

SENATE JUDICIARY COMMITTEE

MINUTES OF MEETING

APRIL 7, 1977

The meeting was called to order at 8:15 a.m. Senator Close was in the chair.

PRESENT: Senator Close  
Senator Bryan  
Senator Ashworth  
Senator Dodge  
Senator Gojack  
Senator Foote  
Senator Sheerin

ABSENT: None

AB 253 REDUCES PENALTY FOR POSSESSION OF SPECIFIED SMALL AMOUNT OF MARIJUANA

Professor Hardin Jones, University of California, Berkeley, submitted his testimony in writing (Exhibit A), his credentials (Exhibit B) and some information that he felt would be helpful to the Committee (Exhibits C, D, E).

He brought out these main points:

1. People do not use it in many instances because of the penalties involved; therefore, he was against the reduction of these penalties.
2. With the prolonged use of marijuana, in relation to some of the other drugs, the bad affects happen sooner and last longer.
3. Marijuana users get no initial pleasure; it is only as the residue is built up in the brain's pleasure centers. As this occurs, it requires more and more usage to stimulate these pleasure centers.
4. 70% of the marijuana taken into the body is removed slowly over a week; then, the 30% remaining in the body, will dissipate slower, taking approximately 9 months.
5. The myth that marijuana increases sexual activity is untrue, actually in repeated usage the sexual drive diminishes and in many cases the male becomes sterile and the female ceases to ovulate.
6. There are many personality changes and a feeling of lethargy is usually evident after the first year.
7. He feels there is a definite truth that marijuana

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is a stepping stone to harder drugs.

8. Tests with monkeys show there is a definite pattern to genetic changes in the offspring.

9. He feels there should be an educational campaign to counteract the campaign for the legalization and misunderstanding of the drug.

10. In his opinion, after prolonged usage, there is never full recovery. It is still worth quitting the drug and get back whatever recovery one can, but if a person is in a genius category, he is never going to go back to where he was.

11. Regarding opium, he stated that he is more encouraged by opiates and opium than he is about marijuana. As far as he is concerned, a person can fully recover from opium and there isn't the brain damage there is from marijuana. He said there is also brain damage from cocaine and he expected that this would not be reversable either. He also felt that methadone was extremely bad. He had made tests in this regard and sees no excuse for the use of methadone at all. If we are to deal with heroin users, we should institutionalize them and given them proper treatment and try to return them to normal functions. Methadone is at least equivalent, in all of its actions, to heroin. It has exactly the same psychic impact. He also feels if marijuana is legalized it will encourage younger people, as well as more people, to smoke marijuana.

He said that the reason his side is not heard too often is because when the movement to legalize the drug was launched, there were already hundreds of people organized with books and papers to be published. He feels, however, that the whole situation is now turning around and some of the supporters now realize they made a mistake. He said that in the next few years there will be a lot published on the bad effects of this drug.

12. Regarding Gerovital and Laetrile, he felt that they are not really harmful, but little is known on their effect. Also, he feels that they do nothing for cancer victims except perhaps relieve them of their pain. Gerovital is an opiate that does help with depression but also one can die from it if taken in large doses.

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Senator Sheerin wated the record to show that the first California results, since their new laws, were out on marijuana usage.

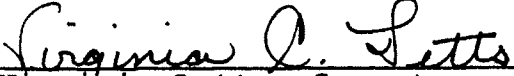
Of the 35% of adults that have used marijunan, there is a 14% increase of those that say they use it regularly. This is a substantial increase over the reports gained two years ago. So, there is an increase since the relaxing of laws. However, in this report, less than 3% of the respondents in the latest poll reported that they had tried marijuana in the last year. Only 1 in 8 indicated that they were more willing to use the drug because penalties were reduced. Also, arrests for users of heroin have risen significantly. He felt that this report, to a certain extent, corroborates Professor Jones testimony.

Professor Jones added that because of his long study and research in the drug area, he urged that the laws and penalties regarding marijuana be retained.

As there was no more time to hear testimony, Janet B. Allen submitted her testimony as a proponent for reducing penalties (Exhibit F).

Meeting adjourned at 10:58 a.m.

Respectfully submitted:

  
\_\_\_\_\_  
Virginia Letts, Secretary

APPROVED BY:

\_\_\_\_\_  
Senator Melvin D. Close, Chairman

April 7, 1977

EFFECTS OF MARIJUANA ON THE AVERAGE USER

Although many have stated that marijuana is a relatively harmless substance, scientific investigations of the past decade established these facts indicating harm to the average user:

1. The symptoms of progressive behavioral changes are reported by most observers of marijuana smokers.
2. The progressive behavioral changes indicate functional brain disorders described by some investigators as organic brain disease or as the amotivational syndrome. Reversible and irreversible forms of brain disease are linked to marijuana smoking.
3. The marijuana smoker is usually unaware of his behavioral changes -- even when other observers see marked adverse changes. Regular smokers of marijuana notice improvement of memory, strength and depth of thought formation, self-motivation and good body feelings after they have quit taking marijuana for a month and longer. Recovery is also observed in persons who have been smoking marijuana only a few times a month. In heavily affected persons, recovery may not be complete but has been followed for as long as three years of abstinence.
4. The adverse effects of marijuana on the brain is consistent with retention of the active ingredient of marijuana in the body. On repeated use, there is progressive accumulation in the body and body cells.
5. Brain cells are adversely affected by the accumulative burden of the active ingredient of marijuana. Structural changes occur in the surface membrane of brain cells. This includes alterations in the synaptic structure so that the very mechanisms of the mind are affected. (See work of Paton and Heath).
6. Monkeys exposed to marijuana smoke, in the range of moderate dosages by young Americans, show measurable changes in the brain cell surface structures by six months of exposure. (Heath). Such changes may be only slowly reversed, if at all, for the monkeys were exposed for six months and subsequently were off marijuana for 8 months before their brain cells were examined.
7. All studies of cells from humans or animals exposed to marijuana, show changes in the brain cell surface membrane and some show parallel changes in other cellular structures. The cellular changes have led us to postulate that genetic change also occurs in marijuana smokers.
8. Evidence now shows both genetic and teratogenic effects of marijuana smoking. Animal studies with such effects include mice, rats and monkeys. Genetic change has been measurable in monkeys and in rats when the male alone is exposed to marijuana. The major genetic damage is linked to malformed offspring and is consistent with a spectacular increase in malformation of the heart (3x) and joints (6x) in children born in the United States since 1970. Prior to 1970, birth defects had been on the decline for two decades.

In my opinion, marijuana is the most harmful hazard yet identified for the high risk of adverse effects in the average user. All exposed are mentally affected to some extent and the risk to health of offspring is well beyond the bounds of acceptable social risk.

Exhibit A

11/1/68

# CURRICULUM VITAE

Hardin B. Jones, Ph.D.

Date of Birth: June 11, 1914, Los Angeles, California

A.B., University of California at Los Angeles, 1937

M.A., University of California, Berkeley, 1939

Ph.D., University of California, Berkeley, 1944 (Biochemistry and Physiology)

Married Helen Cook Jones, 1940 (nutritionist, writer), four adult children

2816 Oak Knoll Terrace  
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Donner Laboratory  
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1946-1947: Instructor, Division of Medical Physics and Physiology Department, University of California, Berkeley

1947-1949: Assistant Professor of Medical Physics and Physiology Department, University of California, Berkeley

1949-1954: Associate Professor of Medical Physics and Physiology, University of California, Berkeley

1954-present: Professor of Medical Physics, Division of Medical Physics and Professor of Physiology, Department of Physiology, University of California, Berkeley

1956-1962 1964-1968: Chairman, Graduate Group in Biophysics and Medical Physics, University of California, Berkeley

1956-1960: Member, the National Advisory Council for Radiation Protection (U.S.P.H.S.), University of California

1959-1960: Associate Director, Institute of Human Development, University of California

1948-1976: Assistant Director, Donner Laboratory, University of California, Berkeley

1976- Assistant to the Director, Donner Laboratory

1974- Asian Art Commissioner, San Francisco City and County

Other positions and awards:

1. Guggenheim fellow 1954-1955.
2. Chairman of the Biological Science, The White House Conference on Aging, 1961.
3. Citation for studies on drug abuse for U.S. Armed Forces, RVN, by General Abrams, 1972.
4. Annual Award Society for Plastic Engineers, 1975.
5. Scientific Advisor the Kaiser Foundation Research Institute, 1956-present.

