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animal *in vivo* experiments, a cause-effect relationship in the action of a cannabis constituent on some biological endpoint (metabolic, molecular, physiological, etc.), may be considered established if the following three requirements are met:

a) molecular or structural specificity of the constituent causing the effect;
b) an appropriate dose-response relationship, both with respect to range and slope; and
c) absence or inhibition of effect by neutralization or removal of the constituent.

In addition, in *in vitro* experiments the relevance of effect would need to be established by comparing the required drug concentration *in vitro* to that found *in vivo*.

The assessment of clinical evidence, however, has posed many more problems. Historically, the most common sequence of development of knowledge about a new clinical problem has included the following steps: recognition of individual cases; study of series of cases in comparison with clinical control groups; epidemiological study of incidence and prevalence in defined populations; inferential identification, from the foregoing data, of possible etiological factors; and experimental demonstration of probable mechanisms. The value of the initial steps, despite the obvious limitations of the information they provide, has not been questioned in relation to other clinical problems. In contrast, very high standards of proof are sometimes demanded from evidence concerning cannabis (see, for example, Grinspoon, 1977). It is instructive to make comparisons with the study of effects of other drugs, such as tobacco or alcohol. With these drugs, "risk-factors" have been freely identified, although full causality has not yet been established. Nevertheless, such risk-factors deserve and receive serious attention with respect to the latter drugs. It is puzzling that the same reasoning is often not applied to cannabis.

In some cannabis research on humans there are numerous constraints which are difficult to overcome directly. For example, in many of the epidemiological, laboratory, or clinical quasi-experimental studies, it seems that researchers can demonstrate relationships only by establishing statistical association. Whether in the area of cannabis research, investigations of other drugs or in other less complicated areas, the research worker more often than not is faced with a variety of possible interpretations of the findings, due to the multiplicity of variables that arise particularly from dealing with human beings. Moreover, in field studies comparing matched groups of users and non-users, it must be remembered that it is, by definition, impossible to determine a drug effect on the variable with respect to which the groups are matched. For example, if the users and controls are matched with respect to socio-economic status, any possible effect of drug use on socio-economic performance is automatically excluded.

Therefore, the researcher can only proceed towards formulating new

hypotheses about possible mechanisms or processes involved, and progress by what is usually labeled the method of successive approximations, i.e., gradually narrowing the range of possible interpretations. This method is followed in all endeavors in science, cannabis research included. To provide rigid proof of causality in such investigations is logically and theoretically impossible, and to demand it is unreasonable.

10. SUMMARY

The acute use of moderate doses of cannabis produces a state of intoxication. This is associated with a dose-related impairment of the ability to drive a car or operate complex machinery. In some situations, the user may not feel the desired euphoric state but rather may experience a short-lived dysphoric reaction which can range in intensity and character from mild anxiety to an acute psychosis. Other acute physiological effects are also transient and do not appear to be of major significance in individuals with no pre-existing disease.

Intermittent use of low-potency cannabis is not generally associated with obvious symptoms of toxicity. Daily or more frequent use, especially of the highly potent preparations, can produce a chronic intoxication which may take several weeks to clear after drug use is discontinued. The seeming inconsistency of this observation throughout the world may reflect differing exposures to THC because of the large variation of potencies and smoking techniques, as well as different cultural preferences for the route of administration.

Respiratory toxicity is observed in heavy users and is probably related to smoke components other than THC. Therefore its severity may depend more on the smoking techniques employed by the user and the combustion properties of the material, than on the THC content. Cannabis effects on the hormonal, reproductive, and immunological status of these users is, as yet, unclear.

Chronic administration of cannabis results in the development of tolerance to a wide variety of the acute drug effects in both humans and experimental animals. Though scientific opinion is more divided on the question of dependence on cannabis, there is now substantial evidence that at least mild degrees of dependence, both psychological and physical, can occur.

Some individuals may be particularly susceptible to the effects of cannabis for a variety of reasons. Adolescents who are undergoing rapid developmental change and elderly populations with decreased rates of drug metabolism, increased prevalence of disease and a more conservative and less flexible mental set may be more sensitive to the effects of cannabis and other drugs. The symptoms of patients with a variety of diseases in-

cluding various forms of mental illness, diabetes, cardiovascular disease or epilepsy may be exacerbated by cannabis use. Interactions with a variety of substances including tobacco and alcohol may also potentiate the observed effects.

The epidemiological studies necessary to assess the frequency of adverse effects and to relate their occurrence to factors such as potency and amount of cannabis used, length of exposure, set and setting have not, as yet, been conducted. The low prevalence of adverse effects observed in field studies of small numbers of heavy users suggests that the adverse effects described in many of the clinical reports occur relatively infrequently in these carefully selected populations. Given that millions of individuals are now using the drug, even relatively infrequent but serious adverse consequences could be of public health significance.

The results of experimental studies in animals have consistently demonstrated toxicity at doses comparable to those consumed by the human who smokes cannabis several times per day. Respiratory toxicity, CNS dysfunction, endocrinological disturbances, reproductive deficits, and immunosuppression have all been observed after treatment with THC or cannabinoids in experimental animals. Most, but not all, of these effects disappear when treatment is discontinued. *In vitro* studies have also been used to demonstrate cannabis-induced cytotoxicity. The results of these experiments are, for the most part, qualitatively consistent with the *in vivo* observations, and may provide valuable information about the mechanisms of action of the cannabinoids and other plant components or products of pyrolysis.

11. RECOMMENDATIONS FOR FUTURE RESEARCH

Based on a discussion of the available information on cannabis toxicity and the lack of relevant data in certain key areas, several recommendations for future study were reached. A comprehensive understanding of any biological phenomenon almost always demands the synthesis of information derived from a variety of experimental designs. Therefore, it is important that no single "best" scientific design be recommended. On the contrary, it is recognized that a broad, integrated approach employing different techniques is most likely to provide the information needed for valid conclusions regarding the adverse effects of cannabis on health and behavior.

1. As outlined in Section 1, there is a lack of consensus on what constitutes the criteria for "social" or "problem" use. Standardization of terminology with respect to patterns of use would greatly facilitate the comparison of clinical reports. There should be a search for "biochemical

markers" to indentify heavy users (such as the changes in transferrin or abnormal hemoglobin A used to identify recent heavy users of alcohol) that could be used as an objective measure of hazardous use.

2. Many general considerations were raised. There is an obvious need to relate biological responses not only to the doses given but also to blood and relevant organ levels of THC and its major active metabolites and to the duration of exposure to such levels. For this reason, further studies of the pharmacokinetics (both acute and chronic) of THC and other cannabinoids are indicated. It is important to explore the contribution of THC to biological effects, as compared to the possible role of other cannabinoids and of other substances contained in the cannabis preparations.

3. Wherever possible, the effects of cannabis should be compared with those of equieffective doses of other drugs with respect to some common action, so that cannabis toxicity can be considered within the context of toxicity of psychoactive drugs in general. This will indicate which effects are specific to cannabis and which are common to many drugs.

4. It must also be emphasized that, with the exception of a few case reports and limited experimental studies, almost all information so far obtained has emerged from observations of healthy mature males. This limits the extrapolation of results to other segments of the population. For example, there is virtually no information on the effects of cannabis in women. Because of the increasing prevalence of use by women and the evidence of sex differences in the biological response to many other drugs, studies in this area are vitally necessary.

5. Other groups may, for various reasons, be particularly at risk for the appearance of adverse consequences. The effects of cannabis on children and adolescents, a group undergoing rapid physical and psychological maturation, should be intensively studied since, in some countries, cannabis use is already very high and increasing rapidly. Effects on academic achievement, and on endocrinological profiles during puberty, are areas particularly deserving of study.

Based on evidence from animal studies, it is also recommended that children exposed *in utero* to cannabis should be examined post-natally for signs of impaired growth and delayed maturation, and for long-term health and behavioral problems.

It is possible that cannabis is producing serious but as yet unrecognized toxic effects on persons with underlying psychiatric, pulmonary, cardiovascular, gastrointestinal, allergic, and dermatologic disease, or with pathological or therapeutically produced immunosuppression. Greater attention should be directed to the problem of cannabis-induced precipitation or exacerbation of these disorders.

Because of animal experiments suggesting that nutritional status may to some extent influence the magnitude and nature of the drug-induced effects, the relationship between poor nutrition and various cannabis-related effects should be studied.

Conversely, efforts must be made to identify special risk factors in those experiencing adverse effects, so that additional groups at risk may be identified.

6. There were also suggestions aimed at improving the quality and reliability of the data available from clinical and experimental studies. Case reports are still necessary to identify rare drug-induced effects, and to confirm the existence of other previously reported signs of toxicity. More complete and consistent descriptions of clinical observations, including the extent and pattern of drug use (cannabis and other drugs) accompanied if possible by objective testing, would add to the value of these reports. There is also a need to identify, in the community, those individuals who may not be seeking medical attention for adverse effects. These "outreach" studies would provide a more accurate estimation of the prevalence of the relevant symptoms than can be provided by case reports alone. More systematic enquiring and reporting with respect to drug use by clinic and hospital patients would also assist in the assessment of the prevalence of adverse effects.

The data from carefully designed retrospective studies should not be underestimated. By means of controlled retrospective studies, the apparent over-representation of certain characteristics (such as age, sex, and pre-existing psychopathology) among patients presenting complaints related to drug use can be assessed. Since adverse drug effects are more likely to be found in individuals who are identified as "patients," i.e., who present with complaints, than in healthy users without complaints, it would be informative to apply objective measures such as various physiological and psychological test batteries to groups of patients with complaints rather than only to groups of healthy drug-using volunteers.

In the past, a large number of cross-sectional studies of cannabis users matched with non-user controls have provided information on the drug's possible toxicity. In view of the difficulties in designing a prospective study, a thorough reassessment of previously studied subjects presents certain advantages, despite the difficulties of tracing some of the individuals involved. The subjects would be older and would have had longer cannabis exposure. Thus they would be more likely to show cannabis-related symptoms. Previously made measurements could be repeated, and recently developed techniques could be employed to provide additional data.

Obviously an ideal approach is that of the controlled study of experimental administration. In this manner, confounding variables such as diet and concomitant use of other drugs can be eliminated. In such settings the subjects can also be treated with dignity and safety. From the animal studies, however, it is apparent that long-term exposure is needed for the production of adverse chronic effects. Experimental administration studies in humans should not be used to determine long-term toxicity. Optimally, methods should be developed for performing both cross-sectional and experimental administration studies without the need for hospitalization.

7. Several types of epidemiological studies are suggested to (a) determine the prevalence and trends of cannabis use in general and special populations throughout the world, and (b) to determine the frequency of adverse reactions, especially those requiring medical treatment among groups of cannabis users. The prevalence-of-use data should include information on the dose (in terms of THC content, route of administration, and frequency of use). This would include world-wide assays of potencies of various illicit cannabis preparations. The surveys of frequency of adverse effects should help to separate the influence of various factors such as frequency of use, experience with other drugs, and pre-existing psychopathology. There is also a special need for studies of the frequency of respiratory, hormonal, cardiovascular, and other non-psychological adverse consequences of cannabis use. Because of the experimentally observed carcinogenic and mutagenic potential of cannabis smoke, possible signs of increased incidence of cancer must be monitored carefully in groups of heavy users. Analysis of ongoing epidemiological data such as hospital and emergency service visits, treatment referrals, etc., is very important and should be continued.

8. Encouragement should be given for prospective studies of potential user groups, including observations of baseline (pre-drug) health status and the occurrence of cannabis-related toxicity during and after periods of heavy use. On a large scale they are difficult to design and expensive to conduct. However, this approach remains the best technique for establishing, in humans, directness of connection between drug use and an observed effect, and for determining the relationship between recorded levels of use and the prevalence of adverse effects. Thus attempts should be made to conduct such studies. Less optimally, efforts could be made to extract pertinent data from prospective studies being conducted for other reasons.

9. The optimal designs of experimental studies of toxicology have been outlined in Section 9. It is recommended that adequate investigations using a variety of species, doses, routes of administration, and lengths of exposure (including full-life studies) be performed to evaluate cannabis effects on all organ systems and to assess potential teratogenicity, mutagenicity, and carcinogenicity. Research on endocrine and reproductive functions should also include serial measurements of trans-placental cannabinoid transfer throughout gestation, and estimations of cannabinoid concentrations in breast milk and nursing pups. Further experiments should be encouraged to elucidate the cellular and molecular mechanisms of action of cannabinoids and to analyze cannabis smoke action in a variety of *in vitro* systems.

10. On the behavioral level, several recommendations have been made. Suggested psychosocial studies include examinations of the influence of legal controls on patterns of cannabis use and on the drug-induced behavioral response of the user. For example, observations of the

user's social interactions, such as peer relationships or family structures and attitudes, may provide data related to reasons for the initiation and maintenance of cannabis self-administration, and may provide independent assessment of the user's behavior while in the intoxicated or non-intoxicated state.

Behavioral studies should include measures of psychomotor and perceptual functions that would be expected to affect one's ability to drive a motor vehicle or otherwise perform safely in the work place. A replication of the reported research on driving on city streets is necessary to confirm earlier results. The hazards of operating complex machinery while intoxicated should be assessed, especially in those countries with newly introduced mechanized farming where rural cannabis use is traditional. Wherever possible, cannabis-induced effects on night driving should be examined, as well as interaction with alcohol and other drugs, and the potential development of tolerance to cannabis-induced driving impairment.

Residual CNS toxicity as a result of long-term cannabis administration must be examined in greater detail. In animal models, the possible contribution of other individual or environmental factors, such as innate intelligence or environmental stimulation, to cannabis-induced learning impairment, EEG changes and histopathology could be assessed. In humans, a careful longitudinal study with verified drug-free periods before testing would help to determine whether or not residual toxicity occurs. The question of an absence or redirection of motivation in heavy users must be examined in greater detail. In addition, an exchange should be set up for autopsy brain bank samples and case-history information relevant to chronic heavy users, to provide material for post-hoc analyses of brain in correlation with recorded levels of use.

11. Additional observations are needed to identify the intervening pharmacological, neurophysiological, and psychopathological factors underlying acute panic and paranoid states and other cannabis-related psychiatric disorders. A comparison between cannabis-related psychiatric disorders and those produced by other drugs, as well as functional disorders, would also be profitable. A controlled study of the intervening etiopathogenic factors underlying spontaneous recurrence reactions ("flashbacks") could be of assistance in the elucidation of the mechanism(s) related to these symptoms.

Specific treatment procedures should be developed to minimize the potentially severe dysphoric states that can occur as a result of the therapeutic use of THC and synthetic cannabinoids. Such studies might not only be of value to patient care, but also shed light on the mechanisms of drug action.

12. Immunological studies should include epidemiological investigations of the prevalence, severity, and duration of selected infectious diseases in populations from which data are readily available and in which use is known to be high (e.g., students, military personnel). For example,

the question of a possible cannabis-related decrease in the immune response to herpes simplex should be studied in a group of cannabis users known to be infected with herpes.

13. Because of the multiple drug intake of many cannabis users, better and broader drug interaction studies (especially regarding behavioral impairment, pulmonary and liver toxicity) are necessary. These should be conducted with both licit and illicit drugs such as caffeine, nicotine, psychotherapeutic agents, and antihistamines. Data from pharmacokinetic experiments will be helpful in the interpretation of drug-interaction phenomena.

14. The development of tolerance to, and dependence on, drug effects, whether they be therapeutic or adverse, is a phenomenon that must be considered in the evaluation of any chronic psychoactive drug effect. More sensitive measures are needed for the identification of dependence, the delineation of time course of acquisition and particularly of the disappearance of tolerance, and its implications with respect to function. The relationship of tolerance, physical dependence and drug-seeking behavior must be established, both for cannabis and for other concurrently used drugs.

Since increasing numbers of cannabis users are now presenting signs of dependence, research must be conducted on methods for treating this problem.

15. Finally, adverse health effects are better prevented than treated. The development of educational programs designed to discourage hazardous cannabis use should be encouraged, and the results of such programs evaluated.

In brief, the obvious need for further cannabis research has been demonstrated. Because of the cannabis-related problems throughout the world, there is an urgent and imperative need for agencies such as the WHO to alert the national governments and other international agencies to the need for research in this field. The benefits of cooperation between developed and developing countries in this area are mutual.

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The Marijuana Health Hazard

By Nicholas A. Pace, M.D.

During the last seven years, a very active organization called NORML (National Organization for the Reform of Marijuana Laws) has been vigorously campaigning state by state for the decriminalization of marijuana. This organization has campaigned nationally to make marijuana appear harmless. They are dedicated to fostering the idea that marijuana should be decriminalized since so many people are using it.

Recently, it has been learned that high on the list of President Carter's priorities in the field of public health is the decriminalization of marijuana. In order for you as law officers to understand the health aspect of this complex issue, we would like to give you the following information.

It is the contention of this author that the public has not been properly informed concerning the harmful medical effects of this drug. If anything, the media tends to portray marijuana as no more harmful than tobacco or alcohol. This comparison is absurd.

As For Tobacco—Tobacco is not a hallucinogenic drug. Smoking tobacco produces no hallucinogenic effects. Smoking marijuana has in reality a hallucinogenic effect on the brain with distortion of time, space and sound. It takes 20 years of heavy tobacco smoking to produce the same type of severe sinusitis, pharyngitis, bronchitis, and/or emphysema that less than one year of daily marijuana smoking produces, proving that marijuana smoke is far more irritating to the respiratory tract than tobacco.

Scientific studies have shown that marijuana smoke mixed with tobacco smoke is far more damaging to lung tissue than tobacco smoke alone.

Even the *Consumer's Report* of March, 1975 acknowledged the lung damage in chronic marijuana users, although one could hardly endorse their suggestion that alternate forms of marijuana consumption such as "drinking marijuana tea" could protect the lung tissues. Medical literature is replete with reports similar to that of Dr. John A. S. Hall's report showing the emphysema-bronchitis syndrome in black male Jamaicans who were regular marijuana users.

Unfortunately, it will take another 20 to 30 years for us to have autopsy reports to show the effects of long term chronic marijuana smoke on not only the lungs but other tissues as well.

Of interest is the fact that lungs of animals exposed to marijuana smoke have shown cellular changes that are similar to those seen in patients who develop lung cancer. Tar from marijuana, painted on the backs of animals, has produced cancers.

As Far As Alcohol Is Concerned—The concept that marijuana is safer than alcohol is definitely erroneous. A person can have one or two drinks a day for 20–30 years and never suffer ill effects from it. Alcohol is water soluble. One ounce is completely metabolized and broken down into water and carbon dioxide within 12 hours. Marijuana, on the other hand, is not water soluble—it is fat soluble, and the active psychotropic (mind altering) ingredient, delta-9 Tetrahydrocannibinol (THC), accumulates (in the

same manner as DDT) in the tissues of the body which are fat laden, including the brain and the sex organs. In animal experiments with radioactive tagged Delta THC, the THC was still detected in the brain, liver, lungs and reproductive organs two weeks after a single injection.

Although alcoholism is a serious drug problem, one does not hallucinate from one or two drinks. In order to hallucinate an alcoholic would have to develop far advanced disease, with brain damage and/or the withdrawal syndrome. On the other hand, the psychotropic effect of marijuana causes hallucinations in small doses, and in some cases, every time the drug is used. The distortion of time, space and sound are examples of the mild hallucinations that occur on a mild marijuana "high" is experienced. Think of what this effect will be on our driving population should marijuana become as popular as cigarette smoking. There are several studies which show that marijuana causes marked distortion of time and space on professional automobile drivers and airline pilots. Dr. H. Klonoff, Professor of the Department of Psychiatry at the University of British Columbia, Canada, in a study, showed the neuro-psychological effects of marijuana on driving.

Marijuana Effects On The Brain—The active psychotropic ingredient has a cumulative effect on the brain which is responsible for the irreversible brain damage that Dr. Robert Heath, Chairman of the Department of Psychiatry and Neurology at Tulane University School of Medicine has shown in his rhesus monkey experiments. The actual irreversible brain atrophy or damage in the rhesus monkeys was produced after three months with the equivalent of one marijuana cigarette (2% THC) a day. The Columbian marijuana currently available in New York City is 3+% THC. Therefore, four to five marijuana joints per week would be at the same dosage that caused brain damage in the rhesus monkey experiment. Dr. Heath has not tried does less than this; therefore, this may not be the minimal level.

It is unfortunate that Dr. Heath's findings have not been properly publicized, especially since it is thought that there are at least two million daily marijuana smokers in this country at the present time.

Loss Of Motivation—In 1972, Dr. Louis J. West described the term amotivational syndrome (loss of motivation). This syndrome is well known to numerous physicians and practicing psychiatrists in this country and elsewhere. Marijuana smokers suffer personality changes that occur gradually over a period of time. These personality changes include diminished drive, lessened ambition, decreased motivation, apathy, shortened attention span, poor judgment, diminished capacity to carry out complex plans or prepare realistically for the future, and a variety of other deleterious changes.

Dr. West suggests that this syndrome is caused by actual organic changes in the tissues of the brain. Dr. William Moore and Dr. Harold Kolansky of the University of Pennsylvania Medical School showed in an excellent study the same distortion of personality among chronic marijuana users. They describe hundreds of patients who have suffered from psychiatric and nuerological symptoms such as impaired judgment, diminished attention and concentration span, a slowing in time sense, and a loss of thought continuity as a result of chronic marijuana use.

Dr. Andrew Malcolm, a Canadian psychiatrist, Dr. D. Harvey Powelson, formerly Chief of the Health Clinic at the University of California at Berkeley, and Dr. Roy Hart, a New York psychiatrist and Editor of the *Journal of the American Academy of Psychiatry and Neurology*, as well as many others, have independently confirmed and extended Dr. West's observations. In a paper that Dr. Hart presented, entitled "A Psychiatric Classification of Cannabis Intoxication," he showed that there were 75 independent studies which revealed the serious effects of marijuana on the mind. Evidence from all over the world has supported the presence of the amotivational syndrome. Dr. John A. S. Hall, a leading psychiatrist in Jamaica, and Dr. Boris Segal, a prominent Soviet psychiatrist—just to name two others—have also reported on this syndrome.

Brain Atrophy (Shrinkage)—The important findings of the English neurologist, the late Dr. A. M. G. Campbell, in his study using air contrast x-rays of the brain on long term marijuana users (all of whom presented severe personality disorders) cannot be refuted. In all ten subjects, there was definite evidence of brain shrinkage as compared to ten control subjects. Dr. Robert Heath, of the Tulane University School of Medicine, studied the brain wave patterns in rhesus monkeys who were exposed to marijuana smoke twice a week and demonstrated that animals exposed this way had irreversible alterations in brain function for about three months after onset of the experiment. These brain wave abnormalities were shown to persist for eight months after the monkeys were no longer exposed to the marijuana smoke.

The regions of the brain where Dr. Heath measured the most pronounced and persistent changes in brain function by the brain wave examination were the same regions where Dr. Campbell noted atrophy or shrinkage in the ten human subjects.

Loss Of Learning Ability—Dr. Harold Kalant of the Department of Pharmacology at the University of Toronto has shown that rats exposed to marijuana smoke for five months suffered an irreversible loss of learning ability as measured by standard psychological tests.

Of special interest are the Soviet studies on dogs who were exposed to marijuana. These dogs showed signs of organic brain damage of the central nervous system including disturbances of various reflexes, impaired motor coordination and muscle movements, and states of depression followed by periods of excitement, aggressive behavior and fears. Autopsies on the brains of these dogs showed large areas of destruction in the cortex (thinking and learning centers) of the brain as well as in the cerebellum (balance section of the brain). These are the same regions of the brain that Dr. Heath reported on in his monkey experiments.

The Seven Day Half-Life—Of interest is the fact that marijuana produces a half-life of seven days. This

means that after one week only 50% of the substance is eliminated. Therefore, anyone who uses marijuana more than once a week cannot be truly drug-free and has a build-up of the drug in his tissues. One might remember the recent headlines of the commuter train crash in Chicago. Although the engineer involved had not used marijuana for the previous 24 hours, the substance was still detected in his system.

Prevention Of Cellular Growth—When marijuana is exposed to cell cultures, there is biochemical interruption of cellular metabolism, with the prevention of the proper formation of the building blocks essential for cell growth. Scientists agree that marijuana interferes with the synthesis of proteins and causes a decrease in the rate of cell division.

Dr. Peter Freed of Ottawa, Canada showed that young rats subjected to marijuana smoke not only suffered from generally reduced body weights, but also had significantly smaller hearts and brains as a percentage of their total body weight. He also got the same results in young suckling rats whose mothers were exposed to marijuana, bringing up the strong possibility that this effect is transmitted through mother's milk.

Reduced Sperm Production—Dr. H. Morishima and Dr. Zeidenberg, at the Columbia College of Physicians and Surgeons, illustrated in a carefully controlled study on 16 marijuana smokers, ages 18 to 23, over a two-year period, a significant and sustained decrease in the sperm concentration occurring after only two weeks of marijuana smoking. The decrease in the sperm concentration was sustained for at least two weeks after marijuana was discontinued. During the experiment, the subjects smoked an average of five to fifteen marijuana cigarettes a day.

Abnormal Sperm Cells—Not only was there a decrease in the sperm count, but there was also a decrease in the motility of the sperm (movement of the sperm). The most potentially damaging effect of marijuana on the sperm was the marked increase in abnormal forms of the sperm cell. This brings forth the genetic possibility of transmitting abnormally viable sperm with decreased genetic information to a fertilized egg.

Genetic Effects—Marijuana not only interferes with cell division but also interferes with the synthesis of the important genetic material of the cells. There is interference with the immune system of the body, too. Studies have shown that marijuana use causes a reduction in the number of chromosomes in the white blood cells, plus abnormal white blood cells. Abnormal embryos have developed in the animals exposed to marijuana and birth defects have been produced in young rhesus monkeys whose parents were exposed to marijuana smoke.

Space does not permit a review in detail of the many other negative health effects that marijuana produces.

I have personally cared for two young people who became psychotic after using marijuana. In one case, psychosis developed after smoking only one joint and in the other case, after smoking five joints a week for a period of six months.

As a student and observer of the drug scene, I sincerely believe that while alcoholism is presently our most dangerous drug problem, marijuana has the potential of becoming an even greater problem since it is being used by an uninformed public. One has to be aware that decriminalization is tantamount to legalization, particularly when so many people are ignorant of the extremely serious risks involved in marijuana usage. No one wants to see young people thrown in jail, but there are other effective alternatives to decriminalization. For example, there is the Sacramento Citation Diversion Program where youths arrested for possession of marijuana are given a chance to take a drug information study course which exposes them to the information that we have written about here. Upon completion of the course, the youth's arrest record is wiped clean.

When someone asks how one can tell if marijuana has had any ill effects on someone, I suggest trying to recall what the individual was like six months prior to the regular use of marijuana and comparing him with what he is like today. If there are marked changes in personality, social attitudes, emotions, etc., coupled with apathy, the chances are that marijuana is having an ill effect on his brain.

With the help of publications like *The Law Officer*, perhaps we can inform the youth of our country of the hazardous medical effects of marijuana.

Listed below are the names of books and publications containing further information on this subject:

SUGGESTED READING MARIJUANA

Russell, George, Marijuana Today, The Myrin Institute Inc., 521 Park Ave., New York; Nahas, G., Keep Off The Grass, Reader's Digest Press, Thomas Y. Corwell Co., 666 Fifth Ave., NY, NY 10019; Berjerot, N., Addiction & Society, Charles C. Thomas; Bloomquist, E., Marijuana, Glencoe Press Beverly Hills, Calif.; Goode, E., The Marijuana Smokers, New York Basic Books; Moreau, J. J., Hashish & Mental Illness, Raven Press, New York; Nahas, G., Marijuana: The Deceptive Weed, Raven Press, New York; Jones, H. B., Sensual Drugs: Deprivation & Rehabilitation Of The Mind, Cambridge University Press, New York; Powelson, D., Marijuana: More Dangerous Than You Know, Readers Digest 12/74 pp 95-99; Drug Information: National Clearing House for Drug Abuse Information, P.O. Box 1635, Rockville, Maryland 20850; American Council on Marijuana, 521 Park Avenue, New York, N.Y. 10002.

Nicholas A. Pace, M.D. is a specialist in Internal Medicine and maintains a private practice in New York City. He is also an Assistant Professor of Medicine at New York University School of Medicine. Dr. Pace is the President of the New York City Affiliate of the National Council on Alcoholism, and is the New York Medical Director of a large corporation.

COMMITTEES OF CORRESPONDENCE INC.
Write Makes Right

Drug Abuse Newsletter

February, 1983 Issue No. 10

Printed in U.S.A. by
Fox Run Press, Topsfield, MA

NIPPING MARIJUANA IN THE BUD

A Comparison of Paraquat—the Herbicide with Cannabis—Nature's Toxic Plant

By Mary Kohler, Hampshire Informed Parents, Inc.
Amherst, Massachusetts

What is Marijuana?

Cannabis sativa is a broad-leaf plant of which there are two main types. The fiber type, hemp, was used for making rope and homespun, while the drug type is illegally grown for its drug (psychoactive) properties. Strictly speaking, *Cannabis sativa L.* is the botanical name for the plant itself, while "marijuana" is the term applied to a crude drug derivative.

Naive *non*-drug users must understand that chronic pot smokers and the drug culture like to foster the belief that the cannabis plant is no different from other agricultural plants. Slang names for marijuana clearly illustrate this: "grass," "weed," "tea," "Vermont-Manhattan Crossbreed," "Wacky-Tobacey," "Oklahoma Baby Buds," to name a few. Scientific research in the last few years has proven how dangerous and misleading this can be.

