loss to sidestream and retention in the unsmoked portion. Thus, the efficiency of delivery of THC by smoking and inhalation using good techniques, and smoking the entire cigarette approximates 40-50% of the original THC contained. A small fraction is lost in the uninhaled sidestream smoke, about 50% is destroyed during pyrolysis and a variable amount is exhaled from the respiratory dead space.

In apparent confirmation, Lemberger et al. (1971, 1972), using radiolabeled THC added to a marihuana cigarette, found that the initial plasma level of radioactivity after smoking was about onehalf the level after intravenous injection. Oral administration of the same dose of THC in an alcohol vehicle produced about one-half the peak level as smoking. However, Galanter et al. (1972) noted marked variability in the amount of THC absorbed using a standardized routine of inhaling, breath-holding and finishing the cigarette within a set time period.

EFFECT OF PYROLYSIS ON THE CANNABINOIDS

Several investigators have studied the effect of pyrolysis on the cannabinoids. Most have concluded that only negligible changes occur in the original cannabinoid fraction of marihuana except for decarboxylation of the acids to the cannabinoids. No evidence was found for isomerization of Delta 9 THC or Delta 8 THC nor the formation of any new pyrolysis products (Manno et al., 1970; Coutselinis & Miras, 1970; Claussen and Korte, 1968; Foltz et al., 1971; Agurell and Leander, 1971). Mikes and Waser (1971) suggested that a small percentage of cannabidiol was converted to Delta 9 THC, but this observation was not confirmed by the other groups.

Coutselinis and Miras (1970) noted that less THC was destroyed during smoking when Delta 9 THC was the only cannabinoid present rather than when a resin or a mixture of cannabinoids were present. This was believed to be at least partially accounted for by the distribution of THC in the cigarette. More destruction occurred when the THC was evenly

distributed in the cigarette than when it was present in a well-defined lump.

SET AND SETTING

A most important variable encountered when evaluating the effect of marihuana is the interaction of the drug with the non-drug factors, set and setting. Set refers to the drug-taker's biological make-up including personality, past drug experiences, personal expectations of drug effect, and mood at the time of the drug experience. Setting refers to the external surroundings and social context in which the individual takes the drug. Set and setting exert their largest effect on psychoactive drugs, like marihuana, with subtle subjective mental effect and minimal physiological effect. Set and setting exert a variable but often marked influence on the potential drug effects (Waskow et al., 1970; Wickler, 1970).

The results of a series of experiments by Jones (1971) suggests the subjective state produced by "a socially relevant dose of smoked marihuana.... 9mg THC" is determined more by set and setting than by the THC content of the marihuana.

In one experiment, a greater variety and more intense pleasurable symptoms occurred in a fourman group allowing unstructured interpersonal interaction than in unstructured solitary test situations. Contrasting behavioral patterns were observed by the investigator and reported subjectively by the individuals. Subjects tested individually demonstrated a relaxed, slightly drowsy, undramatic state as they read, listened to the radio, or sit doing nothing. In the group setting there was elation, euphoria, uncontrolled laughter, a marked lack of sedation and much conversation. (Jones, 1971)

This strongly emphasizes the importance of setting in the marihuana experience. The reason is apparent why marihuana is usually used with other people. However, most investigators studying its effects evaluate their subjects alone, in well-controlled, sterile, scientific laboratories.

The importance of the placebo effect (the subject experiences a drug effect from an inert material) to the "social high" obtained from marihuana was studied in another experiment (Jones and stone, 1970; Jones, 1971). Misjudgments of the pharmacologic potency of both the smoked placebo (marihuana without THC) and active marihuana were commonly made by the subjects although physiologic and performance indices routinely matched the distinction correctly. The smoking of a material that smells and tastes like marihuana by individuals with marihuana experience appeared to produce a mental state that is interpreted as being high if combined with the expectation of becoming high.

The importance of learning to get high was demonstrated when individuals who smoked marihuana less than twice a month were compared with those who used marihuana at least seven times a week. Although both groups rated the active marihuana equally potent, the frequent users rated the placebo equally to the active drug, while the infrequent users experienced significantly less high from the placebo.

The infrequent users' experiences appears to reflect mainly pharmacologic factors with moderate set-setting influence. However, the frequent users' response to the placebo appears to reflect mainly learned set-setting influence and minimal pharmacologic factors. (Jones, 1971)

Smith and Mehl (1970) call learning to get high " reverse tolerance." During the early exposures to marihuana the individual learns to appreciate the subtle drug effect with repeated experience with the drug. Consequently, less drug may be required to experience

the desired high in the early stages of marihuana use.

Further evidence for this is seen when the familiar smoking route and smell and taste cues are made ineffective by giving the active and inactive material by the oral route (Jones and Stone, 1970). Both groups of users can significantly distinguish the intoxication produced by 25mg of active material. But the frequent user rates this high significantly poorer than his smoking high while the infrequent user rates them correctly.

TOLERANCE

The development of tolerance is another important factor that may influence the psychophysiological effects of marihuana. Although tolerance occurs with many drugs and the process has been studied for over a century, the mechanism of this complex phenomenon is not completely known. Kalant et a]., (1971) have extensively discussed tolerance to the psychotropic drugs.

Tolerance has two different connotations. The first, termed "initial tolerance," is an expression of the dose of the drug which the subject must receive at his first exposure to produce a designated degree of effect. These authors state that a variety of congenital and environmental factors contribute to the wide range of differences in "initial tolerance" observed among different individuals, sexes, species, age groups and so on.

The second meaning of tolerance is that of an "acquired change in tolerance" within the same individual as a result of repeated drug exposures so that an increased drug dose is required to produce the same specified degree of effect, or the same dose produces less effect. In this chapter, tolerance will be used synonymously with "acquired increase in tolerance." -Tolerance can only be discussed for each specific drug action and not for all the actions of a given drug on the body. That is, tolerance occurs at different rates for some of the various effects of the same drug on the body and may not occur for other effects of the same drug. The relationship between "initial tolerance" and "acquired change in tolerance" has not been clearly established.

There are two classes of tolerance based on possible mechanisms. The first, dispositional tolerance refers to changes in absorption, distribution, excretion and metabolism which produce a reduction in the intensity and duration of contact between the drug and the target tissue on which it acts.

The second, functional tolerance includes changes in the properties and functions of the target tissue making it less sensitive to the same dose of the drug. Physiological tolerance implies a change in the target organ while psychological or "learned tolerance" implies the acquisition of new skills or functions to replace those changed in the target tissue (Kalant et al., 1971).

Considerable evidence is accumulating which demonstrates that tolerance does develop in numerous animal species (pigeons, rats, dogs, monkeys, chimpanzees, mice) to the behavioral and physiological effects of marihuana and THC in doses many times larger (from 1 mg. to 500 mg./ kg/day) than the minimal active dose (Carlini, 1968; Silva et al., 1968; McMillan et al., 1970, 1971; Frankenheim et al., 1971; Carlini et al., 1970; Thompson et al., 1971; Pirch et al., 1972; Ferraro, 1971; Elsinore, 1970; Cole et al., 1971).

Lipparini et al. (1969) were not able to demonstrate tolerance in the rabbit.

Tolerance, appears to develop rapidly to high doses even when injections are spaced up to about a week apart. Tolerance to high doses appears to be long-lasting with little loss of tolerance even after a month. But at low doses in the behavioral range, tolerance appears to completely dissipate in a few days after a single dose. The magnitude of tolerance development can be large. After repeated exposure, a dose of over one hundred times the original produces little effect (McMillan et al., 1971).

The development of tolerance to THC in animals occurs for some effects but not for others (McMillan et al., 1971; Pirch et al., 1972; Thompson et al., 1971). This differential development of tolerance may explain why tolerance to certain effects studied has not been demonstrated (Masur and Khazan, 1970; McMillan et al., 1971; Barry and Kubena, 1971; Kubena et al., 1971).

Lomax (1971) and Thompson et al. (1971) have noted that the development of tolerance to one effect of the drug (hypothermia or sedation) may allow the expression of the opposite effect (hyperthermia or stimulation) to which tolerance does not develop.

Cross tolerance has been demonstrated between delta-9-THC, delta-8-THC and its synthetic analogues. Cross tolerance, has not been demonstrated between THC and lysergic acid diethylamide (LSD), mescaline or morphine (McMillan et al., 1970).

Preliminary work performed by McIsaac (1971) and Harris et al., (1972) demonstrated a reduction in the duration and quality of response on a conditioned learning task by monkeys on the second intravenously administered dose of THC. Tolerance developed extremely rapidly so that no effect on behavior was seen after five days. After a. two-week period without THC, the animals were retested and the same degree of tolerance had persisted. The researchers believe these observations might indicate a rapid behavioral adaption or "learned" functional tolerance.

However, evidence indicates that dispositional tolerance and/or physiological type of functional tolerance also plays a role at least at higher doses. Tolerance develops to the central nervous system depressant effects, hypotherma hypopnea (Thompson et al., 1971) and the EEG effects (Pirch et al., 1971) of the drug. McMillan et al., (1971) have demonstrated that tolerance to the effects of THC on behavior can be blocked by the hepatic microsomal enzyme inhibitor, SKF-525-A which has been shown to be a potent inhibitor of THC metabolism (Dingell et al., 1971). Methodological techniques must be, developed which will allow microdistribution studies to be performed in tolerant animals with low doses of THC before the mechanism of tolerance development can be clarified.

Evidence for the development of marked tolerance by man has been suggested by studies of heavy daily very long term users of hashish, charas or ganja in foreign countries. Reports from the, Eastern literature (Chopra and Chopra, 1939; Dhunjibhoy, 1930; Ewans, 1904) and more recently from Greece (Miras, 1965; Fink et al., 1971) and Afghanistan (Weiss, 1971) relate daily consumption of enormous quantities of potent cannabis preparation estimated to contain up to about one gram of THC per day.

Weiss (1971) has noted that daily charas smokers start with small doses and then in order to achieve the same effect gradually increase their daily dose about 5-6 times over a 20 to 30 year period. Generally, most reach their maximum dose by age 40 and then gradually decrease their daily dose by 50% usually ceasing use by their 60's. Some smokers have been noted to raise their original daily dose up to a maximum of 10 times within the first two years.

Others have noted that moderate use for many years does not necessitate increased doses (Sigg, 1963).

At least part of the increase in daily amount of drug used is accounted for by the finding that the duration -of the intoxicat n becomes shorter over the years so that the very heavy smoker must consume the drug more frequently to remain intoxicated. Additionally, smokers report that they have on oc sion discontinued use for days or months after which they experienced similar effects at smaller doses (Weiss, 1971).

Fink et al. (1971) noted that as hashish users total daily dose was decreased by more than half over the years, the frequency of use per day declined correspondingly.

Rubin and Comitas (1972) noted that very long term Jamaican ganja smokers generally consumed an average of seven spliffs daily (a ganja cigarette several times the size of an American marihuana cigarette) with a maximum of 24.

Further evidence for the development of tolerance, at least to certain of the depressant effects, is that these very long term smokers apparently tolerate the extremely high doses well without dysphoria or decreased ability to perform their usual activities (Weiss, 1971; Fink et al., 1971; Rubin and Comitas, 1972).

Smith and Mehl (1970) noted the, accumulating American anecdotal evidence of mild tolerance development after heavy daily use for a number of years. Jones (1971) and Meyer et al. (1971) have suggested diminished effect on physiologic and psyochomotor performance, that is, little or no impairment of function in daily users compared with infrequent, intermittent users of marihuana. Additionally, several investigators have noted that frequent users had little or no impairment on psychomotor performance tasks while marihuananaive individuals given the same dose had impaired function. (Clark et al., 1968, 1970; Jones and Stone, 1970; Mayor's Committee, 1944; Weil et al., 1968).

Subsequently (Mendelson et al., 1972) repetitive daily (free access) use over a 21-day period by groups of long-term intermittent (average 7.7 sessions per month) and moderate, marihuana users (daily average, 33 smoking sessions per month) was studied. The development, of tolerance was strongly suggested to the physiological pulse rate and general depressant effect on activity as well as psychological effects which impair recent memory, time estimation and psychomotor coordination.

No tolerance development occurred to the subjective effects of marihuana for experienced users over the 21-day period (global "highness", somatic, perceptual, awareness, feeling, control, friendliness, ambivalence and altered thinking). Furthermore, with the exception of a higher ambivalence rating for the daily riser group, there were no differences in the subjective reports of the daily users or intermittent users. (Mendelson et al., 1972). The ambivalence score is believed (Katz et al., 1968) to be the best measure of "psychedelic effects" of hallucinogenic drugs.

In a prior study (Meyer et al., 1971) found that while the heavy smokers experienced more profound subjective effects soon after smoking, they were less intoxicated than the intermittent users one hour later.

These findings suggest to the investigators that the quality of the "high" may be different for heavy and intermittent users and may change with heavy use. Tolerance, to the subjective effects of marihuana may occur predominantly to the depressant effects so that the stimulatory effects (or hallucinatory-like) would be predominant in the heavy users. The intermittent users who smoked marihuana several times daily in the, current study showed

no increase in the ambivalence, rating.

The increased daily frequency of marihuana use by both groups over time by shortening the interval between smoking sessions appears consistent with earlier observations (Meyer et al., 1971) that the duration of the desired "high" is shorter in heavy users than in intermittent users.

Fink et al. (1971) confirmed several of these findings in a study in which intermittent users smoked a fixed dose (14 mg. of THC) of marihuana. They noted a suggestion of development of tolerance to pulse rate, short-term memory, digit symbol substitution but not to the subjective high or EEG changes. However, the subjects did feel that the duration of the intoxication shortened progressively during the second half of the experiment.

Schuster and Renault (1971) administered twice daily fixed doses of marihuana (smoke from 430 mg. of marihuana with 1.5% THC content) to intermittent users over a 10-day period. A peak tachycardia, of 20 to 30 beats per minute and a usual social high were produced. Preliminary observations revealed the development of tolerance to time estimation in a few days, but no evidence for tolerance to the tachycardia, orthostatic blood pressure, or rating of the high.

Hollister (1971), in preliminary studies found no significant evidence of tolerance after five daily oral doses of 20 mg. of THC. Clinical responses measured were subjective judgment of the high, mood, pulse rate, reading comprehension or excretion of urinary metabolites.

REVERSE TOLERANCE

Smith and Mehl's (1970) clinical observations of many marihuana smokers suggest a J-shaped time curve of tolerance to marihuana. A novice marihuana smoker often reports feeling no high or requiring considerably more drug to get high on his first few trials with the drug than after he obtains more experience with the drug. This phenomenon has been called "reverse tolerance." These clinicians believed this represented "learning to get high" or acquiring the ability to appreciate or become sensitive to the subtle aspects of the intoxication.

Goode (1971) found that more frequent and term marihuana smokers tend to require fewer "joints" to get high but differences were not statistically significant.

Weil et al. (1968) reported that experienced users of marihuana achieved a "high" after being given the same dose as naive (non-users) persons who did not experience a high but did demonstrate objective physiologic and psychomotor drug effects.

Meyer et al. (1971) found that heavy marihuana, users (daily for three years) were most sensitive to the "high" and required less marihuana to achieve a social high than infrequent intermittent users (use one to four times per month for less than two years).

Phillips et al. (1971) reported an increase in severity of symptoms after repeated administration of THC to rats. This "sensitization" may be a correlate of reverse tolerance.

Lemberger et al. (1971) supplied additional evidence for reverse tolerance based on the intravenous administration of 0.5 mg of THC to experimental subjects. Naive subjects experienced no effect from this small dose. However, daily marihuana users, who were told

they were receiving a non-pharmacologically active dose of THC, reported a "marihuana high," which lasted up to 90 minutes.

Lemberger et al. (1971, 1972) and Mechoulam (1970) suggested the possibility that enzymes necessary to convert THC to a more active compound require prior use of marihuana.

Reverse tolerance appears to be a complex phenomenon. Jones (1971) presented evidence which stressed the importance of expectation, setting and prior drug experience on learning to get "high." As the user gains more experience with marihuana the more the individual's mind is able to respond to the expectation of the "high" by actually becoming high when given an inert material which smells and looks like marihuana.

Weil (1971) believes that the capacity to get "high" is an inherent characteristic of each individual's mind. He believes that marihuana facilitates the user's ability to achieve this altered state of consciousness, that is, learn how to get high.

Mendelson et al. (1972) did not find evidence for reverse tolerance. In fact, the daily users were more likely than the intermittent users to smoke two cigarettes per occasion. Both groups had had an average of five years of marihuana use. Several other investigators did not obtain any evidence of reverse tolerance after repetitive daily use in experienced subjects (Hollister, 1971; Schuster and Renault, 1971; Fink et al., 1971).

METABOLISM

Metabolism of the drug by the body exerts an important influence on the psychopharmacologic effect of marihuana. Many laboratories in many countries have been examining the metabolism, of the cannabinoids using in vitro liver microsomal enzyme preparations.

With the recent availability of radiolabeled Delta 9 and Delta 1 THC, cannabinol and cannabidiol much activity has occurred in vivo in animals. A comprehensive review of these areas including studies of absorption, disposition, excretion, metabolism and stimulation-inhibition of metabolism is beyond the scope of this report. Readers interested in further details in this area are referred to an excellent comprehensive review by Lemberger (1972).

From animal and in vitro studies it appears that the liver rapidly changes Delta 9 and Delta 11 THC in a similar manner by hydroxylation to 11-OH THC. This compound appears to be as potent or possibly more potent pharmacologically than the parent compounds This metabolite appears to be, rapidly hydroxylated to 8-11 dihydroxy Delta 9 THC (7-11 dihydroxy All THC) which is inactive. The 8-OH Delta THC appears to be a minor active metabolite (Christensen et al., 1971; Burstein et 1970; Ben-Zvi et al., 1970; Foltz et al., 1970; Wall et al., 1970,71; Nilsson et al., 1970).

These metabolites are excreted primarily into the bile and then to the feces. Some evidence exists for an enterohepatic circulation returning the drug to the blood. (Miras and Coutselinis, 1970; Klausner and Dingell, 1971)

Another metabolic pathway appears to be present resulting in a series of acidic metabolites excreted primarily in the urine (Agurell et al, I., 1970). Recently, Burstein and Rosenfeld

(1971) isolated and identified a major rabbit urinary metabolite, 11-carboxy-2'-hydroxy-Delta 9 THC. They postulate that other acidic metabolites might be esters or amides of this compound (Figure 7).

Recently, Nakazawa and Costa (1971) demonstrated that A' THC was metabolized by lung microsomes forming two unidentified products not found in liver homogenates.

Lemberger et al. (1970, 1971, 1972) and Galanter et al. (1972) have performed metabolic studies in man using intravenous, oral and smoked Delta 9 THC. These studies indicate that the THC disappears from the plasma in two phases.

The initial rapid phase has two components and represents metabolism by the liver and redistribution from the blood to the tissues. The slower second phase represents tissue retention and slow release and subsequent metabolism.

The plasma 1/2 life of THC was significantly shorter in daily users than nonusers at both the first component of phase one (10 minutes versus 13 minutes) and phase two (27 hours versus 56 hours). Tissue distribution was similar in daily and nonuser (1/2 life 2 hours).

Therefore, immediate metabolism of THC and subsequent metabolism is more rapid for daily user than the non-user implying specific enzyme induction. THC persists in the plasma for a considerable period of time, at least three days, with a half life of 57 hours for nonusers and 28 hours for daily users.

The presence of 11-hydroxy THC and more polar metabolites in the plasma of both users and nonusers within 10 minutes indicates that the metabolite probably accounts for the pharmacological activity of marihuana, not THC.

Further metabolism of the 11-hydroxy THC to more polar inactive 8-11 dihydroxy A' THC metabolite occurs more rapidly in users than nonusers. During the first few hours after injection, unchanged THC, its polar metabolites and nonpolar metabolites in the plasma, decline rapidly and then level off as they are distributed to the tissues. THC persists in the plasma, for at least three days, and both users and non-users excrete metabolites in the urine and feces for more than a week.

Delta-9-THC is extensively metabolized to more polar compounds which were excreted in the urine and feces. Urinary excretion and biliary excretion (reflected a day later in the feces) was greatest during the initial 24 hours, then gradually tapered off. All THC is metabolized since no unchanged THC was excreted in the feces or urine. No difference in total cumulative excretion was observed but a significantly larger percentage of the metabolites were excreted in the urine of users than nonusers. About 40-45% of the metabolites were collected in the feces in both groups in one week. Urinary excretion in this period accounted for 30% in daily users and 22% in nonusers. (Lemberger et al., 1970, 1971, 1972)

Perez-Reyes et al. (1971) found a similar pattern of excretion of metabolites after oral administration.

Urine contained no Delta 9 THC, only a small quantity (3%) of 11-hydroxy THC and 90% more polar acidic compounds as yet unidentified. (Lemberger, 1971). Preliminary studies by Burstein and Rosenfeld ('1971) suggest that these human acidic urinary metabolites are identical to the 11-carboxy-2' hydroxy THC found in rabbits.

In man, Lemberger et al. (1971, 1972) found that 11-OH THC and 8-11-OH THC were primarily excreted in the feces. Twenty-two percent of the metabolites in the feces were unchanged 11-hydroxy THC and slightly less were 8-11-dihyd-roxy THC. The remainder were unidentified more polar compounds, perhaps conjugates of these metabolites.

All user subjects (Lemberger et al., 1970, 1971, 1972) but no non-user noted a high after intravenous injection of the 0.5 mg dose of Delta 9 THC. This would be a dose range of 5 to 7 micrograms/kg. Highs have been noted by Kiplinger et al. (1971) with smoking THC to deliver a dose of 6.25 micrograms/kg. The high for some lasted up to 90 minutes. Thus, the plasma levels of Delta 9 THC and its metabolites seen after intravenous injection suggest that psychopharmacologic effects are seen in the first component of the rapid phase and terminated by redistribution and metabolism after the initial phase. The 11-hydroxy Delta 9 THC would be present at this early phase and is probably responsible for the activity of Delta 9 THC in marihuana.

Further evidence that the 11-OH Delta 9 THC is responsible for marihuana's effect was seen in oral and inhalation studies. By the oral route, blood levels of unchanged THC were relatively low compared to the radioactivity levels of the metabolic products at the time of peak subjective effect. While the blood level of unchanged THC at the peak oral effect was identical to that after intravenous injection of the 0.5 mg. dose, the psychologic effect was much more pronounced after oral administration of the larger 20 mg. dose of THC. Again after inhalation, the plasma levels of the metabolites correlate temporally with the subjective effects but the plasma levels of unchanged Delta 9 THC do not. (Lemberger, 1970, 1971, 1972; Galanter, 1972)

PATTERN OF USE

The drug effect of marihuana can only be realistically discussed within the context of who the user is, how long he has used, how much and how frequently he uses and what is the social context of the use. In general, for virtually any drug the heavier the use pattern, that is the longer the duration, the more frequently the use and the larger the quantity used on each occasion, the greater the risk for either direct or indirect damage.

Tolerance development is only one of a variety of occurrences which are related to the repetitive use of marihuana. Any discussion of drug effect must take into account the time period over which the drug is used (duration of use). This is necessary in order to detect cumulative effects or more subtle gradually-occurring changes. Of course, the issue of causality is quite complex because of the multitude of factors other than marihuana use that have a direct or indirect effect on the individual over a period of years.

For the purposes of this report, immediate or acute effects will refer to those drug effects which occur during the drug intoxication or shortly following it. Short-term or sub-acute will arbitrarily refer to periods of less than two years; long-term, from two to 10 years; and very long term (or chronic), greater than 10 years.

Frequency of use, will arbitrarily be designated in the following manner: experimental use refers to use of marihuana at least one time but not more than once a month; intermittent use refers to use more than once a month but not more than 10 times a month (several times a week) ; moderate use refers to use of the drug more than 10 times a month but not more than once a day; heavy use designates use more than once, daily and very heart use refers to use many times a day, usually with potent preparations (high THC content), producing almost continual intoxication so that the smoker's brain is rarely drug free.

AMOUNT OF DRUG CONSUMED

Relatively little actual data are available on the amount of marihuana, smoked per occasion or per day by current users in the United States. (McGlothlin, 1971, 1972). Estimates of the quantity of THC consumed are difficult because of the variability of potency as well as weight and size of the marihuana cigarette ("joint") and the degree of cleaning of stems and seeds from the dried leaves manicuring").

The analytic data available indicates most of the marihuana used in the United States is of Mexican origin and averages about 1 % THC per dry cleaned weight of marihuana (Lerner and Zeffert, 1968; Jones, 1971). Subjective ratings by experienced marihuana users appear to substantiate the data that marihuana containing 1% THC is of average quality (Jones and Stone, 1970; Weil et al., 1968).

Marihuana cigarettes are estimated (McGlothlin, 1971, 1972) to average about 0.5 g in weight and, therefore, contain about 5 mg of THC. Cigarettes used in the eastern states are generally smaller than those, rolled in the west (McGlothlin, 1971; New York Police Department, 1969, 1970)

Most data indicate that for the large majority of users one-half to one cigarette (2.5 to 5 mg THC) is sufficient to "get high" in intermittent moderate users, although often two or more cigarettes were smoked to achieve additional effect (Nisbet and Vakil, 1972; Shean and Fechtmann, 1971; McGlothlin et al., 1970- McGlothlin, 1972; Jones, 1971; Goode, 1970).

Current American daily users appear to consume one to two cigarettes per occasion (Jones, 1971) although some users estimate they smoke three to five cigarettes per occasion (McGlothlin et al., 1970). Goode (1971), however, found practically no relationship between amount required to get high and frequency of use (daily to less than monthly) or duration of use (less than two years to six or more years). In fact the heavy and longer term users were less likely to require more "joints."

Thus, the estimated 15 mg THC for current daily users is about one-half that estimated for confirmed regular users 30 years ago in the United States (Mayor's Committee, 1944; Charen and Perelman, 1946) and one-third to one-fourth the median daily consumption of daily users in North Africa and India.

The maximum daily consumption of 10 cigarettes (50 mg THC) for current heavy U.S. marihuana smokers (Jones, 1971; McGlothlin, 1972) is about the same as the average amount consumed by daily chronic users in other countries, and about one-fourth or less of the maximum in these countries (Soueif, 1967; Sigg, 1963; Indian Hemp Drug Commission's Report, 1893-1894; Chopra, 1940; Chopra and Chopra, 1939).

Studies of American military in Vietnam (U.S. Congress, 1971; Colbach and Crowe, 1970; Forrest, 1970), and Germany (Tennant et al., 1971) described the daily use of quantities of hashish or potent marihuana comparable to amounts consumed by regular chronic users in other countries.

Experimental data appear to confirm these estimates of quantity of THC consumed. Isbell et al. (1967) and Jones (1971) found that most subjects reported a normal "high" after smoking 5-10 mg of THC. Meyer et al. (1971) found that a "very high" state was attained

by ad libitum smoking of 3.12 mg THC by daily users and 3.78 mg THC by intermittent users.

In experiments by Johnson and Domino (1971), subjects were urged to smoke until they were as high as they had ever been on marihuana and felt they could not smoke any more. These subjects smoked from one to four cigarettes containing 8.7 mg of THC to reach this level of intoxication. The range was from 8.7 to 30 mg of THC with a mean of about 20 mg THC.

Intermittent and daily users were allowed to smoke marihuana on a free choice basis over a 21day period in studies by Mendelson et al. (1972). Each cigarette contained one gram of marihuana of approximately 2% THC content, or about 20 mg of THC.

Subjects were asked to rate their high on a 10 point scale with 10 corresponding to highest ever; five as moderately high and zero, no effect. Ratings for the daily user group ranged from zero to nine with an average of about six for all cigarettes rated. Individual means ranged f rom three to about seven. On almost all occasions, subjects in both groups smoked the entire cigarette.

Kiplinger et al. (1971) and Lemberger, et al. (1971) noted that daily long-term users were able to detect effects of the "high" at doses calculated to deliver as low as 5-7 micrograms/kg THC (equivalent to smoking about 100 mgs. of marihuana containing 1 % THC). Perhaps this explains the finding that many users are able to "get high" smoking US wild-growing marihuana containing front near zero to 0.5% THC (Lerner, 1969; Phillips et al., 1970; Fetterman et al., 1971).

Several ad libitum experiments were performed with marihuana of unknown composition (Williams et al., 1946; Siler et al., 1933) using "confirmed regular marihuana users" confined over a 39 and six-day period. The users, who generally consumed three cigarettes per day, under these rather artificial conditions of the, experiment consumed means of 17 (range nine to 26) and five (range one to 20) cigarettes per day respectively.

Miras and Coutsilinis (1970) reported recent experimental data on chronic Greek hashish users who routinely use, single smoked doses of hashish containing 100 mg of THC. Under ad libitum conditions, these users averaged 150-350 mg of THC per day over a 30-day period.

The subjects studied during a 21-day period of free choice Marihuana consumption by Mendelson et al. (1972) generally consumed all of one cigarette containing 20 mg of THC per smoking session. The subjects who were previously daily users were more likely during the experiment to consumer more, than one, cigarette per session than the, previously intermittent users.

Individual consumption by the intermittent users ranged from an average of about one-half to
six cigarettes per day (group mean three) while the daily users consumed an average of three-anda-half to nine cigarettes per day (group mean six-and-a-half). Reasons given by the subjects for the dramatic shift in the frequency of marihuana use included boredom, testing the limits of their endurance, demonstrating its harmlessness to the research staff, and subtle social pressure.

DURATION OF USE

Very little American data exists on the duration of marihuana use. Practically no data exists which demonstrates the extent that persons who initiated marihuana use some 20-40 years ago have continued its use. Robins and Murphy (1967) in a follow-up study of St. Louis black males noted that 20% of those who had tried marihuana by age 24 were still using it to some degree 15 years later. McGlothlin et al. (1970, 1971) reported on a sample of predominantly white adults who began using, marihuana in adolescence and had continued infrequent use for more than 20 years.

In the case of Western and particularly middle class American use of marihuana, the rapid climb to prominence of the phenomenon since the midsixties raises the question of whether the entire drug movement is transient or permanent. Certainly, the majority of the youthful users and many of the adults have used the drug less than 10 years and probably less than five years.

One 1970 survey (Lipp, 1970) revealed that 77% of those students who initiated marihuana use four to five years earlier were still using it to some degree. A recent study (Walters et al., 1972) indicates that students who first used marihuana before entering college in September 1965 and had continued use of marihuana in February 1969 ("old user") differed from the, vast majority of users who began their drug use in college ("new user").

The old user is more likely to experiment with a wide variety of drugs, to be extremely active in radical political organizations, to be alienated from American society, to be less definite about career plans, and to have more heterosexual activities.

The Commission-sponsored National Survey indicated that marihuana use by both youth (12-17 years of age) and adults (18 and over) is experimental in approximately 75% of those who have ever used marihuana. These individuals have, either stopped using it (66% of adults and 57% of youth) or are, using, it once, a month or less. In contrast, 13% of the ever used subsample (12% adults, 16% youth) use marihuana once a week or more.

In other non-Western countries, cannabis use frequently persists for long periods. Especially in the East, persons using it for 20-40 years or more are not uncommon. In other cultures, initiation is most common in adolescence. Once the habit is established it is likely to continue on a daily basis for many years and frequently continues as a lifetime practice (Weiss, 1971; Sigg, 1963; Soueif, 1967; Watt, 1936; Chopra and Chopra, 1939; Bouquet, 1951; VN, 1957).

Probably the duration of use will vary considerably depending on cultural acceptance or rejection (McGlothlin, 1972).

INTERACTION WITH OTHER DRUGS

Little experimental work has been done on the interaction between marihuana and other drugs used socially or medically although this will become an important area as usage increases.

Marihuana is often used with sweet wines to enhance its effect. Some evidence for an additive effect of marihuana and alcohol on motor and mental performance and subjective effect has been seen experimentally (Manno et al., 1971; Jones and Stone, 1970). Some degree of additive effects would be expected with barbiturates based on their similarity to alcohol. A more complex, mixed pattern of effect might be expected with amphetamines and hallucinogens. These latter combinations are rarely used socially (Hollister, 1971).

Acute Effects of Marihuana

(Delta 9 THC)

SUBJECTIVE EFFECTS

Descriptive accounts of marihuana intoxication have been written by noted authors, Beaudelaire (1961), scientists, Moreau (1945), and common users Tart, 1970, 1971; Isbell et al., 1967; Report by Advisory Committee, 1968). Adequate description of the state of mind produced by low doses is difficult because it is not approximated in the usual states of consciousness or by other commonly used drugs. The closest non-drug approximation may be the altered state of consciousness experienced in the hypnotic trance or transcendental meditation or the, transition zone between waking and sleep (Weil, 1971). Due to the highly subjective nature of the experience, there is much individual variation in the effects described.

Tart (1970, 1971) studied the range of potential common effects in an extensive survey of 150 users. Changes noted by these studies at low doses (usually smoked dose about five mg. THC) include euphoria, with restlessness and mild mental confusion. Sensory perception of the external environment. is altered. Users often perceive an overestimation or slowing of elapsed time and expansion of space, enhanced sense of tactile, olfactory, gustatory perceptions and often a feeling of hunger. Visual alterations reported are more vivid imagery and seeing forms and patterns in objects that are usually amorphous. Increased awareness of subtle qualities of sound such as purity, distinctness or rhythm are characteristically perceived by users. A dreamy, relaxed state and disinhibition, with uncontrollable laughter is reported and users often believe that interpersonal relations altered, and act to potentiate social interaction.

At moderate doses intensifications of changes experienced are reported. Users' reports include disturbed associations, dulling of attention, vivid visual imagery, fixed ideas, rapidly changing positive and negative emotions, fragmentation of thought, flight of ideas, impaired immediate memory, altered sense of identity, increased suggestibility and a feeling of enhanced insight. At higher doses, interpersonal relations are dulled and the user feels less social and more withdrawn.

At larger doses psychotomimetic (hallucinogenic-like) phenomena are experienced in a wavelike fashion. These include distortion of body image, depersonalization, visual illusions and distortions, synesthesia, dream-like fantasies and vivid hallucinations.

Data from Isbell et al. (1967) and Perez-Reyes et al. (1971) have indicated that the hallucinogenic oral dose is in the range of 0.4 to 0.5 mg./kg Delta 9 THC. Thus, the hallucinogenic dose is 80 times larger than the delivered dose of smoked marihuana producing minimal subjective effects (five micrograms/kg.) or about 11 to 14 times larger than the usual smoked dose.

LETHALITY

There is no conclusive evidence that short-term marihuana use alone directly results in any physical damage to man. A few scattered fatalities associated with marihuana use are occasionally reported. Most are from 19th century Indian experiences with large oral doses of charas (Deakin, 1880; Bouquet, 1951; Ewens, 1904, Walton, 1938; Indian Hemp Drugs, 1893). Brill et al. (1970) and Smith (1968) have noted that there have not been any reliable reports of human fatalities attributable purely to marihuana, although very high doses have been administered by users.

A frequently cited recent report from Belgium by Heyndrickx et al. (1970) describes an essentially negative pathological and toxicological study of a 23-year-old man found dead in the presence of marihuana, and hashish. A cannabinoid was detected in his urine. However, this finding in no way inculpates marihuana as the responsible agent. There are many possible causes of sudden death which are not toxins and do not produce observable pathology; e.g. anaphylactic reactions, insulin shock, cardiac arhythmias, etc.

A case report (Nahas, 1971) of an attempted suicide by smoking hashish, recently in France is even more anecdotal. An individual was reported to have smoked consecutively ten pipes of hashish containing approximately 200 mg of Delta 9 THC each before losing consciousness. But recovery occurred after supportive treatment.

Another case report (Hughes et al., 1970) relates severe diabetic coma with ketoacidosis after the ingestion of huge amounts of marihuana by a mental patient. However, it appears that the pronounced vomiting secondary to the marihuana ingestion caused a severe electrolyte imbalance and alkalosis. Possibly a vulnerable glucose-regulating system responded to the severe stress inappropriately. Retrospectively, there was no history of diabetes noted previously but this was not confirmed or ruled out by lab tests prior to the episode.

Several case reports (Henderson and Pugsley, 1968 King and Cowen, 1970; King et al., 1970; Lundberg et al., 1971; Gary and Keylon, 1970) noted acute severe, physiological disturbances and acute collapse (shock, chills and fever) subsequent to intravenous injection of suspensions of marihuana. These symptoms may have been due to an allergic reaction to injected foreign plant material, to a bacteremia and/or to the injection of insoluble particles which are filtered by the organs. The symptoms may be considered a complication of the mode of use, rather than results of the drug.

Although a median lethal dose has not been established in man (Brill et al., 1970), one has been found in laboratory animals. Earlier reports (Lowe, 1946; Joachimoglu, 1965) used materials of uncertain potency and composition. Recent studies utilized carefully quantified materials. One group, Phillips et al. (1971), utilizing THC extracted from marihuana, demonstrated the following LD50 (the dose that causes death in 50% of the animals) in units of mg/kg of Delta 9 THC from mice,/rats: oral 481.9/666, intraperitoneal 454-9/ 372.9, intravenous 28.6/42.47.

Thompson et al. (1971) under contract to the National Institute of Mental Health have recently carried out extensive studies in rats, dogs and monkeys in order to define the range of toxicity of the drug. The group used synthetic Delta 9 and A' THC and a crude marihuana extract (CME) of carefully define composition. Delta 9 THC was more potent than Al THC. CME was less potent than a similar quantity of A' THC.

Acute toxicity was studied using intravenous, intraperitoneal and oral routes of

administration in rats. An LD50 similar to that reported by Phillips et al. (1971) was found by the intravenous route (20 mg/kg of THC) and intraperitoneal route (400 mg/kg) but higher values were noted with oral administration (1140 mg/kg). Interestingly, the LD50 for males was 1400 mg/kg while for females it was 700 mg/kg by the oral route. The minimal lethal dose orally was between 225 and 450 mg/kg.

An LD50 was not attainable in monkeys and dogs by the oral route. Enormous dose levels (over 3000 mg/kg of Delta 9 THC) were administered without lethality to most animals. A dose of about 1000 mg/kg THC was the lowest dose which caused death in any animals The completeness of intestinal absorption of THC at these high doses is unknown. Behavioral changes in the survivors included sedation, huddled posture, muscle tremors, hypersensitivity to sound and hypermobility.

The cause of death in the rats and mice subsequent to oral THC was profound central nervous system depression leading to dyspnea, prostration, weight loss, loss of Fighting reflex, ataxia, and severe fall in body temperature which led to cessation of respiration from 10 to 46 hours after single dose oral administration. No consistent pathological changes were observed in any organs. The cause of death when it rarely occurred in the higher species did not appear to be related to the same mechanism as in the rats.

Using intravenous administration, the acute one dose LD50 for Delta 9 THC was 100 mg/kg in dogs and 15.6 to 62.5 mg/kg in monkeys depending on concentration of the solution. The minimal lethal intravenous dose for dogs, also depending upon concentration, was 25 to 99 mg/kg and for monkeys 3.9 to 15.5 mg/kg.

In contrast to the delayed death observed in rats after oral administration, lethality in rats, dogs and monkeys after intravenous injection occurred within minutes after injection. When sublethal amounts were injected, central nervous system depression with concomitant behavioral changes similar to those observed after oral doses were observed. However, their onset was more rapid and the intensity of effect more severe with anaesthesia, and convulsions noted after injection. The monkeys and dogs that survived the intravenous injection of THC recovered completely within five to nine days.

The only consistent pathological changes were noted in the animals which succumbed. Pulmonary changes including hemorrhage, edema, emphysema and generalized congestion were found and death resulted from respiratory arrest and subsequent cardiac failure. The investigators presumed one mechanism possibly accounting for these findings was due to the concentration of the THC solution and its insolubility in water. Presumably, when these highly concentrated solutions mixed with the blood, the THC precipitated out of solution. The precipitated foreign material then formed aggregates (or emboli) that were filtered out in the lung capillaries causing a physical blockage of pulmonary blood flow.

Subsequently, intravenous studies were repeated using Delta 9 THC emulsified in a sesame oil-Tween 80-saline vehicle at 15 mg/ml or 40 mg/ml. The emulsions were administered at a uniform rate of 2 ml/15 sec. Doses administered were 1, 4, 16, 64, 92,128, 192 and 256 mg/kg. All monkeys injected with 92 mg/kg or less survived and completely recovered from all effects with two to four days. All monkeys injected with 128 mg/kg or more succumbed within 30 minutes for all but one (180 minutes).

Histopathological changes found in the lungs of the deceased monkeys were like those described after the, previous intravenous experiment. All the monkeys that died exhibited severe respiratory depression and bradycardia within five minutes after the injection. Respiratory arrest and subsequent cardiac failure occurred within minutes. Behavioral changes preceding death were salivation, prostration, coma and tremors.

Behavioral and physiological changes described clinically in the surviving monkeys followed a consistent developmental sequence and were roughly dose related in severity and duration. Onset was 15 minutes following injection and duration was up to 48 hours. Huddled posture and lethargy were the most persistent changes. Constipation, anorexia and weight loss were noted. Hypothermia, bradycardia and decreased respiratory rate generally were maximal two to six hours post injection. Tremors with motion but not at rest were believed to be caused by peripheral muscle inadequacy.

In summary, enormous doses of Delta 9 THC, All THC and concentrated marihuana extract ingested by mouth were unable to produce death or organ pathology in large mammals but did produce fatalities in smaller rodents due to profound central nervous system depression.

The non-fatal consumption of 3000 mg/kg A THC by the dog and monkey would be comparable to a 154-pound human eating approximately 46 pounds (21 kilograms) of 1%-marihuana or 10 pounds of 5% hashish at one time. In addition, 92 mg/kg THC intravenously produced no fatalities in monkeys. These doses would be comparable to a 154-pound human smoking at one time almost three pounds (1.28 kg) of 1%-marihuana or 250,000 times the usual smoked dose and over a million times the minimal effective dose assuming 50% destruction of the THC by smoking.