Major interest:

Aging

Environment. Effects of:

Decompression and high altitude

Radiation

Smoking

Alcohol

Marijuana

Opiates

Nutrition

Physical conditioning

Demography and Epidemiology

Carcinogenesis and evaluation of cancer treatments

Opportunities and problems in higher education

Metabolism

Cardiovascular, respiratory, physiology and disease

Human development and human biology

Prevention of degenerative disease

Carcinogenesis and evaluation of degenerative diseases

Energy development, needs and utilization

History of civilization

Courses currently offered at University of California at Berkeley: Human Biology Effects of Radiation, Drug Abuse, Carcinogenesis

Current public lecture topics: Prevention of drug abuse, prevention of degenerative diseases, longevity

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Exhibit B 1

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HARDIN B. JONES

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Dr. Hardin B. Jones, professor of medical physics and physiology at the University of California, Berkeley, and assistant director of the Donner Laboratory, discusses . . .

## What the Practicing Physician Should Know About Marijuana

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The average marijuana user — the young man who smokes two to three “joints” per week — is adversely and persistently affected by the “weed.” But he does not comprehend his situation. Young women are affected in the same way, but they are about half as likely to use the drug and they usually consume somewhat less when they do. Effects on these young people are, of course, less than with daily use of the drug, but young people who smoke marijuana to any degree are likely to be brought to physicians by concerned parents who are worried because of the change in their behavior.

Evidence of the cumulative nature of the effects of marijuana is found throughout the literature of this subject. It was my own initial observation upon interviewing marijuana users. I found that it was necessary to smoke marijuana cigarettes several times to get the first intoxicative “high,” and that after that stage was reached (usually after about five cigarettes had been smoked, either all at once or spread out over several weeks), intoxication could be renewed by smoking only a portion of a joint. Because of my observations, I challenged the claims that marijuana has a “reverse tolerance,” with the implication that it was, therefore, safe. The notion of safety due to reverse tolerance has remained in the pro-marijuana literature in spite of the proof that the active components of marijuana do indeed accumulate in the body and in the brain.

The fate of the active ingredient of the cannabis drugs, delta-9

tetrahydrocannabinol (THC), has been determined by a number of studies in laboratory animals and in humans by labeling the administered THC with a radioactive isotope (either hydrogen-3 or carbon-14) and tracing it in the body for distribution, retention, transformation to other chemical forms, and excretion. The retention of labeled THC measured in humans is about forty percent at three days, thirty percent at one week; by extrapolation, ten percent at forty-eight days, and one percent at 4.6 months. The high retention of THC is confirmed by studies in which it was administered to laboratory rodents. The retention is comparable in mice, rats, and humans, except that small animals are more active per unit of size and time of retention is correspondingly reduced. There are also minor species differences in the partial degradation of THC prior to excretion as cannabinal residue. A large fraction of administered THC is converted in the body to 11-hydroxy-THC — a substance that is several times more psychoactive than THC. Both active forms of THC tend to persist in the body for long periods of time.

During the “high” period following the smoking of marijuana, the organ concentrations follow that of the blood. There is a peak of concentration in the brain corresponding to that of the blood which lasts about four to six hours. Although the concentration of THC in the brain is much lower than in the other organs, that fact is not a measure of its effectiveness. The THC taken up by the brain is concentrated largely in the cell

membranes, where the local concentration is twice as high as the THC content of the red blood cells<sup>membran</sup>

The disappearance of THC from the blood over the several hours of the “high” is not due to its removal from the body; it merely accumulates in fat tissue, which has a high affinity for THC. Some of the THC is partially degraded, but it remains a cannabinal residue. Cannabinal residues and THC are excreted largely by the bile, but only at a very slow rate. When THC has been administered to laboratory animals on a uniformly repeated schedule, it accumulates in the fatty parts of cells at an essentially constant rate, since the rate of elimination is so slow — about ten percent per month. The implication of this finding for humans is that progressive retention will increase the body burden of THC for many months before reaching equilibrium when the rate of excretion becomes equal to the rate of intake of THC. Based on animal studies, the concomitant accumulation in brain cells is such that the result of smoking marijuana every other day for a month is a retention of the same quantity of THC in brain cells as that which causes an acute “high” in the beginning marijuana user. The chronic marijuana smoker increases his brain’s burden above this chronic level when he smokes by producing a transitory peak concentration in the blood and brain; but he is never without significant quantities of THC in the brain at a level determined by the brain’s equilibrium with the body fat. In the chronic marijuana user, the high brain (cont. on p. 36)

(cont. from p. 35) levels cannot be reduced without the many months of abstinence necessary to clear THC from the body fat.

The accumulation of THC in the body fat means that the THC becomes involved with lipoproteins and the lipid layers of the cell membranes. The effect of the THC on the cell is not solely the consequence of absorption into the cell surfaces; many substances, including gasoline and kerosene, have equal affinity for fat and are carried into the body readily on inhalation of these vapors. Also, some of the other cannabinoids in marijuana have the same high affinity for cell membranes and body fat. Yet gasoline and kerosene do not cause the problems known to occur with marijuana. One of these cannabinoids is responsible for the alteration of liver function which has been shown to take place independently of the psychic effects of THC. It will be some time before there is comprehensive understanding of the full range of effects of THC and the other cannabinoids once they are absorbed into the body. Among the known effects, THC depresses cell division and synthesis of DNA, suppresses the immune response of the blood lymphocytes, and alters the structure of the brain cell membrane. Alteration of cell structures in the lung air passages of marijuana smokers has also been observed in studies made by Dr. Tennant, a pathologist who investigated cannabis-using American soldiers in Germany. Dr. Tennant did bronchial biopsies on thirty soldiers, average age twenty-one, who smoked 25-30 grams of hashish per month for a few months. This is an estimated 80-90 milligrams of THC per day, approximately four times as much as is received by a person smoking one marijuana cigarette (2% THC) per day. *Twenty-four of the thirty young men had precancerous lesions* detected in the biopsied specimen. These lesions are seen in tobacco cigarette smokers, but not until much later in life and after about three decades of cigarette smoking. It remains to be seen what fraction of marijuana smokers will develop severe respiratory disease. The frequently observed associa-

tion of marijuana or hashish smoking with some degree of inflammation of the respiratory system, from sinusitis to bronchitis, suggests that valid results can be obtained from a demographic survey of the problem with a much smaller sample than was required to establish the effects of cigarette smoking. The signs are that emphysema and lung cancer will occur sooner than in the case of cigarette smoking. The effects should shortly become evident in our vital statistics when appreciable numbers of marijuana smokers will have been exposed to the drug for more than fifteen years. That is the interval usually estimated as the latent time for development of lung cancer in humans.

The physician should especially warn patients with existing lung disease against the use of the cannabis drugs. In this regard there is a well-founded claim that marijuana smoking makes breathing easier during the immediate period of exposure to the smoke. The effect seems to be due to drug-induced relaxation of the bronchioles. This observation has led to a claim by some people in the movement to legalize marijuana that the drug offers a benefit to asthmatics. It has been noted just as frequently in the literature, however, that marijuana is likely to bring on an asthmatic attack. These are not contradictory sets of observations; the induction of attacks of asthma seems to be caused by the chronic irritation by the marijuana smoke, an inflammation due to the cytotoxic impact of THC itself. It certainly appears necessary to warn young asthmatics that aggravation is the more likely result of marijuana smoking.