To date, 421 different chemicals have been identified in cannabis; of these chemicals, 61 are called cannabinoids and are found in no other plant in nature. Thus, marijuana is not a pure drug but a complex mixture. (In contrast, ethyl alcohol is only 1 chemical.) The most studied cannabinoid is delta-9-tetrahydrocannabinol, or THC. This is the chemical chiefly responsible for the "high."

In order to fully comprehend the health hazards of marijuana use, one must keep in mind this basic fact: THC is *intensely* fat soluble—it is attracted to the fatty tissues of the body and the fatty organs (including the brain and sex glands) and finds its way into mother's milk. It is stored in the same manner as DDT. THC is very slow to leave the body: 25-30% of the THC and its products of metabolism reside in the body for one week—traces of THC can be found up to 30 days after one has smoked a single joint. (In contrast, alcohol is water soluble and leaves the body within a matter of hours.) Thus, any regular use of marijuana leads to a steady accumulation of THC—and other cannabinoids. And, although not all of the cannabinoids are psychoactive (mind-altering), all are biologically active.

Since each cell membrane has fatty sections, the cannabinoids dissolve into these cell membranes. This slows the entrance of necessary building blocks into the cell and interferes with biological processes. Clearly, marijuana is very far from a "harmless weed;" it is a very biochemically active and persistent mind (brain) -altering drug. Further, the THC content of today's high-potency marijuana is as much as 10 times stronger than the street marijuana of a decade ago. The National Academy of Science's Institute of Medicine reported in February, 1982, that marijuana use in our nation today "justifies serious national concern."

THE FOLLOWING ARE JUST A FEW OF THE HEALTH HAZARDS CONNECTED WITH MARIJUANA USE (Some symptoms appear in some users with light to moderate use; other symptoms appear only after heavy use. Heavy use is defined as smoking 4 or 5 marijuana cigarettes per week.)

Interference with Psychological Functioning. Symptoms are lack of goals and motivation, impairment of short-term memory and learning, and retardation of emotional growth. This is affirmed by an increasing body of clinical reports from pediatricians and psychiatrists. Each year, marijuana accounts for the second largest number of admissions into federally-funded drug abuse treatment facilities. Tragically, the chronic user is rarely able to perceive the change that has taken place in himself or herself. A carefully designed study matched marijuana smoking in rhesus monkeys to moderate and heavy smoking by humans over a six-month period. For these monkeys, a pattern of abnormal brain waves appeared within two to three months' exposure, and was found to persist even after three months' exposure, and was found to persist even after eight months of abstinence. Upon autopsy, the limbic area brain cells of these monkeys showed distinct damage. The brain cells of the control monkeys (exposed to the same amount of pot smoke with THC removed) were perfectly normal.

Impairment of Normal Sex and Reproductive Processes. In man, marijuana reduces sperm count and motility and increases the number of abnormal forms of sperm. Disruption of ovulation and disruption of menstrual cycles have been observed in humans and in rhesus monkey studies. Since THC collects in and passes through the placenta, the developing fetus will be at risk if the mother uses marijuana.

Serious Impairment of Driving and Flying Performance. Studies have shown that marijuana is just as driver-impairing as alcohol. Moreover, marijuana *adds* to the driver-impairing effects of alcohol. (Note: alcohol can lead to nausea and vomiting; however, marijuana suppresses the vomiting response setting the stage for a dangerous state of intoxication.)

Impairment of Lung Function. This ranges from subclinical effects (which do not yet "show") to the same serious lung conditions caused by cigarette smoking; but pot smoking brings on these conditions far sooner and with fewer "smokes;" for example, one marijuana cigarette may cause more air flow resistance than 16 tobacco cigarettes. (Air flow determines in large measure how well we get oxygen into the lungs and how well we get carbon dioxide out.)

High Risk Groups: The younger the user, the more deleterious the effects. Because experimentation is too often the first step to personal and social loss and eventual dependence, any use by teens or preteens must be strongly discouraged. Other special high risk groups are pregnant women; those with cardiac problems; diabetics; epileptics; and persons with underlying or present mental disorders.

Although one chemical in marijuana—THC—is being used for suppression of nausea and vomiting in various patients suffering these effects from cancer chemotherapy treatment, this does *not* mean that "pot must be safe"—as many youngsters have been led to believe. The 421 chemicals in the crude drug marijuana are combusted into over 2,000 chemicals when smoked. It is thus a Pandora's Box of unknowns. But what we *do* know about it is bad news.

What is the extent of marijuana use in the U.S.?

"Young people are often at the leading edge of social change; and this has been particularly true in the case of drug use. The surge in illicit drug use during the last decade has proven to be primarily a youth phenomenon, with onset of use most likely to occur during adolescence."

The above quote is from Dr. Lloyd D. Johnston, et al., Highlights from Student Drug Use in America 1975-1981, National Institute on Drug Abuse (NIDA). This document presents findings from a national research and reporting program, *Monitoring the Future: A Continuing Study of the Lifestyles and Values of Youth*, conducted annually since 1975 by the University of Michigan's Institute for Social Research. The data give some important indication of drug use among high school seniors, with some information about starting use in earlier grades. In interpreting the data, one must take into account one fact: the research does *not* include those in the target population who dropped out of high school before the 12th grade—15-20% of each age group. At hearings concerning international narcotics control policy, which were held before the Committee on Foreign Affairs, House of Representatives, April, 1982, Dr. Mel J. Riddile of Fairfax County, Virginia, and representing the National Association of Secondary School Principals testified:

"I would like to say that as we find younger and younger children using illicit drugs, particularly marijuana, we find that they don't make it to their senior year and they don't appear in the NIDA surveys.

One study that we conducted in a local school found that 29 percent of the marijuana users dropped out of school in 1 year. They would not have made it to their senior year for that survey. So I think we have to consider that." (U.S. Congress, Committee on Foreign Affairs, "International Narcotics Control", April, 1982)

According to *Highlights*, among high school seniors of the class of 1981, "marijuana is by far the most widely used illicit drug;" 46% used marijuana during the year; 32% used in the past month; 7% used daily (one in every 14 seniors). Daily use was on a slightly downward trend, which, said the researchers, was apparently due to concern about health consequences and peer disapproval. As for grade of initial use by the class of 1981, *34% first used marijuana prior to high school* and 25% during high school. (The remainder had never used.) See 1982 data, end of article.

As for overall use of marijuana, Dr. William Pollin, Director, National Institute on Drug Abuse stated that at least 22 million Americans use marijuana (previous hearings, U.S. Congress, Committee on Foreign Affairs, *International Narcotics Control*, April, 1982). The 1979 National (Household) Survey on Drug Abuse, ages 12 on up, shows that *one out of every three Americans ages 18 to 25 was a current pot smoker* (defined as using the drug within the past month).

To Sum Up: Since 1964, over 6,000 scientific papers have been published on cannabis, the plant from which marijuana, hashish, and hash oil are "processed." According to Dr. Carlton Turner, the White House Drug Abuse Policy Director, who has read and annotated all these papers for the

two-volume work he co-authored, *Marijuana, An Annotated Bibliography*[1], "*Not one* of those papers gives cannabis a clean bill of health."

Indeed, he says, "*The inescapable fact is that unless our current pot-smoking habits are reversed sharply, marijuana will have drastic long-term biological and psychological health effects on our young people, and, therefore on the future of our families and our nation.*" (Peggy Mann, *Pot Safari*, 1982)

Eradication of Marijuana: Use of Paraquat

The use of marijuana is clearly a public health problem of major proportions; the economic and social costs are enormous. Eradicating cannabis, the plant from which marijuana is derived, is one important way to begin to attack this problem. Although various articles we come across in magazines and newspapers might lead some to believe that domestically grown cannabis accounts for a considerable proportion of marijuana in the U.S., actually "domestic commerical cultivation has consistently represented about 7 percent of the total marijuana consumed in the United States." (Attorney General William French Smith, "Drug Traffic Today," *Drug Enforcement*,[2] Summer, 1982, p.5). Increased efforts to eradicate cannabis would certainly lessen the public health problem created by use of the drug. We need to keep in mind that the U.S. is already obligated to participate in ways to control cannabis. According to a recent U.S. State Department document, *Cannabis Eradication in Foreign Western Hemisphere Nations*, November, 1982, the State Department intends

> *"to initiate a cannabis eradication program in foreign Western Hemisphere nations. The proposed action is to support efforts of host governments to eradicate cannabis by aerially applying the herbicide paraquat where appropriate."*

Describing the proposed federal action and evaluating it in terms of domentic environmental impacts, the document also explains that

> *"The U.S. Department of State's Bureau for International Narcotics Matters is mandated by Section 481 of the Foreign Assistance Act of 1961 to establish an international program aimed at reducing the flow of illicit narcotics and dangerous drugs of foreign origin into the United States. In 1978 an Amendment to the Foreign Assistance Act placed restrictions on U.S. support to foreign governments for the eradication of marijuana using paraquat. In December of 1981, these constraints were repealed. With the advent of this development, it is now the intent of the U.S. Department of State to initiate a cannabis eradication program in foreign Western Hemisphere nations."*

Such an action as described in the above State Department document would help to reduce the supply of marijuana coming into the U.S. from abroad. However, it becomes clear that *such a program must ultimately be coordinated with efforts to reduce the domestic production of marijuana in the U.S.* Furthermore, the U.S. is obligated by international commitment to try to reduce this supply: According to the above State Department publication,

> *"The United States is a party to the 1961 Single Convention on Narcotic Drugs, as well as numerous bilateral and multilateral treaties and agreements on the control of dangerous drugs. The United States and other parties assumed the obligation under the treaty to control and prevent trafficking in narcotics, including heroin, cocaine, and marijuana. Any attempt by the United States to abrogate, amend, or withdraw from the Single Convention would have serious repercussions with respect to controls on all other narcotics and dangerous drugs..."*

It has become abundantly clear that marijuana can be controlled most effectively at the initial point of production: this requires eradication of cannabis at its source, for once the illicit crop has been cut and sent on its way to some distant point, the problem of discovering and intercepting it is manifold, and much of it remains undetected. The use of paraquat would be one way to eradicate cannabis before it is harvested and shipped.

What is Paraquat?

According to the 1980 report of the Select Committee on Narcotics Abuse and Control, *The Use of Paraquat to Eradicate Illicit Marijuana Crops and the Health Implications of Paraquat-Contaminated Marijuana on the U.S. Market*, (Congressional committee report, pp. 11-12),

> "The chemical 'paraquat' (1,1'-dimethyl-4,4'-bipyridinium dichloride) is a general contact herbicide manufactured in the United States by Imperial Chemical Indistries, Americas, and distributed by the Chevron Chemical Corporation, under license from the British-based Imperial Chemical Industries, Limited (ICI). The compound was first used as a plant growth regulator beginning in 1959, and *since 1966, paraquat has been registered for a broad spectrum of uses* (Emphasis added):
>
> 1) as a pre-planting herbicide for the control of weeds prior to the establishment of grass seed fields, and in preparation for no-tillage or [minimum] tillage production of crops such as corn and soy-beans;
>
> 2) as a directed spray for the control of weeds in orchards, vineyards, ornamental plantings, and nonerop plant areas;
>
> 3) as a desiccant and defoliant in harvesting such crops as soybeans, sugarcane and sunflowers;
>
> 4) as an aid in pasture renovation.
>
> When paraquat is applied in commercial agricultural settings, precautions are taken to avoid contact with edible portions of the crop undergoing treatment...
>
> *Paraquat is certified by the regulatory agencies of the U.S. Government as a safe and effective chemical when used in accordance with label directions." [Emphasis added.]*

Also, Federal agencies monitor for residues. Testimony quoted in the above report assures us that studies "show no evidence of paraquat residues in our food supply." (Dr. Warren C. Shaw, Staff Scientist, U.S. Department of Agriculture)

Why Use Paraquat?

Studies and experience show use of paraquat to be a viable method of eradicating cannabis.

[1]See Reference List for further information about this work.

[2]A copy of this publication may be obtained from Drug Enforcement Administration, U.S. Department of Justice, 1405 Eye Street, N.W., Washington, D.C. 20537

In July, 1979, a United Nations Narcotics Laboratory (UNNL) Study Group composed of experts from around the world convened in Geneva to consider methods for the eradication of illicit narcotic crops. Following are a few statements from its report, which is reprinted in the above congressional committee report. *The Use of Paraquat to Eradicate Illicit Marijuana Crops and the Health Implications of Paraquat-Contaminated Marijuana on the U.S. Market:*

"Opium poppy, cannabis, and coca bush are the narcotic plants of global concern, being the sources of such principal drugs as heroin, marijuana, and cocaine, respectively...

There are positive ways to control illicit narcotic crops. These include persuading illicit growers to produce other income-generating crops. Unfortunately, this alternative is not always realistic... chemical attack at the present time offers the best overall opportunities to successfully destroy narcotic crops. Mechanical means are, however, also quite viable and fire is feasible.

The variety offered by these three readily available, proven techniques, both individually and in combinations with one another, led the group to conclude that the initial costs to develop the apparently promising approaches of biological controls and genetic alteration would not be cost-effective in the effort to eradicate illicit narcotic crops."

Ultimately, the UN Study Group report states that

"From the approximately 60 herbicidal chemicals that have been evaluated for their effectiveness in controlling cannabis and poppy, the group selected five, as having sufficient merit to receive primary consideration for use in the control of cannabis and poppy."

Of these five, one was paraquat. This chemical was given high marks in terms of effectiveness in cannabis control:

Paraquat

"provides effective control of cannabis and poppy... The effects of paraquat are soon noticeable. It produces the most rapid response of any of the chemicals that have been tested..."

As for environmental impact,

"Drift of paraquat to nearby vegetation may cause visible necrotic spots, but under ordinary circumstances damage would be minimal. Paraquat persists in the soil for long periods, but it is not biologically available because it is tightly absorbed on [bound to the surface of] soil particles. Free paraquat is degraded by soil micro-organisms."

And Chevron Chemical Company, Ortho Division, states in "The Impact of Paraquat on the Environment"[3] that Paraquat

"is rendered inert once it contacts the soil and is not biologically persistent... There is no possibility of residues of paraquat being accumulated in living systems. Thus paraquat soil residues are biologically unavailable to living organisms in the environment... if water did become accidentally contaminated with paraquat, residues in the water would quickly disappear largely due to adsorbtion onto soil particles suspended in the water and in the bottom mud."

[3]Chevron Chemical Company, Ortho Division, Research and Development Department, Richmond, California, "The Impact of Paraquat on the Environment" (summary), March, 1971.

And from the White House Drug Abuse Policy Office *Fact Sheet* (July 19, 1982): "Paraquat is a fast-acting herbicide which is biodegradable, photodegradeable and decomposes upon storage and heating." In other words, paraquat is broken down by soil micro-organisms, sunlight, storage, heating. Toxicity of the break-down products is nominal.

In the application of paraquat, the availability of water is required, for water is the normal carrier.

Are there health hazards for pot smokers?

The UN Report cited above states that—although handling of the concentrate requires care by those applying the chemical, "residues of sprayed formulations on cannabis would not be sufficient to cause toxic effects to the marijuana user." In the White House *Fact Sheet* cited above, we read,

"In 1977, it was confirmed that marijuana containing Paraquat was available on the street in the United States. Analysis by the Center for Disease Control [CDC, Public Health Service, Department of Health and Human Services] in 1978 found that 3.6 percent of their samples of confiscated marijuana contained Paraquat. ***Not a single case of lung damage due to smoking marijuana containing Paraquat was found by CDC despite a follow-up on all reported cases during the 'Paraquat Scare' in 1978."[Emphasis added.]***

Just what was that "paraquat scare?" First, one must understand the climate of the times. Only very recently did the general public begin to learn something about the health hazards of marijuana use; but in the mid-70's, except for scientists and a few others, the general public knew relatively little about these hazards. During that time, Mexico had begun to spray cannabis with paraquat—of course, this would reduce the supply of marijuana into the U.S. Pro-drug forces and various media elements pushed to end spraying programs, implying that paraquat was causing lung damage among marijuana users. And, significantly, research findings describing *marijuana's* effects on lungs were given almost no publicity. Eventually, the U.S. Congress passed an amendment to the Foreign Assistance Act of 1961; this amendment "...placed restrictions on U.S. support to foreign governments for the eradication of marijuana using paraquat." *(Cannabis Eradication in Foreign Western Hemisphere Nations*, State Department, November, 1982) But, when Congress realized the deception in the "paraquat scare," it *repealed* these constraints in December of 1981.

The Public Health Service, Department of Health and Human Services, is supportive of eradicatoin of cannabis using paraquat. A letter published in the State Department publication cited above *(Cannabis Eradicaton in Foreign Western Hemispere Nations*, November, 1982) reads:

"The Public Health Service (PHS) strongly supports a program for eradication of cannabis in the Foreign Westrn Hemisphere Nations...We feel that the proposed cannabis eradication activity can be properly performed by using the herbicide paraquat in accordance with Environmental Protection Agency label instructions and its application requirements and by following sound procedures to monitor the activity."

Success of the Mexican Paraquat Program. Mexico has demonstrated success in its cannabis eradication program. According to the previously mentioned Congressional

report, *The Use of Paraquat to Eradicate Illicit Marijuana Crops and the Health Implications of Paraquat-Contaminated Marijuana on the U.S. Market.*

"In 1975, the Government of Mexico, in a bilateral program agreement with the United States Government, began using chemical eradication agents to destroy opium poppy crops...

The potential of the program impressed the Mexican Government to the extent that it decided to expand the efforts of the aerial poppy eradicatoin program to include what it considers to be its own number one domestic drug abuse problem: Marijuana. The environmentally safe, commercially available herbicide 'paraquat' was chosen by the Mexican Government from a list provided by the U.S. Department of Agriculture of herbicides licenses and evaluated as safe for domestic commercial use as an acceptable agent for the marijuana eradication program. Paraquat's safety record when used in accordance with label directions is excellent."

Some additional statements from the White House Drug Abuse Policy Office *Fact Sheet* (July 19, 1982):

- *"Paraquat has been on the market as a herbicide since 1962 and is one of the most widely used herbicides in the world."*
- *"Paraquat is a legal herbicide for use anywhere in the U.S. as long as the label instructions are followed."*
- *"Paraquat is used to control broad-leaf weeds and cannabis is a broad-leaf weed."*
- *"Approximately 4 million pounds of Paraquat [are] sprayed on over 10.7 million acres in the U.S. each year." (This is for uses such as weed control in orchards and as a harvest aid for such crops as cotton and soybeans).*
- *"The Administration supports the eradication of the cannabis plant as a legitimate activity to reduce the availability and use of marijuana."*

Paraquat Use in the U.S.

In August of 1982, paraquat was used to spray a large cannabis field in Red Bay, Florida. Stringent controls were followed, which prevented the sprayed cannabis from reaching the consumer market; no adverse environmental impacts were noted; stringent controls were followed to protect the health and safety of personnel conducting the spraying. Safety clothing (rubber suits, goggles, respirators, etc.) was worn to protect the personnel involved; there were no problems. A tank-truck was used as far as it could go, and the rest of the spraying was accomplished in the tight places by back-pack sprayers. The paraquat was used as a desiccant, which dried the foliage and allowed the field of cannabis to be burned within 48 hours "at minimal cost to the state." (This information was obtained following a Committees of Correspondence inquiry to the Department of Law Enforcement, State of Florida.)

In using paraquat, one must remember that, like many chemicals in use, including many under the kitchen sink, it is a poison, and like any poison, it must be used with care. Label instructions must be followed and applicable state and federal regulations must be observed. Paraquat should be used only when appropriate and with stringent controls to ensure the health and safety of personnel involved; it is a restricted use herbicide and may be used only by Certified Applicators or persons under their direct supervision."

In conclusion, because the public health hazards involved in *marijuana* use are so great, the use of paraquat as a means to eradicate cannabis is warranted.

What You Can Do

1. Domestic commercial cultivation of cannabis is presently concentrated in seven primary states: California, Hawaii, Oregon, Kentucky, Missouri, Arkansas, Florida. But other states are also involved. Is your state one of these? You can find out from your District Attorney or state Attorney General. At the first national conference of the National Federation of Parents for Drug-Free Youth in Washington, D.C., Dr. Carlton Turner was asked on October 12, 1982:

"Dr. Turner, [we in the midwest have heard] that a growing number of farmers are growing marijuana... What would be your suggestion as to what parent groups might do with the enforcement people in the eradication of cannabis?"

Dr. Turner:

"Talk to the local law enforcement people, who will have contact with the Drug Enforcement Administration, which is giving technical assistance. With these two groups working together, we now have 26 states which are involved in eradication."

2. Parent groups and individuals, write to your elected officials: let them know that you want cannabis to be eradicated—that use of cannabis presents major health hazards. Continue to encourage and support all those who are in a position to take steps to eradicate cannabis, from local law enforcement personnel to your state legislators. Write letters to newspapers expressing this support.

3. If you become aware of a particular place where cannabis is being grown, contact your local law enforcement personnel. (This can be done anonymously.) Also, if you would like more information about Florida's successful use of paraquat on marijuana, you may write to the State of Florida, Department of Law Enforcement, P.O. Box 1489, Tallahassee, Florida 32302.

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U.S. Department of State, *Cannabis Eradication in Foreign Western Hemisphere Nations*, November, 1982

White House, Drug Abuse Policy Office *Fact Sheet*, July 19, 1982

The following is a copy of an article that appeared in the Philadelphia *Daily News* on December 9, 1982 by Stuart D. Bykofsky:

Bob Hope recently disclosed that NBC axed a couple of jokes about drug use from one of his routines during a special. One of the Hope's gags said that for selling cocaine "you can get 20 years in prison or two years in Congress."

Hope is far from one of the drug generation's favorite comics. You'd have to guess you wouldn't find any white powder on the old man's nose.

NBC ran a week-long, anti-drug campaign last year and later ordered *no* drug jokes on its air. That comes right from Grant Tinker at the top.

We have a drug epidemic in America, that's for sure.

But is a flat ban the most effective remedy? Would an anti-drug joke, in which the user is portrayed in less than flattering terms be considered a "drug joke?" Even if that's not the case, should the networks be issuing flat bans on material?

This represents a conflict between a socially desirable end (fighting drug use) and a questionable means (network censorship). Freedom of expression is not an absolute—not in society and not on television—but I have trouble with edicts that wipe out an entire area of commentary.

How do you feel? Should the networks ban *all* drug humor, allow *only* anti-drug jokes, or keep its hands off the material entirely? Let me know by writing to me, care of the Daily News, P.O. Box 7788, 400 N. Broad St., Philadelphia, Pa. 19101.

We encourage people to write Grant Tinker to let him know we appreciate his effort and active participation in getting the anti-drug message to the general public via television and radio programming at N.B.C.

We have already had an encouraging reply to our letter to him. You may state that you are a member of the Committees of Correspondence. Please direct your correspondence to:

Mr. Grant Tinker *Chairman of the Board*
National Broadcasting Company
30 Rockefeller Plaza
New York, N. Y. 10112

COMMITTEES OF CORRESPONDENCE INC.
Wine Makes Might

Drug Abuse Newsletter

February, 1983 Issue No. 10

NIPPING MARIJUANA IN THE BUD

A Comparison of Paraquat—the Herbicide with Cannabis—Nature's Toxic Plant

IMPORTANT UPDATE

1. STATE DEPARTMENT DECISION: According to a December 21, 1982 public notice, Bureau for International Narcotics Matters, Dept. of State.

   "The Department of State has decided to support the efforts of foreign Western Hemisphere nations to eradicate cannabis by aerially applying the herbicide paraquat. In emplementing this decision, the Department now intends to engage in formal discussions with cannabis-producing Western Hemisphere nations."

2. The latest national high school senior survey conducted by the University of Michigan's Institute for Social Research indicates that in 1982, daily marijuana use was down to 6 percent (about one in every 16 seniors). However, this news gives us NO reason whatsoever to become complacent.

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Write Makes Might

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Drug Abuse Newsletter

Issue No. 8
January 82

An Important New Way to Finance Drug Enforcement and Prevention Programs for Your State:

Civil Forfeiture of Illicit Drug Profits

The Drug Enforcement Administration has a powerful new model law which can be adopted by any state. This law, if enacted, would allow state law enforcement officials to trace and seize the assets and profits of illegal drug activity. This includes everything from the drugs themselves to the person's home, car, boat, bank account, etc. Once seized, these illegal drug profits could be diverted into state treasuries. Federal drug enforcement agents are already making such seizures under a similar statute, and monies and property from the federal agents' seizures are going into the federal government's treasury. If a state adopts this model law and makes the seizures, the assets so seized and found, by a court of law, to be assets or profits of illegal drug activity, will then belong to the state. Therefore, the proposed Model State Forfeiture Act, in conjunction with existing state laws, will provide important needed support for state drug enforcement efforts.

This Model Forfeiture Act was written by Harry L. Myers, Assistant Chief Counsel of the Drug Enforcement Administration. Mr. Myers is the same attorney who wrote the Model Paraphernalia Act which has now been adopted by so many of the states.

Every year billions of dollars are reaped by organized crime. Much of this money comes from illegal drug activity. The illegal drug industry is estimated to be the third largest industry in the United States, after Exxon and General Motors. The relatively new Federal Forfeiture Statute gives federal law enforcement officers a powerful new weapon with which to fight organized crime in the drug area. This new law allows the government to attach the very motive for illegal drug activities--the criminal's desire for great wealth. It subjects his money, bank accounts, and property to forfeiture if it can be shown that these items were earned from illegal drug trafficking. (Forfeiture is the taking by the government of property illegally used or acquired, without compensating the owner.) The federal statute, Title 21 of the United States Code, Section 881 (a)(6) provides that all monies and other assets acquired from the illegal drug trade shall be subjected to civil forfeiture. This means that law enforcement officers can go beyond merely arresting traffickers and seizing any drug involved. Now, illegally accumulated assets (bank accounts, cars, airplanes and even real estate) are all subject to civil forfeiture.

In order to understand civil forfeiture it is necessary to understand what civil law is. The legal system is broadly divided into two separate areas--civil and criminal. Both areas can be used to punish wrongdoers but only the criminal law--which is used exclusively by the city, county, state or federal government--can involve a jail sentence. Civil law on the other hand is most often used when one person sues another. The legal rules of evidence, as well as the standard of proof, are different in these two areas. For example, in order to find a defendant guilty of drug trafficking it must be shown "beyond a reasonable doubt" that he did, in fact, illegally distribute drugs. Under civil law it is enough to show that it is "more likely than not" that the defendant acquired his property from drug trafficking. The second standard is, of course, a much easier one to meet.

Forfeiture is an ancient concept, traceable to the Old Testament of the Bible (Exodus 21:28) as well as Greek and Roman Law. Today, forfeiture is most often used to protect the public from harmful objects (adulterated foods, sawed-off shot guns) and as a deterent to crime.

The new Federal Forfeiture of Drug Profits Act provides that the civil law with its less strenuous standard of guilt is to be combined with the concept of forfeiture to become Civil Forfeiture. This is important because it means that no criminal conviction is required.

Under this new Civil Forfeiture Law the federal government can now seize the ill-gotten gains of a drug importer if it can be proved in court that it was more likely than not that they were bought with drug profits. Notice that the criminal conviction of the drug dealer is not required.

For example: Mr. X is a drug trafficker. He has money in the bank, a lovely home, jewellery for himself and his wife, and a very expensive car. The money in various bank accounts allows him to continue to initiate and pay for further underground illegal drug activities. If it can be proved in a court of law that all the items listed above were the result of drug trafficking, they will be forfeited even if Mr. X manages, by skillful legal manuevering, to remain free. The reason is that the forfeiture case is separate from the criminal one. They are two different legal actions. Even if the District Attorney does not prosecute the criminal action against Mr. X, he can still file an action against his property as long as he can show the likelihood that the property was acquired from the illegal drug trade. It costs money to traffic in illegal drugs and moreover a business that is subject to such governmental seizures may become a poor business risk with a poor return for the investment dollar.

Before this new law the federal government could seize and subject to forfeiture certain items. These included:

1) illegal drugs,
2) any equipment and materials used to make, deliver or import illegal drugs,
3) containers for illegal drugs,
4) cars, planes and boats for transporting illegal drugs, and
5) books and records connected with drug trafficking.

However, nothing in the federal law dealt with the profits of illegal drug trafficking until Title 21 of the United States Code, Section 881 (a)(6) was enacted. Undercover drug agents have often stated that among the drug traff...ing elements of society, bragging about just what items were bought with drug money is commonplace. Under federal law and in states that enact the model act such profits would be put at high risk of seizure and forfeiture.

How Would This Law Provide the States With Much Needed Revenues?

Drug enforcement costs are enormous. It is estimated that federal enforcement costs at the present time is about $150,000,000 a year. This includes the costs of the Drug Enforcement Administration, the anti-drug activities of the Customs Service, and the anti-drug activities of the Coast Guard. This figures does not include prosecutorial costs (twenty-five percent of all federal cases deal with illegal drugs), prison costs for convicted felons, or drug treatment centers. It also does not include the millions of dollars spent by the states in these areas.

The proposed legislation offers the states substantial potential for recovering significant amounts of money now being spent to combat drug offenses. The Federal Drug Enforcement Administration serves as a good example. During 1979-1980 DEA seized assets totaling nearly one-half of its annual budget. Since many states are looking at less money because of budget cuts, eroding tax structure and growing inflation, such a statute, properly enforced, could help to provide needed revenues, just as the federal law has done.

What Exactly Does the Model Forfeiture Law Provide?