Thus, evidence from animal studies and human case reports appears to indicate that the ratio of lethal dose to effective dose is quite large. This ratio is much more favorable than that of many other common psychoactive agents including alcohol and barbiturates (Phillips et al. 1971, Brill et al. 1970).

PHYSIOLOGICAL EFFECTS

Much research has been reported on the effect of single doses of marihuana or THC on a wide variety of indices of physiologic function in animals. Most animalt studies involved large doses a-rid produced profound changes similar in nature but less in magnitude than those described in the previous paragraphs. These have been comprehensively reviewed elsewhere (Secretary HEW 1972, Forney, 1971; Secretary HEW, 1971) and should be consulted if more detailed information is required.

Similarly, much research has been done in man. As discussed in the previous section on factors influencing the psychopharmacological effect in man, an acute dose-response relationship has been clearly defined over a dose range relevant to human usage patterns for these effects. Thus, with increasing dose, the larger the effect on the index being observed and the longer the effect persists. However, there is a wide variation between individuals' responses but each individual is quite consistent.

The most consistent physiological sign is an increased pulse rate (Mendelson et al., 1972; Johnson and Domino, 1971; Renault et al., 1971; Galanter et al., 1972; Domino, 1970; Hollister et al., 1968 Manno et al., 1970; Mayor's Committee 1944; Waskow et al., 1970; Isbell and Jasinski, 1969; Meyer et al., 1971; Weil et al., 1968; Jones and Stone, 1970; Clark and Nakashima, 1968). This does not appear to be a direct drug effect on the heart (Manno et al., 1970). Instead, the drug appears to cause complex changes in the autonomic nerves regulating heart rate. Thus, Kiplinger et al. (1971) demonstrated that the increase produced by marihuana in heart rate is prevented by pretreatment with a Beta-sympathetic nervous system blocking agent, propranolol. A comparable increase rate was produced by treatment with isoprotemol, a Beta-sympathetic like drug. One subject developed an

abnormal bigeminal rhythm after both marihuana and isoproternol.

Renault et al. (1971) noted a consistent effect of marihuana on the cardiac rhythm which also produced an increased heart rate. The effect was the suppression of the normal sinus arrhythmia usually produced by respiration. Respiration usually produces a slowing of heart rate mediated by the vagal parasympathetic nerve supply. This depression of normal vagal tone was further evidenced by the absence of heart rate slowing during forced expiration against a closed glotis (valsalva maneuver). This effect seemed to wax and wane over several minutes producing alternate periods of rapid and slowed heart rate.

Both autonomic nervous systems seem to be affected by marihuana; the sympathetic is stimulated while the parasympathetic is inhibited.

Kiplinger et al. (1971) clearly demonstrated that the amount of increase in pulse rate was directly related to the dose of THC administered as did Renault et al. (1971) and Johnson and Domino (1971) over a wide range of doses. Both experienced and inexperienced marihuana smokers demonstrated increases regardless of the subjective state described. Tachycardia is noted rapidly and reaches a peak about 15 to 20 minutes after finishing smoking. The pulse rate returns to normal within one to one-and-a-half hours.

Other than the one report of bigeminy (Kiplinger et al., 1971), little or no alteration of normal heart rhythm were noted by electrocardiogram (Isbell et al., 1967; Mayor's Committee, 1944) other than sinus tachycardia (Mendelson et al., 1972). Johnson and Domino (1971) noted premature ventricular contractions in a few of their subjects, but they felt this effect was more likely produced by the smoking itself rather than by the drug.

Conjunctival injection, reddening of the eyes due to increased prominence of the conjunctival blood vessel and dilation of the scleral vessels, (Hepler et al., 1971; Kiplinger, et al., 1971) is another highly consistent occurrence (Mendelson et al., 1972, Allentuck and Bowman, 1942, Ames, 1958; Hollister, et al., 1968; Isbell et al., 1967; Manno et al., 1970; Waskow et al., 1979; Weil et al., 1968) produced by orally ingested and smoked al., 1968). This finding is produced by orally ingested and smoked marihuana (or THC). And thus the effect must be a direct drug effect and not caused by irritation from smoke (Perez-Reyes and Lipton, 1971). Kiplinger et al. (1971) noted that this finding was dose-related although it develops slowly reaching a maximum about one hour after smoking.

Reported effects on blood pressure are inconsistent. Some investigators find lowered pressure (Hollister et al., 1968; Isbell et al., 1967; Waskow, et al., 1970) while others report a slight increase (Johnson and Domino, 1971; Domino, 1970; Mayor's Committee, 1944) and still others report increases and decreases (Mendelson et al., 1972; Perez-Reyes et al., 1971).

Preliminary results of a carefully performed study of the cardiovascular effects (Weiss, 1971) demonstrated orthostatic, hypotension in the erect position and hypertension when supine.

Little or no effect has been demonstrated in humans on a wide variety of parameters investigated. Body temperature is unchanged (Mendelson et al., 1971; Hollister et al., 1968; Isbell et al., 1967; Brooks, 1896) as is respiratory rate (Domino, 1970; Isbell et al., 1967; Weil et al., 1968), lung vital capacity and acute bronchospasni (Mendelson et O., 1972) and basal metabolism (Mayor's Committee, 1944).

Several studies (Mendelson et al., 1972; Mayor's Committee, 1944; Personal Communication, 1970) have examined changes in blood cells and blood chemistry. No

acute effects were demonstrated on red blood cell number, or structure; differential and total white blood cell count; platelet count; reticulocyte, count; serum electrolyte concentrations; calcium and phosphorous serum levels; liver function tests; uric acid concentration; type or quantity of serum proteins. Although increased frequency of urination is often reported, increased urine volume has not been demonstrated (Ames, 1958; Mayor's Committee, 1944) and no alteration of kidney function identified (Personal Communication, 1970; Hollister et al., 1968; Mayor's Committee, 194-4; Mendelson et al. 1972).

Reports of increased hunger, especially for sweets (Allentuck and Bowman, 1942; Ames, 1958; Manno et al., 1970; Mayor's Committee, 1944), have focused attention on blood sugar and food intake. No consistent significant change in blood sugar has been demonstrated (Dornbush and Freedman, 1971; Hollister, 1971; Hollister et al., 1968; Isbell et al., 1967; Manno et -al., 1970; Personal Communication, 1970; Weil et al., 1968) with some investigators finding decreases (Beringer et al., 1932; Lindemann, 1933-1934), others finding increases (Manno, 1970; Mayor"s Committee, 1944), still others finding both increases and decreases (Miras, 1965).

Podolsky (1971) found that although fasting blood glucose was unchanged by smoking marihuana, higher 30 and 60 minute glucose levels were noted after a standard dose of glucose. No corresponding alteration in insulin or growth hormone levels was demonstrated.

Hollister and Gillespie (1970) found an increased total food intake when the drug was administered after breakfast but not after an overnight fast. Half the subjects reported subjective increased hunger. Subjects' free fatty acid levels and blood glucose remained unchanged while the placebo controls' free fatty acid values decreased. Another study suggested increased appetite and food intake but was without adequate controls (Personal Communication, 1970).

An investigation of physiological parameters of stress after marihuana (Hollister, 1969; Hollister et al., 1970) revealed only a minimal increase in white blood cells and a minimal decrease in cosinophils but no changes in serotonin, cortisol level and urinary catecholamines. However, another investigator (Chopra, 1969) demonstrated increased catecholamine excretion especially those from the adrenal medulla.

Hepler and Frank (1971) and Frank et, al(1971) have carefully studied ophthalmological changes produced by marihuana. Swelling of the eyelids (Ames, 1958), ptosis (Isbell et al., 1967), photophobia and nystagmus (Allentuck and Bowman, 1942) and dilated, sluggish reacting pupils (Mayer-Gross et al., 1960; Mayor's Committee, 1944) were all mentioned in earlier discussions but were not demonstrated (Hepler et al., 1971).

Findings which were quantifiable (Hepler et al., 1971) were a slight pupillary constriction with normal responsiveness to light and accommodation and an increase in glare recovery time. No change was evident on near and far visual acuity, fundiscopic exam, visual field acuity and depth and color perception. However, a decrease in tear secretion and an increase in conjunctival injection was demonstrated.

Hepler and Frank (1971) reported an average of about 25% decrease in the intraocular pressure of most normal subjects after smoking marihuana. A preliminary trial in one patient with glaucoma demonstrated similar findings (Frank, 1971).

No objective impairment of improvement invisual acuity or brightness perception (Caldwell et al., 1970; Caldwell et al., 1969) nor effect on depth perception and duration of after image (Clark and Nakashima, 1968) was noted in other studies.

Neurological examinations have consistently revealed no major abnormalities during marihuana intoxication. (Mayor's Committee, 1944; Rodin and Domino, 1970; Rodin et al., 1970; Personal Communication, 1970). Subjects often report muscle weakness. Minimal decreased leg, hand and finger maximum muscle strength have been demonstrated objectively (Fere, 1901; Hollister et al., 1968; Mayor's Committee, 1944). However, electromyography was reported to be normal (Personal Communication, 1970

A slightly increased briskness in the knee jerk has been detected (Domino, 1971 - Rodin and Domino, 1973) while no change in threshold or elicitation of deep tendon reflexes is usually, reported (Hollister et al., 1968; Isbell et al., 1967).

Incoordination, fine tremor and ataxia are often experienced by the user (Ames, 1958; Beringer et al., 1932; Clark et al., 1970; Mayor's Committee, 1944). The presence of a fine tremor and decrements in hand steadiness and static body equilibrium leave been demonstrated with refined measuring devices when they are not grossly observable (Manno et al., 1970; Mayor's Committee, 1944; Mendelson et al., 1972). Kiplinger et al. (1971) using sensitive apparatus demonstrated these fine hand tremors and changes in body equilibrium are also dose related.

Cranial nerve function and somatic sensation have not been significantly impaired or improved. Subjective reports of increased auditory sensitivity contributing to greater esthetic appreciation of music (Winick, 1960) have been generally unconfirmed in objective tests of auditory acuity and pitch, frequency or intensity or threshold discrimination (Aldrich, 1944; Caldwell et al., 1970; Caldwell et al., 1969; Clark and Nakashima 1968; Mayor's Committee, 1944; Meyers and Caldwell, 1969). Objective improvement in auditory acuity in several subjects was noted (Walton, 1938; Williams et al., 1946).

Similarly, improvement in visual acuity and discrimination and altered depth perception reported by users has been unconfirmed objectively (Caldwell et al., 1970; Caldwell et al., 1969; Clark and Nakashima, 1968; Mayor's Committee, 1944; Hollister and Gillespie, 1970; Jones and Stone, 1970; Frank et al., 1971).

A slight improvement in vibratory sensation (Rodin and Domino, 1970), no change in touch or two-point discrimination (Rodin and Domino, 1970; Williams et al., 1946) nor olfactory and gustatory senses (Williams et al., 1946) have been demonstrated. Decreased sensitivity to pain has been objectively demonstrated (Personal Communication, 1970) which corroborates its past therapeutic use as an analgesic.

One of the most frequently reported subjective effects of marihuana intoxication is a distortion of time sense (Tart, 1971). Actual elapsed time is overestimated or perceived as being longer than actual clock time. Thus, present events are perceived as prolonged when intoxicated and isolated from the past and future. They are in the "hereand-now" (Melges et al., 1971). Many have confirmed this experimentally (Ames, 19.58; Clark et al., 1970; Mendelson et al., 1972; Dornbush and Freeman, 1971; Hollister and Gillespie, 1970; Weil et al., 1968; Williams et al., 1946). The over-estimate is much greater during periods lit which the subject is performing a task than for unfilled time, and the error is (greater as the

time period is longer (Clark et al., 1970).

Melges et al. (1971) have demonstrated that marihuana intoxication induces temporal distortions with a greater concentration on the present and a shortening of span of awareness into the past and future. They believe that under the drug's influence, as the, subject becomes less able to integrate past, present and future, his awareness becomes more concentrated on present events. These present events are experienced as prolonged or timeless because they no longer appear to the intoxicated individual as transitions from the past to the future.

Melges and Bowlby (1969) have described habitual marihuana smokers who specifically use the drug to achieve the "here-and-now" orientation. These smokers claim this focus on the present permits them to be more open to immediate experience while being less troubled by past and future concerns. This focus may also explain the belief that perceptions during intoxications are both unexpected and never experienced previously.

The effect of intoxication on the resting electroencephalogram are still unclear but generally have been minimal, inconsistent and within normal limits. In early studies (Wikler and Lloyd, 1945; Williams et al., 1946) a decrease in alpha activity was noted. More recently (Ames, 1958) noted a delayed alpha increase with concomitant increases in beta and theta activity. Rodin and Domino (1971) reported a slight shift toward slower alpha frequencies.

Three other studies (Jones and Stone, 1970; Hollister et al., 1971; Rickles et al., 1970), failed to find consistent changes but noted increased alpha frequency, increased synchronization and occasional paroxysmal activity. These effects were ascribed to relaxation and drowsiness.

Two investigators (Chopra, 1935; Miras, 1969) reported decreased fast activity and other variable effects. Most recently, Volavka et al. (1971) and Fink et al. (1971), reported a significant rapid onset effect occurring during the five-minute smoking period and of short duration (less than 30 minutes) in continuously alert individuals. The principal changes detected by computer analysis were a dose related increase in percent alpha time and an associated reduction in theta and beta hands.

Roth et al. (1972), demonstrated that auditory evoked responses were decreased in amplitude by marihuana and THC particularly during the first few minutes of stimulation. These results may indicate that the intoxicated individual may receive external auditory stimuli differently during the intoxication period.

The prominent and frequently reported sedative effects of marihuana and the dreamlike states occurring during intoxication directed several investigators to study the effects of marihuana on sleep. Fragmentary data from one sleep laboratory (Pivik et al., 1969) indicated decreased rapideye-movement (REM) sleep time. Another sleep lab (Rickles et al., 1970), in preliminary work demonstrated an increase in REM sleep time. Fink et al. (1971) noted that EEG defined sleep (stages one and two) were dose dependent but THC did not act like a classical sedative. The occurrence of EEG sleep was much more frequent in the placebo and low dose (10 mg THC) conditions than in the high dose condition (20 mg THC).

Mendelson et al. (1972) noticed an increased amount of total sleep as well as an increase in discrete episodes of sleep related to marihuana smoking. These findings correlate well with questionnaire data (Tart, 1970) indicating that at moderate doses, users found it easier to induce sleep and that sleep was considered to be more refreshing, while at higher doses both aspects were impaired.

In summary, marihuana containing Delta-9-THC is a pharmacologically active drug with minimal acute physiological effects at the low to moderate doses used by man.

Based on its few consistently observed physiological effects, marihuana is a rather unexciting compound of negligible acute physiological toxicity at the usual doses consumed by man. The subjective state characteristically described by the intoxicated user is far more interesting to both the user and the scientist than the objective one observed by the investigator.

EFFECTS ON MENTATION AND PSYCHOMOTOR PERFORMANCE

Characteristically, intoxication with psychoactive materials effec. psychomotor and mental functions. It is apparent from the subjective assertions of users and a wide range of experimental studies that marihuana is no exception (Clark and Nakashima, 1968; Clark et al., 1970; Dornbush and Freedman, 1971; Hollister and Gillespie, 1970; Manno et al., 1970; Mayor's Committee, 1944; McGlothlin et al., 1971; Melges et al., 1970; Meyer et al., 1971; Weil and Zinberg, 1969; Weil et al., 1968; Volavka et al., 1971; Galanter et al., 1972; Kiplinger et al., 1971; Mendelson et al., 1972; Dornbush et al., 1971).

Psychomotor tasks which have been tested include tapping speed, handwriting and free-hand writing and free handdrawing, simple and complex reaction time, pursuit rotor and tracking tasks and continuous performance tests. Cognitive tasks frequently tested are simple arithmetic problems, serial addition or subtraction, fine judgment tasks, 'digit-symbol substitution test, digit-code memory, reading comprehension, speech or verbal out-put, forward and backward digit spans, goal directed complex serial subtractions and additions to reach a set end sum, and short-term or immediate memory functions.

In general, Kiplinger et al. (1971) have clearly demonstrated that the degree of impairment is dose related and varies in degree during the period of intoxication exerting its maximal effect at the peak intoxication.

Naive subjects commonly demonstrate greater decrement in performance than experienced users but report less subjective effect (Weil et al., 1968). Experienced users appear to better compensate to the effect of the drug especially for ordinary performance at lower doses (Clark and Nakashima, 1968; Clark et al., 1970; Crancer et al., 1969; Jones and Stone, 1970; Meyer et al., 1971; Weil and Zinberg, 1969; Jones, 1971; Mendelson et al., 1972). Performance of simple or familiar tasks (i.e. simple reaction time) during intoxication is minimally effected. However, on unfamiliar or complex tasks (i.e., complex reaction time), performance decrements occur (Weil and Zinberg, 1969; Dornbush et al., 1971; Moskowitz et al., 1970).

Performance decrements are further enhanced when verbal tasks are performed during

delayed auditory feedback (Kiplinger et al., 1971). Also marked individual differences in performance are noted between similar subjects. (Clark and Nakashima, 1968; Clark et al., 1970; Manno et al., 1970; Kiplinger et al., 1971). A cyclical waxing and waning of the intensity of the intoxication and concomitant performance occurs periodically (Clark et al., 1970; Melges et al., 1970).

Finally, when subjects concentrate on the task being performed at "normal social high," objective evidence of intoxication is not apparent and the individual may perform better than when drug free (Rodin and Domino, 1970; Mendelson et al., 1972).

Obviously, these observations raise practical doubts regarding the intoxicated individuals' ability to function at jobs requiring memory, concentration, and organization of thinking.

THE INTOXICATED MENTAL STATE

Several investigators have suggested that shortterm memory is the mental function most significantly affected by marihuana and contributes to the subtle alterations of mental functioning noted. Generally an impairment of recent or short term memory is demonstrated (Abel, 1970,1971; Dornbush et al., 1971; Menges, 1970-71; Tinklenberg, 1970; Clark et al., 1970; Weil et al., 1968). Thus, mental tasks requiring immediate information acquisition (Abel, 1971) and/or retrieval (Weil et al., 1968) are effected.

Abel (1971) recently showed that marihuana blocks the acquisition process involved in the storage of new interferes with the retrieval of already stored information. Decrements are produced in decisions requiring recent memory or sustained alertness (Clark et al., 1970); conversation (Well et al., 1968); calculations, or reading which requires retention, coordinating and indexing sequential information termed temporal disintegration (Melges et al., 1970, 1971).

Melges eta]. (1970, 1971) theorizes that episodic impairment of immediate memory produces voids which are filled with perceptions and thoughts extraneous to the organized mental processes. He suggests that this leads to temporal disintegration producing a fragmented and disorganized temporal experience in which past and future time frames are blurred and the present is experienced as prolonged or boundless. Thus, depersonalization occurs a the individual experiences himself temporally in a strange and unreal manner during marihuana intoxication.

UNPLEASANT REACTIONS: "TOO STONED" AND "NOVICE-ANXIETY"

These substantial cognitive and psychomotor effect re probably responsible for many of the acute adverse reactions to marihuana. One, of the most common is the heavy, drugged feeling where the individual feels mentally and physically sluggish so that every motion and thought seems to require extreme effort (Smith and Mehl, 1970). This probably reflects impaired cognitive function and psychomotor retardation from getting "too stoned." This most frequently occurs after oral ingestion of a large dose of drugs or in inexperienced smokers who have, not learned to selftitrate their dose to achieve the desired high.

In these instances, depression, anxiety, fatigue, short-term memory loss, dizziness, nausea, incoordination, palpitations are experienced as generalized discomfort, and ill-being.

"Novice anxiety reactions" or panic reactions accoun: for a majority of acute toxic reactions to marihuana (Baker and Lucas, 1969; Baker-Bates, 1935; Gaskill, 1945; Grossman, 1969; Persyko, 1970; Bialos, 1970; Sonnenreich and Goes, 1962; Sigg, 1963; Dally, 1967; Hamaker, 1891; Marten, 1969; Smith and Mehl, 1970; Walton, 1938).

When dosage, set and setting are optimal the distortion of self (depersonalization) and temporal disintegration (timelessness of the present moment) common to marihuana intoxication is recognized by the individual as time-limited and drug-induced. It is usually experienced as pleasurable. But, if dose, set and setting are not optimal the experience may cause the intoxicated individual to fear that loss of his identify and self control may not end or that he is dying or losing, his mind. Acute, anxiety or panic results (Mel et al., 1970).

Non-drug factors of set and setting play a most important role in these, reactions. Of course, the great variability of individuals makes the effect of marihuana on any specific individual rather unpredictable.

The large majority of these anxiety reactions occur in novices who have intense underlying anxiety surrounding marihuana use such as fears of arrest, of disruption of family and occupational relations and of possible physical and mental dangers. Also, individuals with relatively rigid personality structures, whose values are more in line with those of the "straight"society and have little desire for new and different experiences, appear to experience these, anxiety reactions much more frequently than those, individuals who are members of the "counterculture" (Smith and Mehl, 1970).

In addition, simple episodes of neurotic depression may be observed in these, same types of individuals during periods of unusual psychological stress (Well, 1970). Both of these types of reactions are transient and abate as the drug effects wear off over a few hours. Treatment should consist of gentle but authoritative, reassurance that nothing is seriously wrong and that the drug effects will wear off and the individual will feel normal" again (Smith and Mehl, 1970; Well, 1970).

ACUTE PSYCHOSES

Rare cases of full-blown acute psychotic episodes precipitated by marihuana use are reported in individuals with histories of mental disorder, with marginal psychological adjustments or with poorly developed personality structures and ego defenses (Talbott, 1968; Heiman, 1968; Kaplan, 1971; Pernot, 1969; Keeler, 1968; Defer and Diehl, 1968; Wurniser et al., 1969; Allentuck and Bowman, 1942; Bromberg, 1939; Bromberg, 1934; Curtis and Wolfe, 1939; Hughes et al., 1970; Isbell et al., 1967; Keup , 1970; Keeler, 1967; Talbott and Teague, 1969 Mayor's Committee, 1944).

Marihuana intoxication may hinder the ability of these, individuals to maintain structural defenses to existing stresses, or, alternatively produce a keener awareness of personality problems or existing stresses (Smith, 1968). Psychotherapy and antipsychotic medications are useful in controlling and preventing this reaction (Weil, 1970).

Exceptionally rare reports from North America of nonspecific toxic psychosis or actite brain syndrome have occurred after extremely high drug dose consumption, although such reports are, more common in the eastern countries. These conditions are self-limited and clear spontaneously as the drug effect abates (Weil et al., 1968; Bartolucei et al. 1969 Ames, 1958; Isbell et al., 1967; Mayor's Committee, 1944; Williams et al., 1946).

Finally, marihuana intoxication may trigger delayed anxiety reactions or psychotic episodes in a small percentage of persons who have prior experience with hallucinogenic drugs (Ungerleider et al., 1968; Ungerleider, 1969; Weil et al., 1968; Favazza and Domino, 1969).

In summary, the acute psychomotor-cognitive effects of marihuana intoxication are, interesting academically to gain understanding of normal and abnormal mental function. Also, for practically determining the danger-risk factor for the individual including determination of his functional level personally, vocationally and socially in this society. The effect on personal-social-vocational function is highly individualized and difficult to predict at present.

Although reports of anxiety attacks and psychotic episodes are more frequent as marihuana use spreads, they are still exceedingly rare and their incidence appears to be decreasing as use becomes more acceptable to more diverse populations. For example, during the nine-year period of 1961 to 1969, out of 701,057 admissions to Los Angeles County Hospital, located in a city with very high marihuana use, only three patients required hospitalization for psychic sequelae of marihuana smoking (Lundberg, et al., 1971).

In contrast, many cases are being seen in Vietnam soldiers where a extremely potent material is available and daily stresses are high, but, these probably represent only a small fraction of marihuana, users (Talbott and Teague, 1969; Talbott, 1968; Heiman, 1968).

During the, academic year 1968 and 1969, eight students were seen in the mental hygiene division of a private Eastern University student population (8,500) with acute anxiety reactions (Bialos, 1970). The frequency of marihuana-associated acute adverse, anxiety reactions requiring attention at Boston University Student Health Service (student population 20,000) is between five and seven yearly (Pillard, 1970).

In a recent survey of newly admitted patients to a large mental hospital, marihuana was the direct cause of the hospitalization in only 0.9 per thousand admissions (Keup, 1970).

PERSISTENT EFFECTS AFTER ACUTE DOSE

Investigators have not noted persistent effects after smoking marihuana for periods of more than three to five hours (Fink et al., 1971; Weil et al., 1968; Pillard, 1970).

Users report only minimal hangover effects (Mayor's Committee, 1944; Haines and Green, 1970; McGlothlin et al., 1971) after very heavy use. Feelings of lassitude and heaviness of the head, lethargy, irritability, headaches and loss of concentration are reported especially when associated with lack of sleep (Chopra and Chopra, 1939; Indian Hemp, 1893). This may be related to preliminary data (Rickles et al., 1970) suggesting a subtle increase in REM sleep time primarily seen in the last one-third of the night in individuals who smoked one to two cigarettes per day usually at night for at least a year.

EFFECTS OF MARIHUANA USE ON CONCOMITANT BEHAVIOR

Mendelson et al. (1972), under contract to the Commission, analyzed the effects on behavior of acute marihuana intoxication on an extensive variety of assessine nts including a simple

operant task, mood states, individual and group observations before, during and after smoking and clinical psychological evaluations.

Sleep-inducing properties were confirmed. Increased amounts of total sleep were observed in both number and length of shorter and longer blocks of consecutive hours of sleep related to marihuana smoking.

Examination of mood assessments prior, during and after marihuana smoking indicates that the acute effects were a reduction of negative moods (anxiety, hostility, and guilt-shame) and an increase in the positive moods (carefreeness and friendliness). Examinations of the mood prior to smoking revealed that the subjects tended to smoke marihuana when they reported generally positive moods. The effect of the drug was to increase this positive mood. One paradoxical finding was that the subjects also reported feeling more depressed after smoking.

Acute effects of marihuana on cognitive and motor functions were studied with a battery of tests sensitive to brain function (Halstead Category Test, Tactile Performance Test, Seashore Rhythm Test, Finger Tapping Test, Trail Making Test and the Weschler Adult Intelligence Scale). No alterations in performance as a result of acute intake of marihuana were noted in any of these.

The acute effect of marihuana smoking on social behavior was investigated, by observing the individual and his interaction in small groups. The data indicated very strongly that marihuana smoking, in addition to being a subjective drug experience, is also a social activity around which verbal interaction and other types of social behavior are centered.

Although marihuana smoking tended to be, a group activity, subjects did not always engage in verbal communication while smoking. Subjects often were observed withdrawing from the social interaction and then participating in some type of noncommunicative passive activity, such as watching television, listening to music, reading or staring at objects or people. This decrement in total interaction appeared to be a drug effect.

Heavy marihuana users tended to be more withdrawn than the intermittent users, often listening to the stereo and focusing on the personal effects of the drug. The intermittent users tended to watch television which provided group entertainment, thus enhancing the social effects of the drug.

Verbal interaction in formal task-oriented discussion groups diminished when several group members were simultaneously intoxicated. How-ever, groups engaged in problem-solving tasks performed more efficiently because less suggestions and discussion ensued before proposing a workable solution. The groups tended to become more convivial and less task-oriented although none failed to arrive, at the goal. Marihuana did not appear to increase hostility during these sessions and furthermore tended to change the nature of hostile communication from direct criticism to indirect sarcasm.

Assessment of risk-taking behavior revealed that under the influence of marihuana, users tend to become more conservative in the decision making.

In summary, it appears that marihuana does exert subtle effects on measurable components of social behavior and interaction.

Effects of Short-Term or Subacute Use

ANIMAL STUDIES (PRECLINICAL)

Studies have only begun in this area in the last 10 years. Subacute toxicity studies in rats involving 30 daily intraperitoneal injections of up to 30 mg/kg THC were recently reported by Phillips et al. (1971). No fatalities were observed. Total body and organ weight (rains were significantly retarded over the period. However, no significant differences in organ histology were detected altnough in a few animals there were suggestions of change in liver and testicular cells. An interesting phenomena also observed was a suggestion of increased sensitivity to effects of Delta 9 THC occurring after two weeks of daily treatment.

Thompson et al. (1971) under contract to NIMH studied the toxicity in rats treated daily for seven, 28, 91 and then 119 days with oral Delta 9 THC, A" THC and crude marihuana extract at doses from 50 to 500 mg/kg. The findings were generally similar for all three preparations although A" effect was greater than All THC wnich in turn was greater than CME.

A bimodal pattern of behavorial toxicity was exhibited by the cannabinoids for all time periods of dosing ranging from five to 119 days. Initially, a dose-related generalized central nervous system depression was noted. This was characterized by huddled posture, inactivity, drowsiness, slow movements, unkempt appearance, loss of appetite, wide stance, constipation, weight loss, depressed respiration and heart rate and fall in body temperature. Tolerance gradually developed to the initial depressant effects starting after two to five doses and continued at different rates for different parameters.

Concomitant to the development of tolerance, rats exhibited progressively more hyperactivity, manifesting increased exploratory behavior, grooming and motor activity. The daily duration of the altered behavior progressively shortened. Tolerance to the hyperactivity was not seen in the rats. Later, in the experimental period, the rats became hyper-irritable and exhibited fighting behavior, especially at lower doses. Additionally, tremors and later chronic convulsions occurred in significant numbers of rats.

The onset and frequency of chronic convulsions were dose-related and the severity increased as the duration of dosage was extended. Cumulative toxicity, as evidenced by increased mortality, was observed in the rats but most deaths and maximal toxicity (central depression) occurred 36 to 72 hours following first treatment. Drug dose-related histopathological changes in all treated rats (in addition to decreased body and organ weight gains) were hypocellularity of the spleen and bone marrow, vacuolization of the adrenal gland and degeneration of the testes (seminiferous tubules) or ovarian stronia. Extended doses from five to119 days were not significantly more toxic except to the adrenals. No evidence of abstinence syndromes were noted upon abrupt cessation of these doses.

Similar behavorial and clinical findings were observed in monkeys given 50-500 mg oral Delta 9 THC, All THC and equivalent CME for up to 91 days. Cumulative toxicity was less

severe and all monkeys survived the initial moderately severe central nervous system depression. Tolerance to the depression occurred and the monkeys returned to their undrugged behavior. Mild hyperactivity was noted only in several of the median dosed animals.

Three of 28 monkeys studied became moribund on days 10, 14 and 16 respectively. These were sacrificed and the only histopathology seen was severe hemorrhagic and probably drug-related enterocolitis. The bone marrow and kidney changes seen probably were due to severe electrolyte imbalance resulting from the intestinal lesion. The thymus lesion is consistent with stress due to this electrolyte imbalance. Pancreatic atrophy was due to weight changes. Eight additional monkeys were sacrificed at 28 days in fair-to-good condition and no histopathology was demonstrable. Several other monkeys had bloody diarrhea, but recovered spontaneously without demonstrable histopathology.

The remaining 17 monkeys were all in fair-to good condition at 28 days and hyperactivity was no longer observed. They were treated at the same dose for an additional 63 days. Tolerance to the central depression continued to develop so that the effects lasted only one to two hours at 91 days. No additional monkey fatalities were recorded -and the remaining 17 monkeys were normal histopathological at autopsy. Urine and ophthalmological examinations were all within normal limits. Hematological and blood chemical changes after 28 and 91 days were minor and little affected in the surviving monkeys.

Thus, a. minimal toxicity in monkeys, either physical or behavorial, is evident after 91 daily doses orally of enormous amounts of Delta 9 THC. However, significant cumulative toxicity, primarily a generalized central nervous system depression, is evident in the first few days but tolerance rapidly develops to these effects. A dose-related hemorrhagic enterocolitis occurred which may lead to electrolyte imbalance and death in a few monkeys. This probably is a direct irritative phenomena.

Again, the enormous daily doses of THC that were administered to these animals cannot be compared to the daily doses used in man even by the heaviest users.

The effects were observed of 28 daily administrations to monkeys of intravenous Delta 9 THC in sesame oil-Tween 80-saline vehicle at doses of 5, 15 and 45 mg/kg. Behavioral, clinical, hematological and hemochemical changes were similar for monkeys given single or repeated injections. However, the duration was extended in the 28-day groups and tolerance gradually developed. Delayed death indicative of cumulative toxicity occured on days eight and 19 in two of four animals given the largest dose.

Histopathological changes, noted in the two animals which succumbed and in one of the highdose monkeys, were acute hemorrhagic pneumonia resembling the finding in the single-intravenous studies at doses of 128 mg/kg or greater. Additionally in the repeated dose study, edema, ulceration and fibrosis at the injection sites probably contributed to minor hematological and hemachemical alterations.

In summary, the 1972 Marihuana and Health Report to the Congress from the Secretary of HEW noted that these doses were employed in rodents and mammals to test the limits of toxicity. The doses are much higher than those used by man and the routes of administration substantially dif ferent. These studies have shown that the margin of safety between the lethal dose and the pharmacologically active doses of Delta 8 and All THC and crude marihuana extract is large. Consequently, it has been determined that these compounds could be safely administered to man for Phase I and early Phase II clinical studies (Secretary of HEW, Feb. 11, 1972, p. 158-160).

HUMAN EXPERIMENTS (CLINICAL)

Only a few investigators have studied the subacute administration of marihuana to man. Marihuana cigarettes of unknown potency were made available to 34 military prisoners in Panama by Siler et al. (1933). The mean daily consumption was five cigarettes (range one to 20). The usual behavior effects associated with marihuana use were noted. No ill effects were observed nor abstinence syndrome seen.

Williams et al. (1946) made available marihuana cigarettes of unknown potency to six prisoner addicts who were experienced marihuana users in the Public Health Service Lexington Hospital. The subjects were permitted to freely consume the drug in any quantity desired. The number of cigarettes consumed increased only slightly over a 39-day period. The daily range was from nine to 26 per day with a mean of 17. Only minimal evidence of tolerance was seen. There was no evidence of physical dependence; that is, no observable abstinence, syndrome was observed after abrupt termination of the drug.

In general, the following observations were made on these subjects: daily rectal temperature increased slightly; pulse, rate increased for three weeks, then returned to normal; no change was noted in respiratory rate, coordination, or rote memory ; increase was noted in sleep and body weight while caloric intake initially increased then progressively decreased; mild confusion was observed; general intelligence tests were slightly impaired while psychomotor tests were performed faster but less accurately; EEG showed inconsistent changes but returned to normal five days after cessation; and mood was euphoric for several days followed by general lassisitude and indifference.

In a recent uncontrolled preliminary study (Personal Communication, 1970), marihuana extract was administered daily to eight terminal cancer patients from four to 13 days (mean 8.5 days). Daily doses were purposefully raised by the investigator from 7.5 mg (mean daily dose 19.8 mg THC). The total dose per individual patient averaged 168 mg with a range from 75-210 mgs.

Euphoria was experienced by all eight subjects and one had a transient anxiety episode at a high dose. Three subjects demonstrated decreased-opiate analgesic needs indicating an analgesic-effect of the drug. Five subjects reported improved appetite and five, of six tested, demonstrated objective improvement in depression on Back scale. No new changes were seen in physiological parameters, neurological status, blood cell and chemistry values or urine examination. During the period of drug effect, drowsiness was common but not lethargy, lassitude or indifference. In fact, all became more active on the ward. No evidence of abstinence symptoms were seen after abrupt discontinuation of the drug.

Volavka et al. (1971) in preliminary experiments administered two marihuana cigarettes daily (13 mg Delta 9 THC) to four detoxified heroin addicts. Pleasant effects peaked during the second week and then leveled off. Prominent dysphoric effects and depressive reactions with paranoid thoughts appeared during the third to sixth days and persisted causing cessation of the study by one subject after 10 days and after 17 days by another. The other two subjects completed the entire planned 22 days.

Again no abstinence syndrome was seen and the dysphoric symptoms disappeared within five days after the last dose. Consistent electroencephalogram changes developed in three of four subjects indicating increased synchronization. Their EEG changes first appeared immediately after smoking.

In two of the f our subjects they were detectable, in the presmoking records after days 12 and eight, and did not begin to subside until 48 hours after the last dose in two subjects and persisted for the entire 72 hours follow-up in a third subject.

Fink et al. (1971) subsequently studied five medical and graduate students who had been almost daily marihuana smokers in college and were currently weekend smokers. Each subject smoked under laboratory conditions one marihuana cigarette containing 14 mg of THC each morning daily for 21 days.

No subject reported any adverse effects from smoking. The subjects were generally able to conduct their usual daily activities including jobs. However, they reported they did not function completely up to par during the several hour duration of the acute drug effect. There were no effects which persisted for more than three to five hours and cumulative effects were not noted day to day. No persistent decrements were seen in behavior, mental status, EEG, heart, rate, short-term memory, or psychomotor function tests. In sum, daily marihuana smoking for 21 days was well tolerated by well-adjusted graduate students.

Mendelson et al. (1972) performed a Commission-sponsored study of the biological and behavioral concomitants of 21 days repeated doses of marihuana. Subjects were individuals whose life style, activities, values and attributes were more characteristic of the unconventional youthful subculture than most of their peers in the general population. Their mean age was 23. Based on I.Q. testing they were superior intellectually although they had completed, on the average, two-and-a half years of college. Their job histories were rather erratic and characteristic of a pattern of itinerant living. Their family background was a middle or lower-middle socioeconomic status. In addition alcohol use was infrequent while use of drugs, especially hallucinogens and amphetamines, was significant.

Two groups of 10 subjects each were investigated over separate 31-day periods of confinement on a comfortably furnished research ward equipped with an array of recreational materials. A large, open yard was available for outdoor recreational activities. The research period was divided into three periods: a pre-drug period of five days during which the subjects were drug free; a, subsequent 21-day period when marihuana, could be earned by performing a, work-contingent operant task, then purchased and smoked on a free-choice basis; and a five-day post-drug period without access to marihuana.

All attempts were made to not interfere in any way with performance of the operant task or free choice marihuana smoking although the subjects were under constant observation. A vast array of behavioral and biological assessments were made during the experimental period to determine any effect of repeat doses of marihuana over this time.

Two groups of subjects, studied separately, differed primarily in the frequency of marihuana smoking over the past year. Both groups had averaged about five years of marihuana use (range two to 17 years). The first group studied, referred to as the "casual" users by the authors, reported an average frequency of marihuana use, of 7.7 occasions per month (range three to 15 occasions). The second group studied, referred to as the "heavy" users by the authors, reported almost daily use of marihuana (average 33 sessions per month; range 20+ to 75, including one substitute subject to fill the group who only smoked about 10 times a month).

During the first 20 days of the smoking period, the casual group's consumption averaged three cigarettes daily (individual average was one-half to six) while that of the heavy users

averaged six-and-a-half cigarettes daily (individual average three to eight-and-a-half). Both groups demonstrated a progressive trend toward increased daily consumption during the experiment. Close examination of the consumption patterns for individual subjects showed that the trend toward increased use occurred in the subjects who were initially the heaviest users. Several subjects who were initially the least frequent users did not increase their use of marihuana over the course of the study.

Subjects in both groups tended to smoke practically all of each cigarette including the butt. Each cigarette contained about 20 mg- Delta 9 THC. Therefore, the heavy users average daily intake was 130 mg of THC or a total of almost, Joni- -grams of THC over the 21-day period. The casual users average intake was slightly less than half this amount.

No abstinence syndrome or physical dependence was observed after abrupt termination of smoking. Signs of mild to moderate psychological dependence. were possibly seen in the heavy group but no evidence of psychological dependence was seen in the casual users.

No consistent clinically significant physiological or biochemical changes were demonstrated during or after the period of repeated use of marihuana.

Urinalysis, complete blood counts, cell morphologies and differentials, and blood chemistry determinations (calcium, phosphorous, glucose, blood urea nitrogen, uric acid, cholesterol, total protein, albumen, total bilirubin, alkaline phosphatase, lactic dehydrogenase, and serum glutamic oxalacetic transaminase) were unaffected.

Weight gain occurred in all but one subject. Maximal gain was seen during the marihuana smoking period. The subjects were not judged to be clinically malnourished prior to the experiment.

Normal body temperature was not altered. No significant change, in pulmonary function (decreased. vital capacity or acute broncho spasm) was observed during the marihuana smoking period.

Variable inconsistent changes in upright blood pressure were noted. Effects on pulse rate were related only to acute drug administration and were more pronounced during the initial smoking phases. This suggests that tolerance developed to drug-induced tachycardia. No significant electrocardiographic changes were observed. Marihuana smoking had no apparent effect on exercise related cardiac vascular function.

Physical examinations revealed only the development of persistent conjunctival injection, lateral gaze nystagmus and fine, finger tremors. These findings were believed to be acute drug effects and of no clinical significance. No signs of neurological abnormality were observed. No cumulative effect of marihuana to cause, impairment of cognitive function was noted on a battery of tests sensitive to organic brain function.

An increased amount of sleep in both shorter and longer blocks of consecutive hours was observed. Also an increase in the number of discrete episodes of sleep, especially one to three hour episodes also occurred during the marihuana use period. Reappearance of pre-drug pattern was seen during the post-drug period. This reversion appeared to begin toward the end of the drug period which may be indicative of tolerance, to the acute depressant-like

effects of marihuana.

Generally, performances on short-term memory, psychomotor skills and time estimation suggests that repeated marihuana smoking had no discernible effect on the ability to improve performance with practice on these measures. Tolerance appeared to develop to the acute decrement in performance on these measures. On the time estimation task, a tendency appeared for the subjects to increasingly overcompensate for the acute drug effect with repeated testing in the nonintoxicated state.

Both casual and heavy users had a marked decrement in total social interaction during the first portion of the marihuana smoking period. Total interaction of the casual subjects continued to diminish subsequently. Heavy users subsequently tended to exceed presmoking levels of interaction indicating they accommodated to the depressant effects of repeat doses of marihuana.