There can be no doubt about the pleasant effects of marijuana smoking, as attested to by several thousands of users I have interviewed. Furthermore, Dr. Robert Heath has been able to show, by direct placement of brain-wave detecting electrodes into the pleasure centers deep in the brain, that the pleasure centers themselves are triggered by marijuana smoking just as though they had been activated by an electrical current or by other stimuli. His extensive work includes

neurological observation of humans experiencing sex, various drugs, and other sensory stimuli, and corresponding work with monkeys. In monkeys, activation of the pleasure centers by marijuana smoking produces brain wave discharges, but afterward the normal responsiveness of these centers is impaired up to five days. In exposures equal to those of a heavy marijuana user, the pleasure centers of the monkey become inactive for an indefinitely long period of time. An inaccurate, though widespread, criticism of this aspect of Dr. Heath's work is that the dosage causing semi-permanent quiescence of pleasure responses is higher than the usual human range of exposure. Dr. Heath has verified that this is not the case. It may be, of course, that the monkey is somewhat more sensitive to THC than is the case in humans; nevertheless, it is commonly observed that young people who smoke marijuana heavily experience essentially the same effects — quiescence of the sensations of pleasure. I use the term "sensory deprivation" to describe this consequence of marijuana use. The term "depersonalization," as used by Drs. Kolansky and Moore, has a similar implication about these brain changes that evolve slowly with the cumulative effects of marijuana smoking and which on rehabilitative abstinence are the slowest to recover. The ability to feel good or to feel alive results from the normal operation of the pleasure centers and they give such zest as we can know to all the ordinary events of life. Sexuality is merely one facet of these emotional functions. The anatomical structures that control these important functions are first irritated and then impaired by the use of marijuana. The smoker merely observes in his early experiences with marijuana that he feels good or that sex becomes more sensual. He does not observe what became a common, obvious pattern to me as an interviewer of marijuana-smoking students. Their sexuality was heightened only for a short period in early marijuana use; afterward, sexuality diminished steadily. It is common to find absence of sexual activity in

marijuana smokers, including absence of sexual dreams and masturbations. Yet the pot smoker does not perceive these changes. Perhaps they are due in part to induced depression of pituitary and gonadal function. The mechanisms are unknown at this time, but the clinical result is well established.

For some persons, smoking the weed once or twice a week may constitute heavy use as judged by its effects. It depends on the individual sensitivity to the drug and the strength of the marijuana used. Certainly all daily smoking of marijuana is heavy use and there are many signs of chronic debilitation. It is common to find that daily users have become unable to cope with ordinary problems. An early sign of such effect is the complaint that he is being "hassled" by almost any interpersonal contact, an indication that the mental reserves are thin. Daily marijuana users, though heavily affected, have no insight into their condition or recognition of what has happened to them.

A morphological causative factor for their mental state has been observed. In ten consecutive cases of young men who were heavy users, the late Dr. A.M.G. Campbell, professor of radiology at the University of London, and his associates, did air electroencephalography and found enlargement of the ventricles and rounding of the usually sharp and well defined edges of the ventricles — findings that point to severe atrophy of the deepest portion of the cerebral hemispheres. It is noteworthy that the pleasure centers are also in this area of the brain. Clinical findings on heavy marijuana users point to the development of organic brain disease as described by Kolansky and Moore.<sup>1</sup> It appears that irreversible brain changes may be encountered as marijuana use extends beyond three years. Kolansky and Moore<sup>2</sup> note that marked and rapid improvement resulting from abstinence does not begin until several weeks have elapsed and then only if exposure has been of less than about three years' duration. The subjects of the Campbell study had all used marijuana for three years or longer. I have observed improvement in all college students

who, after established regular use, have cooperated with me in abstaining for several months. Most of them have become convinced by their personal experience of recovery that marijuana had indeed impaired their minds, and they have continued to abstain. Improved memory, clearer thinking ability, feeling good, and the return or augmentation of sexual functions have usually been noted in my series of cases. In three cases of students who were heavily affected, but not incapacitated, I had opportunity to follow them closely over a period of four years. In each, improvement was evident in a few months. These young men probably gained full recovery and lost all signs of suppressed mental functions. Viewed over the entire period of observation, the improvement was very slow and required a period of three years.

The average marijuana user, in between exposures, exhibits a wide range of brain changes:

1. He has shifted from a self-activating, interesting, and interested person to one who is withdrawn and given to disordered thinking. I have observed some degree of change of this kind in every marijuana user. When it becomes clearly noticeable as a change in life style, it is often called the "amotivational syndrome." It is more than just a shift to sedation; thinking is affected in many ways.

2. Thought formation in the marijuana user tends to be less powerful: conclusions are relatively impetuous, and expressed ideas are often *non sequiturs*. It is as though some of the reference checking in thinking has gone astray. The user has the illusion that his chronic state is simply a mature mellowing.

3. The marijuana user's attention span and ability to concentrate have been reduced. Memory, especially short-term memory, is shortened.

4. The facial circulation reflexes are impaired; blushing is reduced. The skin tends to be pallid and relatively lacking in blood (except during the marijuana "high," when the skin is flushed and the sclera of the eyes are bloodshot). The focusing of the eyes is less precise; eye movements and facial ex-

pressions are less pronounced than in nonusers.

5. The conditioned social responses, such as affection for parents and tolerance for their suggestions, are impaired. Throughout the literature, cannabis is known as "the drug of alienation." Perhaps the cause is that pleasure centers for social conditioning have been affected. There is a loss of other conditioned responses; for example, an unkempt appearance is common and a loss of inhibition about urination in inappropriate places. One mother recently complained that her son had urinated in her flour bin, which happened to be open; more often the story is urination on walls of rooms in the vicinity of the toilet. Concern for consequences is reduced, and concern for the rights and well-being of others may be largely absent.

6. The marijuana user does not want to be "hassled." Mild criticism or merely requesting that housekeeping chores be done may be interpreted as hassling. The conflict causes the marijuana user to feel actual pain. He may even threaten his parents or other adults opposing his life style.

7. Marijuana is a hypnotic drug, and the hypnotic spell is long lasting. Thus, the user is likely to be talked into many situations that he would otherwise avoid. He may even engage in work in which there is a follow-the-leader type of spirit. The leader, in this case, is not likely to be outside the circle of persons using marijuana. The hypnotic effects of marijuana are, in my opinion, largely responsible for the acceptance of the hazardous consequences of more powerful drugs, a yielding to homosexual advances, and overly generous compliance with unreasonable requests by friends.

8. The young marijuana user tends to remain thin and to be underdeveloped for his age. The trend is more pronounced with heavy use. The daily marijuana user of several years' duration is likely to appear emaciated. The buttocks are thin; the facial muscles are atrophied. Similar changes in body composition have been well established in the rat.

9. The male is deficient in male

hormone. The findings of Kolodny<sup>3</sup> indicate a five percent decline in male hormone production for each marijuana cigarette (one percent THC) smoked per week. This is the relationship in mature males; it is likely that the effect is relatively larger in the adolescent. Since Kolodny finds that the effect is mediated through the pituitary, and both gonadotropic hormones are diminished, it is likely that a similar effect occurs in women.

10. He is likely to have a tendency toward paranoia or schizophrenia, or both. This may be caused by chronic disturbance of the neural mechanisms by which sensations received through two or more organs are synthesized into a composite interpretation of the physical cause. Such a disturbance, which occurs in both psychotic persons and those using marijuana, can lead to completely inaccurate interpretations of the real world.

11. He is likely to have an elevated number of broken chromosomes in cultures of his white blood cells.

12. His white blood cell immune response is lowered. The immune response of skin cells has been shown to be unaffected; the difference is probably a consequence of the high exposure of blood cells to THC, whereas skin cells are less exposed. It is estimated that skin cells receive fifteen percent of the exposure of blood cells.

13. The diurnal cycle of sleep and waking is largely inverted. The marijuana user stays up at night.

14. Sexual functions are often stimulated early in marijuana use, but with regular use, sexuality is suppressed. This is dramatically the case with sexual dreaming, which is usually abolished with the beginning of regular marijuana use.

The average marijuana user will stop using this drug upon being convinced that the life style and effects are not what he seeks. He is not addicted or physically dependent on marijuana; he uses it only about twice a week, while the narcotic addict requires his drug on a regular daily basis. Nevertheless, the average marijuana user is likely to encounter difficulties. His friends are probably users, and the pressure to continue to join in when the "roach" is passed is very great.