The prefatory note to the model forfeiture of drug profits act states:

> Widespread drug abuse, particularly amoung children, teenagers and young adults, poses a serious threat to the well-being of our society. Drug trafficking organizations which cater to this abuse are composed of three elements: (1) contraband drugs, (2) people, and (3) money and other assets. As long as the assets remain untouched, seized drugs and arrested people can always be quickly replaced. Capital is at the heart of all businesses, both legal and illegal. Depriving drug traffickers of their assets, including their operating tools and their illegally accumulated profits, is an essential step in crippling these organizations.
>
> The intent of the Model Forfeiture of Drug Profits Act is to amend existing state laws to permit all states to seize, civilly forfeit and deposit in their treasuries: (1) all moneys and other assets used to buy contraband drugs, (2) all moneys used to facilitate any drug law violation, and (3) all assets acquired from drug trafficking, regardless of their form. The Model Act consists of amendments to the civil forfeiture section of the Uniform Controlled Substances Act, which has been enacted by forty-seven (47) states.

The Model Forfeiture of Drug Profits Act subjects to civil forfeiture:

> " ( ) Everything of value furnished, or intended to be furnished, in exchange for a controlled substance in violation of this Act (meaning the Controlled Substances Act of this State), all proceeds traceable to such an exchange, and all moneys, negotiable instruments, and securities used, or intended to be used, to facilitate any violation of this act; except that no property shall be forfeited under this paragraph, to the extent of the interest of an owner, by reason of any act or omission established by him to have been committed or omitted without his knowledge or consent.
>
> **Rebuttable Presumption:** All moneys, coin, and currency found in close proximity to forfeitable controlled substances, to forfeitable drug manufacturing of distributing paraphernalia, or to forfeitable records of the importation, manufacturing or distributing of controlled substances, are presumed to be forfeitable under this paragraph. The burden of proof is upon claimants of the property to rebut this presumption.

It can be seen that the Model Forfeiture of Drug Profits Act targets four discreet areas.

1) **Exchange** -all things of value furnished or intended in exchange for drugs. A small number of states already have this provision. Note that this section is not only limited to money or negotiable instruments and securities but includes "anything" of value exchanged (i.e. a diamond ring). Two examples of an exchange:

> 1) Suppose Mr X is observed giving Mr Y $2000 for an ounce of cocaine; that money is forfeitable.
> 2) Suppose Mr. X admits going to Mexico with $10,000 to buy drugs but only manages to buy $3000 worth. The drugs as well as the $7000 are forfeitable because all the money was intended for exchange for illegal drugs.

2) **Proceeds** - all proceeds traceable to such an exchange. The term "proceeds" is that which is received when an object is sold, exchanged or otherwise disposed of. As with the Exchange Section, this need not be money but any item received for the illegal drugs. This is part of the model law because profits from the cash-and-carry trade are eventually hidden by changing their form. It is, after all, the proceeds that allow the drug traffickers to live the good life. They are converted into homes, yachts, planes, cars, stocks bonds, business bank accounts and other property. The power to seize and forfeit cash exchanged for drugs strikes at the operational funds of illicit business. However, the power to seize and forfeit drug "proceeds" poses a much greater threat to the accumulated profits of traffickers. For example:

> 1) Suppose Mr X sells drugs for $10,000. The entire $10,000 is forfeitable because it is the proceed from an exchange
> 2) Suppose Mr. X takes the $10,000 and puts the money in a bank. It is still a proceed and it is still forfeitable.
> 3) Suppose Mr. X buys a car with the $10,000. It is forfeitable under the model law because the money and all that it buys is tainted by a drug exchange.

3) **Facilitation money** - all money used or intended to be used to facilitate any drug violation. This section is limited only to money, negotiable instruments and securities. Examples of money used in these manners would include:

> a) money used to run an illegal PCP laboratory,
> b) money used to pay rental fees for cars, boats or planes to smuggle marijuana
> c) money to pay a drug carrier, or even
> d) Money used by a drug carrier for expenses.

4) **Innocent owner** - This section protects the innocent owner whose property might have been used in a way so as to violate the law. For example:

> Mr. A leases his beachfront property to Mr. X. Mr. X uses this property as a dock for small fishing boats bringing in bales of marijuana from the mother ship at night. Mr. A has no reason to suspect these activities. Therefore, Mr. A's property is not forfeitable.

If enacted in your state, this law would have two major beneficial impacts:

1) The law, in itself, would be a powerful deterrent to drug trafficking.
2) The law would provide much-needed revenues to help support drug enforcement, as well as drug rehabilitation, and drug education and prevention programs throughout your state.

WHAT YOU CAN DO

All of the states should adopt this powerful Model Forfeiture Law as part of their law enforcement arsenal. By using effective political action this proposed legislation can become law in your state. Here's how:

1) Write to:
Superintendent of Documents
United States Government Printing Office
Washington D.C. 20402
to order a guide for the model act called:
Drug Agents' Guide to Forfeiture of Assets
Stock number 027-004-00031-2
Enclose $8.50 per copy ordered. This price includes postage and handling. Please order two (2) copies--one for yourself and one to give to your sponsoring state legislator. (Or, you may wish to photocopy important sections from a single copy).
2) Choose a state representative who has the ability to get the Model Forfeiture Law enacted. This involves using a legislative sponsor who has an excellent reputation in both state houses, if possible. This person need not necessarily have a strong knowledge of drugs, but should be well respected. Give your chosen representative a copy of the above mentioned guide, as well as a copy of this Drug Abuse Issue.
3) Notify all parent groups, PTA's church and synagogue groups, etc., in your state. Ask them to contact their local state representatives and express their support for the bill.
4) Keep in close contact with your sponsoring legislator so as to be ready to act by gathering more local support should the bill be in trouble.

POSSE COMITATUS

Here's some good news for you to share with your group and community.

Posse Comitatus, a limited exception to the doctrine of military non involvement in civilian law enforcement was signed into law December 2, 1981 by President Reagan. This legislation, a positive step forward in the battle against illegal drug trafficking, will permit meaningful cooperation between the military and civilian law enforcement officials. Now public law No. 97-86, Posse Comitatus will allow for the greater loan of equipment, training assistance, and sharing of information on movement of air and sea traffic outside the land areas of the United States. At last, the up to date equipment and expertise of our military will be used against the sophisticated measures taken by illegal traffickers. Already Drug Enforcement Administration officials are working with the Navy in the Carribean to detect smugglers.

Posse Comitatus took a full two years to become a reality and its support and passage can be credited largely to the parents of America. Their message of "NO DRUGS" is being heard everywhere and Congress is responding by initiating tougher laws. Posse Comitatus is certainly a step in the right direction.

How Much Do You Really Know About Marijuana?

by Peggy Mann

Peggy Mann has written more articles on the health hazards of marijuana and on marijuana p ue alcohol and driving, for major newspapers and magazines than any other writer in the world.

Q. What Exactly IS Marijuana?

A. Marijuana, hashish, and hash oil are prepared from a plant called cannabis sativa. Because cannabis grows, pot smokers often refer to "their drug" as a simple, natural weed — the implication being that it's harmless. However, it's far from simple and very far from harmless. Marijuana is the most complex of all the illegal drugs. It contains 421 known chemicals and, when it is smoked or burned, these break down into over 2000 chemicals entering the body. Sixty-one of these chemicals are unique — found only in one place in the world — in the cannabis plant. And they are called cannabinoids.

Q. What is THC?

A. It's short for delta-9-tetrahydrocannabinol — one of the cannabinoids; one most responsible for the "high." THC is impairing to brain cells, lungs, the reproductive organs; indeed, to all body cells. And other cannabinoids are even more impairing than THC to certain organs and organ systems. Thus far, scientists have studied only six of the 61 cannabinoids. All are biologically harmful. As one nationally known expert[1] puts it: "There is no other drug used or abused by man that has the staying power and broad cellular actions on the body that cannabinoids do."

Q. How long does marijuana stay in the body?

A. The most important single — and most dangerous — factor about marijuana is this: the cannabinoids are lipophilic (fat-loving). They seek out and seep into fatty sections of all body cells, and the fatty organs (the brain is one-third fat). Only very slowly do they leak back out into the blood stream to be eliminated. It takes about a month for all the chemicals in a single joint to clear from the body. If one smokes more than that, the cannabinoids accumulate in the cells, and the body is never drug-free. As one researcher put it: "Though the high is gone, the pot is not." When the chronic user stops smoking pot it takes about three months for the accumulation of cannabinoids to clear from the body.

Q. Can marijuana cause dependence?

A. The body cells of the regular pot smoker act like microscopic time-release capsules continually emitting cannabinoids into the bloodstream. Consequently, there are no severe physical withdrawal symptoms. (There may be mild symptoms such as sleeplessness, irritability, upset stomach, etc.). However, chronic users become strongly **psychologically** addicted. As one noted psychiatrist[2] puts it: "If marijuana **doesn't** cause dependence, why is it that it's so difficult for the chronic pot smoker to stop?" The difficulty in stopping is reflected in these statistics: according to the Federal Government's drug abuse patient data system, for the past five years, marijuana has accounted for the second-largest number of admissions into our Federally funded drug-treatment facilities. Furthermore, the percentage of these patients almost doubled between 1976 and 1981. During these years, about one-third of the patients started their pot use **prior to age 14.**

Q. How does pot affect personality?

A. The typical "pot portrait" of the heavy, young pot smoker is defined in countless clinical reports as well as in over 350 studies published in scientific journals since 1975. It includes the following: impaired short-term memory, emotional flatness, and the "dropout syndrome." (This can progress from dropping out of sports to dropping out of school to dropping out of the family.) Also: **diminished** will power, concentration, attention span, ability to deal with abstract or complex problems, and tolerance for frustration. **Increased** confused thinking, impaired judgement, hostility toward authority, self-centeredness. Also, unwarranted suspiciousness (paranoia); caring less about everything and everyone; depression, which often leads to suicidal thoughts. And the denial syndrome: refusal to believe that marijuana is affecting you adversely, and **refusal to believe the hard medical evidence that marijuana is physically and psychologically harmful. This symptom is typical of virtually all chronic pot smokers, youngsters and adults.**

Q. What about driving a car?

A. Over 50 driving studies clearly show that **marijuana is just as impairing to driving as is alcohol.** Furthermore, the driver-impairing effect of a one-ounce shot of whiskey or a 12-ounce can of beer or a glass of wine last one hour. But the driver-impairing effects of one "joint" (marijuana cigarette) last 5 to 6 hours. Marijuana impairs all important components of driving performance, including skills performance, perceptual processes, vision, attention, and tracking behavior. Because pot also impairs perception, many drivers actually believe they "drive better stoned." Studies also show that driving under the influence of marijuana **plus** alcohol means double trouble. And the latest closed course driving study showed the impairing effects of pot and alcohol to be synergistic (1 plus 1 equals 4 or 5).

Q. What does marijuana do to the lungs?

A. Pot smoking is harmful to the entire "pulmonary tree," from the sinus cavities to the tiny air-sacs deep within the lungs. Studies also show that it is even more impairing to the lungs than tobacco smoke, and its symptoms strike faster. There is also subclinical damage (which does not "show"). For example, one study[3] of healthy, adult pot smokers — who averaged 2.2 joints a day for five years — found they had 25 percent more airway resistance than a matched group of tobacco smokers who averaged 16 cigarettes a day for five years. (Airway resistance determines how well we get oxygen into the body and how well we get toxic carbon dioxide out.) Most cannabis smokers (pot and/or hashish) also smoke tobacco cigarettes. A lung biopsy study[4] of young U.S. soldiers showed that 91 per cent of those who'd smoked both had pre-cancerous cells. Those who'd smoked one or the other had a far lower incidence of pre-cancerous cells. Those who used neither had no pre-cancerous cells in their lungs.

Q. Can pot cause cancer?

A. It takes 30 to 40 years for lung cancer to grow. Thus far, in the U.S. people have been smoking pot heavily for only a decade or so. Tobacco is now called the single greatest cause of lung cancer, but marijuana and tobacco contain roughly equal amounts of such irritants and gaseous toxic agents as carbon monoxide, acetone, ammonia, and benzene. And the cancer-causing chemicals benzanthracene and benzopyrene are present in pot smoke in amounts 50 to 70 percent greater than in tobacco smoke. Researchers at the Swiss Institute for Experimental Cancer Research[5] exposed more than 5000 animal and human lung cell cultures to puffs of pot and tobacco smoke. The pot smoke caused cancerous lesions more rapidly than the tobacco smoke.

Q. What about sex and reproduction?

A. In males, human and animal studies have shown that pot reduces sperm numbers and mobility and increases numbers of abnormal sperm. Both conditions probably return to normal when smoking is stopped. In females, animal research has shown that eggs are affected by THC, which accumulates in the ovaries.[7] Rhesus monkey and human research shows that THC interferes with the menstrual cycle and impacts on fertility. In the only reproduction studies ever done on long-term exposure to THC[8], rhesus monkeys (with a 28-day menstrual cycle) were given the monkey THC equivalent of a human smoking one joint a day for 3 to 5 years. Result: 44 percent of the "THC mothers" produced dead or dying offspring, compared to 12 percent (a normal birth loss) among control mothers who received no THC. Although the THC fetuses and dead babies looked normal, microscopic evaluations showed a wide range of subtle developmental abnormalities in each of the THC babies, and in none of the control babies. The THC babies which survived had subtle behavioral abnormalities. Studies of human babies whose mothers smoked pot during pregnancy showed the same type of "dose-related" behavioral abnormalities. The more pot the pregnant mothers had smoked the more symptoms the infants showed. One noted marijuana researcher[9] put it this way: "These—as well as numerous human and animal cell studies—show that pot smokers may be playing genetic roulette with the physical and mental health of the children they may have one day."

Q. Does marijuana lead to other drugs?

A. Not necessarily. However, since chronic pot smokers develop a tolerace to the pot high, they often go on to other drugs to induce the high they once got from marijuana. Also, "pushers" (drug dealers) generally handle a variety of drugs and, like any salesperson, try to interest buyers in additional products. The annual National High School Senior Surveys[10] continue to show that about half the high school seniors who are pot smokers also use one or more additional illegal drugs, whereas virtually none of the non-pot smokers are regular users of any other illegal drugs. Teenage pot users tend to stop short of heroin. However, in the latest study published in 1981 of a national sample of 2510 males ages 20 to 30, it was shown that of the 1382 pot-users, approximately one out of ten also used heroine.[11] But of the 1128 non-pot users only one person had used herion. Furthermore, the large majority of those who used heroin frequently were heavy pot users.

The greater the extent of marijuana use, the greater the chance that one will use other drugs. For example, among these same 1382 pot smokers, 73 percent of those who had used marijuana more than 1000 times graduated to cocaine, and 33 percent went all the way to heroin.[12]

The researchers concluded, "The denial of the 'stepping stone theory' is merely the expression of a political rather than a scientific viewpoint."

[1] Dr. Carlton Turner, former director of the National Institute on Drug Abuse Marijuana Research Project at the University of Mississippi; co-author of the two-volume work, *Marijuana: an Annotated Bibliography*; and currently White House Senior Policy Advisor on Drug Policy.

[2] Dr. Mark Gold, recipient of the American Psychiatric Association's Prize for Research in Psychiatry, and Research Director of Fair Oaks Hospital in Summit, New Jersey—one of the few psychiatric hospitals in the U.S. specializing in the treatment of the marijuanaholic.

[3] Subclinical lung study done by Dr. Donald Tashkin, director of the Lung Function Laboratory of U.C.L.A. Hospital in Los Angeles.

[4] Study done by Dr. Forest S. Tennant, Jr., former director of U.S. drug army program in West Germany; currently director of Community Health Projects, Inc., Los Angeles, CA.

[5] Study done by Drs. Cecile and Rudolph Leuchtenberger.

[6] Study done by Dr. Robert Heath, Chairman of the Department of Neurology and Psychiatry at Tulane University Medical School.

[7] Study done by Dr. Akira Morishima of Columbia University.

[8] Study done by Dr. Ethel Sassenrath, of the California Primate Research Center of the University of California at Davis.

[9] Dr. Gabriel Nahas of Columbia University, pioneer marijuana researcher and author of *Keep Off the Grass* and *Marijuana: Deceptive Weed*.

[10] Surveys done by Dr. Lloyd Johnston, Dr. Jerald Bachman, and Dr. Patrick O'Malley, Institute for Social Research, University of Michigan.

[11] "The Stepping Stone Hypothesis – Marijuana, Heroin, and Causality," by Dr. John A. O'Donnell and Dr. Richard R. Clayton, published in 1981.

[12] Paper presented in 1982 to the National Institute on Drug Abuse National Advisory Council by Dr. Richard Clayton and Dr. Harwin Voss on use of marijuana and other illicit drugs.

About the author...

Peggy Mann has published over 30 books; has written fiction and articles for most of the major U.S. magazines and is a staff writer on *Reader's Digest*.

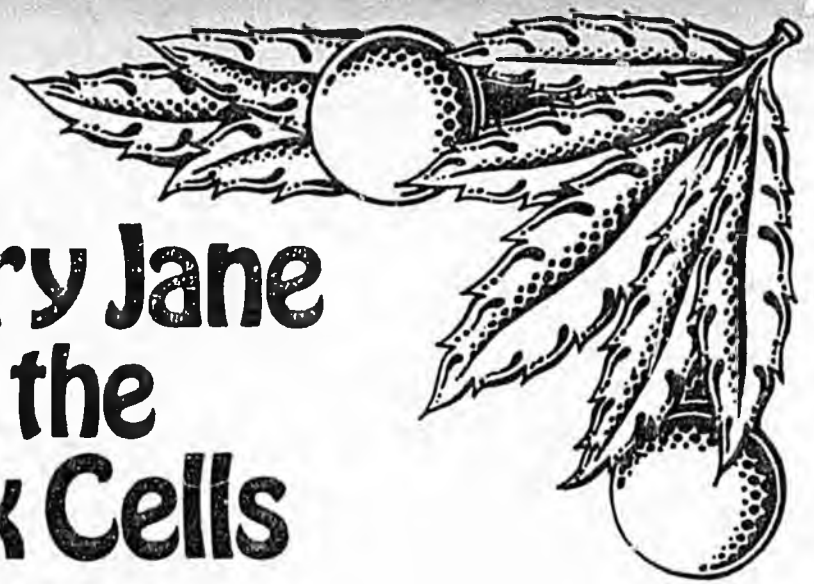
Q. What's the effect on brain cells?

A. No carefully controlled cannabis studies can be done on humans, for if damage was found in brain cells of heavy pot smokers, no one could be certain whether it had been caused by cannabis or alcohol or other drugs or disease. Therefore, in the most important brain cell study done thus far, rhesus monkeys were used. The limbic area was studied. This so-called "old-brain" is so similar in man and the rhesus monkey that, under the microscope, their brain cells look identical. Some monkeys were exposed to THC in the smoke of 2 to 3 monkey-sized joints a day (1/4 the size of a "human joint"). Others (the controls) were exposed to the same amount of pot smoke — with the THC removed. After six months (two years in human terms) there were slight structural brain cell changes in monkeys who'd been exposed to pot smoke with THC two days a week ("weekend smokers"). There were five different and dramatic types of brain cell changes in virtualy all of the brain cells examined in the monkeys exposed to THC 5 days a week. These same types of cell changes are seen in humans with early brain damage. The brain cells of monkeys exposed to the same amounts of pot smoke — but with the THC removed — were perfectly normal.

Q. Does marijuana affect the heart?

A. During "the high" the normal heartbeat increases 50 to 100 percent. Also, blood pressure is increased. Both conditions increase the amount of oxygen needed by the heart. But marijuana also increases the amount of toxic carbon monoxide in the blood, thereby reducing the amount of oxygen which reaches the heart. All research shows that pot should not be used by anyone with heart trouble. It can result in heart attack or death. One problem is that 25 percent of people who die of coronary heart disease never knew they had heart trouble. Their first symptom was — death.

What of the chronic smoker who complains of chest pains? No research has been done in this area. However, in most reported cases when they take no medication — merely cut out pot smoking completely — the chest pains disappear completely within days or weeks.



Mary Jane and the Sex Cells

by Gabriel G. Nahas, M.D., Ph.D.

Seldom in the course of centuries has a plant ever created a controversy as great as has **Cannabis sativa,** better known under the name of marihuana, Indian hemp, or hashish.

Eight centuries ago Moslem scholars from Cairo and Bagdad debated the pros and cons of this magic herb which allows man to dream while still awake. Their discussions had the same alacrity as those of today's American intellectuals. It appears now that this controversy, at least from a medical standpoint, has been partially answered.

One of the greatest uncertainties concerning marihuana, was the lack of evidence of cellular damage related to its use. It was known long ago that marihuana produced marked changes in thinking and behavior. This was brilliantly described by the French physician Moreau, 130 years ago, in his book "Hashish and Mental Illness." He observed that heavy long-term users of marihuana displayed a slowly progressive mental and physical deterioration, but these symptoms were non-specific, vague and had never been directly associated with cellular damage.

Cellular damage from marihuana has now been observed. Long-term marihuana users display an impairment of their cellular controlled immunity. This immunity is a function of T-lymphocytes (white blood cells) which specialize in fighting virus infections and destroying substances foreign to the body, such as cancer cells or tissue transplants.

My colleagues, Dr. J. P. Armand, Dr. N. Suciu-Foca and Dr. A Morishima, of the College of Physicians and Surgeons of Columbia University, and I studied 51 marihuana smokers, 16 to 35 years of age who had smoked an average of 3 joints of marihuana a week for 4 years. (Science Vol. 183, 419-420, 1974) These subjects had used no other drugs, except tobacco and alcoholic beverages.

We sampled blood from the veins of these volunteers and isolated their lymphocytes. The cells were tested with special substances which normally cause them to divide and grow.

Gabriel G. Nahas, M.D., Ph.D., who was decorated by the French and British governments for his work in the French underground during World War II, is now Professor of Anesthesiology at Columbia University College of Physicians and Surgeons in New York City.

The fact that marihuana products are stored in the sex organs, raises the possibility that marihuana might adversely affect the sex cells of men and women.

Such a test, the blast transformation test, measures the strength, or response, of the immunity system of the body.

We compared the immunity response of marihuana smokers with that of control subjects who did not use the weed, but smoked tobacco and drank alcoholic beverages. The immunity response of the marihuana smokers was 40% less than that of the nonsmokers. Furthermore, their immunological response was similar to that of patients with cancer, or kidney transplants (treated with immunosuppressant medicines).

The mechanism of this decrease in the division of lymphocytes was determined in another series of experiments. We were able to show that these lymphocytes from marihuana smokers could not increase the DNA production required for their proper division. DNA (desoxyribonucleic acid) is the basic chemical contained in the core of all cells. It carries the genetic code for heredity.

Similar observations were made on lymphocytes taken from subjects who did not smoke marihuana, but which were exposed in the laboratory to the drug. These cells were incubated in a test tube with very minute amounts of THC (THC is the active ingredient responsible for the effects of marihuana). They presented the same impairment in division and DNA production as those taken from marihuana smokers.

Our results confirmed those of Dr. Stehchver, from the University of Utah Medical School, who observed an increase in chromosome breakage in the lymphocytes of marihuana smokers.

Other scientists have made similar observations on other cells. Dr. Leuchtenberger, from the University of Lausanne, showed that lung cell cultures exposed to marihuana smoke did not grow properly and presented an abnormal DNA production. Dr. Zimmerman, at the University of Toronto, reported that the growth of tetrahymena, a microorganism, was diminished by miniscule amounts of THC which interfered with DNA synthesis.

How is it that the weekly consumption of only 3 to 4 marihuana cigarettes containing 15 to 20 mg. of THC may induce such celluar damage? The answer may lie in the fact that the active ingredients of marihuana, THC, are insoluble in water and are stored in fat tissue. The excretion from the human body of a single dose of marihuana requires more than one week's time. People who smoke marihuana more than once a week will store its by-products in the liver, lungs, brain, spleen, lymphoid tissues and sex organs (testes and ovaries).

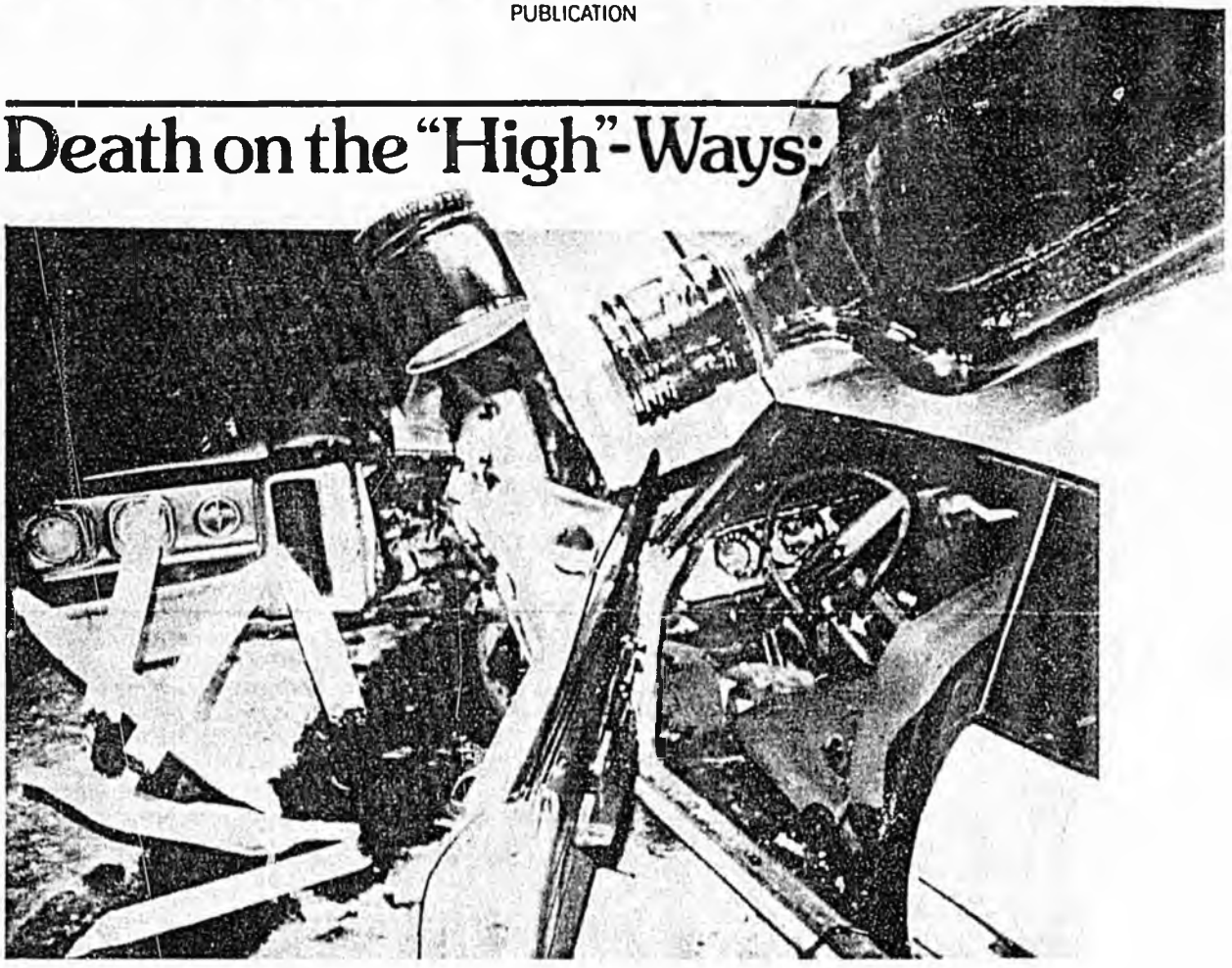
The fact that marihuana products are stored in the sex organs, together with the known cellular alterations related to marihuana, raises the possibility that marihuana might adversely affect the sex cells of men and women.

It is most urgent that we learn to what extent frequent use of marihuana will impair the genetic equilibrium of a person's sex cells. The hereditary fate of future generations may rest upon this research.

DID YOU KNOW? Since men constantly produce millions of sperm, the formation of sperm probably returns to normal when pot smoking is stopped, but the effect on women could be lasting. A female is born with about 400,000 eggs. If they are injured, there is no way to repair the damage. It has been proven that THC accumulates in the ovaries as well as other organs.

A Reprint
Families
A READER'S DIGEST PUBLICATION

Death on the "High"-Ways:



Driving on Drink and Pot

When you mix liquor and marijuana—and then take the wheel—you compound a lethal peril

Condensed from
THE SATURDAY EVENING POST
PEGGY MANN

THE EVIDENCE is clear that alcohol and driving do not mix. Every year, more than 50,000 people are killed on the nation's roads, and almost two million are seriously injured. According to the National Highway Traffic Safety Administration, "About half of the traffic deaths are related to alcohol abuse."

Eighty percent of fatal accidents are first accidents. This figure underscores one of the most tragic parts of today's grim picture: those at greatest risk are the youth of our nation.

In 1980, the U.S. Surgeon General revealed that although the overall death rate for every other age group dropped in the period between 1960 and 1978, the death rate for 15- to 24-year-olds rose. And the Insurance Institute for Highway Safety reports that nearly half of all teen-age deaths are due to motor-vehicle accidents.

The most common explanation offered by researchers for the consistently high accident involvement of young drivers is the inexperience of this group with driving, and with

drinking and driving. But it is now clear that death on the road has received a considerable transfusion of tragedy via a wave of marijuana users.

America's young people form a generation in which large numbers smoke marijuana. The magnitude of the involvement is shown by the fact that in 1962 only four percent of Americans ages 18 to 25 had ever used marijuana, while by 1979, 35 percent reported "current use" (within the past month). Furthermore, the marijuana available today is stronger than it was ten years ago, when the average Delta-9 THC potency was only about one-half percent. (THC is the chief mind-altering chemical in the drug.) Today, the THC potency of "street pot" is 4.5 percent.