Both groups became progressively more convivial and less task-oriented in group discussions. They offered less suggestions in problem-solving tasks but continued to efficiently solve the problem.

Casual users reported general relative increases in negative daily moods and decreases in positive daily moods during the course of the study. The trend began with the onset of smoking and persisted through the post-smoking period. This trend could be a sequelae of repeated marihuana use or related to non-drug variables (set and setting).

The heavy users did not evidence this trend toward relative increases in dysphoric mood until the post-smoking period. Again this may be related to repeated marihuana use, reflect psychological dependence or be related to set and setting variables, such as boredom and tension associated with the prolonged study period.

Finally, repeated use of marihuana over the 21day period did not decrease motivation to engage in a variety of social and goal-directed behaviors. Almost without exception, every subject earned the maximum number of points every day throughout all non-drug and drug periods. No consistent alteration in pattern of work could be related to repeated marihuana use. Subjects often performed very high work output while they were smoking marihuana and experiencing the maximum drug effects.

Repeated marihuana use, did not decrease subject's motivation to complete the study. Nor was any noticeable effect observed on interest and participation in a variety of personal activities, such as, writing, reading literature, keeping up with current national and world events, and participation in both athletic and esthetic endeavors.

Effects of Long-Term Cannabis Use

Patterns of marihuana use in Western countries, particularly the United States are primarily long term (two t o 10 years). Additionally, Western investigators have been able to observe those who use marihuana at most, daily and more often, moderately or intermittently. Consequently, observed effects are rare. Knowledge is incomplete but certain trends appear to be emerging in regard to American usage patterns.

The relevance of Eastern reports of heavy hashish use is uncertain. Nutrition, disease prevalence and quality of medical care impose limits on transferring Eastern observations to Western conditions of use.

DEPENDENCE AND TOLERANCE

Neither severe physical dependence, nor prominent withdrawal symptoms after abrupt termination of very heavy usage is suggested by some overseas experience (Charen and Perelman, 1946; Fraser, 1949; Ludlow, 1857, Marcovitz and Myers, 1944; Siler et al., 1933; Walton, 1938). Other studies, however, suggest marked psychological dependence from heavy use producing compulsive drug taking in very heavy users (Indian Hemp, 1893; Chopra and Chopra, 1957; Bouquet, 1944; Lambo, 1965).

Psychosomatic abstinence syndromes often reported were physical weakness, intellectual apathy, loss of appetite, flatulence, constipation, insomnia, fatigue, abdominal cramps and nervousness, restlessness, and headache. For most heavy users the syndrome of anxiety and restlessness seem to be comparable to that observed when a heavy tobacco smoking American attempts to quit smoking.

However, the psychological dependence appears to be severe as evidenced by the f act that one group of subjects were unable to cease their habitual use although the frequency of use, was only eight to 12 times per month (Soueif, 1967). This psychological dependence may have made some users claim physical dependence so that the government did not terminate dispensing them their drug. Studies in the United States using must lower doses for shorter periods of time have revealed little if any evidence of psychological dependence (Bromberg, 1934 Mayors Committee, 1944; Williams et al., 1946).

Tolerance to the subjective and depressant effects of the drug (discussed in an earlier section) does probably occur in man, with heavy use. Thus, increasingly larger and more frequent doses become necessary to experience the desired effects.

Several investigators have recently studied the question of physiological and psychological dependence to Delta 9 THC in monkeys using intravenous self-injection techniques.

Deneau and Kaymakcalan (1971) demonstrated that no monkey initiated self-administration over a three-week period when given the opportunity to self-inject a

behaviorly effective dose of 100 micrograms per kilogram of Delta 9 THC in a Tween solution. The researchers subsequently administered to these monkeys this dose every six hours. Tolerance developed to the behavioral effects within a few days. Dose administered was progressively increased up to 400 micrograms per kilogram over the course of a month. When the injections were abruptly discontinued, all six monkeys showed after twelve hours, behavioral and physiological changes described by the researchers as mild abstinence signs. Two of the six monkeys then initiated and maintained for several weeks the self-administration of THC.

The investigators believe these findings are evidence for mild psychological and physiological dependence on THC. However, vehicle controls were not included in the research design. Thus, the abstinence signs and subsequent behavior may possibly be accounted for by the biological effects in of the Tween vehicle.

Harris et al. (1972) utilized several procedures to maximize the possible conditions necessary for developing self-injection in monkeys. These procedures included: spontaneous Delta 9 THC self administration with no previous training to the technique; self-administration of A' THC after training, with cocaine alone and a mixture of cocaine and Delta 9 THC. Doses utilized ranged from 20 to 500 micrograms per kilogram suspended in polyvinylpyrrolidone. In all cases, monkeys failed to self -administer Delta 9 THC.

The researchers conclude that A' THC lacks the reinforcing effects of psychomotor stimulants and depressants which monkeys readily self infuse with no auxiliary incentives. Also Delta 9 THC lacks a reinforcing function even for monkeys that are well-trained with cocaine and have experienced several days of rather large quantities of Delta 9 THC during the early pleases of extinction of the cocaine reinforced response.

Finally, the results demonstrate that a two week period of exposure to Al THC (in a mixed solution with cocaine) does not result in the degree of homeostatic imbalance which occurs with morphine, ethanol, barbiturates and sometimes the amphetamines which accounts for the continued self-administration of these drugs.

PHYSIOLOGICAL EFFECTS

Permanent congestion of the transverse ciliary vessels of the eye and accompanying yellow discoloration is the only physical effect firmly linked to long-term marihuana use (Ames, 1958; Chopra, and Chopra, 1957; Dhunjibhoy, 1928). Although there are several suspected or reported effects, none has been conclusively demonstrated in a valid study. Some (Chopra and Chopra, 1939; Indian Hemp, 1893) claim that bronchitis, asthma and other respiratory problems may be produced by chronic and excessive use of potent compounds in India. Eastern smoking, preparations are often a mixture of tobacco and hashish.

Indian users reportedly exhibit digestive tract abnormalities, weight loss and disturbed sleep (Chopra and Chopra, 1939; Soueif, 1967). However, the contributing factors of poor living conditions, malnutrition and prevalence of communicable disease could not easily be separated.

A high percentage of heavy Moroccan users have developed obliterative arteritis of the lower extremities (Sterne, 1960) possibly related to the occurrence of tropic foot ulcers (Ganja -foot) (Miras, 1965). The progression of this abnormality is claimed to parallel prolonged use of the drugs.

Mendelson et al. (1972) were unable to demonstrate clinically significant abnormalities in the extensive battery of tests performed which could be attributed purely to the subjects long-term use of marihuana. No histories were obtained of neurological, hepatic, renal, pulmonary, cardiac, gastrointestinal, (renitourinary, or nutritional disorders. No history of psychotic illness was given.

All subjects were Judged to be in normal mental, health by psychiatric interview and psychological tests (MMPI and Edwards Personality Preference Inventory). Three subjects were felt to be neurotic.

Pre-drug complete physical exams, chest X-ray, electrocardiogram, urinalysis, complete blood count and blood chemistry profile did not demonstrate, any clinically significant abnormalities. No subject showed evidence of poor nutrition.

Pulmonary vital capacity and one second forced expiratory volume were reduced in 12 of the 20 subjects initially. These changes were not correlated with either current cigarette smoking or f requency or duration of marihuana smoking. Histories of past cigarette use, past patterns of marihuana use and past or present contact with environmental air pollutants were inadequate to attempt to account for these pulmonary findings.

Many of the subjects were in fair to poor physical condition as judged by a cardiac exercise tolerance test.

Four of the 20 subjects' initial performance on a battery of cognitive functions tests was poorer than would have been predicted by high average to superior I.Q. scores and educational backgrounds. One of the casual subjects demonstrated improvement with retesting consistent with good brain function. Thus, behavioral impairment was present in three subjects.

Whether the impairment is related to prior drug histories, particularly the excessive use of LSD by the two heavy users, cannot be ascertained. For the casual user nothing in the case histories possibly elucidated the reason for relatively poor performance based on the exceptionally high I.Q., 139 and 128.

Many Western investigators have suggested that smoking hashish or marihuana may possibly cause bronchitis, asthma or rhinopharyngitis (Bloomquist, 1967; Waldman, 1970; Tylden and Wild, 1967; Schwartz, 1969).

Tenant et al. (1971) described bronchitis, sinusitis, asthma and rhinopharyngitis in 22 American soldiers in Germany who smoked daily enormous quantities (100 grams or more) of hashish for six to 15 months. These conditions, believed to be caused by irritation of the respiratory tract by hashish smoke, seemed to improve, with diminished hashish use.

Twenty-one of the subjects were tobacco cigarette, smokers and occasionally smoked hashish rolled in a tobacco cigarette. Nine patients had symptomatic bronchitis. Five of these subjects underwent pulmonary function tests while consuming their usual daily amount of hashish and again three days after discontinuing use. A mild obstructive pulmonary deficit was demonstrated which was at least partially corrected with diminished hashish intake. Hashish contributed to rbinopharyngitis in 12 of the patients and this effect was not allergic in origin. Urticaria, acne, diarrhea and gastrointestinal cramps were less frequent complaints. Extensive hemotological and hentochemical studies including liver function tests were performed and were within normal limits.

Mann et a]. (1970, 1971) and Finley (1971) studied the effect of marihuana smoking on the pulmonary function of eight non-cigarette smoking marihuana smokers (20-27 years old). Marihuana smoking history was defined in marihuana cigarette-years, that is, one marihuana cigarette daily for one year or the equivalent over a longer or shorter period. The mean marihuana cigarette years for the group was 11 and the range from 2.5 to 26. Three of the marihuana users also used hashish. Chest X-ray, comprehensive spironietry deterinitiations, lung volumes and carbon monoxide diffusion studies were observed and retested with prednisone. Pulmonary functions were essentially normal for all of the non-cigarette smoking marihuana smokers and non-smoking controls.

These investigators were able to distinguish differences in quantity and structure and function in pulmonary macrophages and minor material between marihuana smokers and nonsmokers. In tobacco smokers more marked changes were noted. These changes do not indicate a diminution in defensive capacity of these cells.

Kew et al. (1969) has suggested a possible hepatotoxic effect of marihuana. right persons who smoked marihuana for two to eight years, at least six times a week, evidenced mild liver dysfunction by liver function tests and liver biopsy. Several of the patients admitted to the use of alcohol and oral amphetamines but denied use of intravenous drugs. The authors concluded that the findings were not unequivocally due to marihuana.

Hochman and Brill (1971) noted abnormal liver function tests in 10 of 50 frequent marihuana users. However. all admitted to long-term, regular and heavy use of alcohol. When these subjects abstained from alcohol for one month but continued their usual marihuana usage, evidence of disturbed liver function cleared in nine out of 10 subjects.

Recently, Liskow et al. (1971) reported the appearance of an anaphylactoid reaction in a 29year-old woman after smoking marihuana for the first time. Skin tests were positive for an allergy to marihuana, constituents. Allergy to marihuana, especially in areas of the country where it grows wild, may be more common than generally believed.

Campbell et al. (1971) presented evidence of ventricular dilatation consistent with cerebral atrophy by air encephalography in 10 young males (average age 22) with histories of consistent marihuana use for three to 11 years as well as less frequent use of LSD and amphetamines. The first four of the patients had been referred originally for neurological investigation of behavioral change, memory loss or headache. The remaining six subjects were selected from patients tinder treatment for drug abuse because of their long history of marihuana use and concomitant neurological and behavioral symptoms.

However, the patients showed personality behavioral and mental disorders, as well as histories of head trauma and psychomotor or grand mal epilepsy that are commonly associated with ventriculographic changes. Also alcoholism can be associated with these findings. Additionally, the authors compared their subjects ventriculograms with those of normal young adults originally referred for loss of consciousness, syncope and headache without subsequent development of neurological illness.

Thus, the authors demonstrated dilation of the third ventricle, of the frontal or temporal horn, or of the trigone of the lateral ventricle. All of these are commonly associated with personality and mental disorders such as these patients shelved. However, whether these changes are caused by marihuana is not proven beca..se no specific neuropathological cause for the cerebral atrophy was identified. Further carefully designed studies are required to clarify this finding.

The LaGuardia Report (Mayor's Committee, 1944) indicated no damage to the cardiovascular, digestive, respiratory and central nervous system, nor the liver, kidney or blood in individuals who had used from two to 18 cigarettes of unknown potency (average seven) for a period of two-and a-half to 10 years (average eight). However, this study was not up to modern standards as it lacked double-blind precautions and placebo controls and adequate statistical analysis of the data. Bias was present in reporting. Small numbers of prisoners were used as subjects.

Another less comprehensive American study of 310 individuals who used marihuana on the average of seven years was performed on soldiers (Freedman & Rockmore, 1946). It did not demonstrate any evidence of physical or mental deterioration.

Another team of investigators (Meyer et al., 1971; Mirin et al., 1970) examined a group of 10 male marihuana users (average age 25) who had consumed the drug about 20 to 30 times a month for all average of 4.4 years (one-half to five year range) and had smoked daily for three of the 4.4 years. Heavy use was correlated with psychological dependence, search for insight or meaningful experience, multi-drug use, poor work adjustment, diminished goal directed activity, decreased ability to master new problems, poor social adjustment and poorly established heterosexual relationship. No physical or neurological or psychiatric abnormalities were noted in their work-up.

Indeed, numerous American investigators have not reported abnormalities in baseline, examinations of their experimental subjects who have various patterns of marihuana use from very infrequent to many times a day.

GENETICS AND BIRTH DEFECTS

Much concern about possible effects on the unborn generations has arisen because of marihuana's use by persons in their reproductive years. Presently, most studies are preliminary.

There are three isolated case reports in man (Gelehrter, 1970; Carakiishansky et al., 1969; Heelit et al., 1968) of birth defects in mail in the offspring of parents who had used marihuana and LSD. However, due to their complex gestational histories and the high level of birth defects seen in a "normal" population, a causal relationship cannot be attributed to cannabis or anything else. At present, there is no substantial evidence indicating that marihuana at the dose commonly used is a teratogen in man.

Marihuana has been implicated as a teratogen in animals by several groups at high doses. One study (Miras, 1965) showed reduced fertility in rats impregnated after being fed a diet containing marihuana extract for several months. However, the offspring were normal. The reduced fertility may be related to the finding of marked decrease rate of cellular division, but without chromosomal damage, -when Delta 9 or All THC is added to white blood cell cultures (Neu et al., 1969 Martin, 1969).

Dorrance et al. (1970) and Gilmore et al. (1970) detected no significant difference in lymphocyte chromosomes in groups of users and nonusers. No significant differences were, found in lymphocyte chromosomes between heavy, long-term. Jamaican ganja users and matched nonusers. (Rubin and Comitas, 1972)

Pregnant mice injected with cannabis resin on day six of gestation caused stunted but not malformed offspring. Fetal reabsorption occurred when the dose was given on days one to six (Persand and Ellington, 1967). A second experiment using rats injected on days one to six produced a high frequency of malformed progeny. Another investigator (Geber, 1969; Geber and Schramm, 1969) demonstrated congenital malformations in fetal hamsters and rabbits after large multiple doses of cannabis extract.

Another group (Pace et al., 1971) have administered a wide range of dosages of Delta 8 and Delta 9 THC and marihuana extract by subcutaneous, intraperitoneal and intravenous routes at varying intervals pre- and post-conception to rats, hamsters and rabbits. Delta 9 THC up to 200 mg/kg in variety of dose schedules produced reduced average litter size and stunted pups at high doses but no birth defects. A low incidence of abnormalities occurred in rats and rabbits with marihuana extract, but a high incidence of neonatal deaths was observed apparently due to inadequate material lactation.

Studies with radioactive labeled THC (Idanpaaiini-Heikkila et al., 1969) indicated that it did cross the placenta in high concentrations early in gestation during the developmentally labile phase.

These studies suggest that Delta 9 THC itself is not a teratogen. Instead, perhaps some unidentified substance or substances in the plant extract may be causing the teratogenic effect noted by this group and others when injected. It is uncertain whether this theoretical substance(s) volatilizes during smoking or enters the pulmonary vasculature (Pace et al., 1971).

Consequently, the following FDA label required of many currently prescribed psychoactive drugs warning about use in Pregnant women and women of childbearing age, appeals indicated. "Safe use of the drug during pregnancy and lactation has not been established; therefore, in administering the drug to Pregnant patients, nursing mothers, or women of childbearing potential, the potential benefits must be weighed against the possible hazards. Animal reproduction studies have yielded inconclusive results. . . . There have been clinical reports of congenital malformation associated with the use of this drug, but a causal relationship has not been confirmed."

ORGANIC BRAIN DAMAGE

Deterioration of mental functioning allegedly due to long-term use of marihuana can be subdivided into four major categories: organic brain damage, mental illness-psychosis, amotivational syndrome, and recurrent-pnuenomenia. As with alcoholism, it is quite often impossible to distinguish whether the described effects result from drug use or represent personality traits or changes which would have been present without the drug use.

When marihuana consumption was irregular, mental deterioration was not evidenced (Freedman and Rockmore, 1946) in 310 users with an average history of seven years of use. Sixty-seven heavy users in New York showed no evidence of dementia attributable to drug use although they did have underlying personality disorders. Another investigation (Mayor's Committee, 1944) of individuals who used a daily average of seven marihuana cigarettes (two to 18 range) for average of eight years (two-and-a-half to 16 range) showed no evidence of brain damage or mental deterioration.

Reports from India (Chopra, 1935; Chopra, 1940; Chopra and Chopra, 1939; Chopra, Chopra, and Chopra, 1942) relate minor impairment of judgment and memory, limited self - neglect and insomnia, when potent preparations are consumed regularly in large amounts for many years. No evidence for mental deterioration or brain damage has been noted.

Miras (1967) has described a Greek population of heavy hashish smokers who appear as outcasts from the community after 15 to 20 years of heavy hashish use. They appear mentally sluggish and depressed. They are reported to exhibit laziness, psychic instability, amorality and apparent lack of drive and ambition. Their speech and behavior has been described as -peculiar. Some degree of responsibility is retained in that some do work to cover their living and drug purchasing expenses. Some of them are still quite intelligent. Memory is not deteriorated except during the intoxication. They appear overly suspicious. Samples of their electroencephalograms were believed to demonstrate abnormalities.

However, Miras believes that this effect is related to the quantity and frequency of hashish use. He describes three categories of long-term hashish users. Type A uses low doses intermittently and is socially and mentally unaffected. Type B1 uses low doses daily and no interference is caused in function. Type B 2 uses high doses daily causing dependence and performance decrements. Type C uses very high doses daily allegedly causing mental deterioration and abnormal behavior described above. Fink and Dornbush (1971) are currently intensively studying this population. The results will be described in a later section.

Non-differentiated psychosis noted in foreign populations may also be included within this diagnostic category. These will be discussed with the psychosis.

PSYCHOSIS

The alleged connection between mental illness and cannabis derives from Africa, the Middle East and India. These areas are currently developing economically and scientifically, but for many years medical care and especially psychiatric care were given low priority. Many chronic illnesses still persist in these countries which may affect mental functioning. Furthermore, well-trained psychiatrists and methodologists are very rare in mental hospitals in these countries. Consequently, the findings of earlier studies are questionable due to lack of controls, biased sampling and poor data collection and failure to account for variables like nutrition, living standard, cultural factors and socioeconomic status.

India's mental institutions were widely quoted to support the, connection between excessive cannabis consumption and insanity. The Indian Hemp Commission performed a thorough and objective investigation of this question, although methodologically it was not up to modern standards. The Commission was unconvinced of the reliability of hospital statistics, where often the diagnosis was not made by a psychiatrist but by a referring policeman.

Therefore, the Commission examined all admissions to Indian mental hospitals for one year. They found that cannabis rise could not be considered a factor in more than seven to 13% of all cases of both acute and chronic psychosis.

Chopra et al. (1942) carefully performed the same examination of admission to Indian mental hospitals from 1928 through 1939 when cannabis use was extremely high. They found 600 cases of acute and chronic psychosis which could be traced to cannabis use. Other reports from India have produced varying estimates of the incidence of cannabis psychosis (Peebles and Mann, 1914; Chopra, 1971; Dhunjibhoy, 1930 Evens, 1904). In

Egypt 27% to 33% of mental hospital admissions were cannabis related (Ireland, 1893; Warnock, 1903).

Benabud (1957) reported that cannabis users comprised 68% of all mental hospital admissions in Morocco but only 25% of these admissions could be called cannabis psychosis. Watt (1936 and 1961) reported that 2% to 3% of mental hospital admissions in South Africa were due to the use of dagga (cannabis).

Boroffka (1966) and Asuni (1964) reported that 14% of psychiatric admissions in Nigeria used cannabis. Toxic psychosis accounted for half of these and cannabis was felt to aggravate underlying schizophrenia in the remainder.

Several statistical studies from other countries including Jamaica, Colombia, Algeria, Panama and Tunisia support this type of data (Prince et al., 1970; Beaubrun, 1971 Allentuck and Bowman, 1942; Bouquet, 1951; Chevers, 1870; Defer and Dielil, 1968; Fraser, 1949; Freedman and Rockmore, 1946; Porst, 1942; Siler et al., 1933; Reales-Aroyco, 1953; Medical Staff, 1938).

Very little information is available on the prevalence of psychosis in the overall population of cannabis users. Chopra and Chopra (1939) classified 2% of the ganja and charas smokers and 0.5% of the bhang drinkers in their sample of 1,200 as psychotic.

Roland and Teste (1958) estimated that no more than 0.5% of kif (cannabis) smokers in Morocco suffer from recurrent mental conditions.

Prince et al. (1970), in a study in Jamaica, noted that about 20 patients per year are admitted to mental or general hospitals with acute psychotic reactions allegedly precipitated by ganja. In one general and one mental hospital the, ganja smokers comprised 20% of the psychiatric admissions. Furthermore, the percentage of heavy ganja smokers in the community was significantly higher than 20%. Thus, a larger percentage of psychiatric admissions were, derived from non-ganja smokers in a comparable lower socioeconomic segment of the population.

This finding contrasts with the 68% prevalence of cannabis use among psychiatric admissions reported by Roland and Teste (1958) which is considerably higher than the prevalence of cannabis use in the general population of Morocco.

Studies based on several hundred cases indicate that the large majority of individuals hospitalized in mental institutions for "cannabis psychosis" have suffered acute toxic psychoses associated with a sharp toxic overdose or massive excesses among habitual users. Occasional smokers and moderate habitual users seldom had psychotic reactions and then only when there were substantial predisposing factors.

The acute clinical picture seen in these delirium with confusion, disorientation, terror, and subsequent amnesia is that of a severe exogenous psychosis. It does not typically involve the type of thought disorder characteristic of schizophrenia. Short recovery times ranging from a few days to six weeks are uniformly reported in sharp contrast to the lengthy recovery period of functional psychoses (Chopra et al., 1942; Roland, and Teste, 1958; Defer and Diehl, 1968; Beaubrun , 1971; Stringaris, 1939).

Consequently, the psychiatric literature on cannabis-induced chronic psychosis is quite confused. In general, it appears that cannabis use probably produces a specific psychosis, but this must be quite rare, since the prevalence of psychosis in heavy cannabis users, world-wide, is only doubtfully higher than the prevalence in general populations (Murphy,

1963). However, incidence and prevalence data for these countries on psychosis of users and non-users of cannabis does not exist.

A Morroccan investigator, Christozov (1965), studied 140 chronic heavy hashish users hospitalized in a mental hospital. Their behavior was characterized by a confusional state of consciousness, an impulsivity, an irresponsible attitude, and an instability of mood and character. The patients were often psychotic with persistent hallucinations. Intellectual functions were reduced in over half the cases although this was related to a low intellect prior to drug use. Electroencephalography showed no specific changes. In addition, it was noted that half of the patients were also alcoholics.

The majority of the patients were, sedated and showed a rapid improvement, allowing them to be discharged and be employed, Although it appeared that these characteristics are reversible, the patient often returned to heavy drug use again causing return of the syndrome.

Thus, the existence of a more long lasting cannabis-related psychosis is poorly defined. Some evidence indicates the existence, of a, quite rare slow-recovery, residual cannabis-psychosis following heavy chronic use. Patients often exhibit schizophrenic-like withdrawal, mental confusion and mild residual hallucinations; but there is little tendency for the, symptoms to become organized or proliferate. The symptoms develop gradually and then subside gradually before proceeding to full-blown psychotic symptoms. These may produce gradual psychic deterioration in the habitual excessive user after prolonged periods of time. Several authors theorized that the chronic psychosis consists of recurrent acute attacks with gradual deterioration in habitual excessive users (Roland and Teste, 1958; Chopra, et al., 1942; Stringaris, 1939; Sigg , 1963).

Most investigators, therefore, find it exceedingly difficult to distinguish a psychosis due to cannabis from other acute and chronic psychoses because, few, if any symptoms, are uniquely found in it and not observed in other psychoses. Often the diagnosis of cannabis psychosis is made because of the history of heavy marihuana or hashish use. Several have suggested that a characteristic cannabis psychosis does not exist and that marihuana will not produce a psychosis in a well-integrated, stable person (Allentuck and Bowman, 1942; Reales-Aroyco, 1953).

In addition, alcohol often played a part in producing the mental derangement (Medical Staff, 1938; Porst, 1942). Most data refers to any form of psychosis in marihuana users; not specifically cannabis psychosis.

Although it is fairly well-established that cannabis use attracts the mentally unstable, the prevalence of major mental disorder among cannabis users appears to be little if any higher than that in the general population. Therefore, true cannabis psychosis must be earlier, very rare or it must substitute for other forms of psychosis. Perhaps, cannabis use alternatively is protecting some less stable individuals from a psychosis (Murphy, 1963).

Because of these many difficulties, the role of cannabis use in acute and especially chronic psychoses in these countries is impossible to determine with certainty.

Finally, the Eastern literature often mentions the existence of a characteristic psychic degeneration among older habitues after prolonged excessive use (Chopra et al., 1942; Christozov, 1965; Indian Hemp Commission, 1893; Roland and Teste, 1958; Stringaris, 1939; Warnock, 1903). They are frequently described as showing a single minded, carefree

state, such as "Kif-happy vagabonds."

Soueif (1967) administered psychomotor and cognitive performance tests to imprisoned h..shish users and non-hashish users in Egypt. Preliminary results indicate that, on most of the tests, the hashish sample scored 10% to 20% below the control, and differences were larger for those with higher educational levels. These results do not necessarily indicate a causal relationship. Assessment of the significance of these findings must await further description of the samples utilized.

Experience in the U.S. and Western Europe has not involved a level of marihuana use comparable to the above-mentioned countries. Consequently, the associated chronic psychotic disturbances have not been seen.

In Western countries, Bromberg (1939) and Allentuck and Bowman (1952) reported on acute psychotic episodes with clear-cut onset during the marihuana intoxication. Most symptoms cleared within a few days although several had a prolonged illness. These rare acute psychotic episodes, discussed earlier, have been described recently by a variety of authors in scattered countries (Smith, 1968; Weil, 1970; Bialos, 1970; Keeler, 1967; Milman, 1971; Pesyko, 1970 Kaplan, 1971; Prince et al., 1970; Baker and Lucas, 1969; Grossman, 1969; Beaubrim, 1971; Spencer, 1970).

Some of these reported cases are quite transient and clear rapidly with support of others and may be more like acute panic reaction than psychosis. Still others appear to fit the picture of transient toxic psychosis.

A few cases of marihuana psychosis reported by Kaplan (1971) recovered very slowly after extensive psychotherapy. However, the high incidence of schizophrenia and borderline states described in these patients and their families may indicate that marihuana use merely aggravated or precipitated an underlying psychosis in these individuals.

George (1970) reported a case in Britain in which an acute episode of confusion, disorientation, hallucination, anxiety, paranoia, agitation and memory loss related to cannabis use was followed by a more chronic schizophrenic-like syndrome with thought disorder, incongruous affect and hallucinations. This individual was experiencing considerable financial and marital stress prior to these two separate acute episodes. The chronic condition eventually responded to psychotherapy.

Bernhardson. (1969) reported aggravation by cannabis of schizophrenic conditions in several Scandinavian patients. Perna (1969) reported a case in which marihuana appeared to aggravate an extended psychosis for which the patient had required psychiatric treatment prior to the use of marihuana.

Keup (1970) reported 14 cases of prolonged psychotic symptoms requiring hospitalization associated with the use of marihuana. He noted evidence for the existence of a high level of psychopathology in many of them which predated their marihuana use.

Kolansky and Moore (1971) in a widely publicized report of cases of individuals ages 13-to-24 has claimed profound adverse psychological effects from smoking marihuana two or more times a week.

Of 38 individuals reported, all had decompensated personalities, eight had psychoses (four

attempted suicide) and 13, according to the authors became sexually promiscuous due to marihuana. These clinical impressions were, all based on, at most, a few interviews with the, individuals who were referred to these psychiatrists for consultation for problems (including one-third by legal authorities after arrest for possession of marihuana).

Unfortunately, the authors made sweeping generalizations to all young adolescent marihuana users from this biased and non-representative sample. No attempt was made to interview other young marihuana users who have not been referred for psychiatric help, and the high prevalence of promiscuity and psychopathology in comparable adolescent populations was totally disregarded. In addition, case histories of previous mental health were obtained introspectively from the patient, their families or the referral source.

Thus, it is impossible, to state unequivocally, as the authors do, that since marihuana use and psychiatric problems occurred at the same time the former is causative of the latter.

Several authors have reported acute toxic psychosis following marihuana use by soldiers in Vietnam (Talbott and Teague, 1969; Colbach and Crowe, 1970, Bey and Zecchinelli, 1971).

All these cases represented transient reactions and cleared rapidly with treatment. In many cases, personality disorders or borderline personality states appeared to be predisposing factors in the development of the psychotic state. Often revealed were problems of identify diffusion, ego weakness, low self-esteem and inability to form close interpersonal relationships. Also the stressful conditions of the setting in which the drug was used deserves emphasis.

Halikas et. al. (1971, 1972) performed intensive psychiatric interviews on a population of 100 regular marihuana users and a control group of 50 of their non-using or casually using friends. Half of each group met the criteria for some psychiatric diagnosis. Psychiatric illness and antisocial behavior most often preceded marihuana use.

Some attempts have been made to estimate the incidence, of psychosis and other adverse reactions to marihuana in Western countries. Obviously, such estimates depend on how these reactions are defined-one questionnaire study of 2,700 psychiatrists, psychologists, internists and general practitioners in the Los Angeles area reported 1,887 "adverse reactions" to marihuana in an 18-month period (Ungerleider et al., 1968). Adverse reactions were not defined by the authors in the survey. Those reported ranged from mildly unpleasant parental objections to use to severe anxiety or acute psychosis.

Keeler (1967) reported on "adverse reactions" to marihuana (paranoid feelings, etc.) which are limited to the immediate period of intoxication. These phenomena occasionally occur in such a light proportion of regular users that they are of little interest in the present discussion, e.g., 80% of users report they sometimes have paranoid reactions during the marihuana intoxication (Tart, 1970).

Other estimates have been based on hospital admissions in which marihuana use was the recognized precipitating cause. Lundberg et al. (1971) reviewed the admission records for the Los Angeles County General Hospital for the period 1961-1969 and found marihuana use was listed as the reason for admission in only nine out of 700,000 cases, and five of these were for intravenous injections.

Keup (1970) reports that 0.9 per 1,000 of the 1968 admissions to a Brooklyn psychiatric hospital were directly related to cannabis use, and in another 1.9 per 1,000 it was found to be a contributory factor.

In 1966, psychiatric hospitals in England listed 82 admissions for which cannabis use was considered a factor (Baker and Lucas, 1969) in 1967, the number was 140 (George, 1970). For the 1966 data, further analysis revealed that eight of the 82 cases were acute psychotic reactions to cannabis, 20 were related to "cannabis addiction as a way of life," and cannabis could not be established as a definite factor in the remainder (Baker and Lucas, 1969).

Colbach and Crowe (1971) estimate that among a population of 45,000 U.S. soldiers in Vietnam in 1969, some 40 to 50 per month were hospitalized for psychiatric reasons and about five of these were associated with (usually heavy) marihuana use.

Among college populations, Pillard (1970) estimates five to seven marihuana-associated anxiety reactions are, seen per year by the Boston University Health Service which cares for a student population of 20,000; and Bialos (1970) reported 11 cases during a one-year period (1968-1969) for a student population of 8,500.

If it is assumed that about one-third of the Vietnam and college populations are using marihuana to some degree, the annual incidence of hospitalized cases in Vietnam would be about four per 1,000 users; the rate for student-health cases, 0.3 to 1.3 per 1,000 users.

The 1972 Secretary of Health, Education and Welfare's report on Marihuana and Health prepared by the National Institute of Mental Health noted in summary that marihuana can clearly precipitate certain less serious adverse psychiatric reactions, such as simple depression and panic, particularly in inexperienced users.

In these reactions, non-drug factors may be the most important determinants. Psychotic episodes may also be precipitated in persons with a preexisting borderline personality or psychotic disorder or those persons under excessively stressful conditions. These acute psychoses appear to share considerable clinical similarities with the acute toxic psychoses noted in the Eastern literature. Both these psychoses resemble an acute brain syndrome in that they occur primarily after heavier than usual usage and are self-limited and short-lived after the drug is removed from the body.

Some reports describing a prolonged psychotic course after an initial acute episode cannot rule out the role of pre-existing psychopathology. At the present time evidence that marihuana is a suf ficient or contributory cause of chronic psychosis is weak and rests primarily on temporal association. This issue may be clarified by extensive epidemiological and controlled clinical studies. (Secretary, HEW, 1972)

AMOTIVATIONAL SYNDROME

Another type of possible mental deterioration or subtle personality and behavioral changes associated with heavy long-term cannabis use is the amotivational syndrome.

This syndrome has been described world-wide in its extreme form when the most potent preparations are, used (Miras, 1967; Chopra. and Chopra, 1957; Chopra et aL, 1942; Christozov, 1965; Indian Hemp, 1893; Benabud, 1957; Warnock, 1903). Its most extreme form depicts a loss of interest in virtually all activities other than cannabis use. The resultant lethargy social and personal deterioration and drug preoccupation may be comparable to the skid row alcoholics' state.

Benabud (1957) describes the occurrence of this syndrome in individuals chronically intoxicated with hashish. These individuals are unlikely to show conventional levels of motivation. Also the time required to obtain and consume enough drug to maintain this state

is not likely to leave much time for other pursuits. The passive user tends to lose interest in work and other long-term goals.

The question of whether there exists a significant causal as opposed to an associative or correlational relationship, only attracted attention when the traditionally achievement-oriented Western youth adopted cannabis use. The traits of passivity or amotivation are commonly described among heavy cannabis user throughout the world.

A number of Eastern authors have expressed the opinion that this is a result of organicity from chronic cannabis use in large amounts, without objective studies being performed.

Recently the term has been used to describe the behavior of numbers of young Americans who are for a variety of reasons dropping out of school, refusing to prepare themselves for traditional adult roles and smoking marihuana.

This type of social maladjustment is not comparable in magnitude to that described in other cultures. However, the individual may lose the desire to work, to compete, to face challenges. Old interests and concerns are lost and the individual's life, becomes centered around his compulsive drug use. In addition, the individual may ignore personal hygiene, experience loss of sex drive and avoid social interaction (Mirin et al., 1970; Smith, 1968).

West (1970) and McGlothlin and West (1968) have described a clinical syndrome as a result of observations of regular marihuana users for four years. Their clinical impressions are that these individuals show subtle changes in personality over time which might represent an organic syndrome. These include diminished drive, lessened ambitious decreased motivation, apathy, shortened attention span, loss of effectiveness, introversion, magical thinking, derealization and depersonalization, decreased capacity to carry out complex plans or prepare realistically for the future, a peculiar fragmentation in flow of thought, and a progressive loss of insight.

Another psychiatrist, Powelson (1971), has also concluded on the basis of over five years clinical experience with drug users at the University of California, Berkeley, that the effects of marihuana are cumulative. He, feels that after a period of prolonged use a disorder of thinking characterized by a lack of coherence and a pathological thinking process results.

These disturbing findings are being reported more frequently, especially in adolescent and young-adult groups. Recently, tentative and preliminary data (Francois et al., 1970; White et al., 1970) has been presented on a group of 19 hospitalized 14-to-20-year-old patients with behavioral disorders who had used marihuana and other drugs heavily.

In addition to "amotivation," they showed primitive and magical modes of thought and low frustration tolerance. Subtle EEG patterns were detected although this finding is not uncommon in adolescents with behavior problems.

The researchers are presently carrying out a study in non-hospitalized adolescents without behavioral disorders who have similar patterns of drug use in order to clarify their findings.

Kornhaber (1971) believes that at least twice daily marihuana use for a year, in a 13-to-18-yearold population, has a deleterious effect upon the developing adolescent. The intoxicated state facilitates a regression from logical-mathematical thought processes to a more primitive conceptual mode of fantasy and magical thinking and impairs learning ability and judgment by decreasing attention and concentration. Thus, the developing youth turns away from reality toward fantasy and from structure and activity to passive dependency.

Kornhaber suggests that marihuana facilitates the development of normal adolescent turmoil into a pathological state. However, he feels that the existence of the syndrome depends partially on the individual's vulnerability to the drug influence.

A possibly milder variation of this syndrome has been clinically observed by Scher (1970) in individuals in the 20-to-30 age group who have used marihuana daily for five years while apparently functioning normally in society with good jobs, often creative ones. These individuals begin to experience a vague sense of functioning at reduced efficiency level. Thus, the disabilities experienced are personal and internal ,and constitute a vague neurotic depressive-like syndrome,.

In addition to the methodolcgical problems of (Establishing causative as opposed to associative relationships, it is also very difficult to obtain a sample of heavy cannabis users in the West who have not had substantial exp.rience, with other drugs, especially the strong hallucinogens.

Koridiaber (1971) has described a sample of 50 adolesc t psychiatric patients who used marihuana daily and also took other drugs. He concluded that marihuana exercised a "chronic, tranquilizing, psychomotor-depressant effect" among these patients, and facilitated regression, fantasy and magical thinking. School performance, participation in sports, and personal hygiene also declined. He reported improvement in school performance, mood and the underlying depressive symptoms for many patients four to six weeks after discontinuing marihuana use.

Given there is a fairly strong tendency for heavy cannabis users to be passive and apathetic, to emphasize the present over the future, and to choose fantasy over rationality, there are several ways by which this relationship might come about (McGlothlin, 1972).

First, persons who already exhibit these, traits may simply be attracted to the use of cannabis. Sociologists tend to favor this explanation, arguing that the relationship between cannabis use and various behavioral indicators is not causal, but simply one manifestation of a general pattern of youthful deviance or rebellion (Goode, 1970).

Utilizing a large sample, Johnson (1971) found that marihuana use is associated with impaired school performance and several forms of deviance; however, other indicators such as premarital sex and high school truancy predicted the dependent variable as well or better. Tobacco and alcohol use were nearly as good predictors as marihuana.

A second related explanation is that the illegal. context in which the drug is taken forces the adoption of a nonconforming life style. The users is thus further alienated from the dominant culture through his close ties with the cannabis-using group.

Third, cannabis use and associated activities may largely substitute for other interests. The individual may focus so much of his time and energy on cannabis that he has little time for other endeavors.

Fourth, heavy cannabis use may act pharmacologically to produce a chronic tranquilized state. Although the acute phase of intoxication is relatively short, there is some evidence of a lethargic hangover effect (Haines & Green, 1976).

Fifth, personality and behavior changes may result through the routine process of learning vi exposure. If an impressionable youth spends a great deal of his time in the world of cannabis intoxication, he may learn to think in a similar manner when not intoxicated. In particular, he may learn to choose the drug fantasy as an alternative to solving personal

problems and facing adult responsibility.

A related explanation is that cannabis acts as a catalyst, creating a condition which facilitates change, providing other necessary conditions are present. Cannabis, along with the strong hallucinogens, produces a kind of mind-loosening effect in which mechanisms providing structure and stability to perception of self-image, environment, time sense,, etc., are temporarily suspended.

The, more frequent users welcome this effect and report utilizing the loosening effect of the drug to achieve further personality change in the direction of less conformity and more spontaneity, that is, the "hang-loose ethic" (Suchman, 1968; Simmons and Winograd, 1966).

In addition, the cannabis intoxication produces a heightened suggestibility which likely makes the user more amenable to adopting the attitudes and values of the subculture in which the drug is taken. At a minimum, it may be concluded that the effects of cannabis can reinforce and provide a rationalization for previously existing tendencies.

Finally it is possible that chronic cannabis use can result in organicity (Soueif, 1967).

In summary, if cannabis use produces personality and behavior changes via one or more of the above mechanisms, the extent of such changes is likely to be strongly related to the amount consumed and the age of the user. According to evidence found in Western literature, frequent use may be quite disruptive during the formative years of adolescence.

On the other hand, the Eastern literature indicates that, although the very heavy user (200 mg. THC or more per day) is largely incapacitated, manual laborers often function adequately while consuming amounts containing 30 to 50 mg. THC per day (Roland and Teste, 1958; Chopra and Chopra, 1939). Similarly, many musicians and entertainers in the United States have lived productive lives while using marihuana (Winick, 1960).

RECURRENT PHENOMENON

Another poorly understood phenomenon is the spontaneous recurrence of all or part of the drug intoxicated state (somatic and visual sensations) when not under the influence of the drug. This phenomenon has been called a "flashback" when it occurs spontaneously or "a contact high" when it occurs in the presence of others who are intoxicated.

Flashbacks have been reported with marihuana use alone. However, these occurrences are apparently predominant in marihuana users, who have taken hallucinogenic drugs previously. These marihuana, users occasionally find that marihuana highs change for them after their hallucinogenic. experiences. For example, a simple hallucination experienced previously may reoccur while high on marihuana.