On the physical side, the marijuana user may have intermittent headaches for the first few months upon abstaining. This is a mild withdrawal symptom. There may also be symptoms of sleeplessness, restlessness, and agitation, which a physician can alleviate in order to help the user withdraw completely from the drug.

As in most forms of drug dependency, whether physical or mental (including alcohol, barbiturates, tobacco, amphetamines, and narcotics), body conditioning through hard physical exercise is helpful in readjusting the brain reflexes tied to the diurnal cycle. Physical exercise is also helpful in reestablishing the normal vigor of the pleasure mechanisms that rule over brain function. □

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Robert G. Heath, Harold Kolansky, Robert Kolodny, William T. Moore, Forest S. Tennant, Jr., "Marihuana-Hashish Epidemic and its Impact on United States Security," Hearings before the Subcommittee to Investigate the Administration of the Internal Security Act and Other Internal Security Laws of the Committee on the Judiciary, United States Senate, held May 9, 16, 17, 20, 21, and June 13, 1974. U.S. Govt. Printing Office.

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For expanded treatment of brain function affected by drugs, see:  
Hardin B. Jones and Helen C. Jones. *Sensual Drugs: Deprivation and Rehabilitation of the Mind.* Cambridge University Press. Cambridge, New York, Sidney. January 1977.

# Marihuana

## Can It Hurt You?

"MARIHUANA! Can it hurt you?" was a question asked with some urgency by a boy in a group of ninth-grade students visiting the US Capitol Building. The youngsters, curious about a group of men walking by, were told that they were scientists who just completed a day of testimony on the toxicity of marihuana to a subcommittee of the Committee on the Judiciary in the US Senate.

This boy's compelling question highlights an important issue in medicine today. We possess accumulated scientific knowledge of marihuana's toxic effects on humans, yet we are without adequate and effective means to deliver this information to the public. The consequence is that the known toxic effects from marihuana use are not adequately prevented.

Wynder and Peacock<sup>1</sup> said recently that modern medicine has been highly successful in the prevention of devastating infectious diseases, through the coordinated efforts of researchers and clinicians. They indicate that in certain clinical conditions, such as cardiovascular diseases, cerebrovascular accidents, and malignant neoplasms, similar preventive results have not occurred, although much time has elapsed since discovering certain factors known to reduce death risks. The authors said the reason these discoveries have been inadequately used preventively is that

apathy exists among most human beings when it comes to anything for which the results are long delayed. . . . This public attitude is matched by a similar disinterest among most physicians for preventive measures.

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### Extensive Clinical and Laboratory Evidence of Toxicity

A comparable situation prevails regarding the large accumulation of clinical and laboratory work that demonstrates cannabis toxicity. If adequately publicized, this work might have far-reaching preventive effects.

In the past decade, we have seen hundreds of patients suffering from psychiatric and neurological symptoms that resulted from cannabis use, and have described our findings in several publications.<sup>2-5</sup> (pp154-169)

In our reports, we detailed the toxic psychological effects of cannabis use in 51 of our patients, all of whom demonstrated symptoms that simultaneously began with cannabis use and disappeared within 3 to 24 months after cessation of drug use. *Moreover, a correlation of the symptoms to the duration and frequency of smoking was established.* When these observations were coupled with the stereotyped nature of the symptoms seen, regardless of psychological predisposition, we presumed that with intensive cannabis use, biochemical and structural changes occurred in the central nervous system.

All subjects clearly demonstrated *an early diminution in self-awareness and judgment along with slowed thinking and shorter spans in concentration and attention.* We also reported a gradual development of "goallessness," *blunted emotions, a counterfeit impression of calm and well-being, and a prevailing illusion of recently developed insight and emotional maturity.* Many demonstrated *difficulty in depth perception and an alteration in the sense of timing,* both of which are particularly hazardous during automobile driving. These clinical findings, along with other more severe mental symptoms, have been similarly reported by other investigators.<sup>3,4</sup> (pp18-19, 70-84, 206-250), 6

## Consequences of Legalized Status

Some may ask, "But aren't these symptoms found only in people who use marihuana heavily? What about occasional or moderate use?" In an editorial "Marihuana: Buyer Beware," THE JOURNAL warned that

Spokesmen who espouse tolerance toward "occasional" or "moderate" use of marihuana should be mindful of the possibility that, for whatever reasons, occasional may become "frequent" and moderate may become "intensive," with forbidding consequences.

The editorial continued, "If marihuana ever were given the same legal status as alcoholic beverages, nothing could be said except, 'buyer beware.'"

Despite this and similar warnings, marihuana use has continued to escalate, as have the toxic effects. This has led to a large increase in communications by laboratory and clinical investigators who report toxic effects on many body systems and physiological mechanisms.

Campbell<sup>6</sup> showed enlarged lateral ventricles indicative of cerebral atrophy in young, steady cannabis users, while Heath<sup>8</sup> eliminated many human variables in his laboratory work with rhesus monkeys. In his work, electrodes were deeply planted in the brain, and the results consistently demonstrated abnormal electroencephalograms. Anatomical structural alterations found during some postmortems suggested irreversible brain changes.

### Retention in Tissues

Lemberger et al<sup>9</sup> have shown the retention of cannabis  $\Delta^9$ -tetrahydrocannabinol in tissues for as long as eight days. This retention is particularly noteworthy in fatty tissues such as brain and testicles.

Kolodny et al<sup>10</sup> recently reported lowered sperm counts and testosterone levels to the point of temporary infertility in the marihuana smoker, likely related to the retention of the drug in the testes.

Still other investigators indicate that marihuana has effects on body cellular processes that include reduction in number of T-lymphocytes and resultant interference in the immune process,<sup>5 (pp22-108)</sup> reduction of DNA and

RNA synthesis,<sup>7 (pp70-84,92-108,109-117,126-142)</sup> and an increased number of cells with broken chromosomes.<sup>5 (pp11-92,109-117)</sup> Emphysema, pharyngitis, and bronchitis have been reported,<sup>5 (pp147-151,288-314)</sup> and premalignant lesions in lung tissues<sup>5 (pp126-142,288-314)</sup> have also been noted.

To date, most of the public remains uninformed about medical findings that clearly indicate substantial health hazards as a result of marihuana smoking. A systematic campaign to disseminate medical information is long overdue, particularly by governmental agencies and the news media.

The physician should not be apathetic about the current marihuana epidemic. By familiarizing himself with the results and potentials of marihuana toxicity, he is in a uniquely effective position to act as the spearhead in a coordinated community effort to prevent the cannabis epidemic from becoming endemic.

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The following letter was requested by the Editor of the New York Times, published 3/26/75

## Dangerous Marijuana

To the Editor:

Opponents of present marijuana laws are gaining ground by citing studies that appear to refute the mass of evidence against the drug, but these studies invariably miss either or both of two points: The effects of marijuana take time to accumulate, and selected groups of subjects may not experience the effects that occur in most users.

The active ingredient, THC, lingers in the body; 40 to 45 per cent of it remains after four days; 30 to 35 per cent after seven days, with slow elimination thereafter. Persisting brain burdens of THC account for impaired brain functions.

Several investigators have observed chromosome breakage from exposure to marijuana smoke. One study reported no such effect, but its method was faulty. The effect was observed after months or years of even occasional marijuana use; the negative re-

sult was reported when blood cells were collected 2½ hours after a group of marijuana users increased their usage for a few days. Naturally, no increase in chromosome breakage appeared so promptly.

Most men who use marijuana show reduced male hormone levels and lowered sexuality. Defenders of marijuana cite the one study that found normal levels in a group of 27 men chosen for their "good health" from more than 300 applicants. Selection of the healthiest 9 per cent invalidated the result. Brain damage from persistent use has been reported by several investigators but denied by marijuana users. The problem is that impairment prevents recognition of the impairment. Only after several months of abstinence do users recognize their previous loss.