Surveys reveal that "60 to 80 percent of the marijuana users questioned indicated that they sometimes drive while cannabis-intoxicated." (Cannabis is the plant from which marijuana, hashish and the extremely potent hash oil are prepared.)

Highway officials, drug treatment professionals, research scientists and police officers from Maine to California all express profound concern about marijuana's mounting impact on our national highway-death problem. They also worry about the fact that many pot smokers say they often drive high because they *enjoy* doing so.

Hugh Alcott, a California State Department of Corrections probation agent assigned to the special narcotics section, points out a particularly dangerous phenomenon: "A lot of people who've had too much to drink and know their driving skill will be affected smoke a joint 'so they can drive better.' They actually believe that marijuana acts as an antidote to the effects of alcohol. All the pot does, of course, is to make them *feel* that they're driving better. In fact, their driving is far more impaired than if they'd used alcohol alone."

How Does Marijuana Affect Driving?

HERBERT MOSKOWITZ, a research psychologist at the University of California, has done more work than any other U.S. researcher on marijuana and simulated driving studies. In summing up his findings, he said, "The preponderance of evidence indicates that marijuana impairs skills performance, perceptual processes, attention and tracking behavior. All important components of driving are thus clearly affected."

Some of these components are impaired after only a low dose of marijuana—for example, impairment of "search and recognition abilities." After one joint, some drivers may become totally involved with a single facet of driving or with music from the car radio or even with a private reverie. Therefore, they might simply "not notice" a car exiting from a crossroad or a pedestrian who has just stepped into the street.

Other effects of marijuana intoxication on driving skills:

- Impairment of traffic-signal detection.
- Impairment of reaction time. Inability to brake quickly in rush-hour traffic or to move over quickly if another driver cuts in ahead.
- Impairment of short-term memory function and information storage. The driver may forget where to get off the highway or which crossroad to take—on a route he or she knows well.
- Impairment of coordination skills. Difficulty in backing up and turning around.

One test done by Harry Klonoff, professor of psychology at the University of British Columbia, involved 64 psychologically stable students, male and female. All had used marijuana before. Roughly a third of the students received a low-dosage marijuana joint. One-third were given a high-dosage joint. The third group received a placebo (a joint with the THC removed).

All 64 students drove through a closed course with no other traffic, and 38 of the students also drove a 16-mile route from the university campus to the traffic-heavy downtown area and back again. They were rated, before and after, according to the system used by British Columbia's Department of Motor Vehicles in examining drivers for licensing.

Final figures for the street-traffic test showed that those who had received the low-dose joint had a 42-percent decline in driving skills. Those who received the high-dose joint had a 63-percent decline in driving skills.

Even the "careful" pot smoker who "comes down" from his high before driving may well be a menace to himself and others on the highway. One and a half ounces of alcohol (the equivalent of a shot of whiskey) is excreted from the body in several hours. Marijuana, on the other hand, has 61 known cannabinoids (including THC) that appear to be fat soluble. It is speculated that they collect in body tissue—including the brain.

Legal Limbo

THE DRUNK DRIVER usually finds it hard to hide his condition if stopped by the police. But the pot-high driver often has the ability to "hide the high"—to collect himself, "come down" and carry on a normal conversation with a police officer and thus escape detection, making enforcement all the more difficult.

Also, with alcohol, we have the roadside "breath test" as a deterrent. Every state has specific laws so that the drunk driver can be defined and, if warranted, prosecuted. For marijuana intoxication, however, we have no roadside test.

In March 1980, an inexpensive, reliable method was finally perfected for detecting cannabinoids in urine. According to the National Institute on Drug Abuse's Research Technology Branch, "The cannabinoid test can determine in 60 seconds, with 95-percent accuracy, the presence of cannabinoids in the urine for up to 48 hours after a joint has been smoked."

This is a step in the right direction. Many hospitals and private clinical laboratories have the facilities for running the test, and now at least physicians and parents can be alerted about pot problems with youngsters. But until a roadside test is available to highway police, we are in a legal limbo in which no driver can be prosecuted for being marijuana intoxicated.

One mechanism the body uses to rid itself of these cannabinoids is to allow those in fatty tissue to leak slowly back into the bloodstream to be metabolized and excreted. It takes about 2½ days for *half* the cannabinoids in a single joint to leave the body; it takes about two weeks to get rid of all the cannabinoids in a single joint. As one marijuana researcher put it, "Though the high is gone, the pot is not."

Deadly Duo

THE National High School Senior Survey, conducted by the Institute for Social Research at the University of Michigan, is the only national drug-abuse survey conducted annually. The 1980 survey showed that one out of every 11 seniors smoked pot daily, averaging 3½ joints a day. More than half of the 49 percent who had smoked marijuana "usually stayed high" for up to two hours each time they smoked, and 20 percent of those who smoked pot said that they usually drank at the same time.

How much of a driving impairment does such a mix of pot and alcohol really present?

In a study published in June 1980, Moskowitz and Marcelline Burns, a research scientist at the Southern California Research Institute, tested 12 healthy men (average age 26½) who used pot no more than twice a week and who did not take other drugs. The subjects performed a series of laboratory tasks, each related to a specific driving component (tracking, information processing, and so on). Each subject was tested at different times, under four different conditions. (No one knew what he was getting at any one time.) The conditions ranged from low alcohol and placebo marijuana to placebo alcohol (orange juice with a few drops of vodka floating on top) plus one marijuana cigarette.

Following this study, Moskowitz and research scientist Alison Smiley did a related one, but this time the subjects sat in a driving simulator, where they "drove" for 21 miles.

The results of both studies were virtually the same. The "alcohol only" subjects showed the well-recognized alcohol-caused driving impairments in reaction time, coordination, visual perception, attention and information processing. The "pot onlys" had all the same impairments.

But the results of dual use of alcohol and pot were, explained Moskowitz, "essentially additive." (One plus one equals two.) "Driving," he explained, "is obviously a multitask process. You must be able to do two or more things simultaneously. Alcohol impairs this ability in one way, and marijuana impairs it in another way. The alcohol-impaired driver tends to concentrate on one driving element to the exclusion of everything else. By sticking close to the center line for reference, the driver can keep the car from weaving but may be totally unable to attend to any unexpected highway happening. The marijuana-impaired driver, on the other hand, appears to have brief total 'dropouts' in his driving attention. Thus, taken together, alcohol and marijuana undermine the ability of the driver to process the roadway information necessary to control the vehicle safely."

Moskowitz summed up both the studies by saying, "Drivers under the combined influence of alcohol and marijuana have a greatly increased likelihood of initiating an accident."

In August 1980, Lawrence Sutton, executive director of Pittsburgh's Institute for Driver Research and Substance Abuse, tested the effects of marijuana and alcohol in a "closed" driving course. Sutton selected nine students from the University of Pittsburgh. All were experienced drivers, pot smokers and drinkers. Each drove on four successive afternoons, under four different "conditions":

1. pot (one joint) plus alcohol;
2. placebo alcohol plus one joint;
3. placebo joint plus alcohol;
4. placebo alcohol plus placebo joint.

During the 36 driving trials, patrolman Donald Dolfi followed the subjects in his own car, noting their performance, which included executing common procedures for a driver's license examination in Pennsylvania. He "pulled over" those drivers he would have suspected of "DUI" (driving under the influence)—if they had been on the road.

When the test was completed Dolfi said to Sutton, "I guess I spoiled your study. I only pulled over drivers 15 times."

But when the "double blind" code was revealed and Sutton looked at the figures, a chill went through him. Of the 15 incidents in which Dolfi "pulled over" drivers, three students were under the "marijuana only" condition, two were under the "alcohol only" condition, and one bad driver was under the double placebo. But all nine of the rest—100 percent—were under the alcohol plus marijuana condition.

The results of Sutton's study are striking indeed. They show that the impairments caused by pot plus alcohol are *more* than additive. They are synergistic. One drug potentiates ("fires up") the other. One plus one equals three or four on the impairment scale.

A further sobering fact is that *if* they had been on the highway, none of these drivers could have been prosecuted for DUI since they had such a low blood-alcohol-concentration level and since there is, as yet, no viable roadside test for the pot-high driver. All 15 "pulled over" for DUI by Dolfi would, therefore, have been "home free"—unless, of course, they had injured or killed themselves or others.

What Can Be Done?

IN ADDITION to horrendous personal costs in wrecked and lost lives, what are the dollar costs of the ever-mounting highway mayhem?

According to a study published in April 1981, "Only cancer outranks motor-vehicle crash deaths and injuries in dollar costs to the nation. The killing and injuring of people on the highways can be conservatively estimated as costing the United States some $20 *billion* annually in wasteful, unproductive expenditures, including $6.7 billion in medical, rehabilitation and other direct outlay."

William Haddon, Jr., M.D., president of the Insurance Institute for Highway Safety, which sponsored the 420-page report, points out, "With the appearance of this study, public policy makers must face the immensity of this tragedy in terms of its burden on the national economy—and, it is hoped, do

something about it."

At this time, most public policy makers have done very little about it. A few, however, are taking steps, at least along the alcohol/driving route.

Rep. Michael Barnes (D., Md.) and 50 other members of the House of Representatives have introduced a bill (HR 2488) calling for a mandatory sentence of at least ten days' community service, plus fines, participation in alcohol-treatment or traffic-safety programs, and mandatory license suspension for up to one year for first-time drunk-driving offenders—and for repeat offenders, the same, plus mandatory sentencing of at least ten days' imprisonment and suspension of driver's license for at least one year. An identical bill (S 671) has been introduced in the Senate by Sen. Claiborne Pell (D., R.I.).

Candy Lightner of Fair Oaks, Calif., has formed a national organization called MADD—Mothers Against Drunk Drivers. "As it stands now," says Lightner, "drunk-driving manslaughter is a socially acceptable form of homicide. That is why we are MADD!"

The organization has some 32 chapters in seven states. They work to alert the public to the serious consequences of drinking and driving, as well as to educate victims of drunk drivers and other concerned citizens as to what they can do to help resolve the problem in their state and community.

One state that has taken a giant step forward on the marijuana/driving front is Minnesota. In many states an open liquor bottle in the car of a DUI is considered *prima facie* evidence of a crime. In Minnesota, there is also an "open baggie" law. Anyone with any marijuana in the car—whether smoking it or not—is considered to have committed a crime. If involved in an accident or driving recklessly "in a serious way," he or she is treated within the criminal-justice framework. First offenders who have not endangered anyone must attend a mandatory "pot course" on the hazards of marijuana with emphasis on pot-impaired driving.

A second-possession offense usually means a fine of up to $500 and incarceration for a series of weekends in a county jail or work farm. But of the 9000 first-offenders who have gone through the four- to six-hour course, only 22 have been arrested a second time.

For more information on this award-winning "mandatory pot course," write Bruce Bomier, Director, Minnesota Institute, 2829 Verndale Ave., Anoka, Minn. 55303.

THINK OF THIS: each man, woman and child in the United States can expect to be in a car crash once every ten years. Since any of us can be imperiled at any time by the most deadly drug-related disease of all—Death on the "High"-ways—it behooves us to do what we can to halt this menace. ii:

For release Jan 12, 1983 and thereafter

The Gallup Youth Survey

Marijuana Support Fading Among Youths

By GEORGE GALLUP

PRINCETON, N.J. — Although some teen-agers continue to experiment with marijuana, the drug is apparently fading as a symbol of the teen generation, according to the results of the latest Gallup Youth Survey.

The poll also indicates that teen opposition to legalizing marijuana or decriminalizing its possession in even small amounts is solidifying.

For the second year in a row, the survey shows that 74 percent of the country's youth oppose legalizing pot. Youth opposition to decriminalizing marijuana possession rose from 57 percent in 1981 to 60 percent in 1982.

Still, about one teen-ager in three (37 percent) reports having tried marijuana at least once. Marijuana was used by 8 percent of those polled during the week previous to the interview, 5 percent during the previous month, 16 percent between one month and one year ago, and 8 percent over one year ago.

Several key signs in the surveys indicate that marijuana use soon may no longer be the "in" thing to do. Use is declining, while opposition to legal reform favoring its use is growing among students of above average academic standing. Previous high levels of use, and approval from teen-agers on the liberal, trend-setting East and West Coasts are leveling off. Most importantly, long-term trends in use, and approval by those ages 13 through 15 are steadily declining.

Gone is the past rhetoric of youths that urged the nation to "turn off, light up, turn on." In its place are comments opposing marijuana on legal, social, and health grounds.

Teen-agers took surprisingly tough stands on the decriminalization issue, arguing that the amount involved does not matter. The judgment of a 17-year-old boy from Hydro, Okla., was typical: "It doesn't matter whether it's an ounce or a ton -- it's breaking the law."

The flower children of the 1960s would have been shocked had they known that a young woman in Chicago in 1982 probably summarizes the views of many of her generation when she says: "Marijuana is harmful to the human body. It increases the crime rate because an addicted person may often have to steal to support the habit. We should strive to produce healthy and honest citizens, and marijuana is not conducive to that goal. There is no middle ground between right and wrong."

By the time they are 16 through 18, half of the nation's youth (52 pe[illegible]nt) may have tried marijuana. Their opposition to legalization and decriminalization is not as strong as that of younger teens, but those favoring tempering the laws often qualify their remarks by suggesting legalization for medical purposes, or demonstrate concern about conviction of one-time experimenters. More typical, perhaps, are the remarks of two 17-year-olds:

"Legalizing marijuana will make it as available as tobacco, and then we will have even more stoned seventh-grader in school restrooms." (Fairport, N.Y.)

"I enjoy life to the fullest and I am very happy without the help of marijuana or any other drug." (Ayden, N.C.)

Following are the questions asked:

"Have you ever tried marijuana?"

"Do you think the use of marijuana should be made legal?"

"Do you think the possession of small amounts of marijuana should be treated as a criminal offense?"

The findings reported today are based on telephone interviews with a representative national cross section of 1,013 youths, ages 13 through 18 conducted in June 1982.

LEGALIZATION, DECRIMINALIZATION OF MARIJUANA

	Oppose Legalization		Oppose Decriminalization	
	1982	1981	1982	1981
NATIONAL	74%	74%	60%	57%
Boys	72	69	60	51
Girls	75	79	59	62
Both sexes:				
13 to 15 years old	81	81	69	63
16 to 18 years old	66	68	51	50
East	72	69	53	47
Midwest	76	80	63	60
South	74	78	66	63
West	75	67	53	56
Metro areas	66	69	52	49
Suburbs	73	71	58	52
Non-metro areas	79	80	67	65
Have tried marijuana	58	54	37	30
Have not tried marijuana	83	86	73	72

The Gallup Youth Survey

Teens' Views on Marijuana Show Dramatic Change

For release Feb. 8, 1984 and thereafter

By GEORGE GALLUP

PRINCETON, N.J. — Marijuana is apparently becoming passe among America's teens.

In 1978, when the Gallup Youth Survey first began polling teens on their views about marijuana, 27 percent of the respondents admitted to having used the substance during the previous month. This figure declined steadily during subsequent surveys, and in the 1983 poll, only 8 percent made such an admission.

Similar declines were shown in other aspects of teen views on marijuana. For example, in 1978, nearly four teens in 10 admitted that they had tried marijuana at least once. Five years later, the figure has been cut in half.

Teens have been taking an increasingly harder stand against marijuana when the law is concerned. In 1978, over half — 54 percent — believed that marijuana possession should not be treated as a criminal offense. By contrast, the latest survey finds 70 percent of teens calling for criminal penalties for marijuana possession.

Even in 1978, the majority of teens (62 percent) opposed legalization of marijuana. The latest survey, however, reveals that an even greater number of teens — eight in 10 — now share this view.

Over the years it has been the younger teen-agers — 13 to 15 years old — who have been in the vanguard of opposing legalization and avoiding use of marijuana.

In the late 1970s over half of the older teens reported having tried marijuana, as compared to only about 26 percent of the younger teens. Of these younger teens, who are now the 16 to 18 year olds, only 28 percent said in 1983 that they have ever tried marijuana. If this trend continues, even further reductions in use of marijuana may be anticipated, as only 10 percent of today's young teen-agers report having ever tried it.

Only 13 percent of those residing in small towns and rural areas say they have tried marijuana, and 20 percent of

suburban teens give similar reports. Use is highest in central cities at 30 percent. There is no evidence to suggest, however, that higher use in the cities is racially oriented, since white teens are slightly more likely than non-whites to report having tried marijuana, by a margin of 20 percent to 17 percent.

Regionally, after a temporary rise in use in the traditionally conservative South and Midwest, use has dropped to 14 percent in the Midwest and to 18 percent in the South.

Highest levels of use are found in the eastern (22 percent) and western (29 percent) regions of the country.

Although far fewer teenagers appear to approve of or use marijuana themselves, their concern about the substance is unabated. As the survey recently reported, teens continue to name drug abuse as the biggest problem facing their generation. In 1983, 35 percent named it as the leading problem for people their age, compared to 27 percent who named drug abuse in 1977.

These are the questions:

"Have you ever tried marijuana?"

"About how long ago did you last try marijuana?"

"Do you think the use of marijuana should be made legal, or not?"

"Do you think the possession of small amounts of marijuana should or should not be treated as a criminal offense?"

The findings reported today are based on telephone interviews with a representative national cross section of 542 teen-agers, 13 through 18, conducted from July through September 1983.

TRENDS IN ACCEPTANCE AND USE OF MARIJUANA

	1983	1982	1981	1980	1979	1978
Ever used marijuana	19%	37%	37%	40%	41%	39%
Used in past month	8	13	13	20	27	27
Oppose legalization	80	74	74	68	65	62
Oppose decriminalization	70	60	57	54	44	40

HAVE EVER USED MARIJUANA?

	Yes	No
NATIONAL	19%	80%
Male	21	78
Female	18	82
Ages 13 to 15	10	90
Ages 16 to 18	28	71
White	20	80
Non-white	17	83
Above-average students	16	84
Averge or below	23	77
White-collar background	23	77
Blue-collar background	17	82
East	22	76
Midwest	14	86
South	18	82
West	29	71
Central cities	30	70
Suburbs	20	80
Non-metropolitan areas	13	86

(Not sure (1 percent, nationally) omitted.)

SHOULD POSSESSION OF SMALL AMOUNTS BE TREATED AS CRIMINAL OFFENSE?

	Yes	No	Not sure
NATIONAL	70%	27%	3%
Male	73	25	2
Female	67	30	3
Ages 13 to 15	77	21	2
Ages 16 to 18	62	34	4
White	72	26	2
Non-white	64	33	3
Above-average students	72	24	4
Average or below	67	31	2
White-collar background	68	29	3
Blue-collar backgrounbd	71	27	2
East	63	34	3
Midwest	73	22	5
South	73	26	1
West	66	33	1
Central cities	63	35	2
Suburbs	68	28	4
Non-metropolitan areas	75	23	2

For release September 21, 1983 and thereafter.

The Gallup Youth Survey

Drug Abuse Named as Biggest Problem Facing Teen-Agers

By GEORGE GALLUP

PRINCETON, N.J. — Teen-agers, according to the latest Gallup Youth Survey, say drug abuse is the biggest problem facing their generation. Concern about the impact of drugs has risen from 27 percent in 197", when teen-agers also named it as the biggest problem facing their generation, to 35 percent in 1983.

Since 1977, however, the nature of the problem may have changed. Gallup Youth Surveys have shown a steady decline over the years in teen-age acceptance of proposals to legalize marijuana or to decriminalize its possession in small amounts.

In 1977 teen-agers saw drugs as a part of the generation gap and a symbol of their generation's uncertainty in coping with the world around them.

In the current survey teen-agers name other kinds of problems as being important to their generation. Younger teen-agers, 13 to 15 years old, are particularly concerned about drug abuse, with 42 percent naming it as the biggest problem, in comparison to 28 percent of the older teen-agers. Young women show somewhat greater concern than young men about drug abuse by a margin of 38 percent to 31 percent.

Unemployment, named by 16 percent of the teen-agers, ranks as the No. 2 problem facing the current generation. In 1977, only 6 percent said that poor job prospects were a problem. Those who will soon be entering the job market are particularly concerned about unemployment with 22 percent of the teen-agers, 16 to 18, naming it as the leading problem.

Alcohol abuse is the third leading area of concern and is named by one teen-ager in ten (10 percent). Alcohol abuse also ranked third in 1977 when it was named by seven percent. Peer pressures (8 percent) rank fourth — and often consist of pressures felt by teen-agers from their friends to break the rules and to experiment with drugs or alcohol.

The good news about today's generation may be that teen-agers no longer feel the pressure of alienation from their parents. Only five percent now cite lack of communication or getting along with their parents as their biggest problem.

By contrast, in 1977 one teen-ager in five (20 percent) said a breakdown in parental communications and relations was the major problem facing their generation.

Today's teen-agers still face many problems, but at least now they may not have to deal with parental alienation at the same time. By the same token, citation of problems in growing up or finding one's purpose in life have declined from six percent in 1977 to only one percent in 1983.

Problems in school are cited by only one teen-ager in 20 (five percent) and an additional one percent express concern about school drop-outs.

Fear of war is named by four percent. This fear was cited by less than one percent in 1977.

Economic problems such as inflation were named by only two percent, and one percent cite the specific economic problem of financing their college education.

In 1977 smoking and job boredom were each cited by three percent of the teen-agers, but in 1983 each was mentioned by fewer than one percent of the nation's teen-agers as their generation's leading problem.

The question was asked as follows:

"What do you feel is the biggest problem facing people your age?"

The results reported are based on telephone interviews with a representative national cross-section of 508 teen-agers conducted from April to June 1983.

BIGGEST PROBLEM FACING TEEN-AGERS

	1983	1977
Drug abuse	35%	27%
Unemployment	16	6
Alcohol abuse	10	7
Peer pressures	8	5
Getting along with parents	5	20
School problems	5	3
Fear of war	4	-
Career doubts and uncertainty	3	3
Economic problems	2	3
Financing college	1	-
Problems in growing up/ Finding purpose in life	1	6
School drop-outs	1	-
Miscellaneous	4	12
Don't know	18	14
	113*	110*

* More than 100% due to multiple responses.

United States of America

Congressional Record

PROCEEDINGS AND DEBATES OF THE 93d CONGRESS, SECOND SESSION

Vol. 120 WASHINGTON, WEDNESDAY, JULY 24, 1974 No. 110

Senate

SENATE DRUG HEARINGS

Mr. GURNEY. Mr. President, on May 9, the Senate Subcommittee on Internal Security embarked on a series of hearings on the marihuana-hashish epidemic and its impact on U.S. security. It was my privilege to preside over the two lengthy hearings on May 17 and 18, at which most of the medical, scientific, and psychiatric testimony was presented.

For the purpose of these hearings, the subcommittee brought together more than a score of top-ranking medical researchers and scientists from six countries. Several of the participants in our hearings, themselves scientists of international eminence, told me afterwards that our witness list constituted the most distinguished panel of experts on marihuana and hashish—cannabis as it is known scientifically—ever assembled at a single gathering.

I am not exaggerating when I say that I consider these hearings to be among the most important ever conducted by a committee of Congress.

They provide a terrifying answer to the question: how harmful is marihuana? In my remarks today, I plan to summarize the basic scientific findings presented to the subcommittee.

The many articles that have been written about the hearings have brought a flood of letters to my office from law enforcement officers, Government officials, educators, clergymen, writers, editors, students, and anxious parents. Already, the hearings are having a measurable impact. It is my conviction that this impact will be enhanced many times over when the printed record of these hearings becomes available sometime next month.

In his opening statement, Senator EASTLAND clearly established the jurisdiction of the Internal Security Subcommittee by pointing out that the cannabis epidemic had created a new complex of security problems for our Military Establishment and that the widespread use of marihuana and hashish had been encouraged by a militant promarihuana propaganda campaign which began at the time of the Berkeley uprising and continues to this day. As pointed out by Prof. Hardin Jones, assistant director of the Donner Laboratory for Medical Research at the University of California in Berkeley, in his testimony of May 20 before the subcommittee, this prodrug propaganda campaign was initiated by members of the radical left movement whose purpose is the revolutionary overtem. In the words of Timothy Leary, guru of the leftist drug cultists:

Drugs are the most efficient way to revolution.

Or, quoting Jerry Rubin:

Pot is central to the revolution. It weakens social conditioning and helps create a whole new state of mind. The slogans of the revolution are going to be pot, freedom, license. The Bolsheviks of the revolution will be long-haired pot smokers.

There is a tendency to dismiss people like Leary and Rubin as eccentrics or kooks—but one must remember that the underground press which featured them was read by a host of young people every week.

The damage done by this leftist promarihuana propaganda was compounded by the many academicians who were disposed to be tolerant about marihuana, because it seemed to be an integral part of the student revolt against the establishment. It was further compounded by a small number of scientists and a somewhat larger number of literary psychiatrists who repeatedly gave marihuana a clean bill of health based on limited short-term observations—without waiting for the findings on the long-term consequences of marihuana. Most of these long-term findings have only started coming in within the last few years—and that is what our recent hearings were all about.

I recall that when the controversy about cigarette smoking and cancer was raging during the late 1950's, there were medical scientists of some eminence who came to the defense of cigarettes. For example, Dr. Ian McDonald, one of California's foremost cancer specialists, and chairman of the Cancer Commission of the California Medical Association, made the sweeping statement before a congressional committee, that not only did cigarette smoking bear no relationship to lung cancer, but that he would venture the assertion that "a pack of cigarettes a day will keep lung cancer away."

Dr. McDonald's assertion was completely demolished within several years by the mounting mass of scientific evidence that there is a relationship between cigarette smoking and lung cancer.

The sweeping defenses of marihuana that are to be found in a number of books written several years ago by men of some reputation, have, in the same manner, been completely outdated by the mass of recent reports from top-ranking cannabis scientists in various parts of the world.

In amplifying the purpose of our recent hearings, Senator EASTLAND said the following at the hearing of May 9:

When a conflict of opinion exists within the scientific community on a question as important as marihuana, the Congress and the American people are entitled to a fair presentation of both sides to this controversy. In fact, however, there has been widespread publicity for writings and research advocating a more tolerant attitude towards marihuana—while there has been little or no publicity for writings or research which point to serious adverse consequences. The writings are there, the research papers by eminent scientists are there, the books are there—but very few people know about them. One witness who will appear before the subcommittee will testify that in campus bookstores in the United States, Canada and England, virtually all of the literature he found on marihuana—and he found a lot of it—took a tolerant attitude towards it or even advocated legalization.

It is because of this strange imbalance in dealing with the question of marihuana that most intelligent people are under the impression that the bulk of the scientific community looks upon marihuana as a relatively innocuous drug. Part of the purpose of the forthcoming hearings will be to inquire into, and document, the extent of this imbalance. In doing this, we shall, in effect, be presenting the "other side," so that the Senate—and the American people—will have a better understanding of the problem.

The first point that has to be made is that our country is now caught up in what is probably the worst cannabis epidemic in history—even worse than the classic epidemics that had so debilitating an effect on the Egyptian people and other Mediterranean peoples. The fact that the Federal law enforcement authorities last year seized 780,000 pounds of marihuana and 54,000 pounds of hashish means that perhaps 10 times as much cannabis—or even more—got into the country and was consumed. These are fantastic quantities when you consider that a pound of marihuana can intoxicate almost 200 people, while a pound of hashish can intoxicate eight times as many.

All strata of our population are involved in the epidemic—our college students, our high school and junior high school students, grade school students, ghetto youth, blue collar workers, and even staid conservative members of the business and professional community. On this last point, I note that the subcommittee has received a letter from an investment counsel in Chicago urging a more tolerant attitude toward marihuana because, he said, the significant majority of his business and professional freinds smoke it.

The amount of marihuana and hashish being seized in this country is enormous. A few months ago there was a single seizure involving 10,000 pounds of hashish; while on June 26, United States and Mexican agents seized 42 tons—84,000 pounds—of marihuana in the vicinity of the Mexican border. Commenting on the tremendous increase in cannabis imports into the United States, Mr. Andrew C. Tartaglino, Acting Deputy Administrator of the Drug Enforcement Administration, told Senator EASTLAND in the opening hearing on May 9 that—

The traffic in, and abuse of, marihuana products has taken a more serious turn in the last two or three years than either the courts, the news media, or the public is aware. The shift is clearly toward the abuse of stronger, more dangerous forms of the drug which renders much of what has been said in the 1960's about the harmlessness of its use obsolete.

As I have pointed out, the epidemic spread of marihuana and hashish use has been made possible, and even encouraged, by widespread publicity given the statements of scientists and lay spokesmen advocting a more tolerant attitude toward marihuana, and by the near blackout—at least until very recently—on scientific writings pointing to serious adverse consequences.

For instance, books like Lester Grinspoon's "Marihuana Reconsidered" and the Consumer Union's "Licit and Illicit Drugs"—both of which took the stand that marihuana was not seriously dangerous and should be legalized—received rave reviews in the New York Times and the Washington Post and other papers, and the authors were invited to appear on numerous talk shows. But when Dr. Gabriel Nahas, a distinguished Columbia University scientist with more than 400 scientific papers to his credit, a year and a half ago published a book entitled "Marihuana—Deceptive Weed," there was no review in the Times or the Washington Post and no invitation to appear on talk shows. When half a dozen Columbia University scientists wrote individually to the New York Times to suggest that Nahas' book had merit and should be reviewed, their letters were ignored. And when 16 professors and scientists at Columbia's College of Physicians and Surgeons signed a joint letter in January of this year to the editor of the Times book review section urging that Nahas' book be reviewed, this letter was also ignored.