These flashbacks may be interpreted as pleasant, even desired experiences by some but unwelcome and disturbing to others. The recurrences are benign in most individuals and tend to disappear as the hallucinogenic experience recedes in time (Keeler, 1967; Smith, 1968; Weil, 1970; Bialos, 1970; Blumenfield, 1970).

Truly vivid experiences which recapture most of the elements of the original experience are extremely rare (Smith and Meld, 1970). More often they resemble an anxiety state occurring after an unpleasant high or the recurrence of a new perceptual awareness gained while high. It is difficult to differentiate these recurrences from the not uncommon deja vu phenomenon in which a person has the illusion that a perceived situation has occurred

before. These recurrences are intermittent and usually occur within a few days to weeks following the use of marihuana.

National Commission on Marihuana and Drug Abuse

Investigations of Very Heavy, Very Long-Term Cannabis Users

Proving a causal relationship between the use of any substance and an associated illness or condition is extremely difficult. Ideally, prospective longitudinal studies on large populations of both substance users and nonusers matched for socioeconomic and psychocultural variables should be performed for many years in order to detect subtle or cumulative effects. Unfortunately, the enormous expenditures of research effort and finances that would be required for a large scale investigation of this nature are prohibitive.

Consequently, carefully designed and controlled, clinical and epidemiological studies of very heavy, very long-term cannabis users in foreign countries must be relied upon to provide important data on possible effects because these populations are not obtainable in the United States.

GREECE

Preliminary results (Freedman and Fink 1971, Fink and Dornbush 1971, Fink 1971) from an intensive medical, neurological, and psychiatric study of 31 male chronic hashish users in Greece, performed under contract to the National Institute of Mental Health, have revealed few abnormalities in these individuals. Non-users matched for socioeconomic, and psychocultural factors including life style, alcohol and tobacco consumption and nutrition and general health have not been studied.

In collaboration with Professors Miras and Stefanis in Athens, Fink and co-workers are studying a population of chronic hashish users that Professor Miras has known for many years. The population studied is composed of 31 male subjects ranging in age from 26 to 69 years with a mean of 46 years.

The subjects report starting hashish use at 13 to 35 years of age with a mean of 19. They have -used hashish from 10 to 49 years, with a median of 28 years. In the past they used an average of eight grams of hashish daily with a range of 2 to 24: grams daily. (The hashish it estimated to contain 4% THC on the average. Therefore, average daily use was 320 mg. of THC).

In the past, 27 of the subjects were daily -users and four used every other day. Frequently of hashish use per day was: once per day-2 subjects, twice per day-6 subjects, three times per day-14 subjects, four times per day-4 subjects, and five, or more times per day-5 subjects.

The men reported a reduction in drug use with time ascribed to increasing difficulty in obtaining adequate supplies due to increased enforcement of the drug regulations. At

present they use an average of three grams of hashish daily (320 mg. of THC) with a range of one to 10 grams daily.

Twelve now use hashish daily, eight use, every other day and 11 use less frequently. Frequency of daily hashish use is: once per day-5 subjects, twice per day-12 subjects, three times per day-10 subjects, four times per day-2 subjects, and gve(sic) or more times per day-2 subjects.

The men are primarily hashish users. One has used opiates. Two are heavy users of alcohol and six report occasional to frequent use of alcohol at the present time. Tobacco is smoked by all subjects averaging 40 cigarettes per day.

Twenty-three of the subjects report periods of abstinence from hashish averaging ten months but up to three years. Hashish use is primarily social by 20 subjects, and 15 subjects smoke in solitude.

Pipes and cigarettes in which hashish is mixed with tobacco are used interchangeably. The usual time of smoking is after work (21 subjects) but 12 subjects smoke before work and five smoke anytime.

In this population, the median education is three-and-a-half years of school with a range of none to nine. Five of the men are illiterate. Twenty-one of the men are married, one is cohabiting, four are single and five are divorced or separated.

All of the married men are employed and support their families. The subjects report changing their jobs frequently and 11 had periods of unemployment from three to 120 months. Ten were classified as skilled workers and 21 as unskilled workers. Their jobs include selling scrap metals, general labor, cartage, messenger, maintenance assistants, etc.

Arrests are common and 19 report at least one non-hashish related arrest. Eighteen have been in regular military service, six were exempt because of hashish use and seven for other reasons.

Interestingly, 10 of the 15 wives interviewed prefer the behavior and attitudes of their husbands when they are using hashish compared to when they are drug-free.

In regard to family and personal background 20 had refugee parents, 13 had alcoholic or hashish using fathers, 26 had three or more siblings, 19 had dominant mothers. Fifteen of 21 had dominant wives. Seven reported broken homes under age 16.

Apparently, the subjects participation in society is consistent with their lower socioeconomic background. No gross behavioral deviation was detected I in this population.

Psychiatric status was evaluated by history and psychiatric interview. Nine have had psychiatric hospitalization of which three were in the military and related to hashish use. Two have, had psychiatric outpatient treatment. Eight had histories of neurotic traits during childhood. In their psychiatric evaluation, three men are considered to have psychiatric pathology. Two of these were considered sociopaths on the basis of homosexuality and criminal behavior. The third was diagnosed as a schizophrenic. No overt signs of any organic mental syndrome were detected. None of the three men were believed to require psychiatric intervention. The schizophrenic, although suspicious and withdrawal, is a successful business man and lives with his family on weekends.

Complete physical and neurological examination revealed three prominent findings. All had

very poor dentition which the men ascribed to hashish smoking. Chronic bronchitis was detected in 14 of the men and emphysema in three others. This finding is not surprising because all subjects were tobacco cigarette smokers averaging 40 cigarettes per day, in addition to their very heavy hashish consumption. Enlarged livers were also found in nine of the 31 subjects.

Because no extensive psychological test battery has been developed or standardized in Greece, American tests were used. These tests are not culture-free, and it is possible that certain items or subtests were inappropriate for the subjects because they had not acquired the type of knowledge or skills required due to their poor level of education.

The Wechsler-Bellevue I.Q. tests were translated into Greek and administered. Because of these, factors, comparison of level of performance between these subjects and white middle class Americans is meaningless.

The mean I.Q. is 86 with a range of 69 to 109. The mean verbal is 90.3 and the mean performance was 83.6. The group of subjects performed lower than expected on digit symbol, digit span and similarities but higher than expected on comprehension, arithmetic, vocabulary and picture completion. The Ravens Progression Matrices showed a similar pattern and mean I.Q. The significance of these findings will depend on a comparison with a matched nonuser population.

Resting electroencephalograms were obtained in 30 subjects and evaluated independently by four experts. Twenty-five were within normal limits.

Testing was incomplete in one record. One record in a subject who had a head injury within the prior three months showed focal slowing.

Two of the four experts judged the remaining three, records as showing low degrees of average to low voltage theta activity indicative of cerebral dysfunction. The remaining two experts judged these records as within normal limits.

This medical and psychological data suggests some effects of very long term, very heavy hashish use. Without a matched comparison group, factors independent of hashish use, such as age, socioeconomic conditions, or environmental conditions, may account for th observed changes.

However, the researchers note that these men have survived chronic hashish use in high doses without gross behavioral deviation.

JAMAICA

Another foreign investigation (Ruben et al., 1972) conducted in Jamaica (under contract for the National Institute of Mental Health) studied chronic cannabis users and matched nonuser controls. Preliminary findings have shown little evidence of significant differences between the two groups in the extensive anthropological, medical, psychiatric and psychological investigations.

Ganja use is widespread and endemic in the Jamaican lowest socioeconomic strata, and in particular in a millenial-religious sect known as the Rastafarians. More than 50% of all male Jamaicans are estimated to use some form of cannabis, and probably about 20% are regular heavy users of ganja.

The drug was brought to Jamaica from India over 130 years ago by indentured East Indian laborers. However, presently the heaviest ganja users are Afro-Jamaicans who comprise 90% of the population.

The Rastafarian religious sect, founded by Marcus Garvey, preach a "Back to Africa" destiny and claim Haile Selassie to be God. The Rastafarians have always worn. long hair and beards and dressed eccentrically. They believe that "the herb" was given them by God to help them to understand his wisdom exemplified in their greeting, "Peace and Love."

The Rastas reject the values of the dominant society and regard the government as "the powers of Babylon". They have, chosen to opt out of conventional society and instead work and live in a communal existence in poverty. They emphasize the value of ganja in achieving a new level of meaning in this existence.

The Rastafarians add ganja to their infant first bath and start feeding the drug to their infants from the time of weaning in an infusion known as ganja tea. They continue to smoke and drink the drug throughout life.

They, like many other Jamaicans, believe in its medicinal properties especially for asthma and indigestion and promotion of healing; that it gives protection from evil spirits; that it cleanses the skin and purifies the blood; that it promotes sexual vigor; that it gives energy for work and relieves fatigue and provides relaxation after work.

Extensive in-depth studies have been carried out by a team of anthropologists from The Research Institute for the Study of Man in conjunction with The Departments of Psychiatry, Pathology, Physiology and Medicine, of the University of the West Indies. Anthropology field workers lived for extensive periods of time in five rural communities (including fishing, farming and cane cutting areas) and two urban districts.

Over 2,000 people were observed and studied in these communities. Overall life styles of the ganja users were not notably different from nonusing individuals in the Jamaican lowest socioeconomic strata. Users are working, maintaining stable families and homes, and actively participating in their society. No evidence was noted of crime or aggressive behavior or drug use other than alcohol related to ganja use. No evidence of physical dependence was demonstrated. Minimal psychological dependence was observed but no drug craving was expressed.

Thirty long-term ganja smokers and 30 nonusers matched demographically to control factors other than ganja use, were chosen as representative of this functioning lower socioeconomic population and selected for intensive hospital study in order to determine, differences between the two groups.

The mean age of the subjects was 33 with a range of 23 to 51. The primary occupation of one-third of the subjects was farming. The next most common occupations were, fishing, skilled and semiskilled laborers. Half practiced no formal religion, five were Rastafarians and the remainder practiced a wide variety of traditional religious. Almost three-fourths of the males had stable "marriages" and the remaining single subjects were predominantly the younger ones.

The subjects were divided into three groups. Twenty-three were nonganja smokers, 28 were regular daily ganja smokers and 9 were occasional ganja smokers using the drug several times a we or less. Three types of regular ganja smokers were delineated: light smokers using one to four spliffs daily moderate smokers using four to seven spliffs daily; and

heavy smokers using eight or more spliffs per day.

Age of first use ranged from 8-36 years of age. Regular use of ganja occurred at a median age of 16 years with a range of 9-25 years. All ganja smokers had used the drug at least 7 years and some up to 37 years with a mean of 17.5 years.

The ganja users consumer on the average seven spliffs of ganja daily with a range of one to 24 per day. The typical ganja cigarette or cigar, termed a spliff is roughly a four-inch-long paper cone and contains about two to three grams of ganja with a delta 9 THC content of about 2.9% on the average (range of 0.7-10.3%) mixed with about half of a Tobacco cigarette. Also many smoke ganja in a Chillum pipe using very deep inhalation to fill their lungs with smoke. They consume 14 pipe fulls per week on the average, with a range of 1-25 per week.

No significant differences in neurological abnormalities, electroencephalographic abnormalities, hemochemical changes including liver function, urinalysis, chest X-ray abnormalities or chromosome damage in lymphocytes were found in the users or controls.

One user had a long history of bronchial asthma and another had a mild case of Jamaican neuropathy, but nothing suggests these disabilities were in any way related to ganja use. Minor electrocardiographic abnormalities were present in about one-third of both users and controls. This may be related to a syndrome of unknown etiology known as Jamaican cardiomiyopathy.

Thorough physical examination and hematological studies revealed only minimal significant differences between ganja smokers and non-ganja smoking controls. Comprehensive evaluation of red blood cell indices revealed that the ganja smokers had significantly higher hemoglobin levels and packed red cell volumes (hematocrit) than the non-ganja smokers.

These hematologic findings are compatible with those reported recently (Sangan and Balberzak, 1971) for heavy tobacco cigarette smokers. The authors noted that cigarette smoking causes a functional tissue hypoxia due to deficits in lung func tionwith resultant arterial oxygen unsaturation. Thus, an increased demand is placed on the bone marrow to provide more red blood cells to increase the oxygen carrying capacity of the blood.

In addition to the heavy smoking of ganja in spliffs and pipes, 27 of the 30 ganja smokers were tobacco smokers, and several have smoked tobacco cigarettes heavily. 19 of the 30 non-ganja smokers were tobacco cigarette smokers and tended to be light tobacco cigarette smokers.

Thus, the data appears to suggest that a combination of factors including number of years and quantity of cigarette smoking, ganja spliff smoking and ganja chilum pipe smoking is significantly correlated with the hematological changes indicative of functional hypoxia. However, pulmonary function studies did not demonstrate significant decrements correlated with ganja or tobacco smoking.

No significant differences were found between groups by a thorough psychiatric and psychological examination. All subjects were judged to be in normal mental health. Subjects were administered a battery of standardized reliable American psychological tests known to be sensitive to impairment in brain function. These tests were not culture free so that comparison of performance, between Jamaicans and Americans is meaningless Nineteen tests evaluating 47 variables were performed including one personality test, three tests of intelligence and verbal abilities, and 15 neuropsychological tests.

Two of 47 variables had statistically significant differences between ganja smokers and non-smokers. The smokers scored higher on the digit span subtest of the Wechsler Adult Intelligence Scale and bad a more centralized personality organization on the Lowenfeld Mosaic Test.

Non-smokers had the best performance on the number of edge contacts with the non-dominant hand on the Holes Test. These few significant differences were considered chance findings by the investigators.

In general no consistent differences were found on these psychological tests between ganja smokers and non-smokers. The data clearly indicate that the long-term ganja use by these men did not produce demonstrable intellectual or ability deficits when they were without the drug for three days. No evidence in these results suggest permanent brain damage.

The alleged role of ganja in producing personality change in the direction of a loss of competitive striving and an unwillingness to work, termed the amotivational syndrome was also investigated.

Based on clinical impressions gained from careful sociological and psycholo ical techniques, the investigators noted that the chronic ganja smoker differed little in work habits or record from his matched control. No evidence of an amotivational syndrome was found. In fact, the subjects believe ganja has a functional value as a work adjunct. It provides energy for work and helps them do arduous boring jobs.

In the Jamaican culture, ganja may produce a "motivational syndrome". In an objective videotape evaluation of work energy output and ganja smoking, ganja use did not lower productivity on simple repetitive tasks, such as woodcutting which requires compulsive concentrated effort.

A study of cultivators points up the relationship of population, land, and economic pressures to ganja use. In the area studied land resources are scarce, farms small and cultivation difficult on the hilly slopes. Market conditions determine income from cash crops and restrictions on migration maintain population pressures on limited resources.

For these farmers, the researchers suggest that ganja use. decreases total cultivated acreage and consolidates production while disruption of competition and social cohesiveness among the farmers is avoided.

These data may indicate that heavy ganja use during cultivation in farming situations with limited alternatives may serve to maintain the status quo. However, it is possible that the compulsive concentrated effort experienced by the cultivators with heavy ganja use may be productive in areas with good soil and climatic conditions where systematic weeding can increase crop yields.

As a result of the extensive anthropological study, the investigators believe that ganja use in Jamaica is a culturally determined phenomenon. '. "ganja complex" exists which consists of closely related, learned patterns of behavior manifested by the members of the society.

The ganja complex appears to be functional for the working-class Jamaican. Various elements Of the complex including economic, social and personal are interrelated in ways that contribute to operation of the whole culture.

AFGHANISTAN

Dr. Salamuddin Weiss (1971) studied 1011 chronic hashish users in Kabul in order to obtain a general picture of the charas habit in Afghanistan.

Cannabis is cultivated in this tropical country. A concentrated product, charas, the resin obtained from the flowering tops of the female plant, is the preparation generally used. The most common method of smoking charas is in a clay water pipe called a Chelum. Next most commonly used is a pipe or needle and straw. Infrequently, charas is smoked in tobacco cigars or cigarettes. Chewing the leaves or drinking a charas mixture as a confection is quite rare.

Although charas smokers are found throughout society, they are predominantly found in certain groups. The ages of the subjects studied ranged from 13 to 70 years old. More than 75% were, married. Almost all were males.

Socioeconomic status was as follows: 70%, lower, 28% middle and 2% upper. 82% are illiterate, 27% had a primary school education and less than 1% had any higher education.

Most smoking occurs in groups of two to 20 friends in quiet out of the way places. Most users smoke several times a day. The longer one has smoked charas, the shorter the duration of the high and the more often the individual can smoke each day.

Weakness, sexual difficulties and physical impotence are commonly reported by smokers. Most report they have a good appetite and eat more than normal, but malnutrition is common.

One hundred chronic smokers were selected at random and examined medically: 93 were malnourished; no evidence of illness was found in 79 subjects; 13 showed signs of respiratory illness (bronchitis) ; 7 showed sleep disturbances and one had pulmonary tuberculosis. No deaths have been reported from charas overdose. One subject out of the 1,011 was known to be chronically psychotic.

A review of over 150,000 outpatient and inpatient psychiatric visits per year over the past 10 years revealed 20 short-term psychotic episodes yearly involving charas alone and 16, short-term psychotic episodes yearly involving both charas and other drugs. An absence of chronic mental illness related to charas use was noteworthy.

Most charas smokers commence use during their teens, gradually increasing their use about five or six times until they reach their highest dose between the ages of 20 to 40 years.

At the extreme, smokers have raised their daily dosage up to 10 times their starting dose within the first two years. They then gradually decrease their daily requirement by about 50% upon reaching their 60's. Generally, most smokers cease charas use after their 60's, but some, use extremely low doses for the rest of their lives.

These patterns of use are consistent with the development of tolerance. Additionally, chronic smokers note they are able to use larger doses than they did when they began use without any significant signs of intoxication. Also after stopping charas use for a few days or months, the users report they restart use at smaller doses to achieve the desired effect.

No physical dependence was noted. Marked psychological dependence was present which

makes it difficult to stop their habitual use. Discontinuation of charas use produced mild psychologic abstinence signs. These signs, generally include restlessness loss of appetite, sleeplessness, nervousness, headache, and gastrointestinal upset.

Most smokers after discontinuation of use are quite able to live with their families and perform their jobs without discomfort. Most chronic smokers return to charas use within days or months. Out of a group of 100 randomly selected ex-smokers who had used for eight to 22 years, 42 have not returned to charas use, 16 use occasionally and 42 have returned to daily use within one to 13 months.

Most common explanation given by the subjects for restarting use were to continue close relationships with charas using friends and lack of a busy job.

A group of 100 opium addicts were selected at random from the community; 51 of these started their drug use with charas and later substituted opium for charas.

Generally, charas smokers report that they become faster in their daily jobs, but observation reveals a slowness in these activities. The ability to perform a non-complicated job is comparable to non-charas smokers. They tend to be cooperative but lazy persons. They tend to be more theoretical than practical and avoid making decisions. They do not demonstrate creativity or contribute significantly to the improvement of their community.

Summary

Marihuana has been used by man in countries around the world for many centuries. Scientifically, more is known about marihuana's effects than many other botanical substances consumed by man.

Marihuana is one of several preparations from the plant, cannabis sativa. The plant contains many different chemicals, but tetrahydrocannabinol appears to be the major active psychopharmacologic ingredient. The potency of the preparation is determined by the THC content, which varies according to the origin of the seed, the conditions of cultivation, and the extent of manicuring.

Several important factors exert significant influences on the psychopharmacological effect. These include dose, method of use, set and setting, and pattern of use including frequency and duration of use.

The acute subjective experience is dose-dependent. At low doses commonly used in this country a mild intoxication occurs, but at higher doses psychotomimetic experiences can occur. Few consistent physiological effects are noted. No pathologic bodily changes have been conclusively demonstrated from acute use. Subtle effects on recent memory, psychomotor function, and social behavior have been demonstrated.

The margins of safety between the effective dose and the toxic dose is quite large. No human fatalities have been noted in this country caused by marihuana. The most common adverse reactions are becoming too intoxicated, and the acute anxiety panic reaction. Both of these are transient and related to dose consumed as well as set and setting factors.

Acute psychotic, reactions are quite rare. They usually last a few days to weeks and occur in predisposed persons either with preexisting mental disorders or borderline personalities especially under stressful conditions. Transient acute brain syndrome or toxic psychosis is possible at extremely large doses.

Evidence has accumulated which indicates that differential tolerance does develop at least, in persons who smoke large amounts of marihuana several times a day. Development of tolerance to the depressant effects on behavior appears to precede development of tolerance to the intoxicant effect.

Physical dependence has not been demonstrated. Little, if any, psychological dependence is present in most intermittent marihuana users. Moderate psychological dependence occurs in moderate to heavy users and marked psychological dependence has been described in very heavy chronic users.

Some detrimental effects have been conclusively linked to short- and long-term marihuana use for very heavy users. The most frequently reported change in the heavy, long-term smokers of large quantities of potent preparations is chronic bronchitis comparable to that developed by a heavy, long-term tobacco cigarette smoker. A chronic cannabis psychosis probably occurs rarely in heavy chronic, hashish smokers in Eastern countries. Most psychotic episodes are the acute variety and clear in a few days to weeks. No objective evidence has been demonstrated that even very heavy, long-term hashish use causes organic brain damage.

Objective studies of chronic, heavy smokers of potent preparations have not causally linked this drug with the amotivational syndrome which has been described by many clinicians. Almost all chronic, heavy hashish smokers are indistinguishable from their peers in the lower socioeconomic strata of their respective societies in social behavior, work performance, mental status and overall life style.

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III. Marihuana and Public Safety

The significant role of the law enforcement community and the popular press in promoting the idea that marihuana use leads to undesirable and antisocial behavior has been discussed in the Report. The purpose of this chapter is to describe the genesis of the, perceived problem and the theoretical basis for these allegations.

The early campaigns against marihuana use can be viewed as an extension of the temperance and moral reform movements which swept the country during the 1920's. They were generally spearheaded by persons who opposed the use of opiates, alcohol and tobacco on the grounds that all such substances were physically, mentally and morally debilitating. The presumed dependence of the user on the drug, the loss of self-control and the unhealthy preoccupation with pleasure-seeking activities purportedly induced by these substances were seen as contrary to the traditional values of our society.

Reiteration of these themes by practicing professionals, respected members of officialdom and the popular press ultimately gave rise, to what Lindesmith (rev. ed., 1968: 188-189) has termed the "evil causes evil" fallacy, and which Goode (1972) has de-scribed as follows:

The impetus behind public and even expert conceptions of drugs and drug use is that a phenomenon so patently undesirable and universally condemned as the use of narcotics or marihuana must, inevitably, have both pathological causes as well as pathological consequences. Thus, the task of science and medical research is seen as "discovering" these negative concomitants of illicit drug use. In this way, we can all feel better about condemning the phenomenon itself because our moral and ideological feelings can thereby be, backed up and verified by the Indisputable data of positive science (p. 1).

This same philosophical leaning of persons who view marihuana as a significant danger to both the individual and society carries with it a corollary that use be prohibited and the user punished.

Perhaps the most persistent controversy with respect to marihuana use is the degree to which it poses a danger to public safety. Public and professional opinion surveys have repeatedly demonstrated the existence of a widespread belief that marihuana use leads to the commission of deviant, delinquent, criminal and violent acts. In addition, some persons have recently expressed concern that marihuana impairs driving skills and performance and, in this way, also constitutes a public safety hazards.

This chapter will review the evidence pertaining to the effects of marihuana on criminal and violent behavior, deviant and aggressive sexual behavior and driving skills and performance. Then an effort will be made to assess both the nature and strength of the purported relationships between marihuana use and these behaviors.

Problems in Assessing the Effects of Marihuana

The degree to which marihuana constitutes a danger to public safety is dependent, in large measure, upon the drug's observable, effects on the behavior of the user. No drug, including marihuana, produces the same effect at all times, under all conditions and in all individuals. Rather, the quality (form and intensity) and the quantity (extent and frequency) of the perceived effects are determined by the complex interaction of both pharmacological and extrapharmacological factors. As Goode (1972) has noted:

We should bear this qualification in mind when looking at the relationship between the ingestion of a drug and any subsequent behavior-with the latter supposedly "caused" by the effects of the drug. Drug effects vary, and, in addition, even standard effects do not automatically translate into specific forms of human behavior (P. 18).

In a paper prepared for the Commission, Tinklenberg (1971 : 1-8) has enumerated some of the basic factors which should be taken into consideration in evaluating the relationship between marihuana and crime. They are equally relevant, however, for the assessment of any behavioral effect presumably attributable to marihuana, and for that reason they are summarized below.

Definition and Congeners. The concentration of the principal active chemicals in cannabis (THC and their metabolites) in any given amount of marihuana varies widely according to where the plant is grown, how it is cultivated, harvested and cured. These variations permit a wide range of pharmacological potencies and unknown variations in their effects on behavior.

Drug-Drug Interactions. Given the strong possibility of intentional or inadvertent adulteration of marihuana with other psychoactive drugs, it may be that behavioral changes attributed to marihuana may actually derive from the adulterants or from the interaction of THC and the adulterants (which may well be occasioned by the deliberate rather than unknown simultaneous or sequential use, of other psychoactive drugs).

Dose-Response Functions. With respect to the question of how drugs affect behavior, it is likely that marihuana influences behavior in different ways and degrees, depending upon dosage levels. Although it is common to infer that higher doses of a given drug will induce more of a particular response and lower doses less, such inferences may be inaccurate in that drug effects can show a curvilinear dose-response relationship (as seems to be the case with alcohol).

Time-Action Functions. Time-action function describes the changing effects of marihuana during the course of the drug action. During the brief periods in which the drug effects are most intense, there may be a more pronounced alteration in behavior than during most of the points on the drug time-action continuum.

Individual Variation. Different individuals apparently respond quite differently to the same dose-time factors of marihuana as well as other drugs. In some laboratory studies, where, high doses of marihuana induced considerable euphoria and enhanced conviviality in most subjects, a few subjects who received the same dosage in the same setting experienced paranoia, excessive agitation and aggressive tendencies.

Cumulative Effects. The effects of marihuana on individual behavior have been shown to vary according to the amount of previous experience with the drug. There is increasing

evidence that chronic users respond quite differently to marihuana than do occasional users. The cumulative extent of previous experience may have an important influence on subsequent behavioral responses.

Psychological and Environmental Variables. The behavioral response to marihuana and to other drugs is at least partially dependent upon such psychosocial variables as the expectations of the user regarding its influence on his behavior. These expectations are in turn derived from. the personalities of the, individuals involved, recent events in their lives, and the physical, interpersonal and social milieu in which the marihuana use occurs. The behavioral responses to marihuana use are likely to correlate with such psychological and environmental variables quite independently of any pharmacological effects the drug may exert.

Personality Factors. A certain number of individuals in any given population demonstrate characteristic and relatively enduring patterns of antisocial behavior regardless of their immediate circumstances, possible drug use and the like. These individuals, variously described as antisocial, criminal or emotionally unstable, typically manifest, from childhood on, recurrent tendencies toward deviance in many areas of life. For some of these people, those predisposed toward both criminality and drug abuse, crime and drug use do coexist. However, the assumption that the drug causes crime or vice versa is not necessarily valid. One should not automatically conclude from this that the use of drugs has no influence on their criminal behavior. Drug use may possibly provide a form of reinforcement which may increase or decrease the likelihood of a criminal act.

Crime Process Factors. Crime process factors refer to the complexities of criminal behavior and the possible influence of marihuana on that behavior. A multifactored perspective of the etiology of crime , including personal, social and situational variables, allows for the possibility that at each step in the chain of events leading to the commission of a criminal act, marihuana use may contribute to enhance or diminish the possibility of this outcome.

In short, any interpretation of the data to be presented below which fails to take into account at least some of these variables will likely result in a "post hoc, ergo propter hoc" fallacy- that is, the invalid assumption that simply because one event occurs later than another event (one commits a crime after smoking marihuana) that the latter is caused by the former (marihuana caused the crime).

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Marihuana and Violence

(The evidence to be presented here applies not only to aggression and to violence but to marihuana's relationship to crime in general, and is therefore equally relevant to a later section on marihuana and non-violent crime. The effects of marihuana on sexual behavior, including the commission of sexual offenses will be treated in the following section on marihuana and sexual behavior.)

The popular and professional literature contains numerous unsupported and often emotionally charged accusations regarding marihuana's contribution to violence.

In at least two dozen comparatively recent cases of murder or degenerate sex attacks, marihuana proved to be a contributing cause (Anslinger, 1937).

In a recent study of thirty-seven murders in New Orleans in a year, seventeen were traced directly to marihuana. . . . Evil marihuana is pock-marking this nation with murders, sex attacks, suicides, and crimes in every category from bank stick-ups to petty thievery . . . (LaRoe, 1940).

Marihuana, while giving the hallucinations of cocaine, adds delusions of impending physical attack by one's best friend or close relatives. In addition, marihuana is intrinsically and inherently crime exciting. It has led to some of the most revolting cases of sadistic rape and murder of modern times (Rowell and Rowell, 1939: 67).

Even sex does not satisfy the abnormal urges induced by marihuana. There is still the necessity for further excitement, more emotional release. That is when the guns are grabbed, the knives waved and the razors swung. And all that is a marihuana user's idea of what is normal! (Williams, 1969).

To add greater credibility to their undocumented assertions, some persons describe the manner in which the drug purportedly leads to violence.

In the earliest stages of intoxication the willpower is destroyed and inhibitions and restraints are released; the moral barricades are broken down and often debauchery and sexuality result. Where mental instability is inherent, the behavior is generally violent. An egotist will enjoy delusions of grandeur, the timid individual will suffer anxiety, and the aggressive one often will resort to acts of violence and crime ... (Anslinger and Tompkins, 1953: 22).

Smoking of the weed is habit-forming. It destroys willpower, releases restraints, and promotes insane reactions ... Robberies, thrill murders, sex crimes and other offenses result (New York Daily Worker, 1940, in Solomon, 1968: 288).

Others simply deny these allegations or assert that there is no evidence to support the thesis of an independent causal relationship.

The fact that so many witnesses testified to the peaceable and orderly character of the excessive consumers goes far to prove that in this country experience shows that as a rule these (hemp) drugs do not tend to violent crime and violence (Indian Hemp Drugs Commission, 1969: 258).

A fair summary of the available evidence would be that very rarely do major (particularly violent) crimes follow upon the use of the drug, and that, in instances where they do, the relationship is an indirect one (Ausubel, 1958: 103).

One likely hypothesis is that, given the accepted tendency of marihuana to release inhibitions, the effect of the drug will depend on the individual and the circumstances. It

might, but certainly will not necessarily or inevitably, lead to aggressive behavior or crime (President's Commission on Law Enforcement and Administration of Justice, 1967: 13).

The relationship between marihuana use land the commission of aggressive acts or violent crime such as murder, rape and assault remains one of the most controversial issues relating to the drug. Persons who believe that such a relationship exists often argue that marihuana triggers the release of inhibitions and restraints, destroys the will power and heightens aggressive tendencies of the user, serving as a catalyst for the commission of aggressive or violent acts.

This argument raises several fundamental questions: Are the effects presumably induced by the drug commonly experienced by marihuana users? Are these effects, to the extent that they do occur, generally or frequently translated into overt behavior? And is the behavior which presumably manifests itself ordinarily violent or aggressive?

The answers to these questions may be obtained from several sources, including the results of laboratory experiments designed to measure certain physiological and psychological reactions and to identify observable behavioral effects; and retrospective self-reports of effects purportedly experienced by marihuana users. Additional clues may be gained from examination of the criminal records of known marihuana users and the incidence of marihuana. use among persons arrested for or convicted of violent crimes. However, while these latter methods may reveal statistical associations (which could prove to be spurious upon further analysis), they should riot be interpreted to demonstrate the existence of a causal connection between marihuana use and the offenses committed.

THE VIOLENT AND CRIMINOGENIC EFFECTS OF MARIHUANA

The empirical evidence gathered to date lends no support to the hypothesis that marihuana heightens aggressive tendencies in the user or that its effects significantly increase the likelihood of inciting the user to violence or crime. However, those findings summarized below do not mean that marihuana cannot be related to aggressive or violent behavior but merely suggest that the effects of the drug and the behaviors in question may operate independently.

The Mayor's Committee on Marihuana (1944) studied the psychomotor effects of marihuana on 72 prisoners, both users and non-users. Marihuana was administered experimentally as both an oral extract and as cigarettes. The data show that the degree of the drug's effect on psychomotor activities is dependent upon the complexity of the function and, in some cases, on the strength of the dose administered. Although simple reaction time and tasks were only slightly affected, more complex functions like static equilibrium and body and hand steadiness were significantly and adversely affected by both large (5 cc.) and small (2 cc.) doses of the drug.

In contrast to the ability of amphetamines to enhance muscular performance and to increase physical activity (Weiss and Laties, 1962; Tinklenberg and Stillman, 1970), marihuana has been found to decrease the inclination toward physical activity and to actually reduce both physical exertion and activity (Mayor's Committee on Marihuana, 1944; Hollister, et. al., 1968; Hollister, 1971), thereby decreasing the probability of inciting the user to assaultive behavior.

Although marihuana has been found to reduce inhibitions in some persons, it has not been shown to exaggerate extant aggressiveness to any appreciable degree; in some instances it has, in fact, been shown to reduce aggressiveness, and to induce timidity, fear and passivity in the user (Bromberg) 1934,1939; Chopra and Chopra, 1939; Allentuck, 1942; Chopra, and

Chopra, 1942; Charen and Perelman, 1946; Carstairs, 1954; Blumer, et. al., 1967; National Institute of Mental Health, 1970, 1972).

In recent years, a number of studies have been conducted in which marihuana users were asked to describe the effects they experienced while under the influence of the drug. On the whole, their findings are similar to those obtained from the results of laboratory experiments.

Halikas, Goodwin and Guze (1971) found that the majority of the users in their sample reported "usually" feeling relaxed (79%) and peaceful (74%).

Tart (1971) administered a questionnaire to college students in California, one item containing a list of 206 possible effects of marihuana. Respondents were asked to indicate whether, within the last six months, they had experienced the designated effects never, rarely, sometimes, very often or usually. Of the 153 respondents, 69% gave one of the latter three responses to the item: "My inhibitions are lowered so that I do things I'm normally inhibited to do."

To the item: "I lose control of my actions and do antisocial things (actions that harm other people) that I normally wouldn't do," 22% said rarely, 1% said sometimes, and the remaining 77% replied "never." With respect to other more specific effects, 23% of the users stated they "usually" felt physically relaxed, and 49% said they "very often" felt physically relaxed and did not want to get up or move around when high on marihuana (pp. 703-704).

In a study by Brotman and Suffet (1970) of 74 users in New York City (both students and nonstudents) no one mentioned any hostile feelings or actions when asked to describe what happens when they get high on marihuana (p. 264).

Goode (1970) asked 204 respondents to describe their experiences when high on marihuana. Table 1 illustrates the responses of the users to effects possibly related to aggression or crime (pp. 53-54).

In a more recent, Commission-sponsored survey of 15 to 34 year old male residents of Philadelphia, respondents were interviewed about the extent and frequency of their marihuana use, the extent to which marihuana figured in the commission of criminal or delinquent acts and the effects they generally experienced while under the influence of the drug (Goode, 1972). With respect to the effects experienced, nearly all the marihuana users (about 75% of the total sample reported that they had tried marihuana at one time or another) denied that the effects of marihuana on them could be interpreted as criminogenic or violent in nature. Table 2 below presents the subjective effects of marihuana related to crime and violence which were reported by the 559 respondents.

Table I.-CRIMINOGENIC AND AGGRESSIVE EFFECTS OF MARIHUANA

(Figures in Percentages)

More relaxed, peaceful, calmer; marihuana acts as

a tranquilizer - -- ---------- ------ -- ----- ---------- 46

Exaggeration of mood: greater subjective impact, emotional significance --- ------ ----- ------ ---------- -_ -_ 25

Time seems slowed down, stretched out, think more

time has passed ---------- ---------- ------ ---- -------- ------ 25

Become more withdrawn, introverted, privatistic-- - __ 22

Become tired, lazy, lethargic, don't want to move---- - 19

Feel freer, unrestrained, uninhibited --------- ---- --- ------ 18

Feel paranoid ----- ---------- -------- ------ ---------- ----- -- ------- 15

Have hallucinations ---------- - -- -- --------- -- ------- 15

Feel sleepy ------ ---------- --- ---- ---------- 14

More uncoordinated, clumsier, motor skills impaired 9

Other people annoy me more; find fault in others ------ 8

Become more active, want to move around more -_ __ - 6

Table 2.-REPORTED EFFECTS OF MARIHUANA AS RELATED TO CRIMINAL AND VIOLENT BEHAVIOR (Figures in Percentages)

Effects reported	Almost all the time	More than half the time	Less than half the time	Never or almost never
Feeling of wanting to hurt someone	0	3	96	
Feeling of wanting to do something violent.. *	4	95		
Feel more angry	1	3	8	88
Feeling of frustration	3	4	16	78
More willing to follow others' suggestions	4	12	25	59

Care less what others

think of what you do. . 16 15 10 18

Feeling of being able

to do anything 6 5 13 77

Have hallucinations 9 8 16 66

Feeling of relaxation.... 50 22 10 18

Feel less angry 31 22 13 34

Feeling of drowsiness

or sleepiness 22 25 25 27

* Less than 1/2 of one percent. Source: Goode, 1972: 21.

The data show that the overwhelming majority of the respondents report "never or almost never" experiencing effects which can be characterized as producing frustration, anger, or aggression, and that they usually do Dot experience effects whic!. could be taken to indicate an increase in suggestibility. On the other hand, substantial proportions of the respondents reported feeling relaxed (72%), less angry (53%) and drowsy or sleepy (47 %,) at least half of the time.

In sum, these data suggest that marihuana does not commonly produce effects which are likely to increase aggression or incite the user to violence. Numerous studies designed to assess the relationship more directly demonstrate, on the whole, that marihuana does not play a significant role in the commission of violent crimes.

MARIHUANA AND VIOLENT CRIME: THE EVIDENCE

Over the years a number of approaches have been utilized in an effort to assess the relationship between marihuana use and violent crime. Perhaps the simplest approach is to compile a. list of violent offenses allegedly committed by marihuana users and to establish, retrospectively, the role of marihuana in the commission of these offenses.

The Indian Hemp Drugs Commission (1894), for example, investigated 81 cases of violence allegedly caused by hemp drugs in in effort to determine whether or not a causal relationship existed. Of these 81 cases, 11 were too old to permit adequate investigation. In 23 of the cases examined, however, 18 showed no evidence of a connection between the crimes and the use of hemp drugs. The Commission concluded that:

In respect to his relations with society, however, even the excessive consumer of hemp drugs is ordinarily inoffensive,. His excesses may indeed bring him to degraded poverty which may lead him to dishonest practices; and occasionally, but apparently very rarely indeed, excessive indulgence in hemp drugs may lead to violent crime. But for all practical purposes it may be laid down that there is little or no connection between the use of hemp drugs and crime (Indian Hemp Drugs Commission, 1893-1894, reprinted 1969: 204).

Similarly, in 1938 the Foreign Policy Association published the accounts of 10 marihuana crimes, including murder and assault, "culled at random from the files of the U.S. Bureau of Narcotics" (Merrill, 1938: 28). These cases were presented in such a way as to imply that marihuana caused the offenses. According to Grinspoon (1971: 302), they "gave the reader the distinct impression that the user of marihuana was a violent criminal who was given to rape, homicide, and mayhem." Bromberg (1939), however, questions the validity of the causal assumption.

It is difficult to evaluate these statements, because of their uncritical nature.... Among the ten patients, the second, J. O., was described as having confessed how he murdered a friend and put his body in a trunk while under the influence of marihuana. J. O. was examined in this clinic (Bellevue Hospital); although he was a psychopathic liar and possibly homosexual, there was no indication in the examination or history of the use of any drug. The investigation by the probation department failed to indicate use of the drug marihuana. The deceased, however, was addicted to heroin (p. 9).

Based on retrospective case analyses, some observers have attempted to specify more precisely, the nature of the purported relationship or the situations in which aggressive behavior may result from marihuana use. Bromberg (1939), for example, suggested that aggressive or violent behavior may arise when a naive subject develops a panic state in response to marihuana-induced hallucinations. Allentuck and Bowman (1942) believed that aggressive or antisocial behavior following use may occur as a reaction to some unpleasant external stimulus during the phase of hypersensitivity and heightened psychomotor activity. Others have suggested that antisocial conduct of an aggressive or violent nature may occur when marihuana is used, as alcohol often is, to release repressed feelings of hostility (Siler, et al., 1933; Chopra and Chopra, 1939; Allentuck and Bowman, 1942; Freedman and Rockmore, 1946; Murphy, 1963), and to serve as a fortifier for aggressive or violent crimes (Ewens, 1904; South Africa Interdepartmental Committee on Abuse of Dagga, 1952; Ames, 1958; Watt, 1961; Blumer, et al., 1967; Miller, 1968).

The available evidence bearing on these issues, however, suggests that panic reactions rarely occur; that psychomotor activity is more often reduced than enhanced following use; that aggression rarely follows use, but when it does, it generally occurs among individuals with histories of maladjustment, emotional instability or impulse disorders (Bromberg, 1934, 1939; Charen and Perelman, 1946; Ausubel, 1958; Bloomquist, 1968; Grinspoon, 1971; Kaplan, 1971; National Institute of Mental Health, 1972).

After a series of studies of marihuana and crime, Chopra and Chopra (1939) concluded that if any relationship existed between marihuana use and violent crime, it was an indirect one. They stated that:

So far as premeditated crime is concerned, especially that of a violent nature, hemp drugs . . . may not only not lead to it, but they actually act as deterrents.... One of the important actions of these drugs is to quieten and stupify the individual so there is no tendency to violence. . . . The result of continued and excessive use of these drugs in our opinion is to make the individual timid rather than lead him to commit a crime of a violent nature (p. 92).