A study of marijuana (ganja) use in Jamaica that claimed to prove no harmful effects has been thoroughly discredited by Dr. John A. S. Hall,

chairman of the Department of Medicine at Kingston Hospital, Jamaica, who found that the selection with which the study was done was faulty. He observed "20 per cent impotence . . . among males who have smoked ganja for five or more years" and reported that "personality changes among ganja smokers . . . are a matter of common observation in Jamaica." Among the symptoms were apathy, retreat from reality and the incapacity or unwillingness for sustained concentration.

A much more extensive and scientific study in Egypt clearly showed a wide range of adverse effects. Defenders of marijuana choose to ignore this study.

Legislators should weigh these facts before weakening laws that have deterred some young people from endangering their future.

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Berkeley, Calif., March 18, 1975



# Effects of Marihuana on Adolescents and Young Adults

Harold Kolansky, MD, and William T. Moore, MD

The large amount of marihuana smoking (12 million to 20 million people) in this country was reviewed, as well as some of the literature concerning adverse effects. Thirty-eight individuals from age 13 to 24 years, all of whom smoked marihuana two or more times weekly, were seen by us between 1965 and 1970, and all showed adverse psychological effects. Some also showed neurologic signs and symptoms. Of the 20 male and 18 female individuals seen, there were eight with psychoses; four of these attempted suicide. Included in these cases are 13 unmarried female patients who became sexually promiscuous while using marihuana; seven of these became pregnant.

The smoking of cannabis derivatives in the United States has now reached alarming proportions. Between 12 million (estimated by J. L. Goddard, MD, US Food and Drug Administration, in *Life*, Oct 31, 1969, p 34) and 20 million (estimated in *Drug Abuse: The Chemical Cop-Out*, National Association of Blue Shield Plans, 1969) adolescents and young adults are using, or have tried smoking, cannabis derivatives. In February 1970, a *Newsweek* survey (Feb 16, 1970, p 65) showed that 30% to 50% of all high-school students in this country had made marihuana an accepted part of life. Results of surveys of college students smoking marihuana are similarly high. In our own observations at local high schools and at several college campuses along the eastern seaboard, we

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have noted the openness of marihuana smoking, which may indicate a trend toward more universal use of the drug. All of this is in marked contrast to the situation as recently as four years ago when the COMMITTEE ON ALCOHOLISM AND DRUG DEPENDENCE of the American Medical Association reported that most experimenters give up the drug quickly or continue to use it on a casual basis.<sup>1</sup>

Literature in the United States describing the adverse effects of smoking marihuana is rather sparse. Among the more important communications was a report by Bromberg<sup>2</sup> in 1934, describing studies made while individuals smoked. Talbott and Teague<sup>3</sup> recently described 12 patients with acute toxic psychosis associated with cannabis smoking. Of special significance in their communication was the development of psychosis in each of the 12 upon the first smoking of marihuana. Ten of 12 were delusional, and all showed paranoid symptoms. Physical symptoms, including evidence of neuro-

logic dysfunction, were seen in some. Ten showed no history of premorbid personality disorder. The American Medical Association's COUNCIL ON MENTAL HEALTH, along with the National Research Council of the National Academy of Sciences,<sup>4</sup> and an editorial in *THE JOURNAL* in 1968<sup>5</sup> warned that cannabis is a dangerous drug and a public health concern. Also, there have been articles by Ames<sup>6</sup> and Allentuck<sup>7</sup> describing ill effects.

In the literature of clinical experiments, Isbell<sup>8</sup> and his associates showed that the isolated chemically-active ingredient of the cannabis group, (-)  $\Delta^9$ -*trans*-tetrahydrocannabinol, caused psychotic reactions in humans tested at the Addiction Research Center in Lexington, Ky. Hartmann<sup>9</sup> and Wieder and Kaplan<sup>10</sup> described some psychological effects in 1969.

In the pharmacological literature, a detailed report and review by Gershon<sup>11</sup> in 1970 showed the many effects of marihuana on animals. He stressed that, in most animals extracts of marihuana induced stimulation and excitement followed by general depression. Gershon also called our attention to the marked diminution of oxygen uptake by the brain while the animals were intoxicated with marihuana.

We (both authors) are in separate, individual, private practices of child and adult psychiatry and psychoanalysis, and both of us have extensive consultative opportunities. In the period from 1965 to 1970, we began to note a sizeable increase in referrals of individuals who, upon

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investigation by history, showed an onset of psychiatric problems shortly after the beginning of marihuana smoking; these individuals had either no premorbid psychiatric history or bad premorbid psychiatric symptoms which were extremely mild or almost unnoticeable in contrast to the serious symptomatology which followed the known onset of marihuana smoking. In our study, all in this group who smoked marihuana more than a few times showed serious psychological effects, sometimes complicated by neurologic signs and symptoms. In 38 of our patients, our findings demonstrate effects ranging from mild to severe ego decompensations (the latter represent psychoses). Simultaneously, we have examined and treated many other marihuana smokers who either had severe psychological problems prior to smoking marihuana or who also used lysergic acid diethylamide (LSD), the amphetamines, or other drugs; these patients had more complex findings and were not included in this study of 38 patients because we could not be certain that symptoms seen were related to marihuana alone. We have studied some neurotic individuals whose symptoms became more severe after smoking marihuana, but since their earlier symptomatology would becloud such a study as this, we did not include them. Still others who had a marked predisposition to psychosis and who became psychotic after beginning to smoke marihuana were not included in this series, since our purpose was to report only the effects seen as a consequence of marihuana smoking in those not showing a predisposition to serious psychiatric problems. We are currently studying the group with a known predisposition to determine whether marihuana acted as a catalyst to produce psychosis. The 38 patients described in this communication range in age from 13 to 24 years, and the group consists of 20 male and 18 female individuals. We

have seen many patients older than 24 who have been smoking marihuana and who have similar symptoms to those we describe, but we have confined our present communication to those aged 24 and younger.

### Methods

Prior to 1965, we only occasionally saw patients who smoked marihuana. The 38 patients described are part of a consultation practice that included several hundred new referrals seen during the five-year period from 1965 to 1970, most of whom did not smoke marihuana.

To establish a diagnosis for the usual adult referred for consultation, we see the patient once or twice to determine his history and to examine his psychiatric status; following this, treatment recommendations are made. When children and adolescents are referred, we see the parents two to five times to obtain a history; following this we examine the youngsters in one or two office visits. About one of four of our patients is also psychologically tested. Psychological testing is performed by clinical psychologists with long experience on those of our patients for whom our diagnostic impressions are that we are dealing with a psychosis, an ego disturbance, an organic central nervous system disorder, or a severe learning disability. We followed the same diagnostic procedures with those of our patients known to be smoking marihuana.

Formal neurologic examinations were not done, but there were gross indications of neurologic impairment in a few patients who smoked marihuana four or five times weekly for many months. This impairment consisted of slurred speech, staggering gait, hand tremors, thought disorders, and disturbance in depth perception (such as overshooting exits on turnpikes, misjudging traffic lights and stop signs at intersections, diminished ability to time catching a baseball, or undershoot-

ing a basketball net).

A diagnosis was established and treatment recommendations were made for each of our 38 patients. In some, psychotherapy or psychoanalysis was indicated, and in that group, further psychological understanding of the underlying causes of marihuana smoking was obtained. In others, the gamut of psychiatric treatment was instituted, which sometimes, of necessity, included hospitalization.

In each instance, only one of us diagnosed the condition and prescribed the treatment. In a few instances, diagnosis was made by one author and treatment was instituted by the other. In these few cases, there was agreement on diagnosis.

### General Psychiatric Considerations

Most of the 38 patients in this study smoked marihuana two or more times weekly and, in general, smoked two or more marihuana cigarettes each time. These patients consistently showed very poor social judgment, poor attention span, poor concentration, confusion, anxiety, depression, apathy, passivity, indifference, and often, slowed and slurred speech. An alteration of consciousness which included a split between an observing and an experiencing portion of the ego, an inability to bring thoughts together, a paranoid suspiciousness of others, and a regression to a more infantile state were all very common. Sexual promiscuity was frequent, and the incidence of unwanted pregnancies among female patients was high, as was the incidence of venereal diseases. This grouping of symptoms was absent prior to the onset of marihuana use, except in 11 patients who were conscious of mild anxiety or occasional depression.