This one-sided publicity has succeeded in fostering the almost universal impression that marihuana is a relatively innocuous drug, and that it is so regarded by the scientific community. So widespread is this impression that just over a year ago, in March of 1973, District of Columbia Mayor Walter Washington's Advisory Committee on Narcotics Addiction, a committee consisting of some 40 prominent citizens, filed a report urging the complete legalization of marihuana on the grounds that—

No demonstrable medical evidence is available to support the assertion that marihuana use is hazardous or detrimental to the physical or mental health of the user.

Only a few weeks ago, the Subcommittee on Internal Security received a phone call from a mother in San Diego who had just been compelled to pull her son out of his senior year in high school, because he was constantly intoxicated on marihuana and hashish. She told the subcommittee that when she had taken her problem to one of the local drug counseling programs, the drug counselor told her that marihuana was really nothing to worry about "I smoke pot every day myself," she quoted the counselor as saying.

There have been warnings from some eminent scientists in the past but—perhaps because they spoke individually—their warnings were ignored. In September of 1972, for example, I presided over a hearing of the Senate Subcommittee on Internal Security at which we took the testimony of Dr. Olav J. Braenden, for many years director of the United Nations Narcotics Laboratory in Geneva. Dr. Braenden testified that, among the scientists working in the field, there was a general consensus that marihuana is dangerous. He said:

As progressively more scientific facts are discovered about cannabis, the more one becomes aware of its potential dangers.

He underscoredthe need for more research and, pointing to the example of thalidomide, he told the subcommittee that when it comes to medicine and drug policy it is better to be careful than to be careless.

But the media generally paid shamefully little attention to the testimony given by this eminent European scientist—testimony based not only on his own experience but on the experience of some 26 cooperating laboratories in various parts of the world.

The recent hearings, I am happy to report, have finally succeeded in breaking through the virtual blackout which characterized previous media attention to the adverse scientific evidence on marihuana. There were too many scientists of distinction involved for anyone to be able to dismiss their testimony as the work of scientific mavericks or crackpots. The credibility of their collective testimony was reinforced by the fact that quite a few of them, earlier in time when embarking on their research, leaned toward the tolerant attitude on marihuana that was then prevalent. Adding further reinforcement was the additional fact that this mass of independently conducted scientific investigations came up with results that frequently overlapped and mutually supported one another.

On the basis of the attention our hearings have already received, I believe that these hearings have succeeded in completely shattering the widespread belief that the scientific community looks upon marihuana as a relatively harmless drug.

All of the scientists who testified said that they considered marihuana a very dangerous drug. They further stated that this was the consensus at several recent international conferences of cannabis researchers. Several of the witnesses said that they considered cannabis the most dangerous drug on the market today.

Collectively, their testimony pointed to the following findings: First, that marihuana reduces DNA synthesis thus impeding the process of cellular reproduction; second, that, smoked even in small amounts, it results in broken and malformed chromosomes, thus opening up the possibility of abnormal births or genetic mutations; third, that chronic marihuana smoking results in a severe reduction in male hormone levels and sperm count; fourth, that marihuana alone, or combined with cigarette smoke, damages lung tissues far more rapidly than cigarette smoke alone; fifth, that there is evidence of irreversible brain damage after several years of chronic exposure; and sixth, that even single exposures to large dosages can lead to psychotic episodes, while chronic use leads to paranoid symptoms and serious and persistent deterioration in mental functioning.

I have made the point that this testimony cannot be lightly dismissed, because there are too many internationally distinguished scientists involved. The witnesses included such eminent names as: Prof. W. D. M. Paton of Oxford University, who heads up the British drug research program and who is without question one of the world's leading pharmacologists; Prof. Nils Bejerot of Sweden, perhaps the ranking international expert on the epidemiology of drug abuse; Prof. M. I. Soueif of Egypt, author of the classic study on the consequences of hashish addiction in his country; Prof. Robert Heath, chairman

Neurology at Tulane University Medical School; Prof. Morton Stenchever, chairman of the Department of Obstetrics and Gynecology at the University of Utah Medical School; Dr. Julius Axelrod, Nobel Prize winning researcher of the National Institute of Mental Health; and, at a previous hearing, Dr. Henry Brill, senior psychiatric member of the Shafer Commission and president of the American Psychopathological Association.

Let me recapitulate some of the major findings that were presented to the subcommittee by the scientists who testified.

1. TOXICITY AND ACCUMULATION IN THE BRAIN

Marihuana is a complex toxic substance, whose principal psychoactive component is THC—tetrahydrocannabinol. This substance is intensely soluble in fat, which gives it the ability to penetrate into all parts of the body, including the brain, the ovary, the testes, and the fetus. This characteristic means that it tends to persist in the human body for long periods of time after exposure, and to accumulate with repeated exposures.

One of the principal areas of accumulation is the human brain. This has been established with radioactively tagged THC.

Experiments with animals have demonstrated that the toxicity also tends to be cumulative; thus, it requires one-tenth as much marihuana to kill a mouse if given in repeated daily doses as if given in a single dose.

2. EVIDENCE OF IRREVERSIBLE BRAIN DAMAGE

Related to its toxicity and its tendency to accumulate in the brain, is a growing body of evidence that regular marihuana use for a year or 2 may result in irreversible brain damage. This also ties in with the evidence developed by a number of researchers that marihuana use reduces DNA synthesis and, in so doing, reduces the mitotic index, or the rate at which the body produces new cells to replace the cells that are constantly dying off.

Several of the psychiatrists who testified before the subcommittee said that a hypothesis of irreversible brain damage tied in with their own clinical observations that brilliant young people who went on prolonged marihuana binges were simply not able to recapture the same level of mental competence they had displayed before becoming chronic marihuana users, even after abstaining from marihuana for several years.

Dr. Robert Heath of Tulane University, working with brain wave patterns in rhesus monkeys, demonstrated that after posure there was a persisting abnormality in the brain wave patterns of the monkeys, even when the marihuana was removed.

Professor Paton referred to animal experiments which demonstrated that rats exposed to marihuana smoke had significantly smaller brains and hearts than rats not so exposed. In the light of the cumulative evidence, he felt that serious attention had to be paid to the research of Dr. Campbell and his colleagues at the Royal Bristol Hospital, demonstrating that chronic young marihuana smokers aged 18 to 26 had suffered as much brain atrophy as is normally encountered in people aged 70, 80 and 90.

3. DAMAGE TO THE CELLULAR SYSTEM

New scientific research pointing to radically new findings, is traditionally not accepted by the scientific community unless there is confirming or converging evidence from other independent researchers. What was truly remarkable about the body of evidence presented to the subcommittee was the fact that the main reports on new marihuana research converged from four or five or six directions on several central conclusions.

There was, for example, converging evidence from a substantial number of the scientists whose research pointed to damage to the cellular system, primarily through reduced DNA and RNA synthesis.

Dr. Akira Morishima of Columbia University, told the subcommittee that—

When the specimens of three marihuana smokers were compared with those of age and sex matched non-smokers, the mitotic index, or the proportion of those cells in process of cell division, was noted to be only 2.3 percent in marihuana users, compared with 5.9 percent for the controls.

Dr. Morishima also found that a large proportion of the cell nuclei in marihuana smokers contained a significantly decreased number of chromosomes—from 33 to 8—instead of the 46 chromosomes found in normal cells.

Dr. Gabriel Nahas and a team of three other Columbia University scientists found that in 51 marihuana smokers who had averaged three marihuana cigarettes a week for 4 years, the production of the immune cells—the T-lymphocytes—in the blood was 41 percent less than in nonsmokers. He made the point that the immunity response of the smokers "was similar to that of patients with cancer, or kidney grafts—treated with immunosuppressants—who were tested and who presented documented evidence of an impairment of their immunity system."

Professor Cecile Leuchtenberger, head of the Department of Cytochemistry at the Swiss Institute for Experimental Cancer Research, also found evidence of serious damage to the cellular process, involving the possibility of lung cancer and genetic damage. This is what she told the subcommittee:

Smoke of marihuana cigarettes has harmful effects on the tissues and cells of animals and of humans. The observations that marihuana cigarette smoke stimulates irregular growth in the respiratory system, that it interferes with DNA stability of cells and chromosomes, that is it disturbs the genetic equilibrium, strongly suggests that marihuana cigarette smoke is a health hazard which may not only be implicated in lung carcinogenesis, but may also have mutagenic potentialities.

Prof. Arthur M. Zimmerman, of the University of Toronto, in a statement subsequently submitted to the subcommittee, reported on recent research dealing with the effects of marihuana on a culture of unicellular organisms.

His studies, he said:

Clearly demonstrate that THC at a modest dosage reduces the growth and delays cell division of a uni-cellular protozoan, tetrahymena. These effects on cell growth are related to a depression of cell metabolism, i.e., a reduction of DNA, RNA and protein synthesis. The effects of THC are reflected in a reduction in the cell's ability to synthesize and assemble RNA, which is an essential components of the protein synthesis system. The reduced cell synthesis, in the presence of THC, may be attributable to the reduction of DNA synthesis which is known to direct cell metabolism.

Professor Paton, who has monitored some 800 cannabis research papers in connection with his duties as director of the British drug research program, told the subcommittee that there were many more papers dealing with other aspects of the damage done by marihuana to both cell metabolism and cell division. Said Professor Paton:

Numerous such effects have now been described, including actions on microsomes, on mitochondria, on neurones, fibroblasts, white blood cells, and on dividing cells, affecting metabolism, energy utilization, synthesis of cellular constituents, and immunological responses.

Professor Paton and several of the other scientists who testified expressed grave concern that grade school children exposed to marihuana—an increasing phenomenon over the past 2 or 3 years—might damage themselves in a manner which would make impossible the physical and mental maturation. The years on either side of the advent of puberty normally constitute a period of explosive physical development, when new cells are being produced more rapidly than at any other period in the lifespan. A serious impairment in DNA synthesis and cell division during this period could conceivably have catastrophic effects. To paraphrase what Professor Paton told the subcommittee, we might, a number of years hence, find ourselves saddled with a partial generation of teenagers who have begun to grow old before they have even matured.

4. DAMAGE TO THE REPRODUCTIVE SYSTEM

The subcommittee also heard impressive evidence dealing with the damage—or potential damage—of marihuana to the reproductive system. Dr. Robert C. Kolodny, who heads up the Endocrine Research Section at the Masters and Johnson Research Foundation, reported that in a group of 20 males aged 18 to 28 who had used marihuana at least 4 days a week for a minimum of 6 months, the principal male sex hormone, testosterone, was found to be approximately 44 percent lower than for the control group of men who had never used this drug. He said that the reduction in testosterone level appeared to be related to the amount of marihuana used, so that men who averaged 10 or more joints per week had significantly lower levels than men who used fewer than 10 marihuana cigarettes weekly. He also found subnormal sperm counts in six of the men tested. In a few cases involving very heavy use, the sperm count was so low that the men had to be considered clinically sterile. Finally, he reported on several instances where intermittent impotence, apparently associated with marihuana use, disappeared after the use of marihuana was discontinued.

Although making the point that the Masters and Johnson results will have to be confirmed by further research, Dr. Kolodny warned against the possible dangers in these terms:

Since at least some of the active constituents of marihuana have been shown to cross the placenta, there may be a significant risk of depressed testosterone levels within the developing fetus when this drug is used by a pregnant woman. Since normal sexual differentiation of the male depends on adequate testosterone stimulation during critical stages of development, it is possible that such development might be disrupted. Theoretically, there is also the possibility that marihuana use by the prepubertal male may delay the onset or completion of puberty or may interfere with bone growth, if a suppression of pituitary or hypothalamic function occurs. Neither of these possibilities have been investigated.

Although Dr. Kolodny said that he was not aware of any confirmatory research that had yet been conducted on the spe-

togenesis, Dr. Cecile Leuchtenberger told the committee that she has found a marked disturbance in spermatogenesis in male mice which had inhaled marihuana smoke for several months. Not only were there fewer mature sperm cells than in the controls, but many of the spermatids—the precursors of the sperm cells—carried a faulty and reduced amount of DNA. This, she said, would indicate that marihuana smoke interferes with male fertility.

Dr. Morton Stenchever, of the University of Utah, reported on research which he and two other University of Utah scientists had conducted over 1971 and 1972 on chromosome damage in chronic marihuana users. They found that the chronic users displayed roughly three times as many broken chromosomes as nonusers, and that smoking was also accompanied in some cases by abnormal chromosone formations. The much higher rate of broken chromosones held true for light users who had averaged only one marihuana joint per week.

In summarizing his studies, Dr. Stenchever said:

The study did not shed any light on the question of whether or not this chromosome breaking agent or any other chromosome breaking agent is capable of causing abnormalities of unborn children, an increased mutation rate, or an increased incidence of cancer. However, all of these possibilities are potentially there and only further studies of a more detailed nature will be able to answer these questions.

Dr. Paton, in his testimony, reported on a number of experiments with animals that pointed to a series of adverse effects from marihuana on the birth process. Said Dr. Paton:

Administration of cannabis during the vulnerable period of pregnancy has been found to cause fetal death and fetal abnormalities in three species of animals. The deformity includes lack of limbs (reduction-deformity). The factor responsible has not been identified, but does not appear to be THC, although new work is showing that THC kills a majority of fetuses and in the remainder produces an increased incidence of still births and stunting. The effect is dose-related, an important thing to establish if cause and effect are considered.

One must notice that general anesthetics as a class can also produce fetal abnormality. A provisional hypothesis for teratogenicity, therefore, is that this action of cannabis reflects its fat-solubility and relation to anesthetics, and constitutes a sort of anesthesia, for instance, of limb buds developing in the fetus at critical periods—hence the reduction-deformity. It must be stressed that all I have said refers simply to the development of the fetus. There is also the question whether the genetic material, perhaps as a result of interference with cell-division, is altered—giving life to heritable defects.

In one of the animal experiments to which Professor Paton referred, the teratogenic effects carried over for another two generations without further exposure to marihuana.

In the light of all of this converging research, I do not think it premature to warn the public that the use of marihuana during pregnancy, or its chronic use prior to pregnancy, may result in birth defects or even in genetic mutation. Although his research would have to be duplicated by other scientists before it could be considered definitive, Dr. Kolodny made the point that the evidence already on hand was strong enough to warrant a public warning. Professor Paton went one step further. In response to a question, he stated flatly that those indulging in chronic abuse ran a serious risk of giving birth to abnormal or defective offspring.

CANNABIS AND CANCER

There is a growing body of evidence that marihuana smoke has a far greater potential for bringing about cancerous alterations in tissues than does tobacco smoke. Dr. Cecile Leuchtenberger reported that her experiments have demonstrated that addition of marihuana to tobacco cigarettes produced a smoke which was much more harmful to mouse lung cultures than was the smoke from tobacco cigarettes without marihuana.

Drs. Kolansky and Moore, two Philadelphia psychiatrists, told the committee that emphysema and other disorders of the respiratory track were the general rule among chronic marihuana smokers.

Dr. Forest S. Tennant, Jr. ,who headed up the U.S. Army drug program in Europe from 1968 until 1972, told the committee that among chronic hashish smokers in the Armed Forces, bronchitis and sinusitis were very commonplace and that he had been surprised to find in young men of 20 the kind of acute bronchitis ordinarily found in cigarette smokers who had smoked heavily for many years. He said that—

The abnormalities found in the bronchial biopsies were the same that are associated with heavy cigarette smoking and cancer on the lung.

What makes these findings all the more alarming is that, because of the time limitations of an Army tour of duty, the young men examined by Dr. Tennant had been chronic cannabis abusers for very brief periods of time—several months to a year at the most.

Dr. Paton pointed out that one of the major differences between marihuana and tobacco is that the inhalation and retention of the smoke is much deeper and more efficient with marihuana than it is with cigarettes. Calling for medical studies on a wide scale to determine the effects, Professor Paton said that emphysema which is normally a disease of later life is now cropping up with increasing frequency in young people, opening up the prospect "of a new crop of respiratory cripples" early in life.

It will take some years before scientists can report in an epidemiological manner the precise impact of marihuana on cancer. Hopefully, now that we are alerted, it should not take us long to get this information as it took us to find out about the relationship between cigarette smoking and cancer.

THE PSYCHIATRIC EFFECTS OF MARIHUANA

There was also a remarkable convergence of findings between the psychiatrists who testified before the subcommittee on the spectrum of major damage resulting from chronic marihuana usage. The psychiatrists included Dr. Harvey Powelson, for 8 years—1964-72—the head of the psychiatric division of the student health service at Berkeley; Dr. Henry Brill, senior psychiatric member of the Shafer Commission and the president of the American Psychopathological Association; Dr. N. I. Soueif, of the university of Cairo, recognized as the foremost expert on hashish addiction in Egypt; Dr. Philip Zeidenberg, senior research psychiatrist at the New York Psychiatric Institute; Dr. Andrew I. Malcolm of Toronto, until recently staff psychiatrist with the Addiction Research Center of Ontario; Prof. Nils Bejerot of Stockolm, an internationally recognized expert on drug epidemiology; Dr. Conrad Schwartz of Vancouver, chairman of the drug habituation committee of the British Columbia Medical Association; and Drs. Harold Kolansky and William T. Moore, two Philadelphia psychiatrists with wide experience in marihuana-related cases.

Drs. Kolansky and Moore told the subcommittee:

Marihuana and hashish have a chemical effect that produces a brain syndrome marked by distortion of preceptions and reality. This leads to an early impairment of judgment, a diminished attention and concentration span, a slowing of time sense, difficulty with verbalization, and a loss of thought continuity characterized by a flow of speech punctuated with non sequitura which leaves the listener puzzled. In time, the chronic smoker develops a detached look as decompensation of his ego occurs.

Dr. Harvey Powelson, whose extensive exposure at Berkeley over 8 years probably made him the most experienced campus psychiatrist in the country, told the subcommittee that in 1965 and 1966, when the marihuana epidemic first broke, he had had a tolerant attitude toward it, based on the then almost universal assumption that marihuana was not seriously harmful. As a result of his experience, he said, his attitude toward marihuana was changed to the point where he now considers it the most dangerous drug we must contend with. He gave the following reasons for his change in attitude toward marihuana:

1. Its early use is beguiling. It gives the illusion of feeling good. The user is not aware of the beginning loss of mental functioning. I have never seen an exception to the observation that marihuana impairs the user's ability to judge the loss of his own mental functioning.

2. After one to three years of continuous use the ability to think has become so impaired that pathological forms of thinking begin to take over the entire thought process.

3. Chronic heavy use leads to paranoid thinking.

4. Chronic heavy use leads to deterioration in body and mental functioning which is difficult and perhaps impossible to reverse.

5. For reasons which I can't elucidate here, its use leads to a delusional system of thinking which has inherent in it the strong need to seduce and proselytise others. I have rarely seen a regular marihuana user who wasn't "pushing". As these people move into Government, the professions, and the media, it is not surprising that they continue as "pushers," thus continuously adding to the confusion that this committee is committed to ameliorate.

Dr. Philip Zeidenberg, a biologist as well as a psychiatrist, told the subcommittee that—

There is no doubt that a single dose of tetrahydrocannabinol can cause an acute psychotic reaction in mentally healthy individuals, and that marihuana use is also associated with longer-lasting and even chronic psychoses.

All the psychiatrists who testified agreed on the point that chronic marihuana abuse results in a serious loss of motivation—the so-called "amotivational syndrome." Commenting on this point, Dr. Nils Bejerot told the subcommittee that the syndrome is characterized by "a massive and chronic passivity brought about by prolonged and intensive abuse of cannabis. In these cases there is a basically altered sense of reality, and a tendency to magical thinking. Intellectual deterioration, which may be irreversible, and vagabondism commonly develop." Dr. Bejerot expressed the belief that marihuana is an addictive drug and that a strict concept of addiction does not necessarily involve the kind of agonizing withdrawal symptoms that

that—

If cannabis were legalized in the United States this would probably be an irreversible process, not only for this country and this generation, but perhaps for the whole of western civilization. As far as I can see, another result would be a breakdown of the international control system regarding narcotics and dangerous drugs.

THE DANGER OF EPIDEMIOLOGICAL SPREAD

The spreading use of marihuana throughout our society has been made possible in part by the tolerant attitude of the media and the academic community. But another major factor that accounts for the dramatic escalation of marihuana use is the ease with which it can be transported and concealed and used and the relative cheapness of the drug.

As dangerous as alcohol can be when chronically used, the bulky nature of alcohol places certain limits on its use—and these limits are further reinforced by the familiar drunken stagger and by the unmistakable smell of alcohol on an inebriate's breath.

None of these considerations apply to marihuana.

A high school student or a grade school child or a blue-collar worker or an office worker would have difficulty smuggling a bottle of alcohol into his school or his place of work without being discovered. And if he was able to conceal the bottle, he is likely to give himself away by his drunken stagger or his alcoholic breath. With marihuana, however, the concealment of several joints presents no problem ever to the unsophisticated grade schooler—nor is there any drunken stagger or telltale odor.

Cost is another factor contributing to marihuana's tremendous danger of epidemiological spread. Even though the sale of marihuana is illegal, students are able to purchase it—the rate will vary from time to time and from place to place—at approximately $1 per joint. And a joint of good marihuana is quite enough to produce intoxication. If marihuana were ever legalized, an entire pack of joints could theoretically be sold for the same price as a pack of cigarettes or less.

Because of these factors, the marihuana-hashish epidemic, which began in 1965, rapidly spread down into the high schools and junior high schools and then into the grade schools, and more recently into the ranks of the blue-collar workers and businessmen. Beyond its demonstrated ability to involve a very large number of people in a very short time, marihuana use in moderate amounts accelerates rapidly to use in large amounts and more potent forms.

up the Army drug program in Europe, found that young soldiers arriving in Germany could escalate from a few marihuana joints a week prior to arrival, to anywhere from 50 to 600 grams of hashish a month only 1 month later. I want to point out here that it takes only a quarter of a gram of hashish to produce intoxication in the average person.

Dr. Tennant also found that, because of the easy availability of hashish in West Germany, 10 percent of our servicemen rapidly reached the hashaholic stage, while a total of 10 percent consumed hashish in excess of three time a week.

These are facts we have to keep in mind when people talk about the legalization of marihuana in the United States.

Several of the scientists who testified stated that they considered marihuana far more dangerous than alcohol, in terms of its potential for damage to the individual and to society. Summarizing the important differences between alcohol and marihuana, Professor Paton said the following:

Alcohol is taken, often diluted with food, and often for taste or to quench thirst rather than for psychic effect; it is eliminated in a few hours; there is little or no evidence for carcinogenicity or teratogenicity, particularly if nutritional defect and correlation with smoking are allowed for; psychotic phenomena only occur after heavy and prolonged dosage; it occurs naturally in the body of animals, and probably also in man; it has valid medical uses for nutrition and as a vasodilator; it "escalates" only to itself; the price paid for overuse is paid in later life.

Cannabis is taken specifically, and usually by itself (sometimes with other drugs), for its psychic action; it is cumulative and persistent; its tar is carcinogenic and failure to inhale reduces its effect considerably; experimentally it is teratogenic; psychotic phenomena may occur with a single dose; it is not a natural constituent; prolonged trials in medicine from the 1840's led to its abandonment from pharmacopoeias; it can predispose to the use of other drugs; the price for its overuse is paid in adolescence.

One could say that cannabis shares the disadvantages of alcohol and tobacco, together with its own psychotogenic and biochemical actions, its chronic effects being accentuated by its cumulative tendency, giving it much earlier adverse action.

To what Professor Paton said, one has to add the much greater potential of marihuana for epidemic spread, about which I have already spoken.

MARIHUANA AND THE LAW

What I have said about the physical and psychological effects of marihuana should not be construed as meaning that I favor tougher penalties for those who smoke it occasionally and who are caught in the possession of small quantities.

In his opening statement, Senator EASTLAND made it clear that the subcommittee was opposed to sending young people to prison for the possession of small quantities of marihuana for personal use. I strongly support this position. The fact is that at the present time very few young people are sent to prison for simple possession, either under Federal law or under State law. But the State laws are uneven on this point, and Federal law still leaves much to be desired.

We have come a long way in recent years. Up until 1970, under the Marihuana Tax Act and the Harrison Act, simple possession of marihuana called for a mandatory minimum sentence of 2 years in prison and a maximum of 10 years; and it is appalling to think that many young people actually did receive sentences of this magnitude. Both of these acts were removed from the books by Public Law 93-513, which was passed in October 1970. The provisions of this law, which are now incorporated in the United States Code—title 21, sections 841-844—converted simple possession of marihuana from a felony to a misdemeanor. While there is no mandatory minimum penalty, the law does permit a maximum penalty of 1 year and/or $5,000 for first offenders. Second offenders are still considered felons, and for them the maximum penalty is 2 years in prison and/or $10,000. First offenders convicted under this law can have their convictions set aside and records cleared if probation is successfully completed.

My personal opinion is that it would make more sense to rewrite this portion of the law to make simple possession, on a first offense, a misdemeanor punishable by a fine of up to $100. Having laws which permit penalties of 1 year in prison and a $5,000 fine for a first offender caught in possession of an ounce of marihuana is actually counterproductive because by far the majority of our judges recoil from such excessive penalties—and, in the act of recoiling, they frequently are disposed to impose no penalty at all.

The same situation applies, but in an even more dramatic manner, to the laws governing the smuggling of marihuana. Smuggling of any quantity of a drug is a felony. In the case of marihuana, any person caught in the act of smuggling even 1 ounce could, theoretically, be imprisoned for 5 years. In practice, as a customs officer stationed on the Mexican border recently informed the subcommittee, hundreds of young people are caught every week trying to smuggle in small quantities of marihuana. Those caught smuggling bottles of whisky frequently have administrative fines of $5 or $10 slapped on them—in addition to suffering the pain of watching their whisky flushed down the toilet. But in the case of minor marihuana smugglers—anything under an ounce and a half or 2 ounces—our customs officers simply flush the pot down the drain and there is no penalty of any kind.

Laws that are never enforced are worse than no laws at all. In the case of the laws governing the smuggling of marihuana, I really do think that the present penalties for first offenders should be replaced by a mandatory fine similar to what I have recommended for simple possession; perhaps the second offense for both possession and smuggling should constitute a felony punishable by fine and imprisonment.

There are those who recommend the abolition of all penalties for possession of marihuana. This was the position of the Shafer Commission, and it is also the position of NORML, the most prominent of the national promarihuana lobbies. All of the scientists who testified on this point were inclined to favor some kind of penalty for simple possession. As one psychiatrist pointed out, by penalizing traffickers but letting users go scot free, we would, in effect, be sending contradictory signals to our young people—which would make it more difficult to get across the basic message that marihuana is a very dangerous drug against which society has to protect itself. Dr. Brill, who had served as senior psychiatrist on the Shafer Commission, told the subcommittee that although he had originally supported the proposal that there be no penalty of any kind for simple possession, he now felt that this position had to be reconsidered.

If those portions of our law which govern simple possession are still too stringent, the statutes covering the big smugglers and the big pushers are far too lenient—and, even worse, they are far too leniently enforced. Over and over and over again, traffickers caught with hundreds or even several thousand pounds of marihuana go scot-free, with a 6-month or 1-year suspended sentence. This portion of our law, in my opinion, has to be amended and amended promptly. The large traffickers and the pushers must not be permitted to get off so lightly. For them, I would like to see mandatory minimum sentences of several years in prison.

I have instructed my staff to study the existing legislation and ways of improv-

ing it, and after these hearings have been made public, I may want to submit some concrete proposals for the revision of existing laws.

THE NEED FOR A NATIONAL EDUCATIONAL PROGRAM

I believe that, with the evidence we have brought together at these recent hearings, we can now mount a national educational program on marihuana and hashish that will be effective in persuading young people to abstain from the drug.

No young person wants to run the danger of permanent brain damage.

No young male wants his male hormone level reduced by almost 50 percent or his sperm count reduced to zero.

No young person wants to damage their cellular processes and chromosomes, thus opening the way to abnormal offspring or genetic mutations.

Up until recently, those scientists who mistakenly believed that marihuana was a relatively benign drug have had the ear of our press and of our networks. I have the impression that we are now witnessing the beginning of a change in attitude. It is my conviction that we can reverse the massive marihuana-hashish epidemic which engulfs our country—just as we have already succeeded in reversing the relentless upward trend of the heroin epidemic and the LSD epidemic which preceded it—if our various Government agencies and our media and our schools embark on a united educational effort.

It is my hope that our recent hearings will serve to encourage and facilitate the launching of such a nationwide program.

Mr. President, I ask unanimous consent to print in the RECORD at this point the text of the testimony given to the Subcommittee on Internal Security by Prof. W. D. M. Paton of Oxford University, and the text of the testimony of Dr. Harvey Powelson, formerly of the University of California at Berkeley.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

STATEMENT BY W. D. M. PATON

I am Professor of Pharmacology in the University of Oxford. My interest in cannabis was aroused by a conference on adolescent drug-dependence in 1968. Since it subsequently appeared that there was little known about it in modern terms, and that little but sociological or psychological work was being initiated, I began pharmacological studies in 1969. Some of my earlier work has been relevant; on anaesthetics (dating back to 1944 in connection with narcosis in diving and submarine escape), and on opiates (from 1949). The statement that follows rests partly on this work, partly on my own informal contacts with drug users, and partly on a review of the recent research on the effects in animals and man (written together with Dr. R. G. Pertwee and Dr. Elisabeth Tylden) which forms three chapters in "Marihuana" ed. R. Mechoulam, Academic Press, recently published. Of this work (400-500 papers), usually only a small fraction is referred to in official reports and other writings; something like 100 further scientific papers have appeared since our final manuscript was sent in. I will try to bring out what appear to me the salient points of all this work, interpreted from my pharmacological experience, and taking for the most part the point of view of preventive medicine.