Over the years, the conclusion of the Chopras has received increasing support from many quarters of the research community (Mayor's Committee on Marihuana, 1944; Maurer and Vogel, 1962; White House Conference on Narcotic Drug Abuse, 1962; Murphy, 1963; President's Commission on Law Enforcement and Administration of Justice, 1967; National Institute of Mental Health, 1970, 1972).

In the absence of possibilities for addressing the issue more directly, several researchers have relied on statistical studies and have sought to establish the overall and comparative incidence of detected violent crimes among cannabis users. One method has been to compile lists of violent crimes committed during specific periods of time and to determine the proportion of these offenses committed by cannabis users.

Lambo (1965) compiled a list of crimes occurring in three West African countries during a recent two-year period. He claimed that users of cannabis had committed 51% of the 73 murders, 31% of the 263 cases of assault and battery and 26% of the 472 cases against women.

Some have preferred to base their statistical studies on samples of offenders (rather than lists of offenses) drawn from the arrest or conviction files of law enforcement agencies. Several researchers adopting this method are content to identify the marihuana users in their samples and then simply report the number of users charged with violent crimes or the proportions of the total number of violent crimes perpetrated by the users.

The District Attorney of New Orleans, for example, testified before the House Ways and Means Committee that of the 450 men convicted of major crimes in 1930, 125 were identified as regular marihuana users. Approximately one-half of the murderers and one-fifth of those charged with assault, robbery or larceny were said to be regular marihuana users (U.S. House of Representatives, 1937: 23-24).

Bromberg (1939) reviewed the records of 10,854 offenders in the psychiatric clinic of New York County's Court of General Sessions during the period 1932 to 1937. Of the 67 marihuana users identified, only six had been charged with violent crimes. He concluded that there was no causal relationship between marihuana use and aggressive crime.

Others go one step further and attempt to compare the users' rates of violence with those of other selected populations such as non-marihuana using offenders, offenders using other drugs, or all of fenders in a given file.

Bromberg and Rodgers (1946) studied the civilian and military criminal records of 8,280 convicted offenders at the United States Naval Prison in Portsmouth, Now Hampshire between January 1, 1943 and July 1, 1945. Of the total number of offenders investigated, 40 or .0048% were identified as marihuana users (23 used to excess, 10 were moderate users and seven were described as light users). Of these 40, only two reported being more aggressive while under the influence of marihuana than they would be under normal conditions and three had been charged with violent crimes (assault or striking an officer) while in the military. Comparison of the users' criminal records with those of 40 randomly selected non-using prisoners revealed that the non-user group had committed more aggressive crimes than the users.

In conclusion, the researchers stated that:

1. *There is no positive relationship between aggressive crime and marihuana usage in the Naval service; . . .*
2. *. . . there is no significant causal relationship between aggressive crime in civilian life (of the naval offenders studied) and the use of marihuana . . . .*
3. *Marihuana usage is but an aspect of some type of mental disorder or personality abnormality* (p. 826).

Maurer and Vogel (1962) have stated a similar conclusion.

"*It has not been our impression from contact with many hundreds of marijuana users that*

these people are violent criminals; ... While there may be occasional violent psychopaths who have used marijuana, have committed crimes of violence, and who have, in court, explained their actions as uncontrolled violence resulting from the use of the drug, these are exceptions to the general run of marijuana users.... Marijuana is not possessed of any mysterious power to force people to commit acts which they would not otherwise perform (p. 281).

Blum (1969) reviewed the data provided in 1966 by the Federal Bureau of Investigation as part of its Careers in Crime Project. The data showed that marihuana users did not differ significantly from either heroin users or from all offenders (drug and non-drug users) in their rate of violent crime relative to their total non-drug offenses (28%, 26% and 26%, respectively).

There have been several statistical studies, also using offender populations, designed to assess the degree to which persons arrested for cannabis use have previous or subsequent arrests for violent crimes.

Bromberg and Rodgers (1946) found that of the 40 offenders in their sample identified as marihuana users, 12 had been charged with previous offenses, three of them for assault.

Gardikas (1950) reviewed the criminal records of 379 persons arrested between 1919 and 1950 for publicly using hashish. Of these, 117 (31%) reportedly progressed from hashish use to other crimes, about one-third of these subsequent crimes involving violence or weapons. Gardikas stated that one subgroup of these, offenders accumulated 420 offenses of assault, woundings, threats, robberies, and manslaughter (p. 5).

In sum, these statistical studies based on samples of violent offenses, violent offenders or arrested marihuana law violators indicate that some individuals identified as marihuana users do commit violent crimes, have committed them in the past and go on to commit them in the future.

Their numbers, however, are generally small, both absolutely and relatively. These studies therefore suggest a very weak and insignificant statistical association between marihuana use and violent crime which may itself be completely attenuated when the proper statistical controls are applied.

These studies do not establish a causal relationship between cannabis use and violent crime; nor do they permit an affirmative response to the crucial question of whether the use of marihuana alters the progression to violent crime at a significantly greater rate than that which might be expected from some other criminal subgroups, more representative samples of cannabis users, or samples drawn from the general population. They also fail to address themselves to the external conditions and circumstances which might serve to mitigate the observed relationships.

Several recent and more sophisticated empirical investigations have addressed some of the critical questions left unanswered by statistical studies of offender populations. Namely, they set about to determine whether marihuana users in the general population commit acts of aggression or violence significantly more frequently than do nonusers; and whether any observed differences between users and non-users may be more directly attributable to extra-pharmacological (social, cultural, psychological) variables than to the use of marihuana itself or to the pharmacological action of the drug per se.

In 1965, Robins and his associates (1970) conducted a survey of 20 black men born in St. Louis between 1930 and 1934. The marihuana users in the sample were then compared with

the nonusers relative to their ratings on a "violence syndrome" constructed by the researchers.

Respondents were rated high on the violence syndrome if they reported having participated or felt like participating in three or more of the following items, one of which was a judgment by the interviewer that the respondent demonstrated hostility during the interview:

1. Getting hurt in a fight.

2. Ever feeling like killing someone.

3. Ever hitting people when angry.

4. Being quick to lose one's temper.

5. Throwing or breaking things when angry.

6. Ever hurting someone in a fight.

7. Ever fighting with a weapon.

8. Getting mean when drinking.

9. Interviewer's observation of respondent's hostility.

The researchers found that those who had used marihuana during adolescence were more likely to score high on the violence syndrome than were those who did not use the drug for the first time until adulthood; 31% of the respondents who had used marihuana and no other drug during adolescence exhibited three or more of these measures, 24% of those who used marihuana only but started as adults scored high, 16% of the non-users were classified as high on the violence syndrome, and 45% of those who used marihuana and other drugs were so classified.

The researchers also found that users were significantly more likely to report the commission of " adult person or property offenses" than were nonusers; 32 % of the nonusers, 48 % of the marihuana only adult starters, 56% of the marihuana only adolescent starters, and 77% of the multiple drug users reported committing crimes against persons or property as adults.

Based on these data, marihuana users were said to be significantly more likely to have exhibited violent behavior than were nonusers. This conclusion, however, seems somewhat premature.

First, upon the application of three "pathological" controls (dropping out of school, alcoholism and involvement in juvenile delinquency), the original relationship was reduced to some unspecified extent; the researchers reported only that these controls "failed to completely wipe out" the statistical correlation. Secondly, several of the items would not appear to be sufficiently discriminating in that large numbers of people, whether drug users or not, have probably been quick to lose their temper, hit people when angry (most parents, for example), or felt like killing someone in a moment of anger. The subjective nature of the last item the interviewer's observation of hostility has already been noted.

Thirdly, neither the drinkers nor those who were multiple drug users were isolated in the analysis, making it impossible to determine whether or not the apparent relationship between

marihuana use and violence may have been a function of these other drugs rather than the marihuana.

Lastly, but perhaps most importantly, the researchers found several other "pathological" variables correlated with the use of marihuana in their sample: (a) low income, (b) low status jobs, (c) unemployment, (d) receiving financial aid, (e) failing to graduate from high school, (f) fathering illegitimate children, (g) marrying women who had been married previously or who had children, and (h) drinking "heavily enough to create, social or medical problems."

Because none of these variables was controlled in the data analysis (despite the fact that most of them have been found to be significantly related to delinquency and crime and characteristic of persons involved in delinquent, criminal and drug subcultures), it is impossible to determine whether or not any or all of these variables played a mediating role in the observed relationship between marihuana use and antisocial behavior in the, sample. As Goode (1972) has noted, the fact that the three controls which were applied did reduce the relationship, makes it likely that "additional controls would reduce the relationship even more, indeed, reduce it to zero, if applied simultaneously" (p. 13).

As such, although this study represented a significant step forward in investigating the relationship between marihuana and crime or violent behavior, its methodological limitations preclude generalizations of the findings to the larger universe.

In a study of drug use among lower class minority group youth, Blumer and his associates (1967) found that marihuana users were much less likely to commit aggressive or violent acts than were those who used amphetamines or preferred alcohol, and that most of the marihuana using youths deliberately shunned aggressive behavior and adopted, instead, a "cool," non-violent style. The researchers did find a small group of youths (termed "the rowdy") who were oriented toward aggressiveness. Generally, these youths preferred alcohol over other drugs and were found, for the most part, to have been raised in an aggressive and combative social milieu. The researchers point out, however, that most marihuana users in the sample were not of the rowdy type, even though it is this small group which often forms the basis of the public and police image of the youthful marihuana user. In commenting on the role of marihuana in the passage of youth from rowdy to a cool style, the authors note, that the passage from the rowdy type to a cool and mellow youngster, as it relates to the use of drugs, involves chiefly a shift to the smoking of marijuana. . . . [The youngsters'] accounts and discussions also stress that the use of marijuana both produces and symbolizes a "mellow" mode of conduct that is opposed to that associated with rowdy behavior. They place great weight on the "socializing" effects of marijuana use, declaring that its use not only leads youngsters away from violence but has the effect of changing them into social human beings (p. 30).

In a large scale, systematic survey (questionnaire and interview) of more than 1300 students at five West Coast colleges and universities, Blum and his associates (1969) found that 19% of the total sample had used marihuana but that 94% had used alcohol. One, percent of the marihuana users reported fights or other criminal behavior which they attributed to the drug. Of those who used alcohol, 8% reported fights and 2% reported offenses while under the influence of this drug. The researchers make particular note of the fact that despite the increase of marihuana use on these campuses since the middle and late sixties, there has been no comparable increase in assaultive crimes.

In a Commission-sponsored household survey of 15 to 34 year-old male residents of West Philadelphia, Goode (1972) found that not one of the violent crimes, including "forcing sexual intercourse," was significantly correlated with marihuana use. Among the five offense types showing a very weak relationship to the use of marihuana, the only so-called

violent offense, "hurting someone in a minor way," showed the weakest association. The author notes that "the statistical differences in rates of offenses between users and nonusers rest on adding together a small number of weakly correlated offenses. . . . [They do not indicate] massive differences, or differences indicating higher rates of classic, violent crimes among users" (p. 32a).

These more rigorous studies of the relationship between marihuana use and violent crime suggest that marihuana users in the general population do not commit acts of aggression or violence significantly more frequently than do nonusers; that marihuana does not heighten aggressive tendencies in most users and may, in some cases, serve to reduce aggressiveness; and that much of the observed relationship between marihuana and violence is probably a function of social, cultural or psychological variables such as multiple drug use, set and setting and involvement in a criminal or drug subculture.

There is no reason to believe that marihuana use will cause or lead to the commission of aggressive or violent acts by the large majority of psychologically and socially mature individuals in the general population.

OPINIONS ABOUT MARIHUANA AND AGGRESSIVENESS: THE LAW ENFORCEMENT AND CRIMINAL JUSTICE COMMUNITIES

Several references have already been made to anecdotal case histories, to the claims made and to the opinions formerly held by a number of law enforcement authorities relative to the relationship between marihuana use and aggressive behavior or violent crime. A few systematic efforts have been made to explore the current opinions and attitudes of law enforcement and criminal justice officials.

Probably the first detailed survey of the opinions of police officers was that conducted by a Stanford University law student in 1968. Part of this unpublished study has been summarized by Kaplan (1971) and is reprinted below.

Law enforcement agencies have continuously supported the existence of a strong causal relationship between the use of marijuana and acts of aggression and violence. In order to determine the nature and basis for this belief, sixteen law enforcement and narcotics officers were interviewed. The officers selected for the interview from each pollee department were those who spent the largest percentage of their time actually working with marijuana users. When the department had several officers working full time on narcotics, the officer In charge was interviewed, on the supposition that as chief officer, he would have the longest and widest range of experience with marijuana users.

Of those interviewed, seven spent 100% of their time on narcotics problems; three spent 75% to 100%; I spent about 50%; and the remaining five spent 10% to 25%. All emphasized that of their narcotics work, a major proportion of the time is spent on marijuana problems.

The context in which the officers observe individuals under the influence of marijuana is an important factor in evaluating their observations. Only three had done stakeout work where conduct could be observed while under cover. The remaining thirteen officers had only encountered marijuana users in either arrest or questioning situations. In response to the question of whether they had opportunities for informal contact with people using marijuana while off duty or in a social situation, the officers uniformly answered, "no."

The specific subject of this project, i.e. marijuana and aggression, was never mentioned to

the officers. They were told only that I was interested in the marijuana question. The first question which I asked was to briefly characterize, from their personal experience and observations, the behavior of individuals while under the influence of marijuana. During this original description, 10 of the officers mentioned violence or aggressive behavior as a common characteristic. The six other officers didn't mention aggression as a distinguishing characteristic in their original description however, in the next question, when specifically asked if marijuana does lead to aggressive behavior, all said that it did.

Every one of the officers pointed out the wide range of conduct which they see exhibited by those that are "high" on marijuana. They emphasized that how a person reacts depends on his particular personality. As one officer commented, "Some individuals are very happy and to them everything is beautiful, while others are always looking for a fight." Six (6) of the officers emphasized how quickly they can see one mood change into the other-at one moment docile and passive, at another extremely aggressive.

A few of the officers commented that along with the direct influence of marijuana, another important factor in aggressive behavior Is the arresting situation. One officer, Lieutenant A of the B Police Department, who has done quite a bit of stake-out work as well as undercover investigation, pointed out that this change from "silly, joking, funny and talkative" moods to apprehensive and often aggressive postures is many times precipitated by the realization that a law enforcement officer is present.

Sergeant C of the D Police Department also felt the "arresting situation" was probably the primary factor in aggressive behavior reports about marijuana users. Sergeant E also mentioned "the approach of a known policeman" as a factor in the aggressive behavior which they see. However, Sergeant E also estimated that one fifth

of the males, when under the influence of [marijuana] and when aware that they are being arrested, will break and run or resist. This he feels is a much higher percentage than for other types of arrests. Similarly most of the officers did maintain that even considering all other factors such as arrest, the marijuana was the force in most cases which was responsible for the aggression and violence.

Mr. F of the G County Sheriff's Office, however, maintained that in the last few years, those arrested for marijuana offenses have tended to resist arrest less often than previously. He stated, 'They now feel they don't have to fight the officers because of the laws-because of legalizing attempts, they feel they don't have to fight, for they will have their day in court."

Sergeant H of the I Police Department stated that recently (within the last year) he has seen no aggressive reaction to marijuana because of the extremely weak grades of marijuana now available. He felt that the determinative factor in how a person reacts while "high" is the strength of the grass smoked. He reported that the grass they have recently been finding has a very low resin content and its effects are merely "a quick stimulant followed by a depressed mood." However, in another part of the interview, when discussing the type of personality prone to using marijuana, Sergeant H distinguished between those now smoking and the "old grasshead." These latter were, only "Spanish-American or criminals." Now, however, "people without criminal records are joining the ranks of criminals." This major shift in the personality type now using marijuana, it would seem, would be another factor leading to Sergeant H's observation that the problems with aggressive reactions have decreased.

While all stated their belief that marijuana does lead to aggressive behavior, it was in most cases very difficult to elicit from the officers any specific instances where they personally had observed an aggressive reaction to the use of marijuana. Four (4) officers stated that

they had never personally seen someone aggressive under marijuana. They all, however, had heard reports of such instances from other officers. It should be noted also, that these four officers are from small police departments located chiefly in middle class residential areas.

Me officers who did cite specific examples of aggressive behavior from their personal observations cited such conduct as individuals who possessed marijuana fighting among themselves, cases of resisting arrest, a [man] picking a fight in a bar, beating one's wife, sexual promiscuity, stealing, reckless driving, and carrying knives and guns. While citing this type of example most officers emphasized the real difficulty in telling when someone is "high." Except for a few symptoms such as red or dilated eyes, they have to make the judgment from the general actions of the subject. When the subject is acting peculiar and there is no alcohol, or they find marijuana in his possession, then they assume he is "high."

It was also difficult to limit these discussions solely to marijuana. When asked for personal case histories, they often recounted incidents of individuals who had also been using other drugs or alcohol in combination with marijuana. The officers tend to group all of the drugs together, and discuss them together in generalities applying to all. One officer, from J County, recounted as one of his -personal experience histories with aggression and marijuana, a boy who went "berserk" on Christmas day, and who finally had to be shot by the police. On checking newspaper accounts, it appears that LSD was also involved in the episode.

The officers all indicated that they have personally seen many aggressive reactions to the use of alcohol. Most, however, did not feel they could compare the frequency with that of marijuana. Most deal mainly with narcotic problems and thus spend most of their time with marijuana problems. The alcohol problems, and specifically the aggressive or belligerent drunk, are handled by the "beat" cops.

It was also difficult to limit the discussion to personal experiences of the officers themselves. Many of them, when asked for specific examples, went immediately to their desks for reports and articles issued by other law enforcement agencies. This it seems is a problem which developed because of the sample chosen to interview. Because they were usually the most experienced and the chief narcotics officers, most of them are called upon to give speeches before PTA's, church groups, school classes, etc. They all, therefore, were familiar with the literature distributed by law enforcement....

Three of the officers cited as proof of marijuana's danger a recent distribution which pointed out that the "death penalty" Is now imposed on marijuana offenders in Nigeria.

When questioned on passive reactions to marijuana, all of the officers could think of personal encounters with people who were "high" and who were decidedly passive and docile. Yet only four of the officers included this trait in their original characterization of behavior under marijuana. Eight of the officers, however, in their original description of behavior while "high" described some persons as "happy," "funny," or "giggly."

One question asked of the officers was aimed at differentiating the aggressiveness (chiefly in terms of frequency of resisting arrest) between those "high" on marijuana and those arrested for sale or for possession. As mentioned previously, the officers indicated that generally they have a very difficult time distinguishing those who are "high." The officers interviewed generally work on [arresting] pushers, and dealers. Their attention is usually not drawn to individuals because of the particular conduct they might be exhibiting, but rather because the individual is dealing in marijuana. When pot parties where everyone is high have been [broken up], Sergeant 0 of D reported that the places raided have usually been on the peaceful side. Another officer, K, on the narcotics detail in D, felt that users are usually

"very easy to arrest. With others, such as pushers, and sellers, however, officers have to -be more careful." Captain L of M disagreed, however, maintaining that those under the influence must be watched more closely and are usually more aggressive and violent because of a lessening of concern for the consequences and a lack of ability to make sound judgments. Deputy Chief N of the 0 Police Department pointed out that In 0 at any rate, there is a certain "show" which those arrested feel they must put on; "it is hard to separate this show from the effects of the marijuana." Lieutenant P of the 0 Police Department said his experience indicated that those under the influence had to be watched closely. He has arrested people, [when they were] "high" three of four times without incident; the fifth time, however, he felt they might go wild.

In response to a question of whether they felt that some persons smoke pot before engaging in crimes against property, such as robbery, ten of the officers replied that they did believe that this occurred often. Seven of these could cite specific examples of people who had been picked up for stickups, car thefts, etc. and who reported using marijuana beforehand to bolster their courage, or sharpen their senses. However, the other three of the ten had only heard of such conduct. The remaining six officers answered that they did not think this was common, and had never seen any examples. . . .

None (of the officers) believed however that marijuana was responsible for any long-term effects resulting in aggressive behavior. The relationship between marijuana and aggression, they feel, is limited strictly to the period of time during which the user is under the influence. In terms of long-range effects of marijuana on aggression, the reactions of the officers confirm that, if anything, there is a negative correlation. That is, marijuana leads to nonaggressive, non-competitive, passive conduct, when viewed in the context of chronic use.

Whatever limitations and qualifications one can cite regarding the conclusions drawn by law enforcement officers, one thing remains certain: they do believe that the use of marijuana leads in a significant number of cases to aggressive behavior (Kaplan, 1971, citing Schofield: 110-115).

In seeking to present to the public as much information about marihuana and its effects, from as many different sources and approaches as possible, the Commission sponsored the design and execution of two opinion surveys of the criminal justice Community. In addition to soliciting their current opinions about the relationship of marihuana to aggressive or violent behavior, and to infer from them the extent to which their professional experience with marihuana users may have changed over the years, the Commission sought to determine the extent to which current opinions and attitudes of the criminal justice community reflect the growing body of empirical evidence on the subject.

To these ends, nationally representative samples of prosecuting attorneys, judges, probation officers and court clinicians were surveyed by mail. The questionnaires mailed to these officials contained items relative to the relationship between marihuana use and aggressive or violent behavior. The results of these surveys show that more than three fourths of the 781 judges, probation officers and court clinicians responding to a mail survey (InTech, 1971) regarded as either questionable or " probably untrue" the statement that "most aggressive acts or crimes of violence committed by persons who are known users of marihuana occur when the offender is under the influence of marihuana. More than 60% however, regard as equally questionable or untrue the statement that most such aggressive acts or crimes of violence occur when the offender is not tinder the influence of the drug but is attempting to obtain it or the money to buy it. Table 3 shows the percentage of each of the three groups of respondents answering in this manner. (InTech, 1971).

These figures give the impression that neither judges, probation officers nor court clinicians

are certain of the role of marihuana in the commission of violent crime. Their tendency to deny both statements suggests that at the least, the relationship, to the extent that it does exist, is a tenuous one.

Table 3.-CRIMINAL JUSTICE OFFICIALS, BELIEFS ABOUT THE RELATIONSHIP OF MARIHUANA USE TO AGGRESSIVE ACTS

(Figures in Percentages)

A. "Most aggressive acts or crimes of violence committed by persons who are known users of marihuana occur when the offender is under the influence of marihuana.',

	Probably true	Probably not true	Not sure
Judges	17.3	44.2	29.5
Probation officers	14.5	60.0	21.8
Clinicians	6.1	76.5	13.0
Total	15.2	51.2	26.0

B. "When the offender is not under the influence of marihuana but is attempting to obtain marihuana or the money to buy it."

	Probably true	Probably not true	Not sure
Judges	35.6	30.6	25.0
Probation officers	27.3	44.5	21.8
Clinicians	20.0	60.9	15.7
Total	32.1	37.0	23.2

In its survey of state prosecuting attorneys, the Commission likewise found a tendency for these officials to deny a causal relationship between marihuana use and aggressive behavior; 52% of the respondents stated that they either did not believe or were uncertain about the proposition that use of marihuana causes aggressive behavior. Of those who did believe in a causal relationship, however, two-thirds of the respondents' beliefs stemmed front other than personal observation of aggressive behavior exhibited by marihuana users.

These opinion surveys reveal that at least these members of the criminal justice community have begun to reexamine their earlier beliefs. The data suggest that, in their professional experience, they have not found marihuana users to be aggressive or violent to such an extent as to elicit strong and consistent opinions about the causal relationship between marihuana use and violence.

Marihuana and Sexual Behavior

(not on website)

The Report of the National Commission on Marihuana and Drug Abuse

Marihuana and (Non-Violent) Crime

Much that has been said with respect to aggressive behavior and violent crime also applies to the more general proposition that marihuana causes or leads to (non-violent) crime and delinquency. The popular and professional literature abounds with claims and counter-claims. Public and professional opinion surveys demonstrate a widespread belief in the existence of a marihuana-crime relationship but also reveal considerable uncertainty about the existence of such a relationship.

The empirical evidence is somewhat more consistent. Laboratory studies provide no evidence that marihuana produces effects which can be interpreted as criminogenic. Although some studies of offender populations purport to demonstrate a causal relationship between marihuana and crime, they reveal, at the most, a significant statistical association. Closer examination of these data or more sophisticated analysis, however, generally shows the purported relationship to be spurious. The original relationship is usually found to derive not from the chemical effects of the drug but from the operation of social and cultural variables unrelated to either the drug or its use.

In the following pages the available evidence bearing on the relationship between marihuana and crime will be reviewed in an effort to determine whether marihuana itself or the use of the drug plays a significant precipitating or contributory role in the commission of criminal or delinquent acts.

PUBLIC AND PROFESSIONAL OPINION

The formulation and expression of strong opinions about the relationship of marihuana to criminal and delinquent behavior have persisted despite the inherent complexities of the issue, the relative absence of conclusive empirical evidence and the general lack of knowledge and understanding about the effects of the drug. For the most part, however, neither public nor professional opinion about marihuana and its impact on public safety has been explored in any systematic fashion. As a consequence, public policy with respect to the

drug has been shaped by the most vociferous advocates of one position or another at any given time.

Probably the first official body to explore prevailing opinion about the relationship between marihuana use and crime was the Indian Hemp Drugs Commission of 1893-1894. The Commission spent over a year in making field trips to 30 cities, in receiving evidence from almost 1,200 expert witnesses (335 of whom were medical practitioners) and in reviewing judicial proceedings and the case files from India's mental hospitals. The Commission's Report, reprinted in 1969, contains the following information gathered with respect to the relationship of marihuana use to crime.

First, the Commission found that the majority of hemp drug consumers were moderate rather than excessive users, and that the drug users were rarely regarded as offensive or potentially dangerous by their neighbors (a few objected to the smell of the smoke or the example set by the users for the neighborhood children).

With respect to the drug's possible long-term or chronic criminogenic effects (producing "bad characters"), the Commission reported that two thirds of the witnesses did not believe that marihuana would produce, over time, a large proportion of "bad characters" among the moderate users. A majority felt that even excessive use was unrelated to the production of "bad characters." When the possible relationship was framed more precisely in terms of cause-effect rather than statistical association, a ratio of 8 to 1 of the witnesses held that moderate consumption of these drugs had no connection with crime and a ratio of 4 to 1 denied a causal connection between excessive consumption and being a "bad character."

With respect to the more acute effects of hemp drugs, the Commission set out to determine whether criminals use the drug to fortify their courage prior to the commission of their crimes, whether the drugs were used by criminals "to stupefy their victims," and whether the drugs incited the user to commit unpremeditated crimes. The Commission's conclusion regarding the first question was that "criminals like any other consumers of these drugs go to them for that assistance when they feel they require it" (p. 256).

To the second question, the Commission responded that although some persons had alleged the commission of "thefts of ornaments from children stupefied by sweet meats" containing marihuana, the fact of other readily available, more effective and more disabling drugs, considerably more conducive to surreptitious administration, cast doubt on the use of hemp drugs by criminals for this purpose.

To the third question, the Commission said that the majority of witnesses saw no connection between either the moderate or excessive use of hemp drugs and the commission of unpremeditated crimes, including crimes of violence. The Commission therefore concluded that "for all practical purposes it may be laid down that there is little or no connection between the use of hemp drugs and crime," (p. 264).

The Mayor's Committee on Marihuana (1944) also interviewed law enforcement officers (federal, state and local police) about the purported link between marihuana and crime. The Committee reported that:

In most instances [the police officers] unhesitatingly stated that there is no proof that major crimes are associated with the practice of smoking marihuana. They did state that many marihuana smokers are guilty of petty crimes, but that the criminal career usually existed prior to the time the individual smoked his first marihuana cigarette (Schoenfeld, 1944: 14-15).

Reference has already been made to the results of a small, unpublished survey of the opinions of police officers about the relationship of marihuana to aggression (Schofield, 1968). All of the respondents reported observing a variety of conduct exhibited by users under the influence of marihuana and emphasized that an individual's reaction to the drug depends on his particular personality and, in some instances, the strength of the dose. Some respondents observed a recent shift in the type of individual or personality prone to using marihuana.

In response to a question regarding the use of marihuana prior to engaging in property crimes, 10 out of the 16 officers interviewed believed that this often occurred. Seven cited specific examples of offenders who reported using marihuana before committing their offenses to bolster their courage and sharpen their senses; the views of three rested on hearsay evidence; and the remaining six officers responded that they did not believe this was a common practice and that they had never personally observed such examples.

In the Commission-sponsored National Survey of a representative sample of more than 3,000 American youth and adults (Abelson, et al., 1972), respondents were asked to indicate their agreement or disagreement with the statement that "many crimes are committed by persons who show that 56% of the adults and 41% of the youth agree with the statement. The extent of agreement, however, varies significantly according to age, education, geographic location and the marihuana-using experience of the respondent. Those who are early adolescents (12-13 years), over 25 years of age, have not completed high school, live in the South or North Central regions of the country and have no experience with marihuana are, significantly more likely to agree with the statement than are those who are between 14 and 25 years of age, are at least high school graduates, live in the Northeast or West and have had experience with marihuana. Table 5 below, shows the percentage of respondents agreeing to the statement according to age, education, geographic location and experience with marihuana.

The survey also showed the existence of considerable uncertainty with respect to the proposition that many crimes are committed by persons under the influence of marihuana; 25%, of the youth and 17% of the adults were either unsure of its relative truth or failed to respond to the question (p. 69). Adults were considerably more certain, however, about the relationship between alcohol and crime (youth were not asked the question) ; 7% were either unsure or did not respond and 69% agreed with the statement that many crimes are committed by persons who were under the influence of liquor (pp. 28, 31).

Table 5.-PERCENTAGE OF RESPONDENTS WHO AGREE THAT "MANY CRIMES ARE COMMITTED BY PERSONS WHO ARE UNDER THE INFLUENCE OF MARIHUANA"

	Percent agreeing
	Youth	Adults
Total respondents agreeing	40.7	56.0
Age (years):		
12-13	54.5	

14-15 35.2

16-17 31.8

18-25 35.1

26-34 48.5

35-49 59.0

50 and over 68.8

Education:

Less than high school graduate 70.9

Eighth grade or less 49.5

Ninth-twelfth grades 31.8

High school graduate 56.8

College or more 39.2

Geographic location:

Northeast 34.1 46.9

North-Central 42.1 54.9

South 48.5 66.8

West 34.0 52.3

Marihuana experience (ever used):

Yes 8.9 24.1

No 46.1 62.0

The surveys of prosecuting attorneys, judges, probation officers and court clinicians also revealed considerable doubt about the existence of a causal connection between marihuana and crime. Although the survey of prosecuting attorneys conducted by the Commission staff asked only about aggressive behavior and violent crime, the data showed that 52% of the respondents either denied or were uncertain that marihuana causes such behavior.

The Commission-sponsored survey of nationally representative samples of judges, probation officers and court clinicians, however, posed several questions bearing on the more general proposition that marihuana is related to crime and delinquency (InTech, 1971). Respondents were first asked whether or not they had witnessed an increase in the incidence of drug or drug-related offenses in their caseloads during the past five years. The large majority of all three groups (86%) responded affirmatively and reported that marihuana was the type of drug most often seen in this connection (83%). However, about two thirds of the respondents reported that marihuana offenders (those arrested for using or selling

marihuana) constituted less than 20% of their caseloads; 56% of the respondents reported that those arrested for non-drug offenses but incidentally found to possess marihuana comprised less than 10% of their caseloads; and 73% of the respondents reported that less than 10% of their caseloads attributed their offenses to marihuana (pp. 31, 34).

To determine better the nature and direction of a possible relationship between marihuana use and crime, respondents were asked to indicate which -of four statements most reflected their own professional experience. On the whole, the respondents were more likely to postulate a statistical association (36.6%) rather than a direct cause-effect relationship (26.9%) ; 18% of the respondents thought that involvement in a criminal or delinquent subculture caused or led to the use of marihuana (in contrast to the. more prevalent belief that marihuana use, leads to crime) and 9.1% believed there was absolutely no relationship between marihuana use and other criminal or delinquent behavior. The extent to which uncertainty prevails even among these practicing professionals is reflected in the 9.3% no response category (p. 39).

Table 6 shows the responses of the judges, probation officers and clinicians to each of the four propositions (InTech, 1971: Appendix 1, Section II, Question 3). The data show that judges are significantly more, likely to believe that marihuana causes or leads to criminal and delinquent behavior and significantly less likely to believe in either a statistical relationship or in no relationship whatsoever than either the probation officers or the clinicians.

The researchers also attempted to determine these, professionals' opinions about crimes actually committed by marihuana users. More specifically, did the respondents think that most non-drug crimes committed by persons who were known users of marihuana occurred when the individuals were, actually under the influence of the drug or when they attempted to obtain it? Again, the responses indicated considerable uncertainty in all three, groups. One-third of the, respondents were either unsure or did not respond to either proposition. About twice the number of respondents thought that the crimes occurred while in the attempt to obtain marihuana (31.0%) rather than while tinder the influence of marihuana (16.8%).

Table 7 shows the percentage of respondents indicating the probable truth and probable nontruth of the two propositions (Appendix 1, Section 11, Questions 2a, 2b).

The data show that half of the respondents denied the commission of non-drug crimes while under the influence of the drug, suggesting that marihuana itself does not have the capacity to produce criminogenic effects. About one-third of the respondents, however, believed that these crimes occur when the user is attempting to obtain the drug, suggesting an addiction model; that is, that users commit crimes to support a "habit."

This interpretation is corroborated by the significant findings that 65% of the respondents either did not know (23%) or thought that a few (21%), some (17%) or most (4.4%) of the regular users were physically addicted to marihuana

Table 7.-RESPONSES OF JUDGES, PROBATION OFFICERS AND COURT CLINICIANS TO STATEMENTS ABOUT NON-DRUG CRIMES COMMITTED BY MARIHUANA USERS

(Figures in Percentages)

Most non-drug crimes committed by persons who use marihuana occur when the offender

is-

Under the in- Attempting to

fluence of mari- obtain marihuana

huana

Prob- Prob- Prob- Prob-

ably ably ably ably

true not true true not true

Judges 17.1 % 46.8 % 34.2 %, 30.4 %,

Probation officers 21.8 47.3 30.0 37.3

Court clinicians.. .. . 10.4 65.2 16.5 60.0

Total 16.8 49.6 31.0 35.7

The National Survey of the general public (Abelson, et al., 1972) likewise showed that large segments of the population (65% of all adults and 48% of all youth) regard marihuana as addictive. Even among the users, 40% of adults and 21% of the youth believed marihuana to be addicting (p. 22)

These findings, taken together, suggest that much of the confusion regarding the relationship between marihuana and crime may be predicated on public and professional misconceptions about the drug's addiction potential. The Commission's National Survey showed that, among those persons who believed marihuana to be addicting, 67.5% of the adults and 52.3% of the youth believed that many crimes are committed by persons under the influence of marihuana. Among those who said that marihuana was not addicting, 34.6% of the adults and 30.2% of the youth agreed that many crimes are committed by marihuana users. Table 8 below shows this relationship (unpublished data, Abelson, et al., 1972).

Table 8.-RELATIONSHIP BETWEEN PERSONS WHO THINK MARIHUANA IS ADDICTIVE AND THOSE WHO THINK THAT MANY CRIMES ARE COMMITTED BY PERSONS UNDER THE INFLUENCE OF MARIHUANA

(Figures in Percentages)

Persons who think marihuana is

Addictive Not addictive

Youth Adults Youth Adults

Many crimes are committed under the influence of

marihuana:

Mostly agree.. . . 52.3 67.5 30.2 34.6

Mostly disagree 20.8 14.5 39.9 41.1

Other 2.3 3.1 4.4 2.0

Not sure/no answer 24.6 14.9 25.6 27.3

Table 6.-THE OPINIONS OF JUDGES, PROBATION OFFICERS AND COURT CLINICIANS REGARDING THE NATURE OF THE RELATIONSHIP BETWEEN MARIHUANA USE AND OTHER CRIMINAL OR DELINQUENT BEHAVIOR

(Figures in Percentages)

Judges Probation Court Total

(N=556) officers clinicians (N=781)

(N=110) (N 1.15)

Use of marihuana causes or leads to antisocial behavior in the sense

that it leads one to commit other criminal or delinquent acts 33.8 18.2 1.7 26.9

Involvement in a criminal or delinquent subculture causes or leads

to the use of marihuana 18.3 20.0 14.8 18.1

There is a statistical relationship or association between marihuana

use and other criminal or delinquent behavior, but it is not a

cause-effect relationship 31.1 40.0 60.0 36.6

There is absolutely no relationship between marihuana use and

other criminal or delinquent behavior 6.7 14.5 15.7 9.1

($X2=76.895$, $p<.001$).

To summarize, these opinion surveys demonstrate that there is considerable uncertainty about the existence and the nature of a relationship between marihuana use and crime and that this uncertainty exists among youth and adults, practicing professionals in the criminal justice community and the lay public, marihuana users and non-users alike. The data suggest, however, that the persistent and fairly widespread belief in a cause-effect relationship between marihuana and crime may, at least in part, be predicated on the erroneous but equally prevalent belief that marihuana is physically addicting. To the extent that the general public operates under this misconception, they may be more likely to believe that, like the heroin user, the marihuana "addict" commits crime in order to support his "habit" and obtain the drug.

The logical extension of this belief is that marihuana users, like heroin user-„ will be considered more likely to commit their crimes in the attempt to obtain the drug than while under the influence of the drug. Stated another way, persons who believe that marihuana is physically addicting v ould be more likely to base the purported causal relationship between marihuana and crime not on the chemical effects of the drug per se but on the user's physical need for the drug. As such, they would be more likely to postulate that most crimes committed by users occur not when the offender is under the influence of the drug (which, like heroin, makes one passive, lethargic and stuporous) but when the, "addict" needs a "fix" and is desperately trying to obtain the drug or the money to buy it. This interpretation is, indeed, supported by the findings of the Commission-sponsored survey of judges, probation officers and court clinicians and is suggested from the findings of the National Survey.

STUDIES OF OFFENDER POPULATIONS

Over the years, numerous studies have relied on offender populations and zero-order statistical correlations to "demonstrate" a cause-effect relationship between marihuana and crime. This method of " proof by enumeration" has become probably the most common approach to "demonstrating" the purported causal relationship.

As Goode (1970) has noted, however:

Not even marihuana's staunchest supporter would argue that a crime has never been committed by a user while high. Yet, incredible as it seems, the burden of many proofs of marihuana's criminal effects has been precisely the simple fact that it is possible to locate crimes committed in conjunction with smoking marihuana. "Proof" by enumeration is no proof at all. By examining an enumeration of crimes which were committed under the influence of marihuana (even were this definitely known), it is impossible to determine the " cause" of the event taking place, in this ease the crime-or, indeed, that marihuana has anything whatsoever to do with its commission (pp. 215-216).

Even if these studies are taken at face value, their findings do not generally support the thesis of a positive and significant statistical association. In most instances, marihuana has not been found to predispose one to commit crime or to serve as an initiator of criminal careers; nor does the use of the drug appear to alter the progression to other non-drug offenses among those without prior criminal records or histories of psychological maladjustment. Predictably, however

the data do indicate a greater rate, of progression among marihuana-using offenders (both those arrested specifically for their marihuana offenses and those charged with non-drug crimes) than that which might be expected from similar, non-using offenders or from the general population.

Because these studies do provide at least interesting insights into the possible nature and direction of a relationship between marihuana and crime or, conversely, a non-existent relationship, several of these studies are summarized below.

Bromberg, 1939. Between 1932 and 1937, Bromberg and his team of researchers reviewed all cases eventuating in conviction by New York's Courts of General and Special Sessions; conducted interviews with about 17,000 drug and non-drug-using offenders; and analyzed the statistics from both courts. The report of this work, published in 1939, yielded the following information.

Among the 16,854 offenders convicted of felonies in the court of General Sessions, 67 (.005%) were identified as marihuana users. Of these 67, 46 (697c) had been convicted on charges of possession with intent to sell; 16 (24%) were charged with burglary, robbery and grand larceny; two persons were charged with assault and one each was charged with petty larceny, forgery and murder.

The researcher points out that in only nine cases did the, offenders' criminal records commence with a drug charge, "indicating that there was not in those cases a close relationship between drugs and the beginning of a career in crime" (p. 10).

In a 25% random sample of offenders convicted in the Court of Special Sessions (misdemeanors), 135 or 9% were charged with possession of marihuana. Of these 135, 93 or 69% had no previous record, 8 had been charged previously with drug violations only, 5 had mixed drug and non-drug charges and 29 (21%) had only non-drug arrests. In summary, the researcher stated that:

As measured by the succession of arrests and convictions in the Court of General Sessions (felonies) . . . ,

it can be said that drugs generally do not initiate criminal careers. Similarly, in the Court of Special Sessions (misdemeanors), only 8% of the offenders had previous charges of using drugs and 3.7% had previous charges of drugs and other petty crimes. In the vast majority of cases . . . then, the earlier use of marihuana apparently did not predispose to crime, even that of using other drugs. . . . The expectancy of major crimes following the use of cannabis in New York County is small, according to these experiences (p. 10).

Bromberg and Rodgers, 1946. A study of 8,280 naval and marine prisoners at the U.S. Naval Prison in Portsmouth, New Hampshire (1946) revealed that 40 or .0048% of the offenders were marihuana users. The offenses they committed while in the service were: AWOL or AOL (32, or 80%), assault or striking an officer (3), theft (3), and narcotics violations (2). Their previous civilian offenses included three each of assault, theft and traffic violations and one each of gambling and narcotics violations, drunkenness, draft dodging, and violation of the Mann Act. Twenty-eight or 70% of the marihuana users had no previous civilian criminal records (p. 825).

The preponderance of psychiatric disorders in the user group over the non-users (40 randomly selected non-using naval prisoners) led the researchers to conclude that "marihuana usage is but an aspect of some type of mental disorder or personality abnormality" (p. 826), a conclusion also reached by Charen. and Perchan 1946), Ausubel (1958), Andrade (1964), Lambo (1965), Bloomquist (1968), Simmons (1969) and Grinspoon (1971).