There was marked interference with personal cleanliness, grooming, dressing, and study habits or work or both. These latter characteristics were at times present in some pa-

ents prior to smoking marihuana, ut were always markedly accen- ated following the onset of smok- g. In one subgroup, a clear-cut iagnosis of psychosis was estab- shed, and in these patients, there as neither evidence of psychosis r ego disturbance nor family his- ry of psychosis prior to the pa- ents' use of marihuana. Several in is group were suicidal. In some ividuals, instead of apathy, hy- ractivity, aggressiveness, and a pe of agitation were common. In o instance were these symptoms evidence prior to the use of mari- uana.

#### A. Psychosis With Suicidal Attempts

Four individuals, two male and o female between the ages of 14 d 17, showed psychotic reactions re attributable to cannabi de- vatives, and each attempted sui- de. In the usual type of adolescent ychosis, there is an antecedent story of very poor ego organiza- on. In no instance was there a story of such earlier ego disor- nization in our eight psychotic itients; nor prior to smoking mari- uana was there psychosis, ego dis- rbanance, family history of psycho- s, fragile ego, or suicidal attempts.

**CASE 1.**—A 17-year-old girl smoked arihuana daily for one year prior to nsultation and for an additional year ile she was in psychiatric treatment. y history from her parents and by ervation during the year following try into treatment, she showed a dual regression in organizing ough. She continuously repeated rases and had the delusion that she is a great actress, but saw life as ough a veil. Speech and thinking owed down, and she believed that she is living life in slow motion. Memory d perception became markedly im- ired, thinking became tangential, d judgment became poor. This led to ar social and familial difficulties. was attempted while she was marihuana, and despite the ness of the attempt, the patient is euphoric during and following the ort, with slurred speech, pleasant od, absent judgment, and missing

reality testing.

**CASE 2.**—A 17-year-old boy was se- duced homosexually after an older man gradually introduced him to marihua- na smoking over a period of one year. His history showed no evident previous psychopathological condition, and his adolescent development appeared to be normal prior to smoking. Confusion and depression gradually developed, which led to psychiatric evaluation. He continued to smoke marihuana and gradually withdrew from reality, devel- oping an interest in occult matters which culminated in the delusion that he was to be the Messiah returned to earth. He attempted suicide three times by wrist cutting. When he was hospitalized and marihuana was with- drawn, a slow and gradual reversal of the process described occurred.

**CASE 3.**—Shortly after a 14-year-old boy began to smoke marihuana, he be- gan to demonstrate indolence, apathy, and depression. Over a period of eight months, his condition worsened until he began to hallucinate and to develop paranoid ideas. Simultaneously, he be- came actively homosexual. There was no evidence of psychiatric illness prior to smoking marihuana and hashish. At the height of his paranoid delusions, he attempted suicide by jumping from a moving car he had stolen. He was arrested, and during his probation pe- riod, he stopped smoking and his para- noid ideation disappeared. In two six- month follow-up examinations, he was still showing some memory impairment and difficulty in concentration. Of note was the fact that he still complained of an alteration in time sense and dis- tortion of depth perception at the time of his most recent examination.

**CASE 4.**—A 16-year-old girl in whom there was no prior psychiatric difficul- ty smoked cannabis derivatives (mari- huana and hashish) at first occasional- ly, and then three to four times weekly for a period of two years. She began to lose interest in academic work and be- came preoccupied with political issues. From a quiet and socially popular girl, she became hostile and quite impulsive in her inappropriate verbal attacks on teachers and peers. She dropped out of school in her senior year of high school, which led to psychiatric referral. She showed inappropriate affect and devel- oped paranoid ideas about an older sis- ter's husband having sexual interests in her. She refused to give up smoking marihuana and eventually became so depressed that she attempted suicide by hanging. After withdrawal from the drug, her depression and paranoid ideas slowly disappeared, as did her

outbursts of aggression. Ten months of follow-up showed continued impair- ment of memory and thought disorder, marked by her complaint that she could not concentrate on her studies and could not transform her thoughts into either written or spoken words as she had once been able to do quite easily.

#### B. Psychoses Without Suicidal Attempts

Four individuals, all male be- tween the ages of 18 and 24, showed psychoses as a consequence of smok- ing cannabis derivatives. As with those who attempted suicide, this group showed no prior history of ego fragility, predisposition to psy- chosis, or familial history of psy- chosis.

**CASE 1.**—A married 24-year-old man who had shown no previous psychiatric illness or evidence of personality dis- order met a group of new friends who taught him to smoke marihuana. He enjoyed the experience so much that he smoked it daily for two months, claiming that it did not interfere with his daily functioning. He even said that he could think more clearly. Grad- ually he began to withdraw from his friends and seemed suspicious of them. He developed ideas of reference, be- lieving that his friends talked about him saying that he was impotent. (Im- potence had actually occurred on sev- eral occasions after he had smoked a large amount of "good hash.") He also believed that he was developing heart disease as a result of "bad drugs." He had experienced palpitations and a feeling of his heart "jumping" in his throat on several occasions while smok- ing some Mexican marihuana. He be- lieved that his friends were trying to do away with him in order to have his wife. At the end of the two months, he showed a full-blown paranoid psycho- sis and had delusions of grandeur. He believed that he had developed a su- perior intellect at the expense of a loss of his sexual life. He was the first mem- ber of a new "super race." After stop- ping his smoking, his delusional ideas disappeared and he returned to his normal functioning in his job and mar- riage.

This patient and the others in this subgroup, although delusional, were never hospitalized, since they

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adequately functioned in other ways. It was only after some acquaintance with the psychiatrist that each of these patients told of his delusional system. Characteristic of some of our long-term marihuana smokers who develop paranoid delusions is an ability to function for a period of time without others being aware of their illness, either because they join groups who share their aberrational thinking or because they keep their delusional thoughts to themselves.

We have also noted that, as these individuals withdraw from marihuana, the delusional system is given up more quickly in those patients who have been smoking for a shorter period of time; however, as better reality testing is achieved, these patients seem to be left with a residual of some memory difficulty and impairment of concentration. One patient has shown this for two years at the time of this writing.

**CASE 2.**—A 20-year-old man developed delusions of omnipotence and grandeur six months after starting to smoke marihuana. He believed that he was in charge of the Mafia and that he was an Eastern potentate of the Ku Klux Klan. He began to collect guns and knives in addition to training his German shepherd dog to attack others. He had not previously smoked marihuana except experimentally on two occasions while in college. He graduated cum laude in business administration in less than three years by attending summer school. He worked in a family business and was doing creditably in his job as well as in his social life. He found his way into a "swinging" crowd that smoked cannabis derivatives regularly. He took up "the habit" and almost immediately noticed changes in his working pattern and a shift or decline in ambition. He gradually withdrew from a heterosexual relationship after a few episodes of impotence while "high" on hashish. He became apathetic and more of a "loner," and then finally became distrustful of his friends and family. At this point, he sought psychiatric treatment and told of his delusional thoughts, fearful that he was losing his mind. Upon withdrawal from the drug, psychotic symptoms disappeared, yet a residual of difficulty in thinking

(which he described as "fuzzy") was still complained of in a one-year follow-up examination.

**CASE 3.**—An 18-year-old boy who smoked marihuana and hashish regularly for a three-year period became progressively withdrawn, confused, and depressed. His interest in astrology and Eastern religions increased. He became a vegetarian and practiced yoga. He had the delusion that he was a guru and eventually believed that he was the son of God who was placed on earth to save all people from violence and destruction. This patient gave a history of mild anxiety and headaches in his earlier adolescent years, as well as that of some difficulty in getting along with others. Prior to smoking marihuana, he had mild general and social anxiety and headaches for several years. He began smoking marihuana occasionally with friends at the age of 15, and over a two-year period, showed signs of ego decompensation. He did poorly in school, although he could "get along." When he increased the frequency of smoking, delusional symptoms began to develop. Consultation with one of us previously because of some of his adolescent difficulties made it easier for him to consult us again upon becoming concerned with his beliefs that he was God's son. He knew that his thoughts were not "right" and worried when a smoking friend told him of his own similar delusions. There was even a joke among his crowd that they knew "a guy had gone too far" when he thought that he was like a god. Persuasion could not convince this young man to give up cannabis, although he acknowledged that his symptoms resulted from drug use. After consultation, he moved to the west coast and continued his unproductive, aimless life, supported financially by his parents.