I shall use the term cannabis rather than marihuana, since the use of the latter word may suggest a sharper distinction from hashish than in fact exists (both are mixtures of cannabis resin with other material from the plant), and perhaps also begs the question whether or not it would be possible to legislate differently for them.

It is sometimes said that cigarettes and alcohol are as bad as, or worse than cannabis, yet they are "legal"—why should not cannabis be too? I shall try to compare these three later; but it is necessary to review the actions of cannabis first, particularly because very little publicity indeed has hitherto been given to many of its actions.

The first point to stress is that cannabis is a complex mixture of chemicals, of which *at least* the following are known to have a biological action: tetrahydrocannabinol (THC), propyl-THC, cannabidiol, cannabinol, and a group of water soluble materials giving alkaloidal reactions. This affects, inter alia, the suggestion that one might permit a preparation containing up to 1 or 2% THC to be marketed: this would only be feasible if THC were the only active principle. It also means that pharmacological or other studies which are limited to THC have only a restricted relevance to problems of human usage of cannabis.

FAT-SOLUBILITY

Second, and possibly the most important single fact about cannabis, apart from the fact of its psychic action, is that THC, the main psychically active principle, is intensely soluble in fat, as we pointed out in 1970. It has an octanol/water partition coefficient of about 6000 to one, over 10,000 times that of alcohol. Corresponding to this is a low solubility in water. Its fat solubility is greater than that of industrial solvents, and is exceeded only by substances like DDT. The other cannabinoids share these properties. This solubility gives it an affinity for, and ability to transverse, the fatty material in cell-membranes.

From this physical property follows: (a) the activity of cannabis by all routes of administration; (b) its cumulative effect, and the persistence of effect when drug is withdrawn; (c) its passage into all parts of the body, including brain, adrenal gland, ovary, testis, and foetus; (d) the diffuseness of its effects because it is able to reach every cell in the body; (e) the overlap in its effects with those of one important group of fat-soluble materials, the general anaesthetics such as chloroform.

Perhaps I should say a special word about the brain, where perhaps the most important fatty material in our bodies is located, though in much smaller percentage than (say) in adipose tissue. Here, too, cumulation of THC and its first two metabolites has been found.

TOXICITY

(a) Fat affinity and cumulation in the body in themselves are not necessarily harmful, even if cumulation is undesirable in principle. The fundamental test is a biological one, whether *toxicity* is cumulative. This has been found to be the case; for a mouse, it require one-tenth as much cannabis to kill if given in repeated daily doses as if given in a single dose. Similar cumulative toxicity has been found for THC an din other animals. Inferences must not be drawn, therefore, from responses to single exposures to the likely effect of repeated doses.

(b) We have found that toxicity, as judged by loss of weight and lethality, is associated with the fat-soluble fraction of cannabis; THC appears to be the main, but not the only substance responsible. It appears impracticable, therefore, to dissociate the psychic and the toxic effects.

(c) The question of lethality in man is important. Since few practitioners would know how to diagnose a death caused, or contributed to, by cannabis, and since it could not at present be proved by forensic analysis, only scanty information can be expected in any case. The case reported by Heyndrickx et al, in the light of this, is rather convincing.

Possibly more important is to point to three ways in which cannabis could indeed cause or facilitate death. (a) It produces a considerable tachycardia, and this may be associated with electrocardiographic changes and ventricular extra-systoles. It is not at all impossible that this, in unfavorable circumstance in a chronic user, could progress to ventricular fibrillation and death. (b) It causes a dilatation of peripheral blood vessels, corresponding to the hypotensive action in animals. This probably underlies the "fainting attacks" reported, causing postural hypotension. As with other hypotensive drugs, if the subject could not become horizontal, either deliberately or by falling (e.g., because he was in a chair), blood supply to the brain might fail. (c) Cannabis, chiefly because of its cannabidiol content, can potentiate and prolong the action of barbiturates (as well as other drugs used in medical treatment). This could mean that a non-lethal dose of barbiturate became lethal.

Regarding decisions about the law, one wishes that all cannabis users were aware of these possibilities.

TERATOGENICITY

Administration of cannabis during the vulnerable period of pregnancy has been found to cause fetal death and fetal abnormality in three species of animals. The deformity includes lack of limbs (reduction-deformity). The factor responsible has not been identified but does not appear to be THC although new work is showing that THC kills a majority of foetuses and in the remainder produces an increased incidence of stillbirth and stunting. The effect is dose-related, an important thing to establish if cause and effect are considered.

These results are sometimes dismissed on the grounds that any drug in sufficient dose will be teratogenic. While this is not quite accurate, there is evidence that serious disturbance of the mother can have such an effect. This gives an added importance to the criterion suggested by Robson & Sullivan which I would adopt; that a result should be taken as significant when the teratogenic dose is a small fraction of the dose lethal to the mother. This is the case with cannabis, and is in contrast to other drugs, including nicotine and aspirin.

A very important question is whether cannabis directly affects the genetic material, i.e., nucleic acid. Early reports of interference with cell-division indicated this. These have been confirmed. Dr. Nqhas' report here has clinched the issue. One must notice that general anaesthetics as a class can also produce fetal abnormality. A provisional hypothesis for teratogenicity, therefore, is that this action of cannabis reflects its fat solubility and relation to anaesthetics, and constitutes a sort of anaesthesia, for instance, of limbbuds developing in the fetus at critical periods—hence the reduction-deformity. It must be stressed that all I have said refers simply to the development of the fetus. There is also the question whether the genetic material, perhaps as a result of interference with cell-division is *altered*—giving life to heritable defect.

CARCINOGENICITY AND LUNG PATHOLOGY

Like the tar from cigarettes, reefer tar is carcinogenic when painted on mouse skin. Cannabis smoke produces changes in cultures of lung tissue, including loss of contact-inhibition between cells. THC in low concentration resembles the carcinogen methyl-cholanthrene in generating malignancy in rat embryo cells incubated with a murine leucemia virus, but is slower in action. The irritant effect of the smoke on the respiratory tract is well-known to users, and is associated with bronchial pathology.

These effects are becoming very important. Originally, one was uncertain about their significance, and what the balance would be between the facts that more cigarettes than reefers will normally be smoked in any one day, whereas inhalation and retention of the smoke is much deeper and more efficient with the reefer. But now lung damage, in the form of emphysema, is being repeatedly recorded. Emphysema is normally a disease of much later life; but now the quite unexpected (to me, at least) prospect of a new crop of respiratory cripples early in life, is opening up. Originally, I thought the cancer risk was the main problem; cannabis has never been used extensively in a society with an expectation of life long enough to show a carcinogenic effect in man, until recent years. In effect, a new experiment in cancer epidemiology started 5-10 years ago. To this I would now add respiratory pathology generally; and because, just as with bronchitis and cigarette-smoking, it shows itself early, I believe medical studies on this, on a wide scale, are now urgent.

CELLULAR EFFECTS OF CANNABIS AND THC

Numerous such effects have now been described, including actions on microsomes,

on mitochondria, on neurones, fibroblasts, white blood cells, and on dividing cells, affecting metabolism, energy utilization, synthesis of cellular constituents, and immunological responses. To this we must add the recent observation that chronic administration of THC to young rats leads to a reduction in brain and heart weight. Such effects are to be expected, rather than a matter of surprise, from a drug with a high affinity for lipid in a cell-membrane. It should be noted that the local concentrations of THC or its metabolite in the cell-membranes will be far higher than those in the blood; theoretically, one would expect a concentration factor of several hundred; experimentally, concentrations of 600-fold with brain and 380 with red cell membranes.

An important aspect of these effects is what they imply for *maturation* of an individual; we are concerned not only with the effect of a drug on a mature adult, but also what it does to school-children, still developing in many ways. The interference by cannabis with both cell-metabolism and cell-division is very worrying.

THE RELEVANCE OF ANIMAL WORK

It may be argued that actions in animals are of little relevance to man. However, the pharmaceutical industry, and the bodies which supervise it, do not operate on this principle. Difficulties chiefly arise when an inordinately high safety factor has been stipulated. But there is also misunderstanding over rates of dosage. It is to be expected that small animals will require proportionately larger doses (per unit body weight) than man, just as they need proportionately more food, because of their faster metabolic rate. One can estimate a house dose on this basis as ten times that of man, taking this together with the rates of human use reported in WHO Special Report No. 478 (up to or exceeding 10 mg/Kg THC per day) it appears that almost all the experimental work reported in animals is relevant to man. The conclusion is reinforced by the NIMH-sponsored toxicity studies on monkeys. A daily dose of 50 mg/Kg orally of THC killed 1 of 6 monkeys; damage to the pancreas, ulcerative colitis, and myeloid hyperplasia were noted. This result, at doses only 10 times some rates of human consumption makes no allowance for contribution by other toxic materials in cannabis.

TOLERANCE

I mentioned high rates of human use. People have expressed incredulity at this, yet it is well-established. I would like to deposit a table of consumption in a group of English students (subject to the approval of the authors)—perhaps the best evidence yet, since the composition of the actual reefers being used was measured; uses ranged up to 109 mg THC per day, around 20 times the ordinary dose for a "high." By itself it shows the degree of tolerance that is achieved, with the resulting need to take high doses for an effect. By the same token, toxicity and accumulation *at these levels* must be considered.

DIFFICULTIES IN THE EXTENSION OF ANALYTIC WORK TO MAN

Although there are a number of human studies on the effects of single small doses, there is still no systematic modern study of the bodily effects of continued cannabis administration. One reason is that while limited dosage is acceptable for volunteers, dosage over a prolonged period at the higher rates of use is not. It would be possible to study users themselves, if a method of urine and blood analysis existed capable of verifying their actual consumption. This, however, is at present not practicable; as a result only the subject's testimony as to his rate of consumption of a substance of unknown composition is available, and this is hardly sufficient. Once methods of analysis of body fluids are adequate, the position should improve considerably.

PSYCHOLOGICAL EFFECTS IN MAN

It may be useful to bring a number of findings together:

(a) The neurophysiological observations, in man and animals, of hypersynchronous discharges from the deeper parts of the brain (not the cortex) as a result of giving cannabis or THC. These discharges have been termed "epileptiform."

(b) The observation by Campbell and his colleagues of an apparent loss of brain substance in the deeper regions, in a group of young chronic cannabis users. This needs further exploration, and it is likely that it is now possible with new non-invasive radiographic techniques.

(c) The cumulative property of THC, and its affinity for fat and hence for cell-membranes.

(d) The numerous psychiatric reports of gradual psychological change, which becomes less and less readily reversible, the longer the cannabis exposure. (This delayed recovery may well have been known in the Moslem community in medieval times; see Schwarz, J. Amer. Med. Ass. 223, p. 105, 1973.)

(e) The fact that most of the elements of this psychological change (paranoid feelings; change in mood, cognitive impairment, loss of memory, loss of concentration, a motivational state, introspective preoccupation with internal imagery, hallucination) can be reversibly produced by single doses of THC or cannabis in normal volunteers.

(f) The ability of cannabis to affect cellular metabolism and cell division.

These findings converge to a remarkable extent in supporting a prima facie view that repeated cannabis use acts on the deeper parts of the brain (where sensory information is processed and mood controlled); that this is at first reversible, but becomes more persistent as cumulation occurs, and that later irreversible changes occur with loss of brain substance, due either to interference with the capacity of brain cells to synthesise their requirements or to interference with cell division.

It is quite likely that all this would be accepted and acted upon, by the cannabis user, were it not for the visual imagery, and (here cannabis is very like nitrous oxide) the euphoria and the conviction of insight and cosmic significance.

COMPARISON WITH ALCOHOL AND TOBACCO

One may summarize this as follows: (1) alcohol is taken, often diluted with food, and often for taste or to quench thirst rather than for psychic effect; it is eliminated in a few hours; there is little or no evidence for carcinogenicity or teratogenicity particularly if nutritional defect and correlation with smoking are allowed for; psychotic phenomena only occur after heavy and prolonged dosage; it occurs naturally in the body of animals, and probably also in man; it has valid medical uses for nutrition and as a vasodilator; it "escalates" only to itself; the price paid for overuse is paid in later life.

(2) tobacco is taken partly for relaxation, partly to assist work, and there is some evidence of an improvement in mental function; the nicotine in it is rapidly metabolised and non-cumulative; the evidence suggests that it is the tar that is carcinogenic, and the risk can be reduced if inhalation is avoided, nicotine being absorbed through the mouth; it is not teratogenic; no psychotic phenomena occur; it is not a natural constituent; it has no medical use; it does not "escalate"; the price paid for overuse is paid in later life—reducing life expectancy from about 75 years to 70 years.

(3) cannabis is taken specifically, and usually by itself (sometimes with other drugs), for its psychic action; it is cumulative and persistent; its tar is carcinogenic and failure to inhale reduces its effect considerably; experimentally it is teratogenic; psychotic phenomena may occur with a single dose; it is not a natural constituent; prolonged trial in medicine from the 1840's led to its abandonment from pharmacopoeias; it can predispose to the use of other drugs; the price for its overuse is paid in adolescence.

One could say that cannabis shares the disadvantages of alcohol and tobacco, together with its own psychotogenic and biochemical actions, its chronic effects being accentuated by its cumulative tendency, giving it much earlier adverse action.

THE QUESTION OF LEGALIZATION

(a) Viewing cannabis as if it were a new pharmaceutical product, I could not agree to approval being given to the introduction, for general and repeated consumption, of a substance shown experimentally to be carcinogenic, teratogenic, and cumulative, and able to interfere with a variety of cellular processes, until it had been shown, quite unequivocally, that, for some reason, humans were exempt from the actions concerned.

(b) There is no rational dividing line between cannabis and other drugs such as LSD or some opiates. A high dose of cannabis overlaps with a low dose of LSD (in its hallucinatory and psychotomimetic action) and with the less active opiates (in respect of analgesia, euphoria, and "day-dreaming" state). In fact, since cannabis is unique among these drugs for its cumulative action, I would put it lower in the list for legalization than some others. One needs to ask, what other drugs can produce prolonged cognitive impairment in a young person?

(c) In a similar way, it does not seem feasible to me to propose legalization of cannabis of limited potency. There is in fact an analogy with alcohol here: we have marihuana (1–2% THC), and weak beers (3% alcohol); hashish (say 8% THC) wines (8–15% alcohol); red oil, on the illicit market (up to 30–40% THC), hard liquor (35–60% alcohol). To suggest one could legislate for 1 or 2% THC is like suggestion one could legislate for weak beer. It would remove none of the present objections to cannabis legislation, while yet allowing the drug to be used.

(d) The significance of progression from cannabis to other drugs has been much discussed, and my own (1968) paper severely, but fallaciously, criticised. (The fallacy was exposed, inter alia, by R. C. Pillard in the New England Journal of Medicine (197) 285, 416–7). The final report of the Le Dain Commission concluded as regards LSD that "the use of cannabis definitely facilitates the use of LSD or predisposes a certain number of individuals to experiment with it." The argument they give (including the relationship between the nature of the two drugs and the finding that over 95% of those who had used LSD had used cannabis) were the same as those I had advanced in respect of heroin and cannabis. My argument also cited the remarkable temporal coincidence between cannabis convictions and heroin addiction in the U.K.; evidence of this sort has not been provided in respect of LSD.

Today, with the further evolution of drug use, it seems clear that, depending on availability of drug, various patterns of progression are possible, in which one would include cannabis to opiates, cannabis to LSD, and cannabis (low potency) to cannabis (high potency). Simple reasons can now be seen; that cannabis increases suggestibility and impairs memory; and that it overlaps in pharmacological actions with opiates (euphoria, analgesia, daydreaming state) and with LSD (visual imagery). It is therefore well-suited to providing a halfway house, converting one major step directly to use of opiates, LSD or hashish, into two smaller and more easily accepted steps.

The growth of poly-drug use may now have made it impossible to define patterns of progression accurately. But one may hazard the opinion that no programme to get rid of opiate addiction or LSD use will really succeed until cannabis use declines. Cannabis can serve as well to cause relapse, as to initiate drug use.

(d) The last point concerns the age of those involved. If someone dies of alcoholism or lung cancer at the age of 50 onwards, that is a loss; but the individual has had 30 years of adult life, and the chance to make his own contribution. But the adolescent, dead or socially inactivated by 20 years old, has never even had a start on mature life; the loss, both for him or her, and for society, is incalculably greater.

THE DIFFICULTY OF FRAMING A POLICY

My own opinion is that it would be disastrous to make it legal even to possess cannabis. If one talks, not to lawyers or sociologists but to schoolchildren and students, at least in the U.K., it is not at all clear that a majority would even wish for this to happen. But nevertheless, there would be for the foreseeable future a large number of people breaking the law, just as they do over speed limits, customs-regulations, and income-tax

return. It seems that one would have to treat a cannabis-possession similarly, accepting that the majority of offences would not be recognized, yet maintaining the legal position about it. Viewing it in this way might, indeed, help to deglamourize it.

But something more is needed. It would be quite right for the debate to sharpen our criticism of alcohol and tobacco. Further, for a significant number of youngsters, who have found consolation in cannabis, there is the question, "If not pot, what?" It is for the framing of an answer to this question that new creative thinking is urgently needed.

STATEMENT BY DAVID HARVEY POWELSON, M.D.

In 1965, I was chief of the Department of Psychiatry in the Student Health Service at the University of California in Berkeley. It was the first year of the student riots. It was also the first year that hallucinogens were becoming widely used and I, as the person responsible for mental health on that campus, was vigorously involved in the debate about psilocibin, LSD and mescaline.[1]

In the spring of that year a reporter for the Daily Californian, the student newspaper, asked for my opinion on marihuana. At that time I lacked any direct experience as a physician with marihuana users. The medical literature was sparse, but in general seemed to be saying that there was no proof of long term harmful effects from marihuana. I summarized this for the reporter and said there was no proof of harm and that it probably should be legalized and controlled. In general, this view met with approval from most of the students and most of my professional colleagues.

In 1965, the use of marihuana spread throughout the Berkeley Campus. Simultaneously its use was spreading to all the colleges and universities across the country. From the campus communities it spread at an accelerating rate through the surrounding communities. By now its use is subject to no age, social or geographic barriers.

My place of observation was unique. I was there at the beginning and in my work I was actively involved with students not only as a psychiatrist but as a teacher, and as a participant in a four year research project studying maturation and growth, in college students. In addition, I was routinely meeting with deans and administrators who were dealing with the drug problem and the students who were in academic and/or disciplinary difficulties as a consequence of the use of marihuana and its derivatives.

Most importantly, I was in daily contact with the constant flow of students through the student health service and the psychiatric clinic and hospital.

During the period I am speaking of (from 1966-72) the clinic saw approximately 2000-3000 students a year as outpatients and about 150-200 students a year who were mentally ill enough to be hospitalized. Naturally, I didn't see all these students but the people who ministered to them were all under my supervision. I personally interviewed about 200 students a year; many were seen for a single hour, others were seen as intensively as 2-3 times a week for varying lengths of time up to and including 5 years. A legitimate question which is often raised is that of sampling: i.e., "how typical are these patients when compared with the general population of U. C. students?"

(I am convinced that aside from the obvious fact that they have come to the clinic, they vary in no significant way from the population of the University of California, Berkeley, as a whole. For a systematic study of this point, c. f., Katz, Joseph, Ph. D., *Growth and Constraint in College Students*, Institute for the Study of Human Problems, Stanford University, Stanford, California, 1967, pp. 510-68. This study was done at Berkeley on the same group of students I am discussing. Comparisons were made on all sorts of variables: psychological; psychiatric; and so on. No significant difference between the clinic and general population were found.)

During this time (from 1965-72) an increasing number of patients were using marihuana. My best guess, based on surveys and impressions, is that more than 90% used it at one time or another in college. More than 50% used it "socially" (approx. 1-2 times per week) and about 10% were heavy users (at least 1 time daily).

My first important shift in thinking occurred as a result of observations made during psychotherapy with a young man, S., who was bright enough to be getting his law degree and Ph. D. simultaneously and competent enough to be learning to fly and deal in real estate at the same time. As we proceeded in our work together, I came to know S.'s way of thinking; i.e., *how* he thought. Most of us do this without thinking about it. All of us come to know to some degree the way our friends and colleagues think. In therapy, the opportunity to hear someone think out loud about a problem important to him maximizes the opportunity to come to know how he uses or manipulates logic, remember clearly or not at all, thinks or does not exercise good judgment about his own thinking, and whether or not he is able to know his own feelings. We had made enough headway so that S. had begun to be able to observe and understand his own thinking. Periodically, we had hours (I was seeing him twice weekly) when his thinking became mushy. If I tried to follow him, my head began to spin. When I protested that he'd become impossible to listen to, he'd argue that his own experience was that he was thinking more clearly, more insightfully, than ever. On one such occasion, he mentioned that he'd been to a party two nights before where he'd had particularly good "grass." In Berkeley, 1968, that was not a particularly memorable remark, but we thought there might be some connection with his thinking. This same series of events recurred often enough so that I finally was able at times to post dict that S. had had some "mind-expanding drug," usually marihuana.

S., because he was a good observer, helped show me another aspect of the thinking disorder I'm describing. Central to his difficulties was a paranoid stance toward the world. By this, I mean a style of thinking characterized by a constant suspicion that one is being controlled; e.g., by the establishment, the system, etc.; and simultaneously a constant unwitting search for people and situations which will do just that; e.g., drugs, demagogues. If this manner of thinking is carried further, it blends into the condition usually called paranoia. Here the subject is controlled by voices, God, or whatever, and at the same time, he is very often "against his will" being controlled by a state hospital or jail. S. was forever talking about his search for something or someone he could trust.

When he had used marihuana, his thinking became more paranoid, i.e., he became more mistrustful of me, for instance, and at the same time, he became more wily so that he talked glibly, using cliches, theories, and "insights," all to avoid noticing concretely and immediately whatever he was really doing and feeling in his relationship with me, as well as his relationships outside. In short, the pathological part of his thinking was exaggerated in two ways: (1) he was more suspicious, etc. and (2) he was more adept at fooling himself about what he was up to, while simultaneously maintaining how "aware," "in touch," and "loving" he was.

S. continued in therapy but also continued to use marihuana and hashish. (Hashish is merely another more concentrated source of the active principals contained in marihuana). Toward the end of his therapy, I had decided that so long as he muddled his thinking in this way, there was no use continuing. He, however, suffered a fatal accident (as a result of an error in judgment) before his therapy actually terminated.

As I was becoming familiar with these effects of marihuana on S., I gradually learned to pick up signs when they were more subtle. I came to observe the same changes in others, i.e., that marihuana exacerbated the pathological aspects of their thinking.

These observations were made before controlled studies began to give clues as to the nature of the mental changes taking place which could explain these phenomena. The committee has undoubtedly heard or will hear of the studies by the Hollister[2] group at Stanford on what they call "temporal disintegration" which seem to be changes secondary to the loss of immediate memory and the loss of an accurate time sense. There are also corroborating studies from Utah[3], clinical studies by Kolansky and Moore[4], x-ray studies by Campbell in England[5], and a study on students by Schwarz[6] at the Uni- Judgment, memory and logic are necessary.

As this happens, he depends more and more on pathological patterns of thinking. Ultimately all heavy users (i.e., daily users) develop a paranoid way of thinking.

versity of British Columbia to cite a few of the most relevant studies made on subjects comparable to the ones I'm describing.

Following the above described observations, I saw the same picture more and more frequently. The essence of the pattern is that with small amounts of marihuana (approximately three joints of street grade), memory and time sense are interfered with. With regular usage the active principals cause more and more distorted thinking. The user's field of interest gets narrower and narrower as he focuses his attention on immediate sensation. At the same time his dependence and tolerance is growing. As he uses more of the drug, his ability to think sequentially diminishes. Without his awareness, he becomes less and less adequate in areas where

After I had become aware of the generality of this sequence another reporter from the *Daily Californian* interviewed me to see if my opinions had changed in the interim. In the course of that interview, I realized in a concrete and explicit way that they had. The headline read, "Psychiatrist says pot smokers can't think straight." This time the response of the community and colleagues was not so approving. It is an interesting fact that questioning the claims or marihuana users leads to much more anger, vilification, and character assassination than does the opposite stance.

In subsequent years in Berkeley, both at the clinic and in my private practice, I have observed the long term effects of cannabis. Originally, my observation was that students who had "dropped out" into the "drug scene" and were attempting to return, were finding it difficult if not impossible. A frequent story is that the young person has become aware that the life he's been leading is unsatisfactory and unproductive. He then stops drugs for six months or so and reenters the university. When he returns to school, however, he finds that he can't think clearly and that, in ways he finds difficult to describe, he can't use his mind in the way he did before. Such people also seem to be aware that they've lost their will someplace, that to do something, to do anything, requires a gigantic effort—in short, they have become will-less—what we call anomic. An irony here is that they have now achieved the freedom they sought. They need an external director. They are ripe for a demagogue.

The changes in the capacity to think in some subjects are long lasting if not permanent. One of my original (1967) subjects was a member of the junior faculty. He "dropped out" and used hashish exclusively for 18 months in daily doses. When he realized that it was interfering with his physical coordination he stopped all drugs. Two years subsequent to this he returned to the University. He found that he could not do mathematics at a level which he had found possible before. Three and one-half years later, his conviction was that the change was permanent. My own observations of him and other such gifted people

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[1] M. Friedman and D. H. Powelson, "Drugs on Campus," *The Nation*, January 31, 1966.

[2] Hollister, T. F., *Science*, 2 Apr. 71.
Clark, J., Hughes, R., and Nakashima, E., *Arch. Gen. Psychiat.*, Vol. 23, 1970.

[4] Kolansky, H. and Moore, W. T., *JAMA*, Apr. 19, 1971.

[5] Campbell, H. H. G., Evans, M. Thomson, J. L. G., *et al.*, *Lancet*, 2:1219-1224, 1971.

[6] Schwarz, Conrad J., *Consul Psychiat. Ass. Jour.*, Vol. 14, 1969.

have led me to the same conclusion, i.e., that the damage may be permanent.

My stance toward marihuana has shifted to the extent that I now think it is the most dangerous drug we must contend with for the following reasons:

1. Its early use is beguiling. It gives the illusion of feeling good. The user is not aware of the beginning loss of mental functioning. I have never seen an exception to the observation that marihuana impairs the user's ability to judge the loss of his own mental functioning.

2. After one to three years of continuous use the ability to think has become so impaired that pathological forms of thinking begin to take over the entire thought processes.

3. Chronic heavy use leads to paranoid thinking.

4. Chronic heavy use leads to deterioration in body and mental functioning which is difficult and perhaps impossible to reverse.

5. For reasons which I can't elucidate here, its use leads to a delusional system of thinking which has inherent in it the strong need to seduce and proselytize others. I have rarely seen a regular marihuana user who wasn't actively "pushing."

As these people move into government, the professions, and the media, it is not surprising that they continue as "pushers," thus continuously adding to the confusion that this committee is committed to ameliorate.

Mr. GURNEY. Mr. President, I also ask unanimous consent to print in the RECORD a number of editorials that have resulted from our hearings; an article that appeared in U.S. News & World Report; a column by syndicated Columnist John Chamberlain; and a major article which appeared in the Washington Post. Although this last article did not mention our hearings, the author systematically interviewd many of the scientists who testified before the subcommittee, and there is no doubt that the inspiration for the article was provided by our hearings.

There being no objection, the material was ordered to be printed in the RECORD as follows:

SO, YOU THINK POT IS HARMLESS

(By John Chamberlain)

John Stacks, the news editor of Time's Washington Bureau and the co-ordinator of its Watergate coverage, remarks, in an article in the Overseas Press Club of America's "Dateline 1974," that "the success of the Watergate investigators in ferreting out hard facts from reluctant sources was a tonic to Washington journalism."

What Stacks says is true about one type of Washington journalism, the "get the guy" type. I applaud "getting the guy" if he is really a crook or a liar, but when the press corps of a great capital is encouraged to think of journalism primarily as an adventure in the cultivation of stool pigeons it is not a tonic generally. The trouble with Washington journalism at the moment is that whole areas of government activity get very little coverage. All the hounds are on one scent.

Information that might have a great effect on a nation's life is left to smoulder. For example, how many stories have you seen devoted to the remarkable marijuana investigation conducted by the US Senate Subcommittee on Internal Security?

The glib cliche about marijuana, endorsed, by the way, by some conservatives as well as by the liberals, is that marijuana, or pot, when smoked in moderation, is really no worse than a few glasses of beer. This view has been periodically challenged, mainly in Europe, but there has been little published on the subject that has had a cumulative impact.

The Senate Subcommittee on Internal Security, the Eastland Committee, has really dug into the question of marijuana toxicity, rolling up a vast body of testimony that should be the subject of debate on campuses from Berkeley, Calif., to Cambridge, Mass. Since I am not a doctor, and my paraphrases of medical testimony might not be trusted by the marijuana cultists, let me quote a few authorities directly.

Item, from a statement by Drs. Harold Kolansky and William T. Moore on the results of a clinical study: "In the last nine years we have seen hundreds of patients who have suffered psychiatric and neurological symptoms . . . and have described the findings in almost 60 of these patients. . . . Many of those we examined . . . appeared older than their chronological age. . . . The incapability of completing thoughts during verbal communication that resulted in confused responses seemed to imply some form of organicity either of an acute biochemical nature . . . or, one might hypothesize, structural encephalopathy." (I looked up "encephalopathy" in the dictionary: It means sickness or derangement of the brain.)