Gardikas, 1950. The researcher reviewed the criminal records of "379 individuals either sentenced or arrested flagrante delicto for using hashish publically" between 1919 and 1950. More than half (55%) of these individuals were already known to law enforcement authorities prior to their use of hashish and an additional 14% had no subsequent difficulties with the law except for hashish and vagrancy offenses. The researcher notes, however, that the remaining 117 offenders (31% of the original sample) went on to become " confirmed criminals after their first hashish arrest."

Dividing this last subgroup of 117 into three approximately equal parts, Gardikas. then described the subsequent criminality of each group. The first group was given 332 more sentences following their first sentence for using hashish; 142 (43%) were additional hashish offenses, a similar number were for violent crimes or crimes involving weapons, 18

were for "insults" and two were for "high treason."

In a critique of the Gardikas study, Kaplan were accumulated; mostly for hashish offenses (42%) and thefts (20%). Although there were a small number of violent crimes subsequently committed by this group of offenders, most sentences subsequent to their initial hashish sentence were for such relatively minor offenses as illegal gambling, living on immoral earnings, "false statements of identity," and "fishing with dynamite,."

The, third group discussed by Gardikas, comprised of those "who after having, made use of hashish became criminals," accumulated 332 additional sentences. Hashish offenses were again responsible for 30% of these offenses and most of the rest were for theft. Gardikas notes with respect to this group that although not all of these individuals were criminal before they used hashish, their use of hashish "turned [them] into habitual hashish smokers and habitual criminals with a, strong propensity leading toward crime of dishonesty and particularly theft and f rand. At least one-half of them surely and undoubtedly are even to be characterized as dangerous idle, vagrants" (p. 203).

In a critique of the Gardikas study, Kaplan (1971) has stated that:

The basic problem underlying Gardikas' paper is his conclusion that hashish use caused his subsample of 117 arrests to become criminals. This assumes, first. that they had not engaged in crime before beginning to use hashish and, second, that it was the hashish use and not something else that turned -them toward crime. Neither of these assumptions is justified by the data. . . . As for the first assumption . . . all we know is that they had not been arrested or convicted for other crimes first. . . . The second assumption . . . is also impossible to justify. Even if the members of the subsample had not previously been criminals, it may very well be difficult to distinguish the criminogenic effects of hashish from those of conviction and sentence to Greek jails.

Even aside from any criminogenic effect of the Greek penal system, the figures may indicate only that once somebody has been arrested for hashish-and probably served a term in jail as well-lie is more likely to be picked up by the police when further crimes are committed. Finally, the years from 1919 through 1950 . . . were a period of enormous social dislocation [in Greece] . . . . It is obviously an almost impossible task to sort out how much of the subsequent criminality in the subsample was due to hashish use and how much to the social chaos that prevailed in Greece (pp. 103-104).

Andrade, 1964. The researcher retrospectively reviewed the examinations of 120 patients sentenced between 1951 and 1960 by a Brazilian Court to Heitor Carrilho insane asylum. Sentencing in all cases was based on the allegation that cannabis was directly responsible for their crimes. The researcher concluded that:

In the 120 patients examined, we did; not find any criminogenic action that could be attributed to cannabis; ... In the majority of cases examined (83), we found patients with psychotic disturbances. . . . In the cases in which we did not find mental disturbances, a total of 37, the crime attributed to them was that of carrying or selling marihuana.... In the study of the dynamics of the crimes of all the others, we saw that there was a link between the crime and the illness, independent of the use of cannabis (Tinklenberg, 1971: 12).

Lambo, 1965. The researcher compiled lists of crimes occurring over a, two year period in three West African nations and recorded the number of offenders perpetrating these crimes. He found that approximately one-fourth of the offenders had previous convictions. Forty-seven percent of the 863 offenders convicted for false pretenses, 61% of the 2,880 convicted

burglars and 54% of those convicted on charges of "culpable driving" were said to have histories of cannabis use. Many of these users, however, were also shown to have long histories of psychological maladjustment (p. 10). The researcher suggests that "the use of cannabis enhances suggestibility in certain individuals, and this may be a factor in the commission of crime, by these chronic abusers" (p. 11).

THE RELATIONSHIP BETWEEN MARIHUANA AND CRIME:

AN EXPLANATION

As indicated at the outset, enumerative studies of the crimes committed by apprehended marihuana, law violators and non-drug offenders identified as marihuana users cannot, by their very nature, either prove or disprove a causal connection between the use of cannabis and the commission of crimes; nor can their rates of crime be projected onto the larger universe of marihuana users.

As several researchers have pointed out, those individuals apprehended for marihuana offenses represent only a. tiny fraction of all marihuana users (Kaplan, 1971; Weitzner, et al., 1971) ; likewise, those in other offender samples who are identified as marihuana users represent only a small proportion of the offender populations of which they are a part (Bromberg, 1939; Bromberg and Rodgers, 1946; Kaplan, 1971).

Although the data do indicate that some individuals identified as marihuana users are subsequently involved in crime, both drug-specific and non-drug offenses, they do not provide support for the thesis that cannabis was the determining factor in their criminal careers. Likewise, they fail to indicate that the rate of progression to other crimes manifested by these offenders was significantly greater than that which might be expected in either a non-using criminal subgroup or the general population.

As Tinklenberg (1971) has stated:

The important issue is that unless one has systematic data on the proclivities toward crime of the various subgroups of marihuana users, one cannot answer the crucial question of whether the use of marihuana alters the actual rate of crime among these various subgroups over the criminality which would be expected. At this time, it is unknown whether individuals with these characteristics seek the use of marihuana or whether the use of marihuana in any way contributes to the development of these traits (P. 24).

By reading between the lines of these enumerative studies, however, one would be tempted to postulate that individuals with certain psychological, social and cultural characteristics are more likely to seek the use of marihuana, than is marihuana likely to contribute to the development of delinquent or criminal behavior patterns.

The number of researchers pointing to individuals with long histories of psychological maladjustment or disturbances has already been noted. Others have alluded to persons involved, prior to cannabis use, in criminal or delinquent subcultures (Blumer, 1967; Robins, et al., 1970; Kaplan, 1971; Weitzner, et al., 1971). Still others suggest that marihuana use is more likely to develop among persons living in underprivileged communities or within a social structure that limits achievement and advancement (Asuni, 1964; Blumer, 1967; Goode, 1972).

In recent years, considerable evidence has been gathered to suggest that the use of other drugs and association with drug-using friends are also likely to enhance the probability of

marihuana use (Hochman and Brill, 1971; Goode, 1972; Abelson, et al., 1972).

Because many of these characteristics are likely' to be associated with both crin..nal o: delinquent behavior and marihuana, use, some individuals have mistakenly concluded a. cause-effect relationship rather than a statistical correlation.

The studies reviewed in the following pages axe probably the most methodologically adequate assessments of the. purported relationship between marihuana and crime undertaken to date. The data show that the seemingly significant statistical correlation often observed between marihuana, use and crime is spurious; it is dependent not on the chemical effects of the drug but upon the operation of several extra-pharmacological variables which have little or nothing to do with the use of marihuana. per se.

The first of these studies (Goode, 1970) is based on a sample of marihuana users. Because it, like the study by Robins and his colleagues (1967, 1970) referred to earlier, involves a selected population, the extent to which its findings can be applied to the general population remains speculative.

The second study presented. a Commission sponsored survey of young male urban dwellers, is probably the most adequate assessment to date of the relationship between marihuana use and crime. The results are based on a representative sample of the general population of males, 15 to 34 years of age, the self reports of criminal behavior have been cross-checked with Philadelphia Police Department files; and numerous statistical controls have been applied to the data. The study therefore provides at least tentative answers to the following questions:

-Do young, male marihuana users and nonusers in the general population differ significantly in the nature and extent of their criminal activities?

-Is marihuana use, in and of itself, the principal determinant of any observed differences? -If not, what are the variables which explain a statistical correlation between marihuana use and crime?

Goode, 1970. Between February and September of 1967, face-to-face interviews were held with 204 marihuana users residing in the New York City Metropolitan Area. The sample, admittedly nonrepresentative, was drawn front membership lists of drug-related organizations and also included friends and acquaintances of the researcher.

The sample, suspected of differing to some unknown extent from a random sample of marihuana users, can be characterized -as primarily male (53%), young (median age 22 years), white (89.5%), single (78%), middle class urban dwellers, including students, dropouts, business people, housewives and the unemployed (p. 316).

All of the respondents, by virtue of their marihuana use, possession or sale, had engaged in law violative behavior, but, only nine marihuana arrests were reported. This finding indicates that persons who are arrested for marihuana related activities constitute only a small fraction of total marihuana users.

Because of their marihuana-related criminal activity, one would expect that persons in this sample would have a higher probability of being arrested than would the "average" person from the general population. To determine if, in fact, this might be the case, the researcher computed the rate of arrest for his sample and compared it with the national rate of arrest provided by the Federal Bureau of Investigation for the year 1965. Despite the fact that the rates are not strictly comparable (the sample rate is based on arrests ever experienced; the

national rate is based on the number of arrests recorded for one year), the similarity is striking. The national rate was given as 3.7 per 100; the sample rate was computed to be 3.9 per 100 per year, 4.5 if one adds the marihuana arrests (p. 236).

Although the arrest rates of the users and the general population were found to be roughly similar, the types of crimes committed by the users differed significantly from those crimes recorded for the population as a whole. In contrast to the majority of drunkenness and disorderly conduct charges noted for the general population, the offenses of the users most often resulting in arrest involved participation in political demonstrations (19 out of the 55 arrests). No other single offense attracted more, than a few arrests (p. 2335).

In addition to examining arrest rates and the types of offenses committed, the researcher also investigated the relationship between the amount of marihuana smoked and the criminal behavior of the user. If it were true that marihuana did produce a dangerous and criminogenic state in the user, the greater would be his likelihood of committing crimes and of being arrested.

The data, however, show no relationship; excluding the "political crimes" (which were most common among the least frequent smokers and least common among the most frequent smokers), the "serious" crimes committed by 15 respondents (non-marihuana narcotics possession, disorderly conduct, drunkenness, burglary, theft, assault, auto theft, serving liquor to a minor and larceny) resulted in a total of 21 arrests. The heavy smokers did not commit these crimes significantly more frequently than did the light smokers.

Similarly, there was no relationship found between the frequency of use and the likelihood of arrest; three of the daily smokers, three of those who smoked three to six times per week, three who smoked one or two times weekly, one who smoked four times monthly and three who were less than monthly smokers were arrested for committing these "serious" crimes (pp. 237-38).

The researcher concludes that:

Although these numbers are extremely small, the fact of their perfect dispersal is perhaps indicative of the lack of a crime-inducing effect of the drug. It is, at any rate, a proposition which ought to be tested more systematically in the future with more complete data. For the moment, there are indications that point to the fact that the marijuana smoker is no more criminal than the rest of the population (p. 238).

Goode, 1972. The Commission-sponsored Philadelphia survey set out to resolve these issues. Goode (1972) analyzed the data collected during August of 1971 from an interview survey of 559 15-to-34-year-old residents of West Philadelphia.

That part of the report devoted specifically to the analysis of the data is presented in its entirety below. The only deletions made were the author' references to previous studies bearing on the issues addressed, the findings of which have been presented earlier in this chapter.

Excerpts From

MARIJUANA USE AND CRIME*

PREFACE

*Prepared by Professor Erich Goode for the National Commission on Marihuana and

Drug Abuse, January 15, 1972. The data on which this report is based were obtained from a survey conducted by the Institute of Survey Research of Temple University. All tables referred to in Professor Goode's text are found at the end of these excerpts. The interview schedule was developed and executed and the data processed for the Commission by Temple University's Institute for Survey Research, in Philadelphia.

The data analyzed in this report were gathered in August 1971 by the Institute for Survey Research of Temple University In Philadelphia; the author of this report did not have a hand in any phase of the data gathering, including constructing the interview schedule, although he is solely responsible for the data analysis. The sample consists in toto of males age 15 through 34 living in households located in a section of West Philadelphia. Each respondent was interviewed; a total sample size of 559 was collected. (The refusal rate was 10%, which is typical for house-to-house surveys of this type.) The area in which the sample was drawn is composed mainly of two heterogeneous populations: lower-middle and working-class, high school educated blacks, and college-associated whites-students and professionals associated with [Drexel University and] the University of Pennsylvania. About four respondents in ten in this survey are black, and just over half are white. (The number of Orientals and Puerto Ricans or Mexicans is too small to permit a meaningful statistical analysis, so that when race is discussed in this report, only the black-white comparison will be made.) The racial composition is roughly equivalent to the census figures for the sample area although no attempt was made, through a weighting of cases, to "correct" any discrepancies which might have prevailed in population composition. More detailed information is available from the Institute for Survey Research.

A quarter of the sample (23%) had never smoked marijuana: in 17 cases (3%), no information on marijuana use was given by the respondent. Of the marijuana users the question asked about frequency of use during the respondent's most recent year of use-about 1 in 10 smoked marijuana daily or more, about 1 in 5 smoked approximately once or twice a week, 1 in 4 smoked once or twice per month, on the average, and about 4 in 10 smoked marijuana several times a year. (The study also asked how often the respondent smoked marijuana in his first year of use a variable which I have not made use of in this report.) Questions were also asked concerning the respondent's use of other drugs-"stimulants or uppers, such as bennies, speed, or dex," "sedatives or downers, such as sleeping pills, amytal or blues, or nembutal, or yellow jackets," "hallucinatory drugs, such as LSD, mescaline, or STP," and "hard drugs, such as heroin, morphine, demerol, cocaine, or codeine." In addition, questions on one's friends' drug use-both marijuana and these other drugs--were asked.

The commission of various offenses formed another segment of the questionnaire. There were 16 of them, and ranged from those which would not be considered crimes in most instances-such as "disturbing people"-to those which would be considered felonies, drawing long prison sentences such as rape, armed robbery, and assault. As would be expected], the serious offenses were committed (or admitted to) by very, very few respondents-and thus, any comparison between users and non-users has to be made mainly on the basis of committing trivial offenses....

III. THE EFFECTS OF MARIJUANA

At this point, I will introduce the data from the Philadelphia marijuana use and crime study, specifically mandated by the National Commission on Marihuana and Drug Abuse. This survey's data will form the bulk of the factual evidence on the marijuana-crime connection in the report which follows.

The question of marijuana's relationship to crime and aggressive behavior is obviously closely related to the drug's effects. One of the most fundamental generalizations in psychopharmacology to be obtained from thousands of recent research efforts is that the same drug does not have standard and invariant "effects," but that effects are sensitive to a number of extra-pharmacological variables, including the personality of the user, the social setting in which drug, use takes place, the user's past experience with the drug, his expectations, and so on. Thus, it is elliptical and somewhat artificial, and incomplete, to speak of any drug's "effects," as if they occurred under any and all conditions, in all users. We should bear this qualification in mind when looking at the relationship between the ingestion of a drug and any subsequent behavior-with the latter supposedly ",Caused" by the effects of the drug. Drug effects vary, and, in addition, even standard effects do not automatically translate into specific forms of human behavior. Even opposite forms of behavior could follow the same effects, given different individuals taking the drug, different settings in which the drug is used, different definitions of the drug and its use and so on....

The data collected by the Philadelphia survey on the subjective effects of marijuana dovetail precisely with those of earlier studies. The effects agreed to by the users in the sample are clearly inconsistent with aggressive behavior. This does not mean that marijuana cannot be related to the commission of criminal or aggressive acts-but it does suggest that the effects of marijuana, per se, may have nothing to do with the commission of crimes, especially violent crimes. Table 1 summarizes the results from this survey's question on marijuana's effects, which was: "I am going to read to you some of the ways using marijuana may affect people. For each could you tell me whether marijuana had this effect on you almost every time, more than half the time, less than half the time, or never or almost never, when using marijuana." The effects asked about were related to feelings generally thought of as criminogenic either in a positive or a negative direction. Those that are generally considered to be related to crimes deal with anger and frustration, or with derangement, or with suggestibility. Those inversely related to the commission of crimes and aggressive acts dealt with relaxation and sleepiness.

As can be readily seen from Table 1, users overwhelmingly deny that marijuana has effects on them which could be interpreted as criminogenic or violent in nature. Nearly all respondents specifically denied that aggressive feelings came over them during the marijuana intoxication. When asked whether, under the influence of marijuana, they had a feeling of wanting to hurt someone, 96% said that this occurred never or almost never. When asked whether they had feelings of wanting to do something violent, 95% said never or almost never. Almost nine in 10 (88%) said that they never or almost never felt more angry when high. And almost eight in 10 (78%) said that they never or almost never felt frustrated when tinder the influence. Thus, the frustration-anger-aggressive impulse syndrome seems to be an extremely rare phenomenon associated with the marijuana intoxication. Likewise, the suggestibility syndrome does not appear to be characteristic, although it seems to be somewhat more common than aggressive feelings. About six in 10 (or 59%) of the respondents said that they had a feeling of "being more willing to follow other people's suggestions," never or almost never. And about three-quarters (77%) said that they had a "feeling of being able to do anything," never or almost never. Those sensations, however, which would be seen as inhibiting criminal and aggressive im pulses and acts were decidedly more common, Exactly half of the respondents said that they felt "a feeling of relaxation" almost all the time. About a third (31%) said that they felt less angry than usual almost all the time. About a fifth (22%) felt drowsy and sleepy almost all the time-and another quarter (25%) felt this more than half the time.

These data suggest-but do not demonstrate-that the effects of marijuana per se are probably not related in any meaningful or causal manner to aggressive or criminal acts. They give us a clue, but do not prove, that in and of itself, marijuana use does not "cause" the commission

of criminal acts. In fact, if we were to look at the subjective effects of marijuana themselves, they appear to point in exactly the opposite direction-they would seem to inhibit crime, indeed, activity of all kinds. The effect of marijuana would be more in the direction of reducing than stimulating aggressive, criminal or violent activity.

Two final qualifications would appear to be in order before I explore the marijuana-crime link more systematically and fully. One has to do with the length of time that the marijuana intoxication lasts. Two facts bear on this issue. First, each episode of use generally produces an intoxication which lasts roughly three or four hours, at the most. Marijuana's effects wear off about three hours or so after the user smokes the drug. Secondly, from previous studies ... as well as the survey whose data I am analyzing in this report, it is clear that the average, or median, level of marijuana use is roughly once a week. This means that the typical marijuana user is under the influence about three or four hours per week, or roughly 3% or so of his waking hours, and under a "normal" state of mind the remaining 97%. Now, it is possible that this tiny segment of time would influence some users in some significant way, but the fact of its briefness of duration ought to be kept in mind when reasoning about the impact of the drug on the lives of users. The daily user comprises roughly one marijuana user out of 10, and the individual who is high all, or nearly all, of his waking hours, probably constitutes about 1 or 2% of all marijuana smokers. These facts cannot be ignored in our exploration of the causal connection between the effects of marijuana and criminal activities.

And the last issue I will raise in the marijuana effects topic has to do with the truthfulness of the answers given by users. A plausible objection to taking the word of users concerning the effects of the drug on them would be that they are untrustworthy-that they have a motive for lying, for portraying the drug and their experiences in a positive light. Actually, what nearly all researchers have found in an interview situation with drug users is that they very rarely lie; in fact, their honesty about themselves and their activities and experiences appears to be the rule, overwhelmingly. . . .

The overall picture that we receive from . . . various studies is that, like most interview subjects, marijuana users may occasionally lie or hide the truth, but their answers will, in general, be truthful. This does not mean that everything they say must be taken at face value-as with any other group of interviewees, anything which the researcher is capable of checking independently, and which we have data on, we should corroborate with what we learn in the interview situation. At the same time, we would be as fallacious in assuming that everything that marijuana smoker-, said to be true is suspect as if we accepted everything they said to be true in all respects. What all of this means is that we must reason with caution from self-reported data, use them whenever we must, and check them whenever we can.

IV. CRIMES UNDER THE INFLUENCE

The Philadelphia survey on marijuana use and crime asked several questions concerning 16 different offenses. The questions began as follows: "'Many people in every community commit acts which others consider offenses, delinquent acts, and violations. Here is a list of these acts." The specific questions dealt with whether the respondent had ever committed each one, how often, how old lie was when the offense occurred, whether lie was caught by the police, and whether the respondent had been drinking, or was under the influence of marijuana, 24 hours or less before committing the act-as well as whether the respondent thought that using marijuana influenced him to commit the act; these questions were asked about the first as well as the most recent such of. fense, if they occurred. The offenses were: hurting someone in a minor way, hurting someone badly, carrying a knife. stealing a car,

disturbing people, threatening to hurt someone, taking money, stealing from a store, making an obscene telephone call, forcing sexual intercourse with a woman, breaking into a house or store, damaging property, buying stolen property, setting off an alarm, carrying a gun, and using a weapon to steal. From these facts, it might be interesting to find out what proportion of acts involved some drug use occurring within 24 hours-and whether that drug is alcohol or marijuana. I will explain after the data are presented what these facts can and cannot tell us. We must not be too hasty in reading too much into any given set of data.

Table 2 presents summary information from this set of questions. I have presented figures for only six offenses: stealing from a store, damaging property, hurting someone in a minor way, breaking into a house or store, stealing a car, and hurting someone badly. Some of the crimes asked about were committed by so few respondents (such as forcing sexual intercourse) that any statistical analysis would be completely meaningless. Other offenses seem to be unrelated to the aggressive syndrome associated with marijuana use-such as buying stolen property. The six I have chosen are, in any case, representative. Tile first three are relatively minor, and would usually be classified by the law as misdemeanors; the second two are considerably more serious, and would often be classified as felonies. Table 2 presents the proportion who drank alcohol, and smoked marijuana 24 hours or fewer before the crime was committed; the figures in the first two columns are for the first time the respondent committed the offense, and the second two columns are for the most recent time, if it occurred more than once.

What generalizations may we make front Table 2?

First of all, committing these crimes is atypical. Not one these six offenses was committed by a majority of the sample. Secondly the more serious the offense, the less likely it was to be committed. Minor offenses were committed at least once by between four and five out of every 10 respondents, but major offenses had been committed at least once by something like one respondent in 25. (And two of the offenses not in the table were rarer still; forcing sexual intercourse was admitted to by six respondents, or about one in 100, and using a weapon to steal was reported by only three respondents, or one out of 200.)

What about drugs and crime? Compared with not being under the influence, drugs tend to be atypical in the commission of crimes. For none of these categories, whether first offense or most recent, was being under the influence of either alcohol or marijuana characteristic of over a quarter of all offenses, and most are considerably below this. Most crimes here were committed when the offender was not under the influence of any drug, marijuana, or alcohol, when lie was in a "normal" state of mind pharmacologically.* Secondly, in terms of absolute incidence, alcohol is involved in the commission of crime considerably more often than marijuana. Adding together all of the offenses committed 24 hours before each drug was used, alcohol had been used in conjunction with first offenses a total of 47 times, and marijuana only five times-a ratio of not quite ten to one. For the most recent offenses, alcohol was involved a total of 66 times, and marihuana 19--a ratio of about three to one.

In conjunction with this point, it should be stressed that the classic, aggressive, violent crimes traditionally and historically associated with the marijuana intoxication are very, very rarely committed-by anyone, high or normal, user or non-user alike. Six men in this survey admitted to forcing a woman to have intercourse with him as a first offense, and three admitted to rape more than the first time. In two out of the six first-time cases, the offender said that he had been drinking 24 hours before, and in one out of the three most recent-time cases, drinking was involved as well. But in none of the six first time cases, and in none of the three recent-time cases, had anyone smoked marijuana 24 hours before. (None of the men had been apprehended for this offense, incidentally.) Only three of the men in the survey said that they had used a weapon to steal as a first offense, and two admitted this

offense more than the one time-and none said that lie had either drunk or smoked 24 hours before the offense.

*Several facts should he born in mind when considering this generalization. First of all, the survey asked about the use of each drug 24 hours before the offense was committed or less-and hence, the respondent was not necessarily under the influence when the offense was committed, although certainly many respondents were under the influence at that time. Secondly, anyone who uses marijuana is far more likely to become intoxicated with each episode of use than is true of each episode of alcohol use.

Considering the fact that the typical marijuana smoker in this study had been intoxicated several hundred times for a total of well over a thousand hours, and therefore in a state of mind which, if the "causal" theory is correct, is aggressive and criminogenic, then this almost total absence of violent and aggressive crimes committed by users should be puzzling. This fact indicates that the "causal" theory may be inadequate and erroneous.

However, it is not possible to tell from Table 2 whether the commission of crimes is more frequent for alcohol or marijuana on a relative basis during the period of intoxication. That is, if anyone wanted to know whether a thousand hours of a marijuana or an alcohol intoxication was more like to result in the commission of various crimes, this table would not convey this information. Unfortunately, this survey did not ask a question on the frequency with which the respondents drank alcohol or, indeed, whether they drank at all so that an alcohol -marijuana comparison cannot be more systematically made. It is entirely possible that alcohol-related crime, are far more frequent than marijuana-related crimes. simply because alcohol is still, even in this sample, probably the drug of choice among young people, and is more often used than marijuana (just as not being under tile influence of any drug is more frequently involved with crimes than being under the influence, simply because most people, most of the time, are not intoxicated). As to which drug is more "criminogenic" in the sense of what proportion of the time under the influence of marijuana vs. alcohol one commits various crimes cannot be determined from the data from this study. However, in absolute terms, alcohol is considerably more often used before crimes than marijuana.

Another generalization that may be made from Table 2 is that the contribution of marijuana from first offense to most recent offense grows somewhat relative to alcohol. That is, for the first offense, alcohol is used before it about 10 times as frequently as is marijuana, but for most recent offense, alcohol is only three times as frequent. This probably is a reflection of the following two trends: (1) Marijuana smoking is considerably more frequent today (i.e., closest in time when the most recent offense occurred) titan a few years ago (i.e., closest in time when the first offense occurred), and hence, its frequency relative to alcohol would be greater in conjunction with any activity-criminal or non-criminal as well-simply because its use is more common ; (2) Marijuana smoking is more common among young adults (the age group most closely represented by the age when last offense was committed) than among adolescents and preadolescents (the age group most closely represented by the age when first offense was committed) and, moreover, as age rises, marijuana use rises faster than alcohol use rises, at least up, until early adulthood. . . .

It is possible that, as marijuana usage increases, the number of crimes committed under the influence of this drug may increase as well. However, the question as to marijuana's direct contribution to the commission of crimes, especially aggressive crimes, is ail independent issue, and one in need of exploration.

V. WHO COMMITS CRIMES AND WHO DOESN'T?

In this section, it is our job to explore two basic issues:

1. Do marijuana users commit crimes and offenses any more frequently titan non-users do?
2. Are any variables with which marijuana use is strongly related also correlated with criminality?

In the next section I will deal with a third question, and one which is probably the most crucial one in this report: Can the marijuana-crime connection be explained mainly by the use of marijuana in and of itself, or is use itself dependent on third variables which themselves explain the commission of offenses?

As the principal measure of committing crimes, this study has employed the number of different types of offenses admitted to in the 16 categories asked about. Naturally, there are many other crimes not asked about, and, in addition, some of these crimes would not correspond to the image most people would have of "classic" aggressive offenses-such as "disturbing people," or receiving stolen goods. However, as a general index or overall measure of criminality of different groups or categories of individuals, this one is as good as any others that have been employed, and is probably adequate for our purposes. (The survey, it must be noted, did not ask questions about any white collar crimes, which must be reckoned into an adequate measure of output of criminal behavior-but these crimes do not correspond with the public's image of aggressive crimes committed under the influence of marijuana, and so their absence is less relevant than would appear at first glance.) Throughout the remainder of this report, the number of crimes and offenses will be employed as the dependent variable-the outcome to be explained. And throughout, I will be examining the marijuana-crime connection-as well as other relationships-insofar as it bears on file basic issue.

Before the analysis proceeds, it should be pointed out that of the 16 offenses, not one of the violent crimes correlated with marijuana use in any meaningful way at all, and a very weak relationship was evidenced with only five of the offenses-stealing from a store, buying stolen property, disturbing people, damaging property, and hurting someone in a minor way (the last of which showing the weakest association of all). The statistical differences in rates of offenses between users and non-users rest on adding together a small number of weakly correlated offenses. When offense differences are discussed, the reader should not hold the mistaken impression that they indicate massive differences, or differences indicating a higher rate of classic, violent crimes among users. With that warning in mind, we may now proceed to user/non-user differences in offenses.

The first relationship to be presented, then, is whether marijuana users as a whole commit offenses any more frequently than non-users as a whole. The answer is yes. I have employed two indicators of marijuana use; one is frequency of marijuana use during the period of most recent use (which may have been in the past, or may be at present), and whether or not the respondent has ever, or has never, used marijuana. Both indicators of marijuana use correlate very powerfully with committing offenses. For both tables, the differences are significant beyond the .001 level, employing Chi-square as a test of significance, which means that the differences observed could occur at random only one chance in a thousand. This is considered extremely significant. There is a regular and step-wise relationship between frequency of use and committing offenses; the more that a given respondent smokes marijuana, the greater is the likelihood that lie will have committed four or more offenses, and the lower is his likelihood of committing no offenses at all. Over a third (38%) of those who have never smoked marijuana said that they committed none of the 16 offenses asked about-but this was true of only one respondent in eight (or 12%) of the regular smokers. At the other end, there was a 17% difference between non-users and

regular users (24% vs. 41%) in admitting to four or more of these offenses. Tables 3 and 4 present these data in detail.

We would be remiss in our duties as sensitive and acute social analysts if we ended the analysis there. The simple correlation between marijuana use and offenses may very well mask important and even more basic relationships buried beneath it. Marijuana is correlated in a simple manner with the commission of crimes,, but does it remain correlated when controls are applied? In other words, is it a spurious relationship, or one which will remain when crucial variables are held constant' Which-factors are also related to the commission of offenses-which might actually themselves explain the simple marijuana-crime connection? There are several such variables-race, age, education, the u- of other drugs, and the respondent's involvement in the drug subculture. Blacks are significantly less likely to use marijuana (64% of the blacks in the survey said that they had tried marijuana, but 86% of the whites said that they had done so), but slightly more likely to admit to the commission of offenses--41% of all blacks said that they committed four or more offenses but this was true of only 25) % of all whites (see Tables 23 and 25). Does the marijuana-crime correlation hold up for blacks and whites separately? Age was also related to both offenses and marijuana. The oldest respondents (age 29-34) were least likely to have tried marijuana (61%), the youngest (15-20) were next least (73%), and the intermediate age groups (21-23 and 24-28) were most likely to have tried marijuana (82% and 80%). There was a linear relationship between age and offenses, however. The youngest group was least likely to have committed no offenses (20%), and most likely to have committed four or more (42%) ; the oldest group was most likely to, have committed no offenses (35%), and least likely to have committed four or more (22%) (see Tables 29-31). Thus, we would want to know whether marijuana and crime still correlate in each age group separately. The same thing can be said for education (Tables 26-28), the use of drugs other than marijuana (Tables 11-16), and having friends who use drugs (Tables 17-22)-the relationship between marijuana use and crime could be mitigated or even transformed altogether if these third variables are considered. One possibility is that the marijuana-crime relationship is wiped out altogether with the application of these controls-that is, that the relationship is completely spurious. A second possibility is that the marijuana-crime connection may be specific to some groups or categories, but not others. And the third possibility is that the same original relationship remains basically unaltered, or even is strengthened, by the application of these controls.

Special attention ought to be paid to the drug-related variables. There is a powerful and significant association between the use of marijuana and the use of other drugs. Although recent studies have presented evidence that this basic relationship is probably not due to the effects of marijuana per se, but to friendships and associations made in conjunction with marihuana use . . . , the simple relationship between marihuana and other drugs is a statistical fact. There is, in addition, a strong and marked association with using drugs other than marijuana and the commission of crimes. Thus, a legitimate question to be explored is whether "marijuana only" users have a greater crime rate than non-users, whether the higher rate of the commission of offenses cannot be attributed largely or solely to using drugs other than marijuana.

VI. MARIJUANA USE AND CRIME: CAUSAL OR SPURIOUS

Our first clue as to the nature of the underlying relationship between marijuana use and crime is obtained by examining Table 5, which documents the association between number of offenses and marijuana use, taking into account the use of other drugs as well. Table 5 shows that "marijuana only" marijuana users are only very slightly more likely to commit crimes than non-users. Tire original nine percentage point difference between users and

non-users in committing four or more offenses has shrunk to only two percentage points (in fact, only one percentage point--we are comparing 24.4% with 25.5%, and the original 19 percentage point difference between users and non-users in committing no offenses has been reduced to 13 percentage points. In fact, the "marijuana only" user is far more similar to the non-user in number of offenses committed than he is to the user of marijuana plus two or more other drugs. The application of the control involving other drugs clearly attenuates the marijuana-crime relationship, and much of the user-non-user differences in offenses committed can be traced to the fact that marijuana users are significantly more likely to use other drugs, rather than the use of marijuana per se.*

*The exploration of the "escalation" hypothesis-the question of whether or not marijuana "leads to" the use of other more dangerous drugs-would take us far afield in this report. The issue is dealt with in a separate report by the author prepared for the National Commission on Marihuana and Drug Abuse, however.

Our confidence in the lack of basic association between marijuana use itself and offenses--and our ability to attribute the simple original relationship to the use of drugs other than marijuana-is strengthened when we examine the relationship between frequency of use and offenses, holding the use of other drugs constant. Table 5A presents these data. Among "marijuana only" users, there is no statistically significant correlation between frequency of use and the commission of crimes--the differences are small, insignificant, and in no consistent direction. Among users of one other drug, likewise, frequency of marijuana use is extremely loosely associated with committing offenses-the differences which are observed are small, statistically insignificant, and point in no particular direction. And lastly, among users of two or more other drugs aside from marijuana, the association between frequency of marijuana use and the commission of the offenses described earlier is loose and not at all significant. Table 5A very strongly indicates the validity of the "spurious" model.

Closely related to the use of other drugs is a control which should be explored: the respondent's involvement with a drug-using subculture-with others who also use drugs. Naturally, as we saw in the last section, individuals who use marijuana tend to have friends who also use marijuana. What we would like to know is whether the social patterns they exhibit can be traced to their use of the drug, or to the fact that they have friends who use drugs. Thus, we should be very interested in looking at the individual who uses marijuana, but who does riot have drug-using friends, as well as the individual who does riot rise marijuana, but has drug-using friends. If interesting changes take place in the original marijuana-crime correlation, then we have indications that it is the individual's social relations, and not his rise of marijuana, per se, that determine marijuana use's correlation with crime. Tables 6 and 7 deal with this issue; they should be examined in conjunction with one another.

Among respondents with no marijuana-using friends (out of their 10 closest friends), as well as those with no drug-using friends at all, almost an identical relationship between marijuana use and crime obtains as in the original Table 3. Marijuana users are, significantly (but not strikingly) more likely to commit four or more offenses, and significantly less likely to commit none. The percentage differences in Tables 6 and 7 are almost the same (even slightly more) as those in Table. 3-about 25% at the "none" end vs. 19% for the original table, and about 18% at the "four or more" end vs. 9% for the original table (Table 3). If we were to rely only on these segments of the table, we would be led to the, inference that marijuana is meaningfully related to the commission of crimes.

However, an extraordinary thing happens to the other segments of the table: among those with drug-using friends, there is no relationship at all between marijuana use and committing offenses. The differences are so small as to be statistically insignificant. (And

they are actually in the opposite direction-non-users are slightly more likely to commit four or more offenses than users are.) In other words the marijuana-crime relationship is completely wiped out by the application of controls-in this case, integration into the drug-using subculture. We are led overwhelmingly to the conclusion that marijuana users tend to be somewhat more likely to commit crimes solely because they are part of a drug-using subculture; the actual properties of marijuana appear to be completely unassociated with criminal behavior. Anyone (whether he uses marijuana or not) who makes friends and becomes involved with others who use drugs-especially others who use drugs in addition to and aside from marijuana stands a higher likelihood of committing offenses, simply because this segment of the population tends to be more lax about obeying the law. It is merely because marijuana users tend to associate with others who are part of this subculture that their crime rate is somewhat higher. In other words, the marijuana-crime relationship-in terms of the causal or effects model is completely spurious.

What of the marijuana-using isolate? What of those who use marijuana but who have no friends who use drugs-either marijuana or other drugs? How can we explain the fact that the original difference in offense rate between users and non-users were not wiped out among those without drug-using friends-in contrast to being wiped out among those who had drug-using friends? Looking back at Tables 6 and 7, we are struck by the fact that the offense rate of the marijuana-using group without drug-using friends is as high as the groups with drug using friends. What does this indicate? First of all, involvement with a drug-rising subculture is clearly not the only determinant of a high rate of committing offenses. Probably something else is at work. The fact that the offense differences wash out among those involved with the drug subculture indicates that rise by itself (i.e., being high) cannot be a factor in the original marijuana-crime relationships difference cannot explain two things that are similar. The using isolate, however, is probably a (Qualitatively different social being from those who either do not rise, or those who use and have friends who also use. The isolate is probably deviant in a variety of ways crime being one of them. The fact that he uses in spite of having no friends who use (although lie may have friends who do not use) means that he uses most of the time alone, has not integrated his activities into a social life or a subculture, and probably pursues some activities which the dominant society would judge to be eccentric and unusual. In other words, it is possible that his involvement with crime is related to his social isolation from a group which pursues drug activities similar to his own, rather than his use of marijuana. However, these remarks must be regarded as speculation, since more complete information is not available.

A related process occurs when race is employed as the control variable. Among blacks, the original relationship remains intact; marijuana users are significantly (although not markedly) more likely to commit four or more offenses, and less likely to commit none, than is true of non-users. (The relationship is significant at the .004 level, using Chi-square.) However, among whites, the original relationship is completely washed out; users are not at all more likely to commit offenses. Table 8 presents these data. The minor differences can be completely accounted for by random fluctuations; the relationship is not significant at any level.

When education is treated as the control variable in this relationship, the marijuana-crime connection follows a pattern parallel to the two previous explorations-that is, it is completely washed out for some groups, but remains for others. In Table 9, we see that marijuana users who have at least attended college, but not graduate school, are not any more likely to commit offenses than college non-users. The percentages committing four or more crimes, and those committing none, are almost identical for users and non-users alike. (The differences are insignificant, and due to random fluctuation.) However, among respondents with only a high school education, the same basic relationship produced in Table 3 is upheld: marijuana users are significantly more likely to have committed offenses than non-

users. However, at least two variables are compounded here, since most respondents with a college education are white. Thus, the retainment of the original marijuana-crime correlation among high school education respondents, and its wash-out among college educated respondents, should not come as any surprise. However, among respondents with at least some graduate school education, the original relationship asserts itself; users are more likely to commit offenses than non-users. (The differences observed are significant at the .05 level; in other words, the differences have a one in 20 chance of occurring purely at random.) Table 9 presents the marijuana-crime relationship, holding education constant.

Using age as a control variable also produces mixed results. Among the two youngest age groups (15--20 and 21-23), the differences obtaining between users and nonusers are statistically insignificant, and could have occurred by chance alone; in the youngest of these two groups, the non-user is slightly more likely to have committed four or more offenses, and in the next to youngest of these groups, the user is slightly more so--but in both, the differences are too small to be meaningful. In the 24-to-28-year-old group, the differences approach statistical significance, but they are not substantial (.07 level of significance, using Chi-square). However, among the oldest group (age 29 to 34), the same basic difference in offenses as obtained in the original relationship holds up here; users are about twice as likely to have committed four or more offenses as non-users (28% vs. 13%), and less than half as likely to have committed no offenses (21% vs. 58&). These data appear in Table 10.

VII. SUMMARY AND CONCLUSIONS

The central effort in this report has been to determine whether marijuana use, in and of itself, is meaningfully and causally related to the commission of crime. Two models have been used in the past to answer this issue: the causal model, which holds that using marijuana, being under the influence of the drug, actually does stimulate the will to commit antisocial acts, and the spurious model, which holds that marijuana use is merely a reflection of independent and more powerful forces, and that in itself, marijuana use is unrelated to criminal and aggressive behavior. Some small amount of research has been conducted in the past on this issue, but no consistent findings have been turned up; . . . It is because of these factual lacunae that the National Commission on Marihuana and Drug Abuse mandated a study of marijuana use and crime, which culminated in the Philadelphia survey, as well as this report.

The findings from this study strongly support the view that marijuana, use by itself is not related in any meaningful or systematic fashion to criminal behavior, that marijuana use probably does not "cause criminiality. The "spurious" model appears to be a far more accurate description of the marijuana-crime connection than does the "causal" model. The use of marijuana per se is probably completely unrelated to criminal and aggressive behavior. The drug does not "cause" any significant number of users to commit crimes, or aggressive or violent behavior. The effects of the drug seem to be, from what can be gathered from the available data on the question, without criminogenic causality. This does not mean that it is not possible to commit crimes, including aggressive crimes, under the influence of marijuana-but that being high does not increase one's probability of doing so, that on an hour-for-hour, crime-for-crime basis, there are probably no significant differences between being intoxicated on marijuana and being "normal," not under the influence of any drug.

A wide variety of data have been brought to bear on the marijuana-crime issue.

First of all, regarding the subjective self-reported effects of marijuana, all indications are that the effects classically described as being related to aggressive behavior and the

commissions crimes-feeling angry, frustrated, wanting to -hurt someone, being willing to follow any and all suggestions of others, being deranged, wanting to do something violent-have no empirical support whatsoever; users consistently describe these "effects" as non-existent or as extremely rare and atypical, no different from normally. In fact, precisely the opposite is the case: if anything, the effects of marijuana would have far more to do with reducing the criminal "impulse," whatever that might be, due to the fact that they tend to be in the direction of relaxation, .eeling calm, of not wanting to move about, feeling somewhat drowsy, sleepy. Activity of any sort tends to be inhibited by the marijuana intoxication.