**CASE 4.**—A 19-year-old boy smoked marihuana for four months, gradually developing ideas of reference. Believing he had superhuman mental powers, he felt that he was able to communicate with and control the minds and actions of animals, especially dogs and cats. No one knew of his belief in his messianic powers and divine rights. He was referred for psychiatric consultation by his school because of a sharp decrease in his interest in his schoolwork. He seemed listless, apathetic, and depressed. Prior to smoking marihuana he had been outgoing and did well academically, but following the onset of smoking he shunned family and friends. He continued to maintain good grades on the basis of sheer mo-

mentum of accumulated academic experience, although there was decline in academic interest.

His most closely guarded secret was the belief that he was the Messiah, and although he believed this to be a "weird idea," he felt it to be true and thought that marihuana gave him this power.

Upon cessation of marihuana smoking, the delusional system disappeared, and he was able to return to a level of functioning similar to that of the days before marihuana smoking.

It was our impression in these cases that the use of cannabis derivatives caused such severe decompensation of the ego that it became necessary for the ego to develop a delusional system in an attempt to restore a new form of reality. It would appear that this type of paranoid reaction is a direct result of the toxic effects of cannabis upon the ego organization of those patients described in this study.

We have not included in this communication a large number of cases of psychosis due to the use of other psychotomimetic drugs in combination with cannabis derivatives. It is our impression that those patients who had been taking LSD or mescaline or both with marihuana appeared to have more acute psychotic reactions which were accompanied by greater panic and distress, resulting in more frequent need for hospitalization, than those smoking marihuana alone.

### C. Borderline States (Ego Decompensation) in Those on Trial for Possession of Marihuana

Twelve adolescents (aged 15 to 18), nine male and three female, had smoked marihuana regularly for one or more years prior to being arrested for using marihuana. In each instance, the legal authorities asked for a psychiatric evaluation, and none of these individuals smoked marihuana immediately prior to the examination. All 12 showed evidence of ego decompensation and disturbance in reality

testing, memory, social judgment, time sense, concept formation, concentration, abstract thinking, and speech production. All 12 gave a history of steadily declining academic ability and class standing, and all felt isolated from others. Eight of this group complained of trouble converting thoughts into words, which resulted in a rambling, disjointed flow of speech with hesitation and circumstantiality. Memorized phrases were frequently substituted to mask the loss of speech and thought continuity.

Three of these adolescents had periods of depersonalization while *not* under the influence of the drug. They felt that they were watching themselves and others interreact, as if in a dream.

None of these 12 individuals showed evidence by history of psychotic disturbance prior to beginning to smoke marihuana.

Psychological testing performed on our patients in this group showed these patients to have regressed to early stages of psychological development and to be relying on omnipotent and grandiose fantasies as methods of psychological defense against anxiety. All of these patients showed impairment of control of impulses and judgment and an inability to distinguish the subtleties of the feelings of others in social situations. Limited attention span and encroachment on reality testing, as well as generally impaired cognition, were evident in all. The psychological tests were done without the psychologists' previous knowledge of cannabis use by the patients, but testing was not used to help determine whether cannabis was used or whether cannabis produced a specific effect. It was used instead to help determine the extent of ego decompensation.

A 16-year-old boy smoked marihuana for 18 months. He had a normal intelligence prior to smoking. He was well liked by teachers and peers, and appeared to have

no more difficulties than other adolescents prior to smoking marihuana. He said that he began to smoke because his friends did. He felt that it was safe, believing marihuana was harmless. As he began to notice some apathy, loss of goal direction, and increasing depression, he still felt that marihuana was not harmful.

Upon examination, he attempted to win over the psychiatrist with a pleasant, willing, cooperative manner. There was, however, mild disorientation, feelings of omnipotence, and a feeling of isolation.

In psychological testing, he had bright-normal scores on the Wechsler-Bellevue intelligence scale. He showed poor attention span and concentration and poor retention of acquired, as well as of accumulated, knowledge. There was evidence of tenuous control of impulses. Reality testing was impaired. The psychologist reported "early signs of personality decompensation in that he retreated into himself. He functioned at a level of early childhood, believing in his own omnipotence. This state might result in further impulse-motivated behavior so that he would probably commit further asocial and/or anti-social acts prior to becoming severely depressed."

#### D. Borderline States (Ego Decompensation) Not at First Associated With Marihuana

Six individuals 14 to 20 years of age, five male and one female, were seen in consultation. All of these individuals were seen because of the chief complaints of general deterioration in schoolwork, inability to concentrate or to pay attention in class, gradual decrease in academic standing, apathy, indifference, passivity, withdrawal from social activities, and limitation of interest. All showed the same evidence of ego decompensation as described in group C, including disturbance in reality testing, memory, social judgment, time sense, concept formation, concentration, abstract thinking, and speech production. All felt isolated from others. Four of these individuals showed no prior history of these symptoms, while two showed some difficulty in concentration in school prior to smoking marihuana. In the latter

two, the difficulty in concentration became far more pronounced following regular smoking of marihuana.

CASE 1.—A 19-year-old college freshman arrived on time for psychiatric consultation, dressed in old, torn, dirty clothes. He was unkempt, with long hair that was uncombed and disheveled. He talked in a slow, hesitant manner, frequently losing his train of thought, and he could not pay attention or concentrate. He tried hard to both talk and listen, but had difficulty with both. He had been an excellent high-school athlete and the highest student in his class in a large city. He was described as neat, orderly, and taking pride in his appearance, intellect, and physical fitness. During the last half of his senior year, he began casual (one or two marihuana cigarettes each weekend) smoking. By the time of the evaluation in the middle of his first college year, he was smoking several marihuana cigarettes daily. While in college, he stopped attending classes, didn't know what his goals were, and was flunking all subjects. He partook in no athletic or social events, and was planning to drop out of college to live in a young, drug-oriented group.

CASE 2.—A 19-year-old boy entered college with an "A" average. He began smoking marihuana early in the freshman year, and within two months of starting to smoke cannabis, he became apathetic, disoriented, and depressed. At the semester's end, he had failed all courses and lacked judgment in most other matters. Upon return to his home, he discontinued marihuana after a total period of 3½ months of smoking. Gradually, his apathy disappeared, his motivation returned, and his personal appearance improved. He found employment, and in the following academic year, he enrolled at a different university as a preprofessional student. His motivation returned, as did his capability. As with so many of our patients, this young man told his psychiatrist that he had observed changes while smoking marihuana; he even went to a college counselor and told the counselor that he felt he was having a thinking problem due to smoking marihuana. The counselor reassured him that the drug was harmless and that there was no medical evidence of difficulties as a consequence of smoking.

#### E. Ego Impairment With Marked Sexual Promiscuity

Thirteen female individuals, all

Marihuana Effects—Kolansky & Moore

unmarried and ranging in age from 13 to 22, were seen in consultation with almost the same symptoms as those in groups C and D. (One in this group was psychotic and is listed as case 1 of group A. Thus, our total reported group of cases remains 38, not 39.)

This group is singled out because of the unusual degree of sexual promiscuity, which ranged from sexual relations with several individuals of the opposite sex to relations with individuals of the same sex, individuals of both sexes, and sometimes, individuals of both sexes on the same evening. In the histories of all of these individuals, we were struck by the loss of sexual inhibitions after short periods of marijuana smoking. Seven patients of this group became pregnant (one on several occasions), and four developed venereal diseases. Each showed confusion, apathy, depression, suicidal ideas, inappropriateness of affect, listlessness, feelings of isolation, and disturbances in reality testing, and among the 13, all of whom attended junior high school, high school, or college, all showed a marked drop in academic performance. The decline in academic performance was in direct proportion to the frequency and amount of smoking. Most smoked three or more times weekly.