Item, from Dr. W. D. Paton, professor of pharmacology at Oxford: "Administration of cannabis during the vulnerable period of pregnancy has been found to cause fetal death and fetal abnormality in three species of animals. The deformity includes lack of limbs (reduction-deformity) . . . a very important question is whether cannabis directly affects the genetic material, i.e., nucleic acid . . . Dr. Nahas' report here has clinched the issue . . . lung damage, in the form of emphysema, is being repeatedly recorded. Emphysema is normally a disease of later life; but now the quite unexpected (to me, at least) prospect of a new crop of respiratory cripples early in life is opening up . . ."

(So you can give birth to congenital cripples and die in your 40s or 50s of wrecked lungs. Go right ahead.)

Item, from Dr. Robert G. Heath's description of his studies of the effect of cannabis on rhesus monkeys: When the monkeys were regularly exposed to these drugs . . . persistent — perhaps irreversible — alterations developed in brain function at specific deep sites where recording activity has been correlated with emotional responsivity, alerting and sensory perception.

(Warning: you may be more like a rhesus monkey than you think.)

Item, from Dr. Robert C. Kolodny, endocrine research director, Reproductive Biology Research Foundation, St. Louis, Missouri: "Cannabis resin . . . injected into pregnant rats . . . had a variety of effects. These effects included syndactyly (webbing between the digits) . . . encephalocele (hernia of the brain). . . . Phycomelia (abnormal development of the limbs, with the 'seal-flipper' appearance also encountered with thalidomide . . . complete absence of limbs . . .").

(Well, they're only rats. The trouble is that rats react to drugs in a very human way.)

I could go on quoting from other medicos. If you want more evidence, write to the Eastland subcommittee, care of the U.S. Senate.

RESEARCH REPORT—THE PERILS OF "POT" START SHOWING UP

At a time when demands are growing for reduced penalties on use of marijuana and hashish, new evidence is coming out linking the drugs to both mental and physical disorders.

As described in official testimony, research by U.S. and foreign experts indicates that marijuana and hashish may cause birth defects, psychological addiction, and sexual and other troubles.

The experts presented their findings before the Senate Internal Security Subcommittee investigating what it terms a "cannabis epidemic" in the U.S.

Cannabis is the dried parts of the hemp plant from which marijuana—called "pot"—and hashish—or "hash"—are derived. Hashish is more potent than marijuana, but is used less.

THE RISK FACTOR

The researchers emphasized that much more work is needed to substantiate their findings, but they agreed that the claim that cannabis is an innocuous drug is ill-founded.

Over and over in the testimony, the scientists made clear their studies suggest that marijuana and hashish users run considerable risks. For example:

Marijuana and hashish use among children may result in a generation of young "old people," according to Prof. W. D. M. Paton, professor of pharmacology at Oxford. He said cannabis interferes with cell division and cell metabolism and may affect adolescent development.

Professor Paton reported that studies done in England found a shrinkage, due to reduced cell production, of the brains of cannabis users. This shrinkage, he said, is comparable to that found in people late in life.

HARDER TO GET "HIGH"

Regular users of cannabis develop a tolerance for the drug, thus requiring greater levels of its use to get a "high," Professor Paton said. "This increased intake may be a serious factor," he added, since preliminary tests on animals indicate that as the drug is used regularly, less of it is needed to produce a dangerous toxic effect.

Dr. Gabriel Nahas, physiologist and pharmacologist at Columbia University, said his tests indicate that cannabis [illegible] body's immunity system.

Results showed that marijuana smokers had a 40 per cent lower production of white blood cells than nonsmokers of marijuana. He said he suspects that this lowered response lessens the body's ability to combat disease.

Findings by another researcher raise suspicions that cancer, genetic mutation and birth defects may result.

According to Dr. Akira Morishima, of the department of pediatrics, Columbia University, such problems may occur in marijuana smokers because of a substantial decrease in the number of chromosomes—specks of matter that carry hereditary characteristics—in each cell. This shortage often leaves the "pot" smoker with less than the normal complement of 46 chromosomes.

STERILITY PERIL

The potential danger of sterility in men was also raised.

Testosterone, the principal male sex hormone, has been found to be at a significantly lower level of production in marijuana smokers than in those who do not use marijuana, Dr. Robert C. Kolodny, research director at the Reproductive Biology Research Foundation in St. Louis, testified further: "It is apparent that there is a potential risk in cannabis use during pregnancy."

Dr. Kolodny indicated that birth defects and miscarriages were possible side effects of usage.

Despite what many believe, long-time users of the drugs can get "hooked" by developing "psychic dependence" on them, one authority testified.

Dr. M. I. Soueif, of the department of psychology at Cairo University in Egypt, said withdrawal after long-term use results in the individual's becoming "quarrelsome, anxious, impulsive, easily upset and difficult to please."

Although the findings unveiled in the hearings are relatively new, they are already being reviewed by drug-study organizations. E. M. Steindler, secretary of the Committee on Drug Abuse of the American Medical Association, told "U.S. News & World Report":

"It [cannabis] is definitely not an innocuous drug. We have looked at those reports on marijuana and hashish. . . . These are interesting studies, and we feel that more needs to be done along those lines."

Dr. Robert L. DuPont, director of the National Institute on Drug Abuse, takes an even stronger position on the findings.

"These are valid concerns, and all of these problems are being investigated further," he said. "I have no doubt that we will find problems with the use of marijuana and hashish.

"Some of the pressing concerns that I have with cannabis usage have to do with possible chromosome breakage, respiratory-system damage, reduction of testosterone levels and the hampering of the body's immunity system. . . . It's going to take some time to confirm these things and to build a firm base around these findings."

A SENSE OF URGENCY

Exactly what to do about the medical problems remains a matter of debate. Subcommittee officials contend that increased

use of "pot" and "hash," as indicated in the chart at left, adds urgency to this issue.

One thing that seems certain: How to handle this increased usage in the light of recent medical findings is going to present the nation with big problems for years to come.

All told: An estimated 835,366 pounds of marijuana and hashish—a more potent form of marijuana—were seized last year.

Officials say that roughly 8 pounds of drugs reach users for every 1 pound seized. Thus, close to 7 million pounds of marijuana and hashish were consumed in the U.S. last year—enough "pot" and "hash" to make more than 2 billion cigarettes.

Source: Senate Internal Security Subcommittee; U.S. Drug Enforcement Administration.

[From the Indianapolis (Ind.) News, June 10, 1974]

Pot Perils

Advocates of legalizing marijuana have long contended that it's non-addictive and no more harmful to one's health than cigarettes or liquor.

They've got away with this because, until quite recently, no one had done any research on how marijuana affects the body and the mind.

The spreading use of marijuana has caused scientists to look into the question, and the results are now coming in.

Dr. David H. Powelson, former director of the student health services psychiatry department at the University of California at Berkeley, who once called marijuana harmless and urged its legalization, recently told a Senate Internal Security subcommittee that seven years of research have convinced him that he was completely wrong.

He has found evidence, he said, that chronic use of marijuana permanently impairs the ability to "think clearly."

Appearing before the same Senate subcommittee, Dr. Nils Bejerot, acting professor in social medicine at the Karolinska Institute in Stockholm, reported on the work of a team of German scientists.

"A serious complication of cannabis (marijuana) abuse is chronic psychosis," he said. He added that acute marijuana intoxication can cause an altered sense of reality and "a tendency to magical thinking."

At the same time, Dr. William T. Moore declared that he and a colleague, Dr. Harold Kolansky, had conducted studies which showed that "marijuana smoking carries enormous risks of physical and mental damage."

In the current New England Journal of Medicine, a group of researchers at the Reproductive Biology Research Foundation in St. Louis tell of a study they made on the relation between marijuana and sexuality.

Pot, they found, may cause temporary sterility—possibly even impotence—in males. In a prepubescent boy, it may severely disturb the normal course of puberty.

A pregnant woman carrying a male fetus might seriously inhibit his sexual development by smoking grass.

... recent survey by the Phoenix Newspapers, Inc., showed that 57 per cent of students in one Phoenix high school believe that marijuana usage by teen agers is increasing.

If the students are right—and they should know—it's about time the schools told them of these recent findings.

[From the Memphis (Tenn.) Commercial Appeal, May 10, 1974]

The Most Dangerous Drug

For several years, a movement to legalize marijuana has been gaining ground in the United States. Both the Consumers Union and the National Commission on Marijuana and Drug Abuse have urged softer laws. But Congress has reacted cautiously—and with good reason. Research reports on the long-term effects of marijuana use have not been conclusive. The possibility of the drug's becoming a more dangerous and pervasive problem than alcohol has been a strong barrier to its legal acceptance.

Now a new and most persuasive opponent has come forth. In 1965, Dr. David H. Powelson, a California psychiatrist, publicly endorsed the open sale of marijuana. He has changed his mind, he told the Senate Internal Security subcommittee recently. After seven years of research with students at University of California at Berkeley, where he was director of the student health service psychiatry department, Powelson said he is convinced marijuana is "the most dangerous drug" sold illegally in this country.

His studies indicate that chronic use for from one to three years permanently impairs the ability to think clearly. He described this pattern of deterioration: Loss of ability to think sequentially, partial loss of memory, inability to reason and, finally, a paranoid mental state in which the user thinks he's being persecuted.

Marijuana supporters, of course, will cite other studies that don't reach the same conclusion. Authorities can be quoted that pot smoking is relatively harmless fun. People who like marijuana, it is often argued, should have as much right to indulge their habit as those who like alcohol.

But what is "harmless" about the cases like Powelson documents. They exist. Even if some people are more severely affected than others, there is apparently no way to determine who is likely to be mentally and physically impaired and who isn't. Why should the government, through legalization, encourage anyone to take such a chance? And just because alcohol [illegible] doesn't mean that society should approve the abuse of another drug. To the contrary, the alcohol problem should make society determined that additional abuses must be prevented as much as possible. Making marijuana easier to get and smoke would be a major cop-out.

Powelson's change of heart and mind underlines the danger.

[From the Boston Evening Globe, May 16, 1974]

Press, TV Accused of Pro-Pot Bias

Washington.—The United States is in the midst of a marijuana and hashish epidemic, but the media have reacted by blacking out news of evidence that might be adverse to legalizing the drugs, Sen. Edward J. Gurney said today.

In a statement prepared for delivery to a Senate Panel's headings on the dangers of marijuana, the Florida Republican said that based in the amount of seizures, it is estimated that Americans consumed 7.82 million pounds of marijuane and 265,000 pounds of hashish last year.

"These are truly staggering figures—figures which suggest that the United States may today be caught up in the worst cannabis epidemic in history," Gurney said.

Gurney said he is convinced from evidence he has seen that "our media have observed a near total blackout on news or scientific evidence that might be considered inimical to the cause of legalizing marijuana."

In testimony last Thursday before the Senate internal security subcommittee Dr. Henry Brill, one of the senior psychiatric members of the President's Commission on Marijuana and Drug Abuse, said the media seized on passages in the report which suggested a tolerant attitude—"and ignored a number of strongly worded passages warning against the dangers of marijuana," Gurney said.

He added that many television talk programs and news panel shows "have run literally scores of discussions on marijuana, featuring pro-marijuana authors . . ." But he said letters which accompanied a book critical of marijuana and written by "a highly distinguished scientist" were not acknowledged by the television stations.

The senator added that "The New York Times book review section had favorably reviewed some half-dozen books on marijuana . . . the same book was ignored. When six or seven Columbia University scientists who thought the book had merit wrote individually to The New York Times urging that the book be reviewed; their letters were not accorded the courtesy of a routine acknowledgement."

[From the St. Paul (Minn.) Pioneer Press, May 21, 1974]

Result of Smoking Grass Compared to Radiation

Washington.—Marijuana smoking can have the same result as radiation poisoning and some of the blame for leading people to think it's harmless lies with the federal government, a Senate panel was told Monday.

Appearing before the Senate Internal Security subcommittee, Dr. Hardin Jones, a professor of medical physics and physiology at the University of California, said the United States is in a marijuana epidemic caused by a propaganda campaign "involving a small but influential number of academic propagandists, the media, the entertainment industry and the new left."

Jones said efforts to use marijuana at a moderate level or to legalize it "have prevented sensible acts to reduce use of this drug . . . we find no 'safe' level of the use of cannabis."

Smoking marijuana affects the body the same way radiation does, Jones said.

"As an expert in human radiation effect . . . chromosome damage . . . even in thos who use cannabis 'moderately,' is roughl the same type and degree of damage as i persons surviving atom bombing with a heavy level of radiation exposure (approxi mately 150 roentgens). The implications ar the same," he said.

As for misformation about marijuana Jones said the federal government, throug its agencies, "has been one of the worst offenders in spreading the impression that cannabis is a harmless drug.

"Reports of the Department of Health, Education and Welfare are inadequate scientifically, do not touch accurately on the principal matters needing clarification and, in many instances, are likely to lead the public to believe that science has proven marijuana harmless," Jones said.

Jones also said the networks have given so much time to people like LSD advocate Timothy Leary that if the equal time principle were invoked, "some hundreds of hours, at least, to scientists" who have found marijuana harmful would be required for broadcast.

"In placing their facilities at the disposal of this one-sided propaganda campaign, they may have succeeded in brainwashing themselves, in addition to the brainwashing of a substantial portion of the American public.

"At least one cannot escape the impression that many people in the media now seem to have convinced themselves that marijuana is perfectly safe and that the public interest demands its legalization," Jones told the panel.

[From the Jacksonville (Fla.) Times-Union, May 23, 1974]

Marijuana and the Atom Bomb

The horrors of possible genetic mutations resulting from atomic fallout have been widely accepted and rightly so.

At the same time, marijuana has been pushed in many quarters as a pleasant relaxant that should be legalized.

What do the two things have in common?

Plenty, if the testimony of Dr. Hardin B. Jones, a professor of medical physics and physiology at the University of California, is to be believed.

Dr. Jones told the Internal Security subcommittee of the United States Senate:

"As an expert in human radiation effects . . . chromosome damage . . . even in those who use cannabis (marijuana) 'moderately,' is roughly the same type and degree of damage as in persons surviving atom bombing with a heavy level of radiation exposure—approximately 150 roentgens. The implications are the same."

We don't know whether Dr. Jones is a conservative or a liberal in his political views and it should not matter. Scientific research, not ideologies, should be the determinant as to whether marijuana is harmless or dangerous.

Unfortunately, much of the debate so far has been ideological rather than scientific.

That is a ridiculous situation but ridiculous situations are commonplace these days.

The push to make marijuana socially and legally acceptable has come from some very high places and some of these voices have told many people, mostly young people, exactly what they want to hear.

This is true to the extent that evidence indicates that enough marijuana or hashish for five billion "joints" entered the United States last year.

What kind of responsibility do the marijuana "pushers"—both those who sell and those who advocate its use—bear if Dr. Jones or Dr. Olav Braenden, director of the United Nations Narcotic Laboratory in Geneva, Switzerland, are right?

Dr. Braenden's report indicates from research that "cannabis accumulates in the brains and gonads in the manner of DDT, that it produces fetal deformities in animals, in addition to abortions and stillbirths in a manner that resembles the damage done by thalidomide. . . .

"That it results in breakage and serious damage to human chromosomes, and that it seriously reduces the body's ability to produce DNA, a critical component of all cells, including reproductive cells. . . ."

If this is true, what will be the effect of marijuana on a generation yet unborn? How can it be justified on any moral, social or ethical basis?

Public outcry, based on much thinner evidence than is piling up against marijuana has relegated several substances or products into a virtual leper colony status.

Unless the scientific testimony can be refuted by believable scientific research, the case against marijuana calls for a verdict of guilty and a change in the climate of thought that regards it as merely a pleasant relaxant.

Such a change in attitude is needed to counter what Dr. Jones describes as efforts to use marijuana at a moderate level or legalize it. These efforts, he says, "have prevented sensible acts to reduce use of this drug . . . we find no 'safe' level use of cannabis."

His testimony won't make a popular man on campus and it is more believable for this reason. He is risking the treatment accorded others who have debunked some of the modern myths that have become dogma in some academic circles.

What a frightening prospect to have all the radiation monitoring equipment and worldwide efforts to curb atomic fallout only to have the same effects from the already epidemic use of marijuana.

[From the Florida Times-Union, Jan. 9, 1974]

"Pot" Accumulates—Like DDT

A striking reminder that the public fight against drug abuse is a continuous battle comes in a report recently released by the U.S. Senate Internal Security subcommittee.

In the words of Chairman James Eastland, D-Miss., "We have been concentrating on the heroin epidemic for the past two years, and there seems to be some solid evidence of progress. . . .

"But it is impossible to escape the conclusion that, while our attention was focused on heroin, there has been a runaway escalation of the use of other drugs, primarily marijuana and hashish (milder and stronger forms, respectively, of cannabis). . . ."

For perspective, it should first be recognized that throwing the nation's major attention against heroin, instead of milder drugs, was no oversight, but a soundly reasoned decision. Heroin kills; heroin destroys lives; the need of heroin addicts to support a $150 or so a day "habit" has driven many—daily—into the streets to steal and rob and kill.

It would, indeed, have been a distorted sense of priorities which did not attack the greatest evil first.

And there is evidence that the massive effort is paying off: as early as a year ago Dr. Robert Dupont, chief of the Washington Narcotics Treatment Administration, termed heroin addiction "more than cut in half" in the nation's capital; Dr. Jerome Jaffe, head of the Federal Special Action Office for Drug Abuse Prevention, told a congressional subcommittee that heroin addiction was "leveling off;" and John Ingersoll, director of the U.S. Bureau of Narcotics and Dangerous Drugs stated that a "turning point" seemed to have been reached in the battle against "H."

But, without any thought to diminishing the efforts which have curtailed the greater drug abuse, there indeed seems urgency to turn to the lesser, though still pronounced, evil.

Evidence indicates that more than five billion marijuana and hashish "joints" (or 20 for every man, woman and child in the country) entered the U.S. last year.

"The pandemic use of marijuana and hashish has been brought about, in part," Eastland said, "by a militant pro-marijuana propaganda campaign conducted by many New Left organizations and by the entire underground press . . .

"And it has been stimulated perhaps in major degree, by a number of highly publicized reports, written by persons (many entirely well meaning) who did not have available to them, at the time, most of the highly significant scientific research conducted over the past few years that puts a danger sign on cannabis use. . . ."

Among the most recent reports cited by Sen. Eastland was one by Dr. Olav Braenden, director of the United Nations Narcotics Laboratory in Geneva, which "points strongly to the conclusion that marijuana may be even more dangerous than had previously been believed. . . .

"(Researchers have found that) cannabis accumulates in the brains and gonads in the manner of DDT, that it produces fetal deformities in animals, in addition to abortions and stillbirths, in a manner that resembles the damage done by thalidomide . . .

"That it results in breakage and serious damage to human chromosomes, and that it seriously reduces the body's ability to produce DNA, a critical component of all cells including the reproductive cells. . . ."

The subcommittee's report should receive priority attention from the full Congress, and, even more important, from the public, when the new session begins Jan. 21.

The prevalent impression that "pot" is harmless—"people smoke it every day and it doesn't bother them"—is increasingly being contradicted by many studies (of which the UN report is only the latest) which show persuasive evidence of serious, long-range effects. It is a matter too important to remain clouded, confused.

[From the Washington Post, June 24, 1974]

New Findings Show Harm—Views on Marijuana Shifting

(By Robert Joffee)

Los Angeles.—Marijuana may turn out to be more harmful than many scientists had previously thought.

Only a year ago most researchers studying the drug thought it probably was relatively harmless—at least when compared with alcohol and other commonly abused drugs.

Since then, however, new findings have raised the possibility that long-term use of "grass" might be linked to damaged chromosomes, lower production of sex hormones, and greater vulnerability to diseases.

The new findings are preliminary and as yet unsubstantiated, but they have appeared in prestigious scientific and medical journals—publications which previously paid scant attention to the perils of "pot."

The findings are significant politically as well. At a time when respectable voices are calling for laws making personal possession and use of the drug a misdemeanor or no crime at all instead of a felony, the findings already have provided ammunition for those who oppose such moves.

Last week the Illinois Bar Association passed a resolution urging repeal of all laws banning personal possession and use. IBA President William P. Sutter explained, "We aren't endorsing its use; we are recognizing that the majority of medical opinion is that casual use is not harmful . . ." Critics can now argue that medical opinion may be changing, though many researchers still favor removal of criminal penalties for marijuana use despite the new findings.

About $4 million in federal grants and contracts insure that the research will continue during the coming fiscal year.

"I couldn't give a hoot about social policy," says Dr. Morton A. Stenchever, an obstetrician at the University of Utah Medical Center in Salt Lake City, "but I'll have to say there are quite a few problems with marijuana."

He compared chromosome damage in a group of 49 marijuana users to that in a control group of nonusers. His findings, published last January in the Journal of Obstetrics and Gynecology, were that users averaged 3.4 chromosome breaks per 100 white blood cells while non-users averaged only 1.2 breaks.

Dr. Stenchever explained that increased chromosome breaks might raise the likelihood of eventually getting cancer or becoming the parent of a child with birth defects.

Dr. Akira Morishima of the Department of Pediatrics, Columbia University, N.Y., has reported findings similar to Stenchever's.

The Stenchever and Morishima findings led the National Institute on Drug Abuse (NIDA)—the federal agency which bankrolls much of the nation's marijuana research—to fund several projects in which other researchers will attempt to reproduce the Stenchever and Morishima research processes to determine whether similar findings can be obtained.

Controversy over the findings persists. "Genetic damage is an extremely nebulous field," said Dr. Lissy Jarvik, a pediatrician-psychiatrist doing genetic research at the University of California Medical Center in Los Angeles.

"I don't see how Stenchever's work can be replicated," she said. "He's had some 50 students on a number of drugs, and marijuana was simply the only drug they had in common." She contended that Dr. Morishima's work would be easier to recreate.

Dr. Jarvik pointed out that "the body has repair mechanisms. Depending on the type of break, chromosome damage may have no effect. Also, cells in which breaks have occurred may die; and then again, there's no harm."

The danger, she said, is that cells with abnormal chromosomes might multiply and produce identical, also damaged, cells. "Then, in 10 or 15 years, such cells might be responsible for causing cancer."

"Whenever I present data I'm immediately attacked by the other side," Dr. Stenchever retorts. "Maybe she didn't read my article." He insists the increase in breakage alone is enough to cause serious concern, and he notes that half the drug users he studied took no other drugs except alcohol.

The Utah researcher noted that, when it comes to chromosome breaks, other widely used drugs are probably as dangerous as marijuana. "I think the same rate of breakage probably occurred in Valium," he said. Valium, a tranquilizer, is one of the most common prescription drugs in the country.

Few researchers are more cautious about the implications of their findings than Dr. Robert C. Kolodny, director of the infertility program at the Reproductive Biology Research Foundation in St. Louis. He has been checking levels of testosterone, the principal male sex hormone, in marijuana.

Dr. Kolodny, 30, has been working with Dr. William Masters, famed for his pioneer research in human sexual response, and Drs. Robert Kolodner and Gelson Toro.

In a recent article in the New England Journal of Medicine, Dr. Kolodny told how his group compared 20 men who used marijuana four days a week for a minimum of 6 months with 20 men who were non-users; testosterone levels in the users averaged a striking 40 per cent lower than in non-users.

Dr. Kolodny speculated—and he stresses the word "speculate"—that "there may be a decrease in fertility as a result of chronic, intensive marijuana use"; that heavy users may encounter potency problems; that pregnant female users "may disrupt sexual differentiation in male fetuses" during the second, third and fourth month of pregnancy; and that preteenage boys who smoke marijuana "may somehow disrupt completion of puberty," impairing normal sexual development.

He noted that his study has not yet been replicated. "So what you're dealing with is speculation based on preliminary findings."

Other researchers praised Dr. Kolodny's objectivity; and some said they believe his work is more important—and more frightening—than even he thinks it is.

Others noted that the exact function of testosterone is not completely understood, and thus the effect of the shortage is unpredictable.

Dr. Kolodny is beginning to receive testosterone samples from other laboratories throughout the country.

Even fellow researchers who respect his work call Dr. Gabriel Nahas a "crusader" against decriminalization. Others call him "a fanatic." Almost all agree, however, that efforts to duplicate the Columbia University pharmacologist's research should be made as soon as possible.

Dr. Nahas, who announced his findings at a highly publicized press conference two weeks before they appeared in Science magazine last February, studied white blood cell production in 51 marijuana users. All the subjects reported having smoked at least three times a week for four or more years.

He found that cell production in users averaged 40 per cent less than in a control group of nonusers.

Since white blood cell production is considered vital to the body's ability to fight disease, he speculates that marijuana use impairs the immunity system.

The Nahas findings are viewed as significant because they show exactly the same low level of production in white cells taken from users that he found in cells taken from nonusers and subsequently exposed to a marijuana agent in the test tube.

"We'd all be surprised if Nahas' findings are replicated," said UCLA's Dr. Jarvik. "I've spoken with a number of people in immunology and they're all extremely skeptical."

Sources at NIDA, which is funding attempts to replicate the immunity-system research, said two papers prepared for publication this summer confirm the Nahas findings while a third, using different techniques fails to do so.

Drs. Stenchever, Morishima, Kolodny and Nahas all learned about the drug-use background of their test subjects through interviews with them. Critics argue, with some justification, that interview data are not sufficiently reliable.

Ideally, say the critics, a test subject should be confined to"a closely supervised hospital ward where researchers can make certain that he is under the influence only of the drug being tested—and feeling only the effect of a prescribed dose.

Until recently, prescribed doses of marijuana were unavailable—and street doses varied enormously from cigarette to cigarette.

But now, because pharmacologists have isolated tetrahydrocannabinol (THC), the main intoxicating agent in marijuana, researchers can choose from a pot smoker's pipe dream of doses. The government provides low-, medium-, and high-dose cigarettes—and even cigarettes with no dose at all. In addition, researchers can obtain THC pills, so that marijuana can be administered orally.

Long-term controlled-dosage research is expensive, because hospital beds and supervising nurses are expensive. But such research is said to be especially rewarding for detailed study of the psychological aspects of the drug.

A bearded young man named Craig sat smoking a "joint" in a dimly lit room filled with stereophonic rock and roll. A nurse sat beside him to make sure he smoked the whole cigarette.

The smoking room was on the third floor of UCLA's Neuro-Psychiatric Institute (NPI)—and except for occasional supervised excursions to movie theaters and restaurants, Craig had been on that floor for almost 90 days, receiving $25 a day for his work.

That work involves submitting to, and participating in, a daily battery of tests: being wired to brain-wave machines, pressing buttons when images appear on a screen, answering questions in almost incessant interviews, and taking written tests not unlike school admission exams.

Would Craig continue smoking after his release? "Yeah, probably," he said, "but if anyone tries to take my pulse or ask how high I am, I'll kick 'em."

Dr. Sidney Cohen, a psychiatrist, and Phyllis Lessin, an anthropologist, supervise the NPI study.

"We've pretty well disproved the old notion that marijuana produces a 'reverse tolerance,'" Lessin said. Reverse tolerance is a technical term for the old pot smoker's notion that it takes less and less marijuana for an experienced user to get high. Dr. Cohen said NPI researches have found that the drug produces real tolerance, that one becomes inured to the effects of the same dosage if it is received day after day.

Lessin said NPI researchers also had disproved other myths about the drug. "We're learning that in many ways, it's a drug just like other drugs," she said.

Dr. Cohen provided two examples: "A lot of cops believe grass dilates the pupils of the eye; when, in fact, if a suspect's pupils are dilated, it's probably because of anxiety. As for the notion that pot excites sexual desire, well, we found that—like alcohol—it's sexually debilitating."

NPI researchers were not seeking the therapeutic applications for marijuana, Dr. Cohen said, but two therapeutic possibilities were discovered there because specialists from the enormous UCLA medical center next door also ran tests on NPI subjects.

For example, eye specialists discovered that marijuana reduces pressure within the eyeball, and thus might prove to be effective in treating glaucoma—a condition of excess pressure inside the eye which often afflicts older people. "The standard drugs for treating glaucoma don't help some people, but maybe THC will," Dr. Cohen explained.

Lessin said she occasionally goes over to the Jules Stein Eye Institute to help administer tests to middleaged glaucoma victims. "In other words, I have to teach them how to smoke pot," she said.

And while marijuana fails to dilate pupils, it does dilate bronchial tubes. "Asthma victims suffer from constricted bronchials," Dr. Cohen said. "It's possible THC will prove to be a useful supplemental drug for them, too." He said doctors at the medical center already are working to develop an experimental THC aerosol can.

Of course, the problem with THC as a therapeutic drug is its side effect—the high. Dr. Cohen said pharmacologists are hoping to isolate other cannabinoids which are not intoxicating because they may prove to have the same therapeutic effect.

At the Langley-Porter Institute (LPI) in San Francisco, another University of California facility, one strong joint a day is considered an extremely low dose. Test subjects there receive the equivalent of a pack of such cigarettes each day.

"Of course we administer it orally," said Dr. Reese Jones, a psychiatrist who has conducted marijuana research at LPI for more than five years. "Our subjects would be hoarse if they had to take that dose in smoke."

Dr. Jones' subjects—like their counterparts in Los Angeles—are confined to a psychiatric ward where they undergo constant testing. "We've been learning that little doses do one thing and big doses another," Dr. Jones said, stressing that big doses have much stronger physical effects.

"Our subjects are pretty sedated when they first get started on the high dose," he said. "Then, after six or seven days, what looks like a tolerance develops, and they become more alert and active, both psychologically and physically. You could say they return to normal.

"After two or three weeks, we substitute a placebo (a pill with no TCH); and suddenly the subjects become irritable and restless, and have trouble sleeping. They are probably suffering the symptoms of withdrawal from a physical dependence."