Secondly, the Philadelphia survey asked the respondents about using marijuana and/or alcohol 24 hours or less before various crimes were committed. Marijuana very rarely figured into the commission of crimes in any way. For only a tiny minority of all crimes committed was the respondent under the influence. This was especially the case for serious and aggressive crimes. Alcohol was far more likely to be used soon before criminal activity than marijuana. -

The third type of information brought to bear on the marijuana-crime question was the self-admitted offense rate of users versus non-users. The total number of different types of crimes which respondents said that they had committed was compared. The simple relationship between using marijuana and committing offenses was positive and statistically significant, and there was also a high correlation between frequency of smoking marijuana and committing offenses. However, a wide range of other variables, themselves related to both crime and to marijuana use, were also correlated-race, education, age, the use of other drugs, and having drug-using friends. Thus, the issue became: is it the causal connection with these third variables which produces the marijuana crime simple correlation, or does the correlation hold up even when these factors are controlled? In other words, which is right, the causal or tile, spurious model? Is marijuana use merely dependent itself on larger, broader, more potent factors-or does it exert an independent power? Do users commit crimes more frequently than nonusers because they use marijuana or because they happen to be the kinds of people who, would have a higher crime rate, marijuana or no marijuana.

The evidence from these three-variable tests support the "spurious" model. The control tables show that the differences in crime rate between users and non-users is, in most cases, dependent not on marijuana use per se, but on these larger factors. The fact that the relationship disappears, or is wiped out, when some controls are applied shows that the marijuana-crime connection is dependent on sociological variables, and not chemical effects. When the use of other drugs was held constant, the marijuana-crime correlation was severely attenuated, and in some cases, washed out entirely. When the variable of having friends who use other drugs-both marijuana as well as stimulants, sedatives, hallucinogens and "hard drugs" was applied, the relationship disappeared among those with drug-using friends, but not those who had no drug-using friends. When race was held constant, the marijuana-crime connection was wiped out completely among whites, but not blacks; among white marijuana users, their crime rate was not statistically different from non-users, but black users did have a higher crime rate than non-using blacks-similar in magnitude to the original relationship. When education was used as a control variable, we saw that among college-educated respondents, the marijuana-crime correlation was nonexistent, but it remained among respondents with a high school education, and for those who had attended graduate school. And lastly, age was applied as a control. Among the youngest groups, the marijuana-crime relationship was attenuated, but it remained somewhat strong among the two oldest age categories.

If there were truly a causal relationship between marijuana use and crime, these disappearing correlations would not occur. The application of sociological variables cannot wash out a chemical reaction in the user. The enormous variability dependent on social

factors indicates that marijuana effects do not inherently produce behavior of a criminal nature. The kinds of people who use the drug tend to follow Patterns of behavior regardless of whether or not they use marijuana. By itself, marijuana, use is not a potent producer of behavior, and certainly not criminal behavior. Individuals who commit criminal acts are those who would do so with or without the use of marijuana.

The data from this study support-the conclusion, almost without qualification, that marijuana use does not cause criminal behavior.*

*A subsequent regression analysis with the six variables used independently as controls showed that when all six variables are applied simultaneously, the use of marijuana in and of itself accounts for less than 1% of the variance in committing offenses (personal communication by the author, 24 January 1972).

The Report of the National Commission on Marihuana and Drug Abuse

Summary and Conclusions: Marihuana and Crime

The Commission's review of the available evidence bearing on the relationship between marihuana use and criminal, aggressive and delinquent behavior has yielded the following information.

The once prevalent belief among the general public and the professional law enforcement, criminal justice and research communities that marihuana causes crime, violence, aggression and delinquency has moderated appreciably over the years. Recent evidence indicates that increased attention has been devoted, instead, to a possible statistical correlation rather than a cause-effect relationship.

At present, however, considerable confusion and uncertainty exists among both the general and professional publics, among youth and adults, and among marihuana users and non-users about the relationship between marihuana and criminal, aggressive or delinquent behavior. The confusion and uncertainty stem from a general lack of knowledge and understanding about the effects of the drug, including its potential for physical addiction. Many persons are still under the misapprehension that marihuana is addicting and that crimes are committed in order to support a drug "habit."

In general, recent changes in public and professional opinion have corresponded with and reflected the increased use of marihuana, particularly within the middle class segment of society; more direct observation of and professional experience with the marihuana user; new and more enlightened information about the drug and its effects; and concomitant changes in the public image of the user.

There is no systematic empirical evidence, at least that drawn from the American experience,

to support the thesis that the use of marihuana either inevitably or generally causes, leads to or precipitates criminal, violent, aggressive or delinquent behavior of a sexual or nonsexual nature.

Laboratory studies of effects have revealed no evidence to show that marihuana's chemical properties are, by themselves, capable of producing effects which can be interpreted as criminogenic; that is, that marihuana is an independent cause of criminal or aggressive behavior. If anything, the effects observed suggest that marihuana may be more likely to neutralize criminal behavior and to militate against the commission of aggressive acts.

The research community has recently gathered considerable evidence to show that marihuana and criminal, aggressive and delinquent behavior are statistically and significantly correlated when measured together in isolation from variables which are related to marihuana use and other forms of antisocial behavior. The data also show, however, that this statistical association either attenuates significantly or disappears completely when the proper statistical controls are applied.

In other words, the observed relationship between the use of marihuana and criminal, violent, aggressive and delinquent behavior is spurious. It is dependent on such extra-pharmacological factors as the age, race and education of the user; the type of community in which he lives; his past history of psychosocial maladjustment; and his involvement in a criminal or delinquent subculture (use of other drugs; drug buying and selling activities; associations with friends who also use, buy and sell cannabis or other drugs).

To reiterate what Professor Goode has so cogently stated.

If there were truly a causal relationship between marihuana use and crime, these disappearing correlations would not occur. The application of sociological variables cannot wash out a chemical reaction in the user (1972:52).

To put it still another way, to believe that marihuana causes criminal, violent, aggressive or delinquent behavior is to confuse the effects of the drug with the people who use it.

From the perspective of marihuana's relationship to antisocial behavior of a criminal or violent nature, the drug cannot be said to constitute a significant threat to the public safety. If its use, therefore, is to be discouraged, it must be discouraged on grounds other than its role in the commission of criminal or violent or delinquent acts.

The enormous increases in marihuana arrests over the past several years are ample evidence that the police have taken seriously their role of maintaining law and order with respect to marihuana use and that they have responded to public pressure and concern about the increase in marihuana use. Yet, in their experience with the marihuana user they have been placed in the unenviable position of having to enforce a law either disregarded or discredited by large segments of the population they serve.

Over and over again they have seen their efforts in this respect negated by the de jure or de facto modification, if not nullification, of the laws against possession by prosecutors, judges and even legislators. Their increasing frustration and demoralization, therefore, at least with respect to the marihuana user, is quite, understandable.

These other officials, however, are likewise placed in a difficult position; for they, too, must enforce and apply the criminal law, and they, too, must respond to public pressures and concerns. In some instances, they have demonstrated particular resistance to criminalizing the user and subjecting him to criminal penalties which are deemed to be unwarranted if not

unwise.

In the case of marihuana, recent changes in law enforcement practices with respect to the user have, in fact, reflected the increased use and public tolerance of marihuana. The statutory changes now taking place at the state and local levels are further evidence of the trend toward greater public acceptance of the user. In these instances, the laws and their enforcement were altered because they no longer performed the symbolic function of expressing society's disapproval of marihuana use.

The Report of the National Commission on Marihuana and Drug Abuse

Marihuana and Driving

The United States Department of Transportation has estimated that in 1970, more than 111 million Americans were licensed drivers and that there were approximately 109 million vehicles registered and regularly traversing America's streets and highways. The Commission-sponsored National Survey (Abelson, et al., 1972) has revealed that approximately 21 million or 15% of all American adults 18 years and over have tried marihuana and that about 6.9 million adults currently use the drug.

At the present time, there is no reliable estimate of the proportion of marihuana users who drive while "high," but America's tragic experience with highway accidents and fatalities involving persons driving under the influence of alcohol raises serious questions about the extent to which marihuana impairs driving skills and performance and thereby constitutes a public safety hazard on this nation's thoroughfares.

In recent years, public safety experts, along with the medical and scientific communities, have devoted increasing attention to the effects of any mind-altering drug on driving, but there is as yet little evidence to inform discussion. As part of its more general concern with the impact of marihuana on public safety, the Commission has reviewed the available research and has concluded that the evidence which presently exists is, at best, inconclusive.

In view of this finding and prior to a rather brief summary of the knowledge we now have, the Commission feels compelled to urge the public to consider these findings as only tentative, to adopt an extremely cautious attitude about the effects of marihuana on driving skill and performance, and perhaps most importantly, to avoid driving at all while under the influence of any mind-altering drug or intoxicant.

THE CURRENT STATE OF KNOWLEDGE

The literature on drugs and driving contains several references to the role of drugs, including marihuana, in traffic violations, accidents and fatalities. They differ considerably, however, in the nature and extent to which they influence or affect driving behavior (Waller,

1965; Chetta, 1967, Commission on Narcotic Drugs, 1968; Third Triannual Congress on Traffic Accidents, 1969; Waller, 1970; Klein, Davis and Blackbourne, 1971 National Institute of Mental Health, 1972).

The studies examine the relationship between marihuana and driving and tend to be either statistical and enumerative with regard to traffic accidents or experimental with respect to the physiological and psychological effects of marihuana use deemed to be related to driving skill and performance. All of them suffer to one degree or another from an overabundance or dearth of extraneous variables and have, therefore, precluded generalization of the results and the production of conclusive, and valid findings.

The difficulty in interpreting the data gathered from statistical or enumerative studies of traffic accidents derives primarily from the inability to isolate precise cause. There are no tissue, urine or blood analysis methods currently and systematically in use outside the laboratory, similar to those available for alcohol, for determining the presence of marihuana in the bodily fluids of drivers.

Statistical Studies

The statistical or enumerative studies generally can be characterized as two types. In the first type, samples of arrested marihuana, or other drug law violators are selected and their traffic violations or accident rates are compared with those in the general population. In the second type, samples are drawn initially from lists of persons known to have committed traffic violations or been involved in traffic accidents. The samples are then divided into persons who in some way are identified as marihuana users and those who are not and the incidence of traffic violations or accidents in the two groups is then compared.5

5 Dr. E. J. Woodhouse, a chemist is now in the process of developing a marihuana testing method. At the present time he reports being able to detect the presence of marihuana by analyzing urine samples (Polak, 1971).

Waller (1965), compared the crash rates per unit miles of driving of known marihuana users with those of other drivers of similar age distribution. He found that the crash risk was not increased by the use of marihuana.

A similar study yielding similar results was performed in the State of Washington (Crancer and Quiring, 1968). There were no significant differences in the crash rates per 100 drivers between those who did use marihuana and those who did not. The researchers compared the driving records of persons arrested for illegal drug use (100 narcotics users, 123 dangerous drug users and 79 marihuana users) with those of 687,228 licensed drivers living in the same general driving environment (King's County, Washington). Comparisons were made of the number of accidents, the number of violations and the type of violations accumulated between January 1, 1961 and October 1, 1967.

All three drug using groups had significantly higher accident and violation rates than did the comparison group matched for age and sex; the accident rate for the marihuana users was 39% higher; for the narcotics users, 29% higher; and for the dangerous drug users, 57% higher. The violation rates were 180 % higher, 149 % higher and 16% higher, respectively.

Table 9 below shows the percentage of marihuana users and county drivers, by sex, with none and 10 or more traffic violations and accidents between January 1, 1961 and October 1, 1967.

Since the majority of the users were first arrested for their illegal drug use in 1964, the researchers compared their violation rates before and after that time. The data show a violation rate of 1.78 per marihuana driver prior to 1964 (January 1, 1961 to June 30, 1964) ; the rate increased to 3.44 per driver between July 1, 1964 and October 1, 1967. For the same time periods, the county group's violation rate per driver increased from 0.4-4 to 0.53.

The violation rates for both reckless and hit-and run driving were significantly higher for the marihuana users than for the county comparison group.

In short, these data suggest that marihuana users are much more likely to have many violations and accidents and are much less likely to have clear accident and violation records than are a comparison group of drivers drawn from the same general population. Them findings are difficult to interpret more precisely, however, because Such variables as the number of miles driven and overall driving experience were not taken into account.

Table 9.-MARIHUANA USERS AND COUNTY DRIVERS HAVING NONE AND TEN OR MORE TRAFFIC VIOLATIONS AND ACCIDENTS, BY SEX, JANUARY 1, 1961OCTOBER 1, 1967

(Figures in Percentages)

	Marihuana users		County drivers	
	Male	Female	Male	Female
None...	10.0	33.3	41.1	67.7
10.....	22.9	11.1	2.2	0.1

Source: Crancer and Quiring, 1968:9.

A survey of 12,453 Virginia high school students was conducted during 1970 by the Virginia Highway Safety Division (Ferguson and Howard, 1971). The objectives of the survey were to determine the extent of drug use in the Virginia high school population and to assess the number of traffic crashes which could be caused by drug-impaired drivers.

The data, show that 2.9% of the sample reported experiencing, either as a passenger or driver, at least one traffic crash in which drug use "could have been a causal factor." The data also show that the students were more likely to attribute the crashes to marihuana (54%) than to other drugs (46%). Use of marihuana was found to be slightly more common than was the use of other drugs among drivers involved in non-fatal collisions but was used with equal frequency in those drivers involved in fatal crashes (p. 31).

The researchers suggest as an explanation for their findings the fact that marihuana. usage was greater among this population (12.3%) than was the use of other drugs (7.7%). This explanation is not completely adequate, however, in that the survey ignores both the possible presence of alcohol along with marihuana and other drugs, either separately or in combination. As such, it cannot be said that marihuana causes more accidents than do other drugs, including alcohol.

Klein, Davis and Blackbourne (1971) surveyed students at four academic institutions in Florida in an effort to assess the role of marihuana in traffic involvements. Respondents were divided into five groups of marihuana users: (a) non-users, (b) previous users, (c)

using less than four times a month, (d) using four to eight times per month, and (e) using more than eight times per month. For each group information was obtained relative to the frequency of alcohol and tobacco use; respondents' ability to judge speed, time and reaction time; traffic involvements; and licen · revocations. In addition, respondents were asked their opinion about whether or not persons under the influence of marihuana should be permitted to operate aircraft and various other vehicles, including taxis and private automobiles.

With respect to traffic involvements, the data show that 18% of the infrequent users and 53% of the frequent users reported having been stopped by the police while under the influence of marihuana. The data also show that as the frequency of use increases, so too does the number of license revocations.

As Nichc's (1971) has pointed out, however:

Apparently no attempt was made to compare the number of times they were stopped while under the influence of marihuana as opposed to the number of times they were stopped while not under the influence. Thus, the data do not give any indication of whether the violations were due to the effects of marihuana or whether they were the result of poor driving habits in the first place (pp. 28-29).

Both experimental and quasi-experimental approaches to assessing the effects of marihuana on driving suffer from methodological shortcominogs and inconsistent results. The primary deficiency in the experimental investigations lies in their inability to hold constant the numerous external variables which actually affect driving behavior and which, therefore, precludes valid comparisons of actual driving performance with that simulated in a controlled but unrealistic environment. In the quasi-experimental studies using interviewing techniques, the accuracy of self-reports becomes a question which must be raised with respect to the, effects of marihuana on driving skills and performance.

The data derived front these studies, however, suggest that marihuana does interfere, at least in some users, with the ability to judge time, speed and distance ; with reaction time; and with the ability to control the vehicle and respond to an emergency situation (Zinberg and Well, 1969; James, 1970- Hochman and Brill, 1971; Klein, et al., 1971).

Data from a survey of 10% of the undergraduate students at UCLA (Hochman and Brill, 1971) show that one-third of all marihuana users drive, occasionally while "high." Of the chronic users, 42% drive frequently while high and 10% always drive while "stoned" (p. 22).

According to the researchers, "both (marihuana) users and non-users were universally of the opinion that (marihuana) 'intoxication' affected driving, but users thought, that they compensated by being more cautious, driving more slowly, and concentrating on the dri ng," (p. 22). The researchers also report that as usage of marihuana becomes more chronic, "fear" and avoidance of driving while intoxicated decreases and the ability to compensate for the drug's effects increases.

With respect to traffic violations, the data show that 4% of occasional and chronic marihuana users had received traffic tickets when they were intoxicated by the drug but that none had been discovered to be intoxicated at the time.

These findings corroborate those, from an earlier study (Zinberg and Weil, 1969) in which the researchers stated that "users appear to be able to compensate 100% for the nonspecific effects of ordinary doses of marihuana on ordinary psychological performance" (p. 39). In another report Weil (1969) wrote that "it appears that once a person becomes accustomed to

the effects of cannabis, he, can compensate fully for the drug's influence on performance of tasks of ordinary complexity." (p. 6).

Experimental Studies

Controlled laboratory experiments have attempted to measure these and other effects on driving with greater specificity. Manno and his associates (1970) found that there are significant impairments of motor and mental performance attributable to marihuana.

In an experiment conducted by Frank and his colleagues (1971), marihuana smokers demonstrated "a marked and very consistent increase in the amount of time required to recover from glare . . . This ranged up to four times as long with a mean peak of almost twice as long (171%) after smoking marihuana. . . . Furthermore, this increase in glare recovery time persisted for several hours" (p. 9) and did not seem to be dose related.

These researchers did not find significant differences between marihuana users and nonusers, however, in pulse, rate, time estimation or dilation of the pupils.

With respect to marihuana's effect on emotional reactions, Dr. S. E. Miller (1959) suggested that "these drugs (Including marihuana) have similar abilities for changing normal emotional reactions, even causing individuals to become oblivious or indifferent to their surroundings" (p. 864). Klein and his colleagues (1971), however, urge against generalizing these findings from the laboratory situation to the complex task of actual driving.

Crancer and his coworkers (1969) conducted a study designed to determine the effects of a "normal social marihuana high" on simulated driving performance among 36 experienced marihuana smokers and compared the effects they discovered with those occasioned by alcohol use.

The researchers found that experienced marihuana users under conditions of a "normal social marihuana high" (from two cigarettes totalling 1.7 grams of THC) accumulated significantly more speedometer errors than under control conditions. No significant differences were found, however, relative to accelerator, brake, signal, steering or total errors in simulator scores.

Comparing the effects of alcohol (at a blood level of 0.10%-the legal limit of intoxication) and marihuana intoxication (1.7 grams THC), the researchers concluded that moderate intoxication by marihuana was less detrimental to simulated driving performance than was the presence of alcohol at the 0.10% blood level. The mean error scores were 84.46 for the control group, 84.49 for the marihuana group and 97.44 for the alcohol group (p. 6).

There have been several criticisms leveled at this study, however, and several researchers have cited contradictory findings. Frank and his associates (1971) have pointed out the fact that the subjects did not have, complete control over their simulated drive.

Kalant (1969) noted that "it does not follow automatically that lack of effect of a drug on the simulated task will correlate with lack of effect on the actual task" (p. 640). He also criticized the use of dissimilar doses of marihuana and alcohol for the comparison and in this regard stated that "the finding that a heavy dose of alcohol caused more impairment than a mild dose of marihuana is neither surprising nor helpful in assessing the relative effects of the two drugs in the relative doses in which they are normally used" (p. 640).

Lastly, Kalant pointed out that Crancer and his colleagues failed to indicate if any measures

were actually taken to ensure effective absorption of the doses by the experimental subjects. This may be important, if the findings of dose dependent impairments observed by Dagirmanjian and Boyd (1962) and Isbell and his associates (1967) are valid.

Although Crancer and his fellow researchers did not feel that the impairments found were related to either dosage level or experience with the drug, this latter finding is also subject to question in view of the earlier findings of the Mayor's Committee on Marihuana (1944) and Weil and his colleagues (1968) that the performance of drug-naive subject was more impaired than was that of experienced marihuana users.

In a more recent simulator study, attention was directed to the effects of marihuana on risk acceptance (Dott, 1971). The experimental situation involved the placement of 12 experienced marihuana users under four conditions (non-smoking, placebo, low dose, and high dose) in order to compare subjects' reactions to various passing situations, some of which required an immediate response to an emergency.

The data show that even though more accidents occurred under the two marihuana conditions than under the placebo (and normal) condition, the differences were not significant. Significant differences were found in the number of passes completed and in the time needed to make pass decisions. Not only did the marihuana smokers complete fewer passes (174 in placebo condition, 153 in low dose condition, and 133 in the high dose condition), but they took more time to make the pass decisions while under the influence of the drug. The researcher concluded that "marihuana appears to make the subject less willing to accept risk, and it delays elective decision reaction time. Effects were most noted in situations which did not have a high attention demanding value. . . . In those situations which were of an emergency nature and which demanded immediate attention and response . . . . no drug effects were noted" (p. 28).

Dott also found, in contrast to Frank and his associates (1971) that pulse rate did seem to be affected by marihuana intoxication.

Based upon a comparison with the same experiment performed years before in relation to alcohol (Light and Kelper, 1969), Dott stated that "the effects of marihuana on driving behavior are more subtle and less hazardous than the effects of alcohol."

McGlothlin (1971) is presently conducting another simulator study and is attempting to measure the effects of marihuana, methadone and alcohol on simulated driving, attention, information processing abilities and other measures related to driving efficiency such is peripheral vision, depth perception and glare recovery. At this time, five experiments have been conducted and the researcher has stated that:

concentrated and divided attention for both auditory and visual modalities are significantly impaired by smoked marihuana containing 15 mg. THC.... In general, where impairment was found for the marihuana treatments, it appears to be equivalent to that resulting from a blood alcohol level of about 0.01%. Frequent marihuana users (one or two times per week) typically showed less impairment than those using less frequently (p. 22.).

The inconclusive and controversial nature of the research to date suggests that there is enough of a potential risk involved to both the individual and the public safety to recommend strongly against driving while intoxicated-no matter what the intoxicant. Although marihuana does not seem to produce serious impairments of driving skills or performance, to say that the drug does not at all adversely affect driving behavior or that it may not be a factor in traffic violations or accidents is to misrepresent the current state of

knowledge. As the National Institute of Mental Health (1972) has noted, "obviously, more research is needed in elucidating the role of various drugs on highway accidents . . ." (p. 220).

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The Report of the National Commission on Marihuana and Drug Abuse

I. Control of Marihuana, Alcohol and Tobacco

History of Marihuana Legislation*

This chapter traces the legislative histories of marihuana, alcohol, and tobacco.

In the first section, "History of Marihuana Legislation," the origins of the intoxicant use of cannabis in this country during the early 20th century are noted along with the subsequent state and federal statutes enacted prohibiting use, distribution, production and sale.

Proscriptions began appearing on the books after about 1914 and continued through 1971, which brings the reader to the point subsequently covered by the rest of this Appendix.

Early colonial laws regarding alcohol are described in the beginning of the next section, "History of Alcohol Prohibition." From that point in history, the national movements which spread over the next two centuries, culminating in the enactment of National Prohibition from 1920 to 1933, are described.

The various state modes of control which appeared after Repeal are then briefly enumerated along with a discussion of the present state controls over production, distribution, and sale of intoxicating beverages.

The introduction of tobacco cultivation in 1613 in the colony of Virginia opens the third section, "History of Tobacco Regulation." The widespread use of tobacco in the latter 1800's into the first half of the 20th century is traced along with the increasing pressure from groups fearful of tobacco's deleterious effects on health.

Federal sumptuary regulations are outlined along, with a discussion of the impact further federal controls might have on the tobacco economy.

History of Marihuana Legislation*

**This section is drawn from the manuscript of The Marihuana Consensus: A History of American Marihuana Prohibition, in press 1972, by Professors Charles H. Whitebread, II, and Richard J. Bonnie of the University of Virginia Law School.*

"Marihuana" or Indian hemp, labeled Cannabis Sativa L. by Linneas in 1753, has been used for centuries in Asia and Africa for its intoxicant properties. It was cultivated as a source of fiber in North America in the early 17th century. Yet, cannabis was not used as an intoxicant in North America until the late 19th century, and in the United States until the early 20th.

Cannabis use was prevalent in Mexico by 1898. Widely cultivated and growing wild, the drug was readily available for eating, drinking, or smoking, the latter being by far the most common method of ingestion. Soldiers in Pancho Villa's army are reputed to have used the drug freely. The path of the introduction of marihuana smoking for pleasure into the United States was not via Europe, which transmitted the fiber, oil, and medicinal uses of hemp, but via Mexico and the West Indies.

The plant and its intoxicant use in the United States in the first decades of the 20th century encountered a political and social climate which was not particularly conducive to hearty growth. Gradually criminal prohibitions appeared on the statute books of nearly every state where the drug was used.

Well into the thirties, however, marihuana smoking attracted little attention from the national policy and opinion apparatus which was deeply ensnared in drug matters of much wider social impact than the limited, regional use of this new drug.

The "villain" theory of American marihuana prohibition - attributing the drug's illegal status to the Federal Bureau of Narcotics and its longtime head, Harry J. Anslinger - has been particularly popular in recent years.

Although the federal narcotics bureaucracy, with Commissioner Anslinger at the helm, was to become marihuana's leading antagonist in the mid-thirties, a restrictive, public policy toward the drug was well-rooted locally before that time. During the "local" phase of marihuana prohibition, lasting roughly from 1914 to 1931, practically every state west of the Mississippi, except for two, had prohibited use of the drug for non-medical purposes.

The real story of marihuana policy in the United States begins as a series of distinctly local tales.

STATE PROHIBITION: 1914-1930

Marihuana use was a familiar phenomenon in the border towns of Texas and New Mexico after 1910. First to note the use of the drug were El Paso law enforcement officials who quickly secured a local ordinance in 1914 banning sale and possession of the drug. El Paso officials and local representatives of the Customs and Agriculture Departments of the Federal Government agitated for state and federal legislation to combat the "killer weed."

After an official request by the Secretary of Agriculture, the Secretary of the Treasury issued a decision under the Food and Drug Act prohibiting importation of cannabis after 1915 for other than medical purposes.

On the state level in Texas, legislation was slow in coming. Marihuana use was still a local problem in the 'border towns and it attracted little statewide interest. The Texas Legislature included marihuana when it passed a general narcotics statute in 1919, prohibiting transfer of listed narcotics except for medical purposes (Texas, 1919: 278). In 1923, the statute was tightened to prohibit possession with intent to sell (Texas, 1923: 156-157). The legislature's failure to prohibit simple possession or use reflected an objection to interfering with private conduct.

The degree of public interest in narcotics and marihuana is well-illustrated by the limited newspaper coverage. In its only direct reference to the 1923 marihuana legislation, the Austin Texas Statesman, which had given the legislature extensive coverage, stated:

The McMillan Senate Bill amended the anti-narcotic law so as to make unlawful the possession for the purpose of sale of marihuana or other drugs. Marihuana is a Mexican herb and is said to be sold on the Texas-Mexican border (Austin Texas Statesman, 1923).

Even more surprising is the fact that the El Paso Times did not mention the McMillan bill before or after its passage.

New Mexico in the same year prohibited sale, cultivation and importation of cannabis. Mere possession was not expressly prohibited but anyone found in possession was presumed to have imported the marihuana illegally (New Mexico, 1923: 58-59). The Santa Fe New Mexican, hometown newspaper of the bill's sponsors paid scant attention, noting only that:

The Santa Fe representative, however, had better luck with his bill to prevent sale of marihuana, cannabis indica, Indian hemp or hashish as it is variously known. This bill was passed without any opposition. Marihuana was brought into local prominence at the penitentiary board's investigation last summer when a convict testified he could get marihuana cigarettes anytime he had a dollar. The drug produces intoxication when chewed or smoked. Marihuana is the name commonly used in the Southwest and Mexico (Santa Fe New Mexican, 1923).

In addition to coming in via Mexico, marihuana was being smuggled in by sailors from Cuba and other points in the Indies via New Orleans. Dr. Frank Gomila, Commissioner of Public Safety of New Orleans, began his campaign for federal legislation which would later bear fruit. He observed that the traffic was quite organized amounting to thousands of kilograms a year:

... [T]he custom was to keep [marihuana] In warehouses or storerooms for further distribution. It was sold by the wholesaler to the retailer who In turn put the 'weed' through a process known as 'sweating.' The dried leaves and stems were soaked in sugar water and dried on butcher's brown papers (Gomila and Lambow, 1938: 29).

According to Dr. Gomila and the newspapers, the demand in New Orleans in the mid-twenties was so great that the "peddlers" were able to become exceptionally prosperous by dividing the market. One had exclusive jurisdiction over the blacks unloading the fruit boats, another over the lobby in a certain hotel, and so forth. It should be noted that marihuana was also available at the local pharmacy without a prescription before 1923 in Texas and 1921 in Louisiana. After that marihuana had to be bought on the street unless the user could successfully forge a prescription.

Different pictures emerge, of the marihuana user in El Paso and San Antonio on the one hand and New Orleans and Galveston on the other. In the border towns, he was a Mexican laborer, indolent to some, volatile to others. Local authorities were, by and large, unable to generate any significant public or political interest, although there were no political objections to making the Mexican weed illegal.

In the port cities, however, the marihuana user was a "dope fiend," the basest element of

American society. He was a narcotics addict, a pimp, or a gambler; she was a prostitute. In New Orleans, marihuana was simply another narcotic in a city with a major narcotic problem. It was always open to sensationalism.

Even before public attention was excited, however, the prevalence of marihuana use came to the attention of the President of the Louisiana State Board of Health, Dr. Oscar Dowling. On August 21, 1920, he advised the Governor of the increasing availability of marihuana, a "powerful narcotic, causing exhilaration, intoxication, delirious hallucinations, and its subsequent action, drowsiness and stupor. . ." (Jones, 1920).

At the same time, Dr. Dowling wrote to the Surgeon General of the United States, Dr. Hugh Cummings, to advise him of the increasing traffic in morphine, opium, and marihuana, and to seek federal cooperation.

An interesting sidelight of this request for assistance from Washington is that four months later Dr. Dowling was to become embroiled in a bitter battle with the Federal Government over an order to close his pet project, the New Orleans morphine clinics (Dowling, 1920). Ultimately he would lose, and one of the earliest attempts to deal with narcotics addiction would be suppressed for a half century (Lindesmith, 1967: 135-161).

Very little, however, was done about the marihuana issue until the press seized upon it. In the fall of 1926, the New Orleans Item dispatched an army of reporters among the smoking and selling population.

A series of articles published by the more widely circulated Morning Tribune (both the Item and the Tribune were owned by the same publishing company) exposed the immense profits being made and commented upon the volatile effects of the drug upon its "addicts." It was reported that marihuana:

Numbs the sense, creates wild fancies and has a hypnotic effect upon the user, making his will easily subordinated to that of others.

What emerged from these articles, however, was not a vision of addicts on the streets and pushers on the docks but rather peddlers who lurked on playgrounds seeking to entrap young minds. "Over two hundred children under fourteen are believed to be addicted to the marihuana habit," the paper reported, and "at least 44 schools were definitely being infected" (Gomila and Lambow, 1938: 29-31).

Local policy-makers wasted no time. The New Orleans Police Department immediately launched a round-up. They arrested more than 150 persons for violation of a law which had lain dormant for two years (Gomila and Lambow, 1938: 29-31; WCTIT, 1928).

Dr. Dowling soon circulated "a warning to parents, guardians, and teachers of children against this menace" (WCTIT, 1928: 1). The Women's Christian Temperance Union jumped on the bandwagon, focusing its attacks on the "soft drink" bars which had sprung up all over New Orleans during Prohibition:

The soft drink stand and the corner drug store have taken the place of the saloon as a social meeting place. Here is where marihuana and liquors can sometimes be bought (WCTU, 1928: 3).

Beyond these immediate effects, a more substantial impact of the local policy reaction in

New Orleans was the formation of a tightly knit coterie of New Orleans law enforcement, public health, and social welfare officials who would carry their campaign to Washington, with ultimate success.

The drug and the practice of smoking it spread during the mid-twenties from the Gulf Coast and border town points-of-entry in two directions north and west from the border together with its ethnic identity and north and east from New Orleans with its identity as a narcotic and enslaver of youth.

Practically every state west of the Mississippi River prohibited the possession or sale of marihuana during the period 1915 to 1930. Most of them acted by 1930: California (1915), Iowa (1921), Nevada (1923), Washington (1923), Arkansas (1923), Nebraska, (1927), and Wyoming (1929).

The Bureau of Immigration records the entry of 590,765 Mexicans during this period, two-thirds of them remaining in Texas, the others settling in states in the Rocky Mountain area, most of them as farm laborers (U.S. Bureau of Immigration, 1915 to 1930).

Whether motivated by outright ethnic prejudice or by simple discriminatory disinterest, the proceedings before state legislatures resembled those in Texas in 1923. There was little, if any, public attention and no debate. Pointed references were made to the drug's Mexican origins and sometimes to the criminal conduct which inevitably followed when Mexicans ingested the "killer weed.,"

The Colorado Legislature first prohibited possession, cultivation and sale of the drug in 1927, the year after the use of marihuana noticeably increased (Colorado, 1927: 309). At that time., according to a subsequent newspaper report, the drug was " used almost exclusively . . . by the Mexican population employed in the beet fields" (Rocky Mountain News, 1931).

Similarly, in 1929, the Montana Legislature amended its general narcotic law to marihuana, prohibiting use, sale or possession without a prescription (Montana, 1929: 5). On seven different days from June 24 to February 10, the date of the bill's passage, the Montana Standard succinctly noted the progress of the bill through the legislature. The legislature's attitude was characterized in the January 27 issue:

There was fun in the House Health Committee during the week when the marihuana bill came up for consideration. Marihuana is Mexican opium, a plant used by Mexicans and cultivated for sale by Indians. "When some beet field peon takes a few rares of this stuff," explained Dr. Fred Fulsher of Mineral County, "he thinks he has just been elected President of Mexico so he starts out to execute all his Political enemies. I understand that over in Butte where the mexicans often go for the winter they stage imaginary bullfights in the 'Bower of Roses' or put on tournaments for the favor of 'Spanish Rose' after a couple of whiffs of marihuana. The Silver Bow and Yellowstone delegations both deplore these international complications." Everybody laughed and the bill was recommended for passage (Montana Standard, 1929: 3).

About the same time, Mexican laborers bad begun to appear in Idaho and the mayor of Boise remarked:

'The Mexican beet field workers have introduced a new problem-the smoking in cigarettes

or pipes of marihuana or grifo. its use is as demoralizing as the use of narcotics. Smoking grifo is quite prevalent along the Oregon Short Line Railroad; and Idaho has no law to cope with the use and spread of this dangerous drug (WCTU, 1928:).

Idaho passed a law in 1927 (Idaho, 1927: 98).

By 1931, the Texas Legislature finally got around to prohibiting possession of marihuana. By now alcohol prohibition had withdrawn any philosophical barrier to making possession illegal. The San Antonio Light reported that:

At last the state legislature has taken a definite step toward suppression of traffic in a dangerous and insanity-producing narcotic easily compounded of a weed (marihuana) indigenous to this section. This newspaper has urged the passage of prohibitory legislation and is gratified that the solons at Austin have acted, even if tardily, in the suppression of traffic in a drug which makes, the addict [read Mexican] frequently a dangerous or homicidal maniac (San Antonio Light, 1931).

In the East, appearance of the practice was not a necessary prerequisite for prohibition. That Maine (1913), Massachusetts (1914), Vermont (1915), and Rhode Island (1918) barred the sale of cannabis without a prescription before 1920 does not indicate that marihuana smoking had appeared there on any significant scale. Rather, in the course of anticipating and implementing the national anti-narcotics policy declared by the Harrison Act in 1914, medical representatives on the drafting committees recommended the inclusion of "another narcotic" to which addicts could resort once the other opiates became difficult to obtain.

The New York Times in 1914 described cannabis as a "narcotic [having] practically the same effect. as morphine and cocaine," (New York Times, 1914: 6) and it noted in an editorial that:

[T]he inclusion of cannabis indica among the drugs to be sold only on prescription is only common sense. Devotees of hashish are now hardly numerous enough here to count, but they are likely to increase as other narcotics become harder to obtain (New York Times, 1914: 8).

By 1923, the New York Times referred to marihuana as the city's "latest habit-forming drug" when reporting its exhibition at a Women's Club meeting (New York Times, 1923: 24). Finally, in 1927, whether responding to an increase in use or to the substitution admonition, the legislature included marihuana in its definition of "habit forming drugs" in a comprehensive narcotics bill (New York, 1927: 1695).

The situation in Chicago paralleled that in New York until 1927. Large Mexican communities developed in Chicago and Gary, Indiana, during the twenties and marihuana smoking became common in these areas and among journeymen musicians as well. As in New York, there was little public concern. The New Orleans pattern took over around 1927, however, when the attention of local law enforcement officials was suddenly drawn to the Mexicans and their "muggles." One law enforcement official reported that:

There are about 7,000 Mexicans in Gary, 10,000 in Indiana Harbor and 8,000 in South Chicago.... The Mexicans depend on the steel mills, railroads, and construction gangs for

employment. Many are drifters when slack labor conditions prevail.... [T]wenty-five percent of these Mexicans smoke marihuana. In fact, many of them make their living by raising and peddling the drug (Paul, 1929: 4).

A situation perceived to be so widespread was naturally considered likely to infect the rest of the community. As in New Orleans, reports started to appear that high school students were smoking the weed (Paul, 1929: 1; Chicago Tribune, June 3, 1929).

Since there was then neither state nor federal legislation prohibiting sale of marihuana, the local United States attorney declared war armed with an Internal Revenue statute prohibiting production and transfer of "a cigarette substitute" on which tax had not been paid. In June 1929, he raided wholesale houses "believed to have disposed of large quantities of marihuana cigarettes, sold to school pupils and other youthful thrill seekers." He arrested nine men "most of them Mexicans" (Chicago Examiner, June 22, 1929). At the same time, local officials began to use a statute which prohibited transfer of "any cigarette containing any substance deleterious to health" (Chicago Examiner, June 19, 1929).

The Chicago Tribune, lobbying heavily for anti-marihuana legislation then pending before the Illinois Legislature, reported that day-to-day progress of the enforcement activity (Chicago Tribune, July and October, 1929). Every stall in the legislature earned a banner headline such as:

BAN ON HASHISH BLOCKED DESPITE RAVAGES OF DRUG

In an article appearing in June, 1929, the paper noted:

The number of addicts is growing alarmingly according to authorities, because of the ease with which [marihuana] can be obtained. The habit was introduced a dozen years ago by Mexican laborers . . . but it has become widespread among American youths and girls even among school children.

The legislation, however, was killed.

Marihuana prohibition had become widespread. In states where either Mexicans or the drug had appeared, its use was quickly suppressed.

Soon after being apprised of its presence, local lawmakers invoked the criminal law. In New Orleans, Denver, and Chicago the spectre of a doped school population was the cornerstone of the prohibitory effort.

And, during alcohol prohibition, paralleled by the local phase of marihuana prohibition, it was naturally imperative to suppress a drug which frustrated alcohol users might substitute, for their customary intoxicant.

THE UNIFORM NARCOTIC DRUG ACT

Following the ad hoc local phase of marihuana legislation in the United States was the nationalization phase. During this period marihuana became integrated at both the state and federal levels with the nation's narcotics policy which had been manifested forcefully in Congress' adoption of the Harrison Narcotics Act in 1914.

The Harrison Act, a taxing measure, required registration and payment of an occupational

tax by all persons who imported, produced, dealt in, sold or gave away opium, cocaine or their derivatives. The Act required all legitimate handlers of these narcotics to file returns setting forth in detail their use of the drugs.

Since the Act also provided that only legitimate users could register and no one but a registered user could obtain the specified form, any transfer by an illegitimate user was a violation of the Act. For those failing to comply with its registration requirements, the original Harrison Act provided penalties of not more than $2,000 in fines or more than five years imprisonment, or both.

Drafted as a tax law rather than an outright criminal statute, the Act was intended to do indirectly what Congress believed it could not do directly: regulate possession and sale of the opiates. However, because the Act essentially was a revenue-raising measure imposing a tax on transfers of narcotics, it could not effectively prohibit the possession of drugs.

This indirect regulation of narcotics traffic had a number of significant consequences. First, since the Act could not penalize users of addiction directly, there was an immediate need for complementary residual state legislation in order to deal effectively with the drug problem.

Second, the enforcement of the Act was as signed to the Internal Revenue Service in the Treasury Department. The first enforcement agency for the Harrison Act was the Narcotics Division of the Prohibition Unit of the Internal Revenue Service created in 1920 (Schmeckebier, 1929: 143). This division was incorporated in the Prohibition Bureau which was created in 1927 (Act, 1927:1381).

In 1930, the enforcement of the narcotics laws was severed from the Bureau of Prohibition and established as the separate Bureau of Narcotics in the Treasury Department (Act, 1930: 585). The existence of this separate, agency has done as much as any single factor to influence the course of drug regulation from 1930 to 1970 (King, 1953: 736).

Although the impact of the Bureau on the passage of the Uniform Narcotic Drug Act and the Marihuana Tax Act will be explained in detail in subsequent sections, it is important here to note that the existence of a separate bureau having responsibility only for narcotics enforcement and for educating the public on drug problems inevitably led to a particularly prosecutorial view of narcotics addiction and the use and abuse of all drugs.

After the passage of the Harrison Act in 1914, there remained a considerable lack of uniformity regarding the offenses prohibited and the penalties imposed by the several states.

In 1919, the American Medical Association asked the Commissioner of Internal Revenue to call a conference, to consider better control of traffic in narcotic drugs. The profession was uncertain of its obligations in the matter because they were faced with an amalgam of conflicting laws. The A.M.A. asked that the wholesale, retail, and manufacturing drug interests be among those attending, along with delegates from the medical profession in each state. The proposal received no official or unofficial response either from the Commissioner of Internal Revenue or the Bureau of Prohibition.