Five of the 13 were engaged in homosexual activities which began after the onset of smoking, and three attempted suicide.

In no instance was there sexual promiscuity prior to the beginning of marijuana smoking, and in only two of the 13 cases were there histories of mild anxiety states prior to smoking. We take these results to indicate marijuana's effect on loosening the superego controls and altering superego ideals.

#### Adolescent Development and Marijuana

The nature of adolescent development is of importance in a discus-

sion of marijuana. The adolescent may begin to smoke marijuana and then suffer damage in further psychological growth, development, and maturation.

In brief, adolescence has as its central driving force the organic, maturational establishment of puberty. Related to physical changes of adolescence are profound (normal) psychological changes.

Anna Freud<sup>12</sup> has described these psychological changes in the normal adolescent as follows:

It is normal for the adolescent to behave . . . in an inconsistent and unpredictable manner; to fight his impulses and to accept them; . . . to love his parents and to hate them; . . . to thrive on imitation of and identification with others while searching unceasingly for his own identity; to be more idealistic, artistic, generous, and unselfish than he will ever be again; but also the opposite, self centered, egoistic, and calculating.

These psychological changes, according to Pearson,<sup>13</sup> are due to the unsettling effect of sudden, general bodily growth and the gradual changes in primary and secondary sexual characteristics, as well as to a final stage of myelination within brain tracts which leads to greater perception of nuances of color and sound. Pearson also described the conflict of generations, and how lack of parental understanding further weakens the adolescent's ego, leading to the psychological changes already mentioned.

The normally developing adolescent compares the image of his body (often characterized by uneven growth spurts) to his preadolescent body (smooth and even), to those of his peers (different), and to those of adults (who are ambivalently admired), and feels himself lacking. He is bombarded by known sexual impulses related to the organic sexual changes, and he feels overwhelmed and at first unable to control or deal with these impulses effectively. He feels flooded by sub-

tletries of color and sound never before perceived, but now very taxing to his mind. Typically, in efforts at management of these biologically induced phenomena, and also due to the struggle with his parents, he regresses psychologically and tends to handle these anxieties in paradoxical ways, as by immersing himself in glaring colors and loud sounds, by fighting with parents, or by dressing in a bizarre way which accentuates his body-growth proportions.

The normal adolescent needs support and guided firmness from the parent. If this is missing, he may turn increasingly to drugs. The adolescent living in a ghetto has the added problem of the absence of daily necessities, making reality harsh and the appeal of drugs even stronger. When the adolescent is further exposed to equivocation by authorities in speech or writing on the innocence or dangers of marijuana, then his urge toward a drug solution for conflict may be enhanced, and if there has been a lack of support and interest in the child prior to adolescence and a lack of continuing interest, support, and benevolent firmness by the parent in the teen-age years, the adolescent may still more readily turn to drugs.

To illustrate the issue of lack of firm guidance, several of our patients had parents who talked to the adolescent of their own curiosity about the effects of marijuana, without emphasizing its dangers, or emphasized the discrepancies in the law, without insisting that the youngster must not use marijuana or other drugs because of the serious effects that would occur. We have found that equivocation by the parents has contributed to eventual drug experimentation.

Most often, the normal adolescent, weakened by his own rising sexual pressures, body changes, and disillusionment with parental ideals, seeks peer relationships to establish

new ideals and thereby strengthen his own character. Among his peers today, he finds many smoking marihuana. He cannot tolerate the isolation from those who smoke. Also, the need to repudiate parental ideals is strong. In his desperation to find new ideals, he turns to those who use drugs. Even though their smoking frightens him, gradually he accepts their drug use. He cannot see any changes in his friends as a result of smoking cannabis (early changes are even difficult for the professional to detect). He identifies, however, with their rebellious attitude toward authority as expressed by their use of marihuana. He may then smoke. At first, he is puzzled and disappointed at not reaching a "high" (which he will not admit to his new friends), and he fails to see any adverse effect upon himself other than some exaggeration or distortion of sensory perceptions. He continues to smoke in an attempt to achieve an effect. His parents and others are thought to be alarmists; he can see no harm in "smoking a little pot." He is unaware that increased smoking over a period of time will likely deprive him of the ability to adequately resolve his internal conflicts.

When we examined the effects of marihuana on the adolescents in our study, we were struck by the accentuation of the very aspects of disturbing bodily development and psychological conflicts which the adolescent had been struggling to master. Marihuana accentuates the inconsistencies of behavior, the lack of control of impulses, the vagueness of thinking, and the uncertainty of body identity which Anna Freud described.<sup>12</sup> Moreover, dependency and passivity are enhanced at a time when the more natural course would be to master dependent yearnings and to become independent. Rebellion toward parents and authority is increased while the adolescent is struggling toward

abandoning such rebellion. His uncertainty about sex grows while he smokes marihuana. The desire to be independent diminishes while he is smoking with his peers.

While the adolescent is struggling to master his feelings about bodily growth surges, he is confronted with further changes in the mental image of his body if smoking marihuana. Also, while he is struggling to master new physical, intellectual, and emotional strengths, he is hampered by marihuana. This leads to further anxiety.

Moreover, while struggling to make order out of the sudden flood of new sounds and colors incident to normal brain maturation, he is inundated by the changes in sensory perceptions which are the hallmark of marihuana use. While valuing clear thinking, coherent speech, alertness of reasoning, good attention span, and concentration, he is now confronted with at least temporary interference with these activities.

Our study showed no evidence of a predisposition to mental illness in these patients prior to the development of psychopathologic symptoms once moderate-to-heavy use of cannabis derivatives had begun. It is our impression that our study demonstrates the possibility that moderate-to-heavy use of marihuana in adolescents and young people without predisposition to psychotic illness may lead to ego decompensation ranging from mild ego disturbance to psychosis.

Clearly, there is, in our patients, a demonstration of an interruption of normal psychological adolescent growth processes following the use of marihuana; as a consequence, the adolescent may reach chronological adulthood without achieving adult mental functioning or emotional responsiveness.

We are aware that claims are made that large numbers of adolescents and young adults smoke mari-

huana regularly without developing symptoms or changes in academic study, but since these claims are made without the necessary accompaniment of thorough psychiatric study of each individual, they remain unsupported by scientific evidence. No judgment on the lack of development of symptoms in large, unselected populations of students or others who smoke marihuana can be made without such definitive individual psychiatric history-taking and examination.

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~~CONFIDENTIAL~~  
Report dated 8-26-76  
refer (Page 11)

April 7, 1977

Senate Judiciary Committee  
Nevada State Senate  
Legislative Building - Carson City, NV 89710

ATTENTION: Chairperson, Mr. Melvin D. Close, Jr.

SUBJECT: AB-253

I, Janet B. Allen, appointed on 9-23-75 to the Governor's Commission on the Status of People, State of Nevada, do hereby state that I am a proponent for AB-253.

During the many meetings, which we as members of this Commission held state-wide, we found that the use of marijuana is not conduct of sufficient seriousness to warrant conviction of a "felony" and the accompanying legal detriments.

We found no reliable studies which could conclusively establish that its use was any more damaging to the human mental & physical components, than the consumption of legalized "alcohol". We did, however, find considerable evidence that a substantial amount of the resources of our law enforcement agencies and our judicial system is devoted to the problems involving the use of marijuana. This causes a serious financial burden to the tax payers.

Our recommendation is .."the possession of one ounce or less of marijuana for personal use should be decriminalized, or in the alternative, the crime be reduced to a misdemeanor with a nominal fine, constituting the maximum punishment.

Nevada Statute "Minor's Disabilities, 129.010 (1973) cites the 'age of majority to be 18'.

I am addressing my reasons, as a proponent for AB-253, to those first offenders and perhaps even the second offender who fall within the category

Exhibit F1  
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covered under AB-253, since we found the lives of many of our young people  
were drastically altered under the current law.

Presently