At such high doses, not presently available to ordinary users in this country, Dr. Jones is convinced THC closely resembles "sedatives—hypnotic-type drugs like alcohol and phenobarbital."

The "good news," he said, is that test subjects tolerate high doses "extremely well." But the "bad news" is the similarity between THC and "drugs that cause serious problems for some people in our society who use them."

Unless U.S. customs agents can prevent increasing importation of hashish and hashish oil (concentrated marijuana derivatives), Dr. Jones said he fears this country may face an epidemic of heavy-dosage use not unlike that in his laboratory.

About 40 miles south of San Francisco, at the Veterans Administration Research Hospital in Palo Alto, Dr. Leo Hollister, a pharmacologist, began some of the first U.S. government-sponsored marijuana research on human test subjects almost seven years ago.

Today he and psychiatrist Jared Tinklenberg are comparing the effects of single, normal doses of marijuana with similar doses of other drugs.

"The social aspects of this drug have been described ad nauseum," Dr. Hollister remarked. "When it comes to short-term effects, I don't think we've learned anything really significant in the last couple years.

"Now the issue that remains to be settled is how the drug achieves its effects."

The two men observed that marijuana seems to disrupt the transfer of information in the brain from short-term to long-term memory so that information acquired while under its influence is forgotten more easily than if it were acquired sober.

"It's possible that marijuana allows the brain to be flooded with irrelevant information," Dr. Tinklenberg speculates. "The subject then fails to distinguish between important and unimportant facts.

"Now we're trying to see if marijuana shares this quality with alcohol."

Feb.6,1984

Editor
Ketchikan Daily News
501 Dock Street
Ketchikan, Alaska 99901

Dear Sir,

It was with great interest and agreement that I read the editorial from the Anchorage Times printed in your Feb.3rd edition entitled "An embarrasment". His conclusion bears repeating: "Elimination of hallucinatory drugs in the world is a commendable goal for mankind. Americans everywhere, including Alaska, can be proud of the role of their government in that effort. The revelation that this state is undermining the program is shameful and should shock its people."

It is Alaska's liberal marijuana laws that are responsible for his editorial and I couldn't agree more. Having grown up on the East Coast in an affluent community in New Jersey I had lots going for me materially. My experience with drug abuse started with occasional sips of someone's drink or sneaking a beer out of our fridge to drink in the woods behind our house. This started at about age 10 but by age 12 it wasn't occasional anymore and I found that I liked the feeling alcohol induced better than anything else.

My abuse of alcohol brought me into conflict with my family and the law. I spent 5 years, from 13 to 18 years of age, on probation and my junior and senior year of high school spending an hour per week at a court appointed psychiatrist's office. After graduation I was drafted into the Army the same year, and in 1966 that meant going to Viet Nam. My problem with alcohol was so bad by that time that I never even completed basic training and 11 months after my induction I was back on the streets with an Undesirable Discharge and a criminal record as an adult.

1968 was the year I remember for my introduction to drugs. When I returned home, the whole atmosphere of partying had shifted from alcohol to marijuana, hash, LSD, various other prescription medicines for ups or downs, and in a few cases herion. I tried most of these and marijuana became a regular part of my life at that time. I am fully aware of the effect that drugs had on my life and also of that these were all considered illegal there and then. There is no way that anyone can say that marijuana should be thought of as being in the same category as alcohol.

In the early seventies marijuana research was in its infancy and testing was limited to low-grade pot under short-term exposure. Many of my friends served in Viet Nam and quite a few came back with drug habits which led them to self-destructive experiments in their search for greater highs. Today there are strains of marijuana that contain more than 10 times the stupifying agent delta-9-THC than that used in those first tests. If that is what the kids today are starting with it's sure to be that much more damaging for those who fall victim to dependence on it. Just because there are some who seem to be able to handle occasional "recreational" use, don't kid yourself about the fact that there are inescapable physical and psychological effects.

Research has shown marijuana to be a complex substance with definite harmful effects, especially for adolescents. It's time that the people and their representatives take a close look at the facts and then get in step with the rest of the world.

Sincerely Yours,

Bob Konet

Bob Konet, P.O. Box 1021, Ward Cove, Alaska 99928

KETCHIKAN DAILY NEWS FEB 1, 1984 KETCHIKAN ALASKA 99901

From Other Editors

An embarrassment

The effect of Alaska's liberal marijuana laws is reverberating outside the state's borders and, indeed, around the world, according to a U.S. State Department specialist in international narcotics traffic.

During a visit here, the assistant secretary of state said the permissive attitude in Alaska is impeding federal programs in foreign countries. Other nations ask whether the United States seeks to protect its own growers from foreign competition.

It is understandable that American diplomats squirm when it is asked. Perhaps Alaskans should squirm, too.

Nine years ago, marijuana made headlines in Alaska. A group of young, liberal legislators in 1975 pushed through a bill to decriminalize marijuana because, they said, it reflected the times, it was the "thing to do." The only controls left were civil penalties that had the force of a feather in a windstorm.

The Supreme Court went even further when it ruled that possession of marijuana in a person's home for personal use was legal.

The court said, "The state cannot impose its own notions of morality, propriety or fashion on individuals when the public has no legitimate interest in the affairs of those individuals."

We said then—and we haven't changed our mind—that the state does, indeed, have an interest in what goes on in the privacy of a home, such as child abuse and health standards and anything else that has an effect upon society at large.

Last week's visitor said the Alaska tolerance of marijunana is undermining worldwide efforts to stop illicit drug production in other countries. The Alaska law allows an individual to raise up to four ounces for personal use. The U.S. is trying to convince growers in other nations to spray their fields with chemicals to kill the plant.

Elimination of hallucinatory drugs in the world is a commendable goal for mankind. Americans everywhere, including Alaska, can be proud of the role of their government in that effort.

The revelation that this state is undermining the program is shameful and should shock its people.

—Anchorage Times

FISCAL NOTE

Revision Date: April 19, 1984

REQUEST
Bill/Resolution No.: HB 698
Title: "An Act relating to marijuana..."
Sponsor: House Judiciary
Requestor:
Date of Request:

FISCAL DETAIL
Agency Affected: Department of Law
Program Category Affected: Administration of Justice
BRU, Program or Subprogram(s) Affected: Prosecution

EXPENDITURES/REVENUES: (Thousands of Dollars)

	FY 84	FY 85	FY 86	FY 87	FY 88	FY 89
OPERATING						
100 PERSONAL SERVICES		142.9	151.5	160.6	170.2	180.4
200 TRAVEL		6.5	6.9	7.3	7.7	8.2
300 CONTRACTUAL		61.5	63.8	41.2	43.7	46.3
400 SUPPLIES		17.4	12.1	12.8	13.6	14.4
500 EQUIPMENT		7.5				
600 LAND & STRUCTURES						
700 GRANTS, CLAIMS						
800 MISCELLANEOUS						
TOTAL OPERATING		235.8	234.3	221.9	235.2	249.3
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND		235.8	234.3	221.9	235.2	249.3
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS:

FULL-TIME		1	1	1	1	1
PART-TIME		4	4	4	4	4
TEMPORARY						

SOURCE OF FUNDS TO OFFSET FISCAL IMPACT OF BILL:

ANALYSIS: Attach a separate page for analysis

Prepared By: Richard I. Pegues/Director — Phone: 465-3672
Division: Administrative Services — Date: 4/19/84

Approved by Commissioner: Richard I. Pegues for Norman C. Gorsuch — Date: 4/19/84
Agency: Department of Law

Distribution (by Agency preparing fiscal note):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

12/1/83

Fiscal Note
Analysis
HB 698

April 19, 1984

HB 698 is a blanket provision which would make possession or use of less than one-half pound of marijuana by anyone a class B misdemeanor. Some of the conduct which this bill would cover (such as use or display of any amount in a public place, possession of any amount while operating a motor vehicle, or possession of more than four ounces of marijuana anywhere) is a class B misdemeanor under existing law. See AS 11.71.060. Some of the conduct which this bill would make a crime (such as delivery of less than one-half ounce or possession of less than one ounce in public) is classified under current law as a "violation", punishable by a fine. See AS 11.71.070. The penalties under current law for other conduct such as delivery of one-half ounce or more, delivery to a minor, or possession of any amount on school grounds would not be altered. Penalties under existing law for these offenses range from A misdemeanor to B felony level. See AS 11.71.030, .040, and .050.

The passage of HB 698 would have fiscal impact on the Department of Law in three general areas: (1) the cost of defending the new law against constitutional challenge; (2) the cost of processing the resulting additional criminal cases; and (3) the cost of educating the public about the new law. These three areas are discussed separately below.

1. Defending the New Law

In 1975 the Alaska Supreme Court in the case of Ravin v. State, 537 P.2d 497 (Alaska 1975), ruled that under Art. I, Sec. 22 of the Alaska Constitution the state could not prohibit possession of marijuana by adults in their own homes for personal use. The court held that the state had not demonstrated the existence of a legitimate state interest which was strong enough to justify the regulation of this conduct.

Since passage of HB 698 would make it a crime for an adult to possess any amount of marijuana anywhere, including in his or her own home, the constitutionality of the new law is certain to be challenged. An appellate court will have to decide whether the state has proved that there is a "compelling state interest" in the prohibition of the use of marijuana which is sufficient to outweigh an individual's right to privacy under the state constitution. It is extremely important, therefore, that the legislature's consideration of this bill include extensive public hearings, debate on the social policy merits of the proposal, and the collection of the results of the most recent scientific, medical, and pharmacological studies regarding the physical, emotional, and social effects of marijuana usage.

In addition to the necessary legislative hearings, evidentiary hearings at the trial court level can be expected when a challenge to the new law is filed. Challenges to the new law will most likely arise in the context of a defendant's pretrial motion to dismiss a criminal prosecution. When responding to such a defense motion, the prosecutor would, in essence, have to convince a court to reverse the ruling in the Ravin case. In order to demonstrate that the result in Ravin is no longer correct, the prosecutor would have to present convincing, scientifically accurate, evidence that the effects of marijuana usage are so injurious to a person's mental and physical health as to justify the legislative decision to totally prohibit use of marijuana by anyone at any time (as opposed to use by minors or use by a person who is operating a motor vehicle--both of which are already prohibited under current law).

The presentation of this convincing evidence will require the prosecution to present expert testimony from authorities who have conducted recent research in this area. Out-of-state witnesses in medical and scientific fields charge a fee for their services. These fees will vary from individual to indivudal, but are expected to average at least $100 per hour. This would include services for consultation, witness preparation and actual testimony. Costs will be incurred for expert witness

transportation, food and lodging, and other incidental expenses. Additionally, there will be some costs for preparation of exhibits and written reports. To the extent possible, the Department of Law would attempt to present written testimony in situations where it is not feasible to fly a person to Alaska to testify in person. We estimate that a minimum of six expert witnesses will be required to attempt to successfully defend the new law at the trial court level.

Hearings at the trial court level can reasonably be expected to take several days. A substantial commitment of attorney time will be required for scientific and legal research in preparation for the hearings, actual court time, legal briefing, and the preparation of proposed findings of fact. Since prosecutions under the new law will occur statewide, defense challenges may be raised at the same time in different parts of the state. The extensive hearings described above may have to be held in more than one judicial district in the state.

Regardless of which side prevails at the trial court level, the lower court ruling would almost certainly be followed by an appeal. At a minimum, such an appeal (or appeals) would required additional legal research, a thorough review of the record, the drafting of briefs, and oral argument before the

appellate court. Although these appeals would present an increased workload for the criminal division attorneys assigned to appellate work, no additional funding is requested for this aspect of HB 698's fiscal impact.

2. New Criminal Cases

Although some of the conduct included within the scope of HB 698 is already against the law, much behavior which is now classified as a "violation" or which is not now an offense of any sort will become a misdemeanor crime. It is difficult to accurately predict in advance the impact which the passage of HB 698 will have on the criminal justice system.

Some law enforcement officers who work primarily in the drug enforcement area believe that the new law could potentially result in "thousands" of new misdemeanor cases a year. They believe that the bill would cause an increased enforcement effort both in the areas not now covered by existing law and against persons who commit minor offenses which are already against the law. A great number of the new cases would arise from situations where law enforcement officers now commonly discover small amounts of marijuana (as when an officer responds to a domestic disturbance call and sees some marijuana plants in a person's

home, or when a person is arrested for a minor offense and a routine search for weapons reveals some marijuana cigarettes in the person's pocket, for example). Incidents of this sort occur frequently now, but do not generally result in any criminal prosecution for the marijuana possession. Many of these cases are likely to be referred for criminal prosecution if HB 698 becomes law.

Prosecutors generally predict a lesser number of new potential criminal cases under HB 698 than do police. Once the public becomes aware of the new law, people are likely to be more careful about not allowing marijuana or smoking paraphernalia to be exposed in plain view in their homes, for example. Judging from the number of minor marijuana offenses prosecuted prior to the Ravin decision in 1975 prosecutors expect a "few hundred" new criminal cases a year.

Cases which are accepted for prosecution will require attorney time both at trial and in preparation for trial (i.e., preparation of search warrants, response to defense motions, evaluation of results of laboratory analysis, pretrial witness preparation, etc.). To handle screening of the expected case referrals, and to prosecute the additional cases, the criminal division will require the addition of at least one Attorney III

position. It is anticipated that this additional position will be used to add one half-time attorney in both the Anchorage and Fairbanks District Attorney's offices.

It is anticipated that a large percentage (perhaps 50-75%) of the defendants in the new cases will be first time offenders who will be eligible for pretrial diversion. Given the light sentences which these persons are likely to receive if convicted, pretrial diversion (including required community work service) appears to be a well justified use of criminal justice system resources. Even if a case is diverted however, attorney time is required to screen the case and make the diversion arrangements. New pretrial diversion personnel will be needed to supervise the new cases. Existing pretrial diversion offices are now working at full capacity. The addition of hundreds of new cases to an already full caseload will require, at a minimum, the addition of two new full-time positions. This fiscal note therefore includes funding for a paralegal II position for the Anchorage office. (This person would also be responsible for new cases in Palmer.) Funding of one additional community counselor is also required. This position will be divided into two half-time positions, one assigned to the Northern region (Fairbanks), and one in the Southeast region.

3. Public Education

In order to inform the public of the changes in the law, the Departmen. of Law will develop and disseminate public notices explaining the new law. These notices will include newspaper ads and brochures, and will be modeled upon the public education not.ces which were distributed statewide in connection with the new drug law in 1982 and the new DWI and drinking age laws in 1983. Based upon experience with these earlier notices, approximately $15,000 will be needed to cover the costs of writing, layout, typesetting, publication, and distribution.

In addition to the costs explained above, it is anticipated that the passage of this bill will result in increased costs to other components of the criminal justice system, including law enforcement, the courts, the public defender agency, and corrections.

4/19/84

Fiscal Analysis
HB 698

1. Defending the New Law

Admin. & Support Component/Prosc. - BRU

Object	Total
Contractual Services - Professional fees scientific experts 120 hrs. X $100 = $12,000	$12,000
Experts' staff support, preparation of exhibits, written testimony 50 hrs. X $40 = $2,000	2,000
Experts' travel to attend hearings and offer testimony 6 trips X 4 days X $80 = $1,920 subsistence	1,920
6 trips X $1,500 = $9,000 travel	9,000
	$24,920

This amount will be required for both FY 85 and FY 86, to cover both trials and appeals.

2. New Criminal Cases

Third Judicial District - Anchorage

	Atty. III (PPT)	Total
Personal Services	30.0	30.0
Travel - Witness travel subsistence, atty. travel	1.5	1.5
Contractual Services		
office commo. equip. repairs	2.4	2.4
copy - postage	1.2	1.2
		3.6
Commodities - Ongoing		
office consumables	1.8	1.8
Law library	1.2	1.2
Commodities - one time		
New position materials	1.2	1.2
		4.2
Equipment - one time		
New position equipment	1.5	1.5
		40.8

Fourth Judicial District - Fairbanks

	Atty. III (PPT)	Total
Personal Services	34.1	34.1
Travel - Witness travel subsistence, Atty. travel	1.5	1.5
Contractual Services		
office commo., equip. repair	2.4	2.4
copy - postage	1.2	1.2
		3.6
Commodities - Ongoing		
office consumables	1.8	1.8
Law library	1.2	1.2
Commodities - one time		
New position materials	1.2	1.2
		4.2
Equipment - one time		
New position equipment	1.5	1.5
		44.9

Pretrial Diversion

	Paralegal Asst. ANC-PFT	Comm. Couns. FAI-PPT	Comm. Couns. JNU-PPT	Total
Personal Services	40.6	20.3	17.9	78.8
Travel - Staff travel/subsistence to outlying areas	1.5	1.0	1.0	3.5
Contractual Services				
Office commo./equip repair	4.8	2.4	2.4	9.6
copy - postage	2.4	1.2	1.2	4.8
				14.4
Commodities - Ongoing office consumables	1.8	1.8	1.8	5.4
Commodities - one time				
New position materials	1.2	1.2	1.2	3.6
				9.0
Equipment - one time	1.5	1.5	1.5	4.5
	53.8	29.4	27.0	110.2

3. Public Education

Admin. & Support Component/Prosc. BRU

Object		Total
Contractual Services - one time writing, layout, typesetting, publication and distribution of public notices and information brochures describing the changes in the law.	15.0	15.0
		15.0

Summary of Expenses

	Defending the new law	New Criminal Cases	Public Education	Total
Personal Services		142.9		142.9
Travel		6.5		6.5
Contractual	24.9	21.6	15.0	61.5
Commodities		17.4		17.4
Equipment		7.5		7.5
	24.9	195.9	15.0	235.8

Costs beyond FY 85 include a 6% inflation factor, less one-time items. The costs for defending the new law will occur in both FY 85 and FY 86 and they will be eliminated thereafter.

1.	POSITION TITLE ATTORNEY III				RANGE/STEP 22A	BARG. UNIT PX	FORM 12 PAGE/LINE	GOV.	APPROV.	DISA
2.	TYPE OF POSITION PPT	STAFF MONTHS 12	RP NUMBER	PCN NUMBER	DRU PRIORITY	LOCATION Anchorage	ELECTION DISTRICT 8	LEG.		
3.	CONTINUATION LEVEL		ADDITION		JUSTIFICATION					

	TYPE OF EXPENDITURE		AMOUNT
	1	2	3
	PERSONAL SERVICES		
5.	Salary 1,950 X 12	23,400	
6.	Benefits	3,838	
7.	Supplemental Benefits	1,434	
8.	Fixed Benefits	1,320	
9.	TOTAL PERSONAL SERVICES	01	29,992
0.	Travel	02	1,500
1.	Contractual	03	3,600
2.	Commodities	04	4,200
3.	Equipment	05	1,500
4.	Other		
15.	TOTAL COST		40,792

	RECEIPT CODE	FUNDING SOURCE		
16.		Federal Receipts	1002	
17.		G.F. Match	1003	
18.		General Funds	1004	40,792
19.		I-A Receipts	1005	
20.		Program Receipts	1020	
21.		Other		

FOR OMB USE ONLY
4A KEY NUMBER __ __ - __ __ - __ __ - __ __ - __ __

This permanent part-time position is required to handle the influx of new cases that will result when marijuana violations, or any use of marijuana, which is not now a violation, become misdemeanor offenses. Prosecutors expect that at least a few hundred such offenses will occur each year as a result of the enactment of HB 698. This position will be responsible for prosecuting those new cases that are brought in the Third Judicial District. Because these new cases will be classed as misdemeanor offenses, allocation of the position to the Attorney III level is appropriate.

3 REQUEST FOR NEW POSITION

AGENCY DEPARTMENT OF LAW

PROGRAM DUE PROCESS

BRU PROSECUTION

THIRD JUDICIAL DISTRICT

FY.8

1.	POSITION TITLE ATTORNEY III				RANGE/STEP 22A	BARG. UNIT PX	FORM 12 PAGE/LINE	GOV.	APPROV.	DISAPP
2.	TYPE OF POSITION PPT	STAFF MONTHS 12	RP NUMBER	PCN NUMBER	BRU PRIORITY	LOCATION Fairbanks	ELECTION DISTRICT 16	LEG.		
3.	CONTINUATION LEVEL		ADDITION							

	TYPE OF EXPENDITURE		AMOUNT
	1	2	3
	PERSONAL SERVICES		
5.	Salary 2,232 X 12	26,784	
6.	Benefits	4,393	
7.	Supplemental Benefits	1,642	
8.	Fixed Benefits	1,320	
9.	TOTAL PERSONAL SERVICES	01	34,139
10.	Travel	02	1,500
11.	Contractual	03	3,600
12.	Commodities	04	4,200
13.	Equipment	05	1,500
14.	Other		
15.	TOTAL COST		44,939

	RECEIPT CODE	FUNDING SOURCE		
16.		Federal Receipts	1002	
17.		G.F. Match	1003	
18.		General Funds	1004	44,939
19.		I-A Receipts	1005	
20.		Program Receipts	1020	
21.		Other		

FOR O&M USE ONLY
4A KEY NUMBER __ __ - __ __ - __ __ - __ __ - __ __

JUSTIFICATION

This permanent part-time position is required to handle the influx of new cases that will result when marijuana violations, or any use of marijuana, which is not now a violation, become misdemeanor offenses. Prosecutors expect that at least a few hundred offenses will occur each year as a result of the enactment of HB 698. This position will be responsible for prosecuting those new cases that are brought in the Fourth Judicial District. Because these new cases will be classed as misdemeanor offenses, allocation of the position to the Attorney III level is appropriate.

13 REQUEST FOR NEW POSITION

AGENCY DEPARTMENT OF LAW

PROGRAM DUE PROCESS

BRU PROSECUTION

FOURTH JUDICIAL DISTRICT

Revised Date

FY 85

1.	POSITION TITLE: PARALEGAL ASSISTANT II				RANGE/STEP: 16A	BARG. UNIT: GGU	FORM 12 PAGE/LINE	GOV.	APPROV.	DISA
2.	TYPE OF POSITION: PFT	STAFF MONTHS: 12	RP NUMBER	PCN NUMBER	BRU PRIORITY	LOCATION: Anchorage	ELECTION DISTRICT: 8	LEG.		
3.	CONTINUATION LEVEL		ADDITION							

4.	TYPE OF EXPENDITURE	1	2	AMOUNT 3
	PERSONAL SERVICES			
5.	Salary 2,573 X 12		30,876	
6.	Benefits		5,064	
7.	Supplemental Benefits		1,893	
8.	Fixed Benefits		2,736	
9.	TOTAL PERSONAL SERVICES	01		40,569
0.	Travel	02		1,500
1.	Contractual	03		7,200
2.	Commodities	04		3,000
3.	Equipment	05		1,500
4.	Other			
5.	TOTAL COST			53,769

	RECEIPT CODE	FUNDING SOURCE		
6.		Federal Receipts	1002	
7.		G.F. Match	1003	
8.		General Funds	1004	53,769
9.		I-A Receipts	1005	
0.		Program Receipts	1020	
1.		Other		

FOR O&M USE ONLY
4A KEY NUMBER __ __ - __ __ - __ __ - __ __ - __ __

JUSTIFICATION

This full-time position is required to oversee community work service assignments for those misdemeanant offenders who are screened into the state's Pretrial Diversion Program. Because a large percentage of defendants in the new cases that will result from enactment of HB 698 will be first-time offenders, as many as 50% of these defendants may be eligible for pretrial diversion. This position will be responsible for providing pretrial diversion services in the Anchorage and Palmer area.

3 REQUEST FOR NEW POSITION

AGENCY DEPARTMENT OF LAW

PROGRAM DUE PROCESS

BRU PROSECUTION

PRETRIAL DIVERSION

Revised Date

FY 8

1.	POSITION TITLE COMMUNITY COUNSELOR			RANGE/STEP 14A	BARG. UNIT GGU	FORM 12 PAGE/LINE	GOV.	APPROV.	DISAP.
2.	TYPE OF POSITION PPT	STAFF MONTHS 12	RP NUMBER	PCN NUMBER	BRU PRIORITY	LOCATION Juneau	ELECTION DISTRICT 4	LEG.		
3.	CONTINUATION LEVEL		ADDITION							

4.	TYPE OF EXPENDITURE		AMOUNT
	1	2	3
	PERSONAL SERVICES		
5.	Salary 1,121 X 12	13,452	
6.	Benefits	2,206	
7.	Supplemental Benefits	825	
8.	Fixed Benefits	1,368	
9.	TOTAL PERSONAL SERVICES	01	17,851
0.	Travel	02	1,000
1.	Contractual	03	3,600
2.	Commodities	04	3,000
3.	Equipment	05	1,500
4.	Other		
5.	TOTAL COST		26,951

	RECEIPT CODE	FUNDING SOURCE	
6.		Federal Receipts 1002	
7.		G.F. Match 1003	
8.		General Funds 1004	26,951
9.		I-A Receipts 1005	
0.		Program Receipts 1020	
1.		Other	

FOR O&M USE ONLY
4A KEY NUMBER __ __ - __ __ - __ __ - __ __ - __ __

JUSTIFICATION

This permanent part-time position is required to oversee community work service assignments for those misdemeanant offenders who are screened into the state's Pretrial Diversion Program. Because a large percentage of defendants in the new cases that will result from enactment of HB 698 will be first-time offenders, as many as 50% of these defendants may be eligible for pretrial diversion. This position will be responsible for providing pretrial diversion services in the Southeast Region, centered at Juneau.

3 REQUEST FOR NEW POSITION

AGENCY DEPARTMENT OF LAW

PROGRAM DUE PROCESS

BRU PROSECUTION

PRETRIAL DIVERSION

Revised Date

FY.85

1.	POSITION TITLE COMMUNITY COUNSELOR			RANGE/STEP 14A	DARG. UNIT GGU	FORM 12 PAGE/LINE	GOV.	APPROV.	DISA
2.	TYPE OF POSITION PPT	STAFF MONTHS 12	RP NUMBER	PCN NUMBER	ORU PRIORITY	LOCATION Fairbanks	ELECTION DISTRICT 16	LEG.		
3.	CONTINUATION LEVEL		ADDITION		JUSTIFICATION				

	TYPE OF EXPENDITURE		AMOUNT
	1	2	3
	PERSONAL SERVICES		
5.	Salary 1,287 X 12	15,444	
6.	Benefits	2,533	
7.	Supplemental Benefits	947	
8.	Fixed Benefits	1,368	
9.	TOTAL PERSONAL SERVICES 01		20,292
0.	Travel 02		1,000
1.	Contractual 03		3,600
2.	Commodities 04		3,000
3.	Equipment 05		1,500
4.	Other		
5.	TOTAL COST		29,392

	RECEIPT CODE	FUNDING SOURCE	
6.		Federal Receipts 1002	
7.		G.F. Match 1003	
8.		General Funds 1004	29,392
9.		I-A Receipts 1005	
0.		Program Receipts 1020	
1.		Other	

FOR D&N USE ONLY
4A KEY NUMBER __ __ - __ __ - __ __ - __ __ - __ __

This permanent part-time position is required to oversee community work service assignments for those misdemeanant offenders who are screened into the state's Pretrial Diversion Program. Because a large percentage of defendants in the new cases that will result from enactment of HB 698 will be first-time offenders, as many as 50% of these defendants may be eligible for pretrial diversion. This position will be responsible for providing pretrial diversion services in the Northern Region, centered at Fairbanks.

3 REQUEST FOR NEW POSITION

AGENCY DEPARTMENT OF LAW

PROGRAM DUE PROCESS

ORU PROSECUTION

PRETRIAL DIVERSION

Revised Date

FY.8

Other than hearing considerable testimony from witnesses including that of Dr. Reese T. Jones, Professor of Psychiatry, University of California, San Francisco and that of Dr. Gabriel G. Nahas, Mxxxxxxx O.B.E., M.D., Ph. D., Professor of Anesthesiology, Columbia University, New York City,

the Committee also considered the report, "Marijuana and Health," by the Institute of Medicine, U. of California;

the books/or excerpts from them, "Keep Off the Grass" and "Marijuana: Biological Effects," both authored by Dr. Nahas;

"Health Consequences of Marijuana Use," by William Pollin, M.D., Director, National Institute of Drug Abuse (written 1980);

a printed interview with Dr. D. Harvey Powelson, of the mental health program of Calaveras County, California, who once termed marijuana "harmless" but who now calls it "Our Most Dangerous Drug," the title of the printed interview;

a pamphlet called "Marijuana - What Parents Need to Know" from the Alaska Council on Prevention of Alcohol and Drug Abuse;

a pamphlet, "Marijuana" by Charlotte Drug Education Center, Inc., Charlotte, North Carolina;

pamphlet, "Marijuana Update," a Readers' Digest reprint of May, 1980;

article, "Marijuana: The Myth of Harmlessness Goes Up in Smoke," by Peggy Mann, a Saturday Evening Post feature, 1980;

article, "The Marijuana Epidemic," by Stuart M. Butler, analyst, The Heritage Foundation, Washinton, D.C.;

booklet, "Report on Adverse Health and Behavioral Consequences of Cannabis Use," World Health Organization, 1981;

an assortment of Drug Abuse Newsletters of 1982, 1983;

article printed in the Congressional Record entitled "Marijuana and Health," the ninth report to the U.S. Congress, by the Secretary, Health and Human Services, (1982);

booklet, "Marijuana Today" by George K. Russell, (1983), and article, "Marijuana Smoking and Its Effects on the Lungs," by Donald P. Tashkin, M.D. and Sidney Cohen, M.D., of the Departments of Medicine and Psychiatry, U.C.L.A. School of Medicine, Los Angeles, California.