Nevertheless, the American Medical Association, through its own Council on Health and Public Instruction, did hold a conference in early 1922 during which a uniform state narcotic control law was presented. At the November meeting of that conference, there were present 15 representatives of 10 pharmaceutical organizations and two representatives of the medical profession.

The draft of a uniform law was approved unanimously by all present. The American

Medical Association set out to codify the draft and to send it for approval to each of the constituent organizations (White, August 3, 1932; Woodward, August 6, 1932). After securing approval, all the associations agreed to pursue enactment first in New York.

The general lack of uniformity in anti-narcotics legislation, the weakness of state enforcement procedures, and the growing hysteria about dope fiends and criminality converged in several requests outside the medical community for a uniform state narcotic law (Anslinger and Tompkins, 1953: 159).

The drafting of the Uniform Narcotic Drug Act must also be viewed against the background of two larger movements: (1) the trend toward the creation and dissemination of uniform state laws by the National Commissioners on Uniform State laws, a group to which each state sent two representatives appointed by the governor; and (2) the general concern in the late 1920's and early 1930's with interstate crime, manifested , for example, by the creation in 1930 of the nearly autonomous Federal Bureau of Investigation. Because the concept of states' rights and narrowly construed federal power was then so powerful, an appeal to the National Commissioners was the inevitable recourse for those pressing for uniform anti-narcotic regulation.

DRAFTING THE UNIFORM ACT

By 1924, the Commissioners had appointed Committee to draft a uniform narcotic drug act At the 1925 meeting of Commissioners, the chair man of the Committee reported that he himself had prepared a first tentative draft based on the New York Act, the Washington state legislation, the Harrison Act, and a bill then before the New York Legislature. Presumably this was the on drafted by the A.M.A. Conference after its 192 meeting.

The chairman noted, however, that Dr. William Woodward, head of the A.M.A.'s Bureau of Legal Medicine and Legislation, with whom he had only recently conferred, had made "some very valuable suggestions." Because the tentative draft had already been printed before these suggestions, he requested that it "not be read but be re-committed to the Committee" (1925 Handbook: 977-985). This first draft included cannabis in the list of "habit-forming drugs," although all such drugs could be distributed and used for medical purposes (1925 Handbook: 978).

A second tentative draft was presented in 1928 and again the draft was not discussed at the conference but recommitted for further study. The second draft was essentially an exact copy of the 1927 New York Statute. It also included cannabis in the class of habit-forming drugs (1928 Handbook: 75-78,323-333).

There was a lack of concern on the part of the Commissioners themselves with the whole narcotics problem between 1924 and 1928. The President of the Conference, introducing Dr. Woodward, said:

In view of the importance of the act I think it would not be amiss to listen to the Doctor for a few minutes, that he may point out to us why it is important. In some of the states we do not recognize the importance because it has not been called to our attention (1928 Handbook: 76-77).

Nor was the Bureau of Prohibition particularly concerned at this time with the cannabis provision. Lack of official concern and interest continued to be the Bureau's attitude toward the second tentative draft (Nutt. June 13,1929).

Since neither the Commissioners nor federal narcotics officials were particularly concerned about state and local control of narcotics generally and marihuana in particular, it seems clear that neither was responsible for the inclusion of marihuana in the category of "habit-forming drugs. Rather, it would appear that it was included in the first draft because that had been drawn from the 1923 Washington statute which had listed cannabis.

Insofar as the second draft was a copy of the 1927 New York Act, inclusion of cannabis in this draft is not unusual. Few, if any, of the persons involved in the drafting were concerned about marihuana smoking or even aware of its use.

Two third drafts were submitted, the first in 1929 and the second in 1930. The initial one closely resembled the second tentative draft, and once again it included cannabis in the category of "habit-forming drugs.` Again, the growth, distribution, and possession of cannabis was prohibited except for medical purposes.

The nascent Congressional interest in marihuana in 1929 and the Bureau of Prohibition's subsequent resistance to amending, and thereby endangering, the Harrison and Export and Import Acts, caused the Bureau to take full notice of this 1929 third draft. Like its predecessors, however, the initial third draft was recommitted for further study (1929 Handbook : 43, 332-346).

The second third tentative draft, submitted in 1930, was the first to remove cannabis from the definition of "habit-forming drugs" and to include only a supplemental provision for dealing with the drug (1930 Handbook: 485,97).

When the Conference of Commissioners met to consider the second third tentative draft, Judge Deering, the Chairman of the Committee on the Uniform Narcotic Drug Act, recommended its recommission for further study because the Committee had not yet had an opportunity to consult the newly created Bureau of Narcotics.

At the time of this conference, August 14, 1930, no one had yet been appointed Commissioner of the Bureau, although Harry J. Anslinger was Acting Commissioner (1930 Handbook: 126-127). The Senate confirmed Anslinger's appointment as Commissioner on December 18, 1930.

The Bureau of Narcotics their became actively involved in the drafting process. Commissioner Anslinger was pressing for inclusion of the cannabis provision. He stated that he felt the limited medical use for cannabis was far outweighed by the need to control potential cannabis addiction (Anslinger, July 28,1930).

Dr. Woodward and the pharmaceutical industry advocated optional inclusion of marihuana on the one hand, and federal narcotics representatives urged not only inclusion but elimination of medical use, on the other.

The fourth tentative draft retained the optional cannabis provision. At a session before the convening of the full Conference of Commissioners from September 9-12, 1931, Commissioner Anslinger and A. L. Tennyson of the Bureau met with Judge Deering to discuss the Bureau's feelings about the fourth tentative draft.

At this time Commissioner Anslinger stated that the Bureau felt strongly that inclusion of

cannabis in the state law ought to be mandatory. Moreover, the Bureau urged that the only successful way to deal with the marihuana drug traffic, because of its domestic nature and the easy availability of the weed, was to prohibit the cultivation of the plant altogether and to find some substitute for the limited medical use (Tennyson, September 16, 1931). However, the fourth tentative draft presented to the Conference of Commissioners included the optional marihuana provision. And, the Conference tentatively approved the fourth tentative draft and directed the Committee to prepare a final draft (1931 Handbook: 127-128, 390-402).

The American Medical Association played a key role in the drafting process prior to 1931. Their efforts had been largely responsible for consideration of the Uniform Drug Act in the first place. From the beginning in 1925, Dr. William Woodward, the Director of the A.M.A.'s Bureau of Legal Medicine and Legislation, actively assisted in the drafting of the Act and widely circulated the drafts to interested persons for their comments.

It appears, however, that Dr. Woodward's personal style and the preeminent position of the American Medical Association in the drafting process were resented by the two remaining interest groups-the Federal Bureau of Narcotics and the retail and wholesale pharmaceutical associations. The Bureau had been commenting on drafts only after they had been drawn by the A.M.A. and did not feel it was playing an active role in the drafting process. The pharmaceutical industry felt that their interests were considered only peripherally and that they had been excluded from the heart of tire, drafting process.

As a result of the dissent, a conference of interested parties was scheduled before the final draft was to be presented to the Conference of Commissioners.

Present at this preliminary conference on September 15, 1932, were representatives of the Drug Committee the Federal Bureau of Narcotics, the Department of State, the Public Health Service, the American Medical Association, and delegates from the drug industry and other medically related industries and organizations. The final version of the Uniform Narcotic Drug Act was hammered out at this session. The Bureau was central to the drafting process and Commissioner Anslinger made a major effort to involve the drug manufacturers and the wholesale and retail drug trade in it to protect the Act from possible subsequent political disagreement (Anslinger, August 1, 1932): Finally, the conference agreed on a draft be presented to the National Conference.

The manufacturers of drug products were strongly opposed to the inclusion of cannabis under any criminal regulatory scheme. Representatives of the industry opposed a mandatory cannabis provision. The final conclusion reached by all the parties present was:

After considerable comment, it was decided to eliminate Section 12 (Cannabis) and leave it to the Conference of Commissioners as to whether it should be included under the general provisions of the Act (Report of Preliminary Conference, 1932: 23).

The Bureau was no longer insisting on the mandatory inclusion of in absolute marihuana prohibition; it did not want to risk the opposition of the drug industry to the, entire Act.

The fifth tentative draft did, however, include a significant change in form which would have important consequences in the decades to come. Although the marihuana provision remained supplemental to the main body of the Act, any state wishing to regulate the sale and possession of marihuana was instructed, simply, to add cannabis to the definition of "narcotic drugs." All the, other provisions of the, Act would their apply to marihuana as well

as to the opiates and cocaine. The Commissioners adopted this form as it had been prepared at the September 15, 1932, preliminary Conference.

The only recorded opposition to the adoption of the final draft came from some Commissioners who objected to tying the Uniform State Law to the terms of the federal Harrison Act. This last obstacle was over-come by the argument that a number of states already had passed such legislation so that the states' rights problem need not stand in the way. The Act was adopted 26 to 3 (1932 Handbook: 107).

ENACTMENT OF THE UNIFORM ACT BY THE STATES

After final acceptance of the Uniform Act, the Bureau set to work at once to secure state enactment-including an adequate marihuana provision. A comprehensive campaign was undertaken in the press, in legislative chambers, and in any other forum to gain public support for the Uniform Act.

In addition, perceiving the absence of public awareness of marihuana and needing to encourage positive action to overcome the drug's optional status, the Bureau also sought to arouse public interest in marihuana through "an educational campaign describing the drug, its identifications and its evil effects" (Federal Bureau of Narcotics, 1937 : 59).

That there was little general knowledge about cannabis is illustrated by the fact that as late as 1934, it was necessary to show marihuana to the New York police so that they could recognize it growing or in dried, smokable form (New York Times 1934: 6).

The Bureau's district supervisors and local agents were campaigning actively in the legislatures before which the Act was pending. A press campaign was conducted across the country to gain the support of civic groups and other interested parties. Mr. Anslinger sought editorial support in newspapers (Anslinger, October 22, 1936) and assisted in the, drafting of articles for popular magazines (Anslinger, December 23, 1936). To mobilize the Bar, Bureau officials wrote an article for law journals explaining the need for the Uniform Narcotic Drug Act (Anslinger, 1932: 52; Tennyson, 1932: 55).

Despite these efforts, it appears that the Uniform Act had a rough time in state legislatures during its early life. By April 26, 1933, only two states had enacted it in full. As late as March 1935, only 10 states had enacted the Uniform Law.

A number of significant objections had emerged in the state legislatures considering the passage of the Uniform Narcotic Drug Act. First among these was the potential cost to the state of enforcing the Act. Second, there was concern over the number of registrants who would have to be licensed due to the belief that the Uniform Act would require special licensing of doctors, dentists, and veterinarians. Third, the limit on the amount of exempt preparations which could be sold caused a great deal of technical difficulty with the Act. Fourth, many criticized the right of the court to revoke or suspend the license to practice medicine or pharmacy. And finally, there seemed to be widespread misunderstanding of the record-keeping requirements of the Act.

Although these objections were largely administrative, they nevertheless posed what appeared to be serious stumbling blocks to the successful passage of the Uniform Law in all the states.

The combination of public apathy and administrative resistance necessitated a new approach in generating public interest. Beginning in late 1934, Commissioner Anslinger

gradually shifted the focus of the FBN's educational campaign away from the liability of federal law enforcement agencies to deal effectively with the local drug problems to the need to cope with the new drug menace-marihuana.

The clearest reflection of the, change in Bureau policy is found in two official statements of Commissioner Anslinger, one made in 1933 and the other in 1936.

One 1933 statement explains the need for a Uniform Narcotic Drug Law and emphasizes United States international obligations, the need for more effective coordination in law enforcement, and the impact the law will have on the dangers of morphine, cocaine, and opium addiction (FBN Paper, July 1933). In the later statement, however, more than half of the time is devoted to a discussion of the "worst evil of all" the marihuana problem.

To aid the new approach's objective, Commissioner Anslinger made speeches and contributed articles to journals. The most influential of his efforts was "Marihuana Assassin of Youth" which appeared in the widely circulated American Magazine in July 1937 (Anslinger and Cooper,1937).

The FBN files contain more than 50 letters addressed to the Commissioner which say: "Your article was the first time I ever heard of marihuana."

Among the most effective proponents of the Uniform Act was the Hearst newspaper chain. These papers began editorializing in favor of enactment within days after the Act had been approved in 1932.

The Hearst chain was not alone. A Birmingham, Alabama, paper on August 22, 1935, emphasized the need to control marihuana as a reason for adopting the Act (Birmingham Age Herald, August 22, 1935). A Washington Post columnist in September, 1934, devoted three quarters of his article to marihuana with quotes from Anslinger and Stanley urging adoption of the Uniform Act (Washington Post, September 29, 1934).

Other large-city newspapers such as the Cleveland Plain, Dealer and the St. Louis Star Times kept a steady, if intermittent, stream of anti-marihuana articles flowing in the, period just before the passage of the Uniform Act in those areas. In Missouri, especially, local concern generated by the extensive coverage in the Star Times speedily pushed the legislature to adopt the Uniform Act.

Often it has been supposed on the basis of this increased coverage that the use of marihuana increased around 1935. Since there was some larger design involved, however, a firm conclusion is unwarranted. At the same time, it is possible that use, did spread after the publicity campaigns, especially among the young.

Judging from the tremendous expansion in coverage by the New York Times beginning in 1935, the evidence supplied by the LaGuardia Commission in its 1944 Report and the, leap in enforcement activity, marihuana, finally came to New York City in the 1930's, though then probably on a smaller scale than in Denver land the, border towns of Texas.

Apart from the press, another influential participant in the marihuana campaign, especially after the Repeal of Prohibition, was the Women's Christian Temperance Union. Although the WCTU had distributed a pamphlet on marihuana as early as 1927, their publication, the Union Signal, does not reflect any significant interest either in the Uniform Act or marihuana, until 1934. Before that year the "narcotic" receiving the most attention was nicotine. Beginning in 1936, however, the Union Signal had a direct line to the FBN

national office, and from then on every issue contained material on marihuana (WCTU bound volumes, yearly).

The World Narcotic Defense Association and its head, Richmond P. Hopson, were also involved in the drive for state enactment. They were continually in postal contact with almost every state legislator in the country (WNDA, 1937). The most well-financed group in the campaign, the Association underwrote national broadcasts and distributed a lengthy pamphlet on marihuana, in 1936.

The General Federation of Women's Clubs also contributed energetically. The Federation educated its membership about the need for the Uniform Act and about the evils of marihuana in particular. The Chairman of the Federation's department of legislation noted:

The situation concerning club women particularly is the accessibility of the frightening degenerating marihuana weed, which is rolled in cigarettes ... and has been playing such havoc with young high school boys and girls (WCTU, 1936: 285).

The state and local clubs immediately began to unite local legislators and to conduct educational campaigns for parents, teachers and children (WCTU, 1937: 36; Wood, January 13, 1936). An FBN agent appeared at a New York meeting of the local Federation with two marihuana plants. They were exhibited at a local flower show:

Marihuana Plant exhibit at Flower Show

of Katrina Trask Garden Club

Tomorrow, 3 P.M. on at the Casino

This plant is the cause of a dread menace which in being fought by the State Department of Health.

Public Invited to Show-25 cents (Saratogian, 1936: 5)

Other groups such as the YWCA , the National PTA and the National Councils of Catholic Men and Women were all in touch with the Bureau and were made, aware of the Bureau's dual aims of "influencing and creating public opinion in favor of the passage of the Uniform Narcotic Drug Act and awakening the parents of the country to the increasing danger of the use of marihuana." (Anslinger, March 28, 1935).

However, arousing public opinion alone was not the ultimate goal of the campaign. The FBN was interested in the enactment of the Uniform Act along with prohibitory marihuana legislation in all the states.

By early 1935, only 10 states had adopted the Uniform Act. And, three of these states had not included marihuana (Anslinger, March 1, 1935). The Bureau embarked upon its marihuana strategy in 1935, the turning point in state enactment. Whether or not public interest actually existed, public opinion-makers influenced legislative opinion and created a "felt need" for legislation.

Within the next year, 18 more states adopted the Act and every one of them which did not have previous legislation included marihuana (Anslinger, January 13, 1936; WCTU, 1937:

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75).

ENACTMENT OF THE MARIHUANA TAX ACT

Despite the public opinion campaign conducted in the early 1930's the general public was largely unaware of the drug, its use, or its alleged effects; only regional interest was aroused.

A change seems to have occurred after 1935. The increased national awareness played a significant role in the decision of the Treasury Department to seek federal legislation. On April 14, 1937, the "Secretary of the Treasury, on behalf of the Commissioner of Narcotics," submitted the "administration proposal to Congress to impose an excise and transfer tax on dealings in marihuana" (Schaller, 1970: 70).

The scheme of the Marihuana Tax Act was threefold: a requirement that all manufacturers, importers, dealers, and practitioners register and pay a special occupational tax; a requirement that all transactions be accomplished through use of written order forms; and the imposition of a tax on all transfers in the amount of $1 per ounce for transfer to registered persons and a prohibitive $100 per ounce for transfers to unregistered persons.

The key departure of the marihuana tax scheme from that of the Harrison Act is the notion of the prohibitive tax. Under the Harrison Act, a person not required to register, that is, a non-medical user, could not legitimately buy or possess narcotics. To the dissenters in the Supreme Court decisions upholding the Act, this clearly demonstrated that Congress' motive was to prohibit conduct rather than to raise revenue.

The seemingly bizarre legal formulation of this tax measure was precipitated by the recognized need for the Federal Government to take action forbidden to it under prevailing constitutional doctrine.

Hearings on the proposed marihuana taxation were held before the House Ways and Means Committee. During five mornings of testimony by FBN officials, government witnesses, and industry representatives, the Bureau presented the following four-fold argument: (1) marihuana was a disastrous drug; (2) its use was increasing alarmingly and had generated public hysteria; (3) state legislation was incapable of meeting the threat posed by the drug, thus, federal action was required; and (4) the government might best act through separate legislation rather than through an amendment to the Harrison Act.

No definite scientific study of the effects of marihuana was presented to substantiate the position that marihuana was a dangerous drug. No synthesis of available scientific information was submitted nor was there any statement by the Public Health Service. Neither of the government's own public health experts, Assistant Surgeon General, Dr. Walter Treadway, and Dr. Lawrence Kolb, testified, nor did Drs. Walter Bromberg or J. F. Siler who had recently published scientific articles on the effects of cannabis in humans (Siler, et. al., 1933: 269-280; Bromberg, 1934).

Instead, the scientific aspects were presented by a law enforcement agency, the FBN:

Despite the fact that medical men and scientists have disagreed upon the properties of marihuana, and some are inclined to minimize the harmfulness of this drug, the records offer ample evidence that it has a disastrous effect upon many of its users. Recently we have received many reports showing crimes of violence committed by persons while under

the influence of marihuana.

The deleterious, even vicious, qualities of the drug render it highly dangerous to the mind and body upon which it operates to destroy the will, cause one to lose the power of connected thought, producing imaginary delectable situations and gradually weakening the physical powers. Its use frequently leads to insanity.

I have a statement here, giving an outline of cases reported to the Bureau or in the press, wherein the use of marihuana is connected with revolting crimes (U.S. Congress, 1937: 30).

Instead of having one of the few researchers who had done any significant research into the effects of cannabis on humans, the Bureau chose a Temple University pharmacologist, Dr. James Munch, whose experience was confined to experimentation of the effects of cannabis on dogs.

The second component of the Bureau's case was the contention that marihuana use had spread alarmingly in recent years, provoking a public outcry. To demonstrate this, the Bureau submitted, for the record, the Gomila article cited earlier, and a 1936 letter from the city editor of the Alamoosa Daily Courier (U.S. Congress, 1937: 32-37). The letter described an attack by a Mexican-American, allegedly under the influence of marihuana, on a girl of his region.:

I wish I could show you what a small marihuana cigarette can do to one of our degenerate Spanish-speaking residents. That's why our problem is so great; the greatest percentage of our population is composed of Spanish speaking persons most of whom are low mentally, because of social and racial conditions (Baskette, September 1, 1936).

The third component of the Bureau's case was that even though every state now had marihuana legislation, local authorities could not cope with the marihuana menace. To support this proposition editorial pleas from the Washington newspapers were offered along with Bureau testimony that officials of several states had requested federal help.

Senator Brown asked Commissioner Anslinger "to make clear the need for Federal legislation." He continued:

You say the states have asked you to do that. I presume it is because of the freedom of interstate traffic that the states require the legislation.

Anslinger agreed:

[W]e have had requests from the states to step in because they claimed it was not growing in that state, but that it was coming in from another state (U.S. Congress, 1937:16).

Nothing was presented to support that statement; no letters from local authorities and no investigative reports by FBN agents describing the trafficking apparatus.

The congressmen and senators participating in the hearings accepted the Bureau's argument. In fact, Senator Brown, Chairman of the subcommittee which considered the

legislation in the Senate, and Chairman Doughton of the Ways and Means Committee, had been thoroughly briefed by the Bureau in advance of the hearings. There was no probing of the Government witnesses. In fact, the Government made its case in the House in one session, and the next three sessions were devoted to countering the technical objections of the oilseed, birdseed, and hemp industries (U.S. Congress, 1937:59-65 67-86 .

On the last morning of scheduled hearings, Dr. William C. Woodward appeared on behalf of the AMA to oppose the bill. Dr. Woodward objected to H.R. 6385 because he believed that its ultimate effect would be to so restrict medical use by red tape that any medical use would be impossible. He admitted that there were currently few therapeutic applications but he observed that the bill inhibited further research which might bear fruit. He went even further to imply that the bill was designed with this objective in mind. He noted that if federal legislation was considered necessary, it could be achieved without sacrificing medical usage by simply amending the Harrison Act.

Dr. Woodward's most pointed attack was directed against the assumption that federal legislation was needed to control the marihuana habit. He argued that existing state legislation was more than sufficient if properly enforced and that if lack of coordination was the problem, that was the FBN's fault.

Noting that the FBN already had the authority to "arrange for the exchange of information concerning the use and abuse of narcotic drugs in [the] states and for cooperation in the institution and prosecution of suits . . .," he asserted that the Bureau had not done its job:

If there is at the present time any weakness in our state laws relating to cannabis or to marihuana, a fair share of the blame, if not all of it, rests on the Secretary of the Treasury and his assistants who have had this duty imposed upon them for 6 and more years (U.S. Congress, 1937: 93).

Dr. Woodward also contended that the law would be a useless expense to the medical profession and unenforcible. He noted: "Since marihuana grows so freely, and every landowner was a potential producer, whether wittingly or unwittingly, full enforcement would require inspection of the entire land area of the country, a task which would be unseemly for the Federal Government to undertake" (U.S. Congress, 1937: 94-95).

Finally, Dr. Woodward wondered why, if federal legislation was considered necessary, the Congress did not simply amend the Harrison Act. To the Bureau's argument that such a course would be unconstitutional, he inquired how Treasury's counsel could argue that the present bill was constitutional since the technique was identical. Dr. Woodward's own view was that the amendment of the Harrison Act would be constitutional and that such a course would dispel the professional objections which he raised (U S. Congress, 1937:97).

After accusing Dr. Woodward of obstructionism, evasiveness, and bad faith, the Committee did not even thank him for his testimony (U.S. Congress, 1937: 121). When the Senate Finance Committee conducted hearings on the bill, now styled H.R. 6906, two months later, Dr. Woodward submitted instead a short letter which stated the AMA's reasons for opposing the bill (U.S. Congress, 1937: 33-34).

Both Committees reported the bill favorably despite Woodward's objections. The Ways and Means Report stated:

Under the influence of this drug the will is destroyed and all power of directing and controlling thought is lost. Inhibitions are released. As a result of these effects, it appeared from testimony produced at the hearings that many violent crimes have been and are being committed by persons under the influence of the drug Not only is marihuana used by hardened criminals to steel them to commit violent crimes, but it is also being placed in the hands of high-school children in the form of marihuana cigarettes by unscrupulous peddlers. Cases were cited at the hearings of school children who have been driven to crime and insanity through the use of the drug. Its continued use results many times in impotency and insanity (U.S. Congress, 1937: 1 2).

The Marihuana Tax Act passed the House of Representatives very late in the afternoon of a long session on June 14, 1937; the only opposition came from congressmen who had no idea what marihuana was and desired further information before voting (Congressional Record, 1937: 5575, 5689). Instead of a detailed analysis they received a statement of one of the members of the Ways and Means Committee, which repeated uncritically the lurid criminal acts attributed to marihuana users at the hearings. After less than two pages of debate, the Act passed without a roll call (Congressional Record, 1937: 5575).

TIGHTENING THE LAW

After the passage of the Marihuana Tax Act, the FBN began with a four-pronged enforcement policy:

1. Control of cultivation of the plant for legitimate purposes and eradication of wild growth;
2. Pacification of marihuana-sensationalism in the press;
3. Education of the federal judiciary toward strict application of the law; and
4. Allocation of federal enforcement resources toward major trafficking rather than petty possession offenses.

The scope of the plant's growth, the transportability of the seeds, the dormancy of the seeds, and the lack of a highly efficient herbicide militated against a comprehensive eradication program. The cost of such a program would have been substantial even if success were assured. No active effort was undertaken to conduct an acre-by-acre survey of the United States.

The eradication "program" became simply a matter of reaction to routine information-letters from farmers who had identified the plant and discoveries of acreage by law enforcement agents.

As the Bureau's interest in marihuana subsided during the 1940's, so did the effort to eradicate the wild growth. In fact, the Federal Government encouraged the cultivation of hemp during the war, even though an inactive strain had not been developed, because sources of sisal rope had been severed by Japan's occupation of the Philippines. All over the United States, the weed remained plentiful and largely undetected.

After passage of the Act, Commissioner Anslinger directed his agents to discourage local officials from playing up any alleged involvement of marihuana with crime to the press. On April 11, 1938, the Commissioner told his New York District Supervisor that:

Our present policy is to discourage undue emphasis on marihuana for the reason that in some sections of the country recently press reports have been so exaggerated that interest in the subject has become almost hysterical and we are therefore trying to mold public opinion along more conservative and saner lines (Anslinger, April 11, 1938).

Immediately following passage of the Act, the FBN also directed an "educational" effort toward the federal judiciary to emphasize the need for severe sentences for marihuana offenders. The Bureau also concentrated on the stifling of suppliers, large interstate traffickers, and smugglers. Small possession cases were to be left to local authorities.

Several factors, however, served to frustrate this policy. First, marihuana traffic was highly disorganized and there was no national or regional network as such (New York City, 1945). Second, use was still concentrated geographically and socioeconomically and was not a major enterprise. Finally, during the war years, the Bureau abandoned responsibility for most marihuana law enforcement to the states, where the disorganized traffic and regional use could be most effectively controlled. The FBN chose instead to concentrate on the opiates.

After the relative quiet of the war years there was apparently a significant increase in narcotic drug abuse in the late, 1940's and the public began to be concerned with the spread of narcotic addiction, particularly among young persons. Congressional furor was aroused by the assertion that the use of marihuana inevitably led to the use of these harder drugs, particularly heroin.

The new legislation came in two waves. In 1951, Congress passed the Boggs Act (Boggs Act, November 2, 1951: 767) which increased penalties for all drug violators. For the first time in federal drug legislation marihuana and the narcotic drugs were lumped together, since the Act provided uniform penalties for the Narcotic Drugs Import and Export Act (Boggs Act, November 2, 1951: 767) and the Marihuana Tax Act (21 USC 1964). The states followed the federal lead. Then, in 1956, Congress passed the Narcotic Control Act, escalating the penalties still further. Once again the states responded in kind.

The hearings before the Subcommittee of the House Ways and Means Committee and the floor debate indicate that the Boggs Act was motivated by a. perceived increase in narcotic use in the period 1948 to 1951 (Kefauver Committee Hearings, 1951: 240-241; New York Times, 1951).

Representative Boggs, speaking during the Congressional debate on his bill, enunciated a concern which was reflected in many other quarters. After noting that there had been a 24% increase in arrests for narcotic violations between 1949 and 1950 and a 70% increase between 1948 and 1950, Representative Boggs stated:

The most shocking part about these figures is the fact that there has been an alarming increase in drug addiction among younger persons. In the first six months of 1946, the average age of addicted persons committed . . . at Lexington, Kentucky, was 37.5 years. Only three patients were under the age of 21. During the first six months of 1950, only four years later, the average had dropped to 26.7 years and 766 patients were under the age of 21... (Congressional Record, 1951: 8197).

Representative Boggs and others supported the mandatory minimum sentences for drug peddlers because they felt that some federal judges had been lax in enforcing the narcotic laws (Congressional Record, 1951: 8197, 8207, 8211). Public opinion was overwhelming that harsh sentences, including the death penalty for peddling narcotics to minors, would strangle the drug monster then stalking the American youth (Kefauver Committee Hearings, 1951: 430-431).

The Boggs Act was directed in large part at the federal judiciary since a key provision removed judicial discretion in sentencing by providing that upon conviction for a second or subsequent offense the imposition or execution of the sentence could not be suspended nor probation granted.

There had been no concerted lobbying effort by the judicial community during the legislative process; however, James V. Bennett, Director of the U.S. Bureau of Prisons, aroused the judges in the Fifth U.S. Circuit District into eventually recommending the amendment of the law to remove provisions for mandatory minimum sentences (New Orleans Statesman, May 28, 1954; New Orleans Times-Picayune, May 28, 1954).

Even while the Boggs Act was still pending in Congress, the Bureau of Narcotics encouraged the states to modify their existing narcotic and marihuana legislation to enact "penalties similar to those provided in the Boggs Bill [which] would be of material assistance in the fight against the narcotic traffic" (Federal Bureau of Narcotics, 1950: 6).

Seventeen states and the territory of Alaska responded by passing "little Boggs Acts" by 1953 and 11 other states increased their penalties by 1956. Two of the latter group, Ohio and Louisiana, enacted penalty provisions which were substantially more severe than those passed previously in any jurisdiction (Federal Bureau of Narcotics, 1956: 28).

The Ohio law, approved June 16,1955, provided a 20 to 40 year sentence for the sale of narcotic drugs. The Louisiana measure, adopted the following year, provided severe prison sentences without parole, probation, or suspension for the illegal sale, possession, or administration of a narcotic drug. The sentences ranged from a five-year minimum to a 99-year maximum (Federal Bureau of Narcotics, 1951: 8).

Underlying the inclusion of marihuana in the scheme of increased penalties was the progression theory. In the Boggs hearings many witnesses testified to the link between marihuana use and ultimate heroin addiction. Commissioner Anslinger, for example, testified:

The danger is this: Over 50 percent of these young addicts started on marihuana smoking. They started there and graduated to heroin; they took the needle when the thrill of marihuana was gone (Boggs Act Hearings, 1951: 206).

Representative Boggs himself summed up the stepping-stone thesis in House floor debate:

Our younger people usually start on the road which leads to drug addiction by smoking marihuana. They then graduate into narcotic drugs-cocaine, morphine, and heroin. When these younger persons become addicted to the drugs, heroin, for example, which costs from $8 to $15 per day, they very often must embark on careers of crime ... and prostitution ... in order to buy the supply which they need (Congressional Record, 1951:

8197-8198).

The stepping-stone theory thus supplanted the older hypotheses which had linked marihuana to addiction, insanity and violent crime.

In a paper filed as an exhibit to the hearings on the Boggs Act, Dr. Harris Isbell, Director of Research at the Public Health Service Hospital in Lexington, Kentucky, stated that marihuana was not physically addictive, although he paid lip service to the psychological dependence hypothesis (Boggs Act Hearings, 1951: 147-148).

Acknowledging the possibility of "temporary psychosis" in "predisposed individuals," Isbell otherwise disputed the crime and insanity thesis. Before the Kefauver Committee in the Senate he testified that:

[M]arihuana smokers generally are mildly intoxicated, giggle, laugh, bother no one, and have a good time. They do not stagger or fall, and ordinarily will not attempt to harm anyone.

It has not been proved that smoking marihuana leads to crimes of violence or to crimes of a sexual nature. Smoking marihuana has no unpleasant after-effects, no dependence is developed on the drug, and the practice can easily be stopped at any time. In fact, it is probably easier to stop smoking marihuana cigarettes than tobacco cigarettes (Kefauver Committee Hearings, 1951: 119).

Some observers felt that the narcotics problem had disappeared almost entirely from the national scene after the Boggs Act was passed. Nevertheless, state and federal law enforcement authorities, armed with data suggesting that the strengthening of the drug laws had at least halted the increase in drug use, pressed for further increases in penalties in order to root out the drug menace entirely (Federal Bureau of Narcotics. 1956: 28). Without extended debate or widened public interest, Congress passed the Narcotic Control Drug Act in 1956 (Daniel Committee Hearings, 1955: 57).

There was less attention paid to marihuana during Congressional debate in 1956 than had been the case in 1951. But, the established precedent of classifying marihuana with hard narcotics continued and resulted in a proliferation of marihuana offenses and a further increase in penalties based on the theory that the end of the American narcotics experience could thereby be assured.

However, efficacy of still higher penalties was not uniformly accepted among law enforcement officials; the Deputy Commissioner of the FBN suggested that more severe penalties might press grand juries not to indict and the petty juries not to convict in drug cases. Others rejected this view and felt strongly that more severe penalties were imperative if society was to be rid of its present peddlers and if new entrants into the narcotics business were to be deterred (Good, July 31, 1954).

Among congressmen considering the Bill, there was no dissent from the proposition that harsher penalties were the means to eliminate the illicit use and sale of all drugs (Congressional Record. 1956: 10689).

In addition to facilitating enforcement of narcotics laws through a number of ancillary provisions, the Narcotics Control Act of 1956 established the following penalties:

Possession
Minimum sentence

First offense
2 years

Second offense
5 years

Third and subsequent offense
10 years

Fine
$20,000

Sale
Minimum sentence

First offense
5 years

Second offense
10 years

Sale to minor by adult
10 years

Parole or probation were made unavailable to all except first offenders in the possession category (26 TTSC, 1964).

The Act also created a new offense by prohibiting illegal importation of marihuana. Simple possession was by statute sufficient to convict the possessor of knowingly receiving illegally imported marihuana (21 USC, 1964).

Few legislators recognized that marihuana was in any way different from the physically addictive narcotics. The House Subcommittee on Narcotics, which produced what became the essentials of the 1956 Act, had inserted a footnote to the major heading "Narcotics" which stated in fine print that the term narcotics included marihuana (U.S. Code Cong. and Ad. News, 1956: 3294). Only once during the Congressional debates on the House and Senate versions of the Bill was the subject of marihuana as a separate substance even raised.

Moreover, in a statement reflecting the general acceptance of the stepping-stone concept, Senator Daniel, Chairman of the Senate Subcommittee that investigated the drug problem, described marihuana:

That is a drug which starts most addicts In the use of drugs, Marihuana, in itself a dangerous drug, can lead to some of the worst crimes committed by those who are addicted to the habit. Evidently, its use leads to the heroin habit and then to the final destruction of the persons addicted (U.S. Code Cong. & Ad. News, 1956: 3294).

By the fifties, marihuana had been fully integrated into the narcotics legislation of every

state in the Union and of the national government. Possession of the drug, even for one's own use, was a felony everywhere, and the user was subject to long periods of incarceration as punishment for his indulgence.

1960-1970: NEW LEGISLATIVE APPROACH

From the mid-fifties to the mid-sixties, federal activity in marihuana and narcotic law enforcement was relatively stable. The number of offenders apprehended and convicted in both areas remained constant (U.S. Courts, 1956-1964).

However, in the early and mid-sixties a new phenomenon was occurring. Drug abuse began to spread. It no longer confined itself to the ghettos and certain socioeconomic and ethnic groups; the new users were the sons and daughters of the middle class. It began striking home at the average American and became a national, major issue of concern (Rosevear, 1967: 117-131; U.S. Bureau of Narcotics, 1966: 40).

The new middle class use of marihuana induced significant medical inquiry into the nature of the drug and spurred a new legislative approach. One commentator stated:

Nobody cared when it was a ghetto problem. Marihuana-well, it was used by jazz musicians or the lower class, so you didn't care if they got 2 to 20 years. But when a nice, middle-class girl or boy in college gets busted for the same thing, then the whole community sits up and takes notice. And that's the name of the game today. The problem has begun to come home to roost-in all strata of society, in suburbia, in middle-class homes, in the colleges. Suddenly, the punitive, vindictive approach was touching all classes of society. And now the most exciting thing that's really happening is the change in attitude by the people. Now we have a willingness to examine the problem as to whether it's an experimentation, or an illness rather than 'an evil' (New York Times, Feb. 5, 1970: 14).

Congress initially acted by passage of the Drug Abuse Control Amendments of 1965 (Public Law 89-74,1965). This legislation established a Bureau of Drug Abuse Control within the Food and Drug Administration and created criminal, misdemeanor penalties for the illegal manufacture and sale of depressant and stimulant drugs and hallucinogens.

The dramatic increase in the use of marihuana and other drugs during the latter 1960's was a matter of high public visibility. In response, President Johnson offered Reorganization Plan No. 1 of 1968 (H. Doe. No. 249,1968). This reorganization was effective on April 8, 1968 and placed the Federal Bureau of Narcotics (of Treasury) and the Bureau of Drug Abuse Control (of FDA) in the Department of Justice and designated it the Bureau of Narcotics and Dangerous Drugs.

What had been obvious with the passage of the 1965 Drug Amendments became glaring with this reorganization, that is, the tremendous disparity in penalties for violations involving dangerous drugs as opposed to narcotics and marihuana. As a result of increased medical and scientific inquiry, LSD and several other drugs 'were acknowledged as being more powerful hallucinogens than marihuana.

To compound the disparity, tetrahydrocannabinol (THC), the major active ingredient in marihuana, was placed under controls whereby someone in unauthorized possession of THC was subject to no penalty, but someone in possession of marihuana was subject to a minimum mandatory penalty of two years imprisonment (Federal Register, 1968: 14880).

Congress then changed the possession penalty, under the Drug Abuse Control Amendments, to a misdemeanor and increased the penalties for sale or manufacture of LSD and the other controlled drugs to up to five years (Public Law 90-639, 1968).

Nevertheless, a great disparity regarding penalties for these substances still existed. The atmosphere for change was ripe. Adding pressure to the situation was the criminalization of increasing numbers of young persons whose sole crime was possession of marihuana for their own use.

In late 1968, the newly formed Bureau of Narcotics and Dangerous Drugs drafted legislation which would nationalize control of the drugs under the Bureau's jurisdiction. The proposed law vested on the commerce clause rather than on the taxing powers.

The change in authority was prophetic because the Leary decision, which was handed down by the Supreme Court on May 19, 1969, held that the order form procedure necessary to meet the requirements of the Marihuana Tax Laws, forced an individual to incriminate himself in violation of the Fifth Amendment (Leary v. U.S., 1969). Ostensibly, this decision left BNDD with no marihuana possession law and was another factor in evidence of the need for a revision of the law.

This new bill , H.R. 13742, covered the regulation of narcotic drugs, "dangerous drugs" and marihuana. It was transmitted by President Nixon on July 14, 1969.

Emerging from this legislation was an overall balanced scheme of criminal penalties. Minimum mandatory offenses were essentially abolished and the offense of possession of a controlled substance for one's own use was made a misdemeanor. Further, in first-offense, simple possession cases, the court was given the discretion to place a defendant on probation, for up to one year. If, at the end of the probation period, the defendant bad not violated any of the conditions of the probation, his conviction could be expunged.

The same misdemeanor penalty and opportunity for first offender treatment was provided for the distribution of a small amount of marihuana for either: (1) no remuneration; or (2) the cost of the drug.

This provision was included in recognition of the large number of such transactions which take place among youth and in recognition of a phenomenon which surfaced as a substantial challenge to the traditional picture of the national marihuana trade. Legislators had formerly stereotyped the "seller" as the vicious criminal pushing his wares for high profit and felt that extraordinarily harsh penalties were justified for sellers (Narcotics Legislation Hearings, 1969: 4).

But several studies showed that the structure of marihuana traffic bore little or no relation to the traditional stereotype. One survey of 204 users found that 44% had sold to friends at least once. Many casual users sold to leave themselves enough profit to cover the amount of their own use (Goode, 1969: 7). Under the new Act, they would not be punished as distributors.

The new legislation also made a distinction between marihuana and narcotic drugs. Marihuana was placed in a category with hallucinogenic drugs and their difference from narcotics was emphasized by the difference in penalties as follows:

Maximum sentences

Marihuana and other non-narcotic controlled substances
Narcotics

	Years	Dollars
1st offense	1	5,000
2nd offense	2	10,000
1st offense	1	5,000
2nd offense	2	10,000

Simple possession:*

Unlawful distribution, possession with intent to distribute, manufacture, importation or exportation:

	Years	Dollars
	5	15,000
	10	30,000
	15	25,000
	30	50,000

* Distribution of small amounts of marihuana for no remuneration is treated the same as simple possession.

The bill was passed by Congress (and signed into law by President Nixon) on October 27, 1970, as the Comprehensive Drug Abuse Prevention and Control Act of 1970.

In conjunction with this new federal law, a uniform state act was drafted by the National Conference of Commissioners on Uniform State Laws and approved by them as the Uniform Controlled Substances Act at their annual conference August 1-7, 1970.

The following statement in the preface of the Act explains its purpose:

This Uniform Act was drafted to achieve uniformity between the laws of the several states and those of the Federal Government. it has been designed to complement the new federal narcotic and dangerous drug legislation and Provide and interlocking trellis of Federal and state law to enable government at all levels to control more effectively the drug abuse problem.

The Uniform Act does not recommend penalties except with respect to possession for one's own use. For such offenses, the Conference recommended that it be treated as a misdemeanor.

To date, 26 states and three territories have adopted the Act in its entirety or in a varied form. Currently, 10 to 15 states are considering it.

The most recent chapter in the legal history of marihuana appears in other pages of this Appendix. The appointment of the National Commission on Marihuana and Drug Abuse and the issuance of its Report are themselves significant events from an historical point of view.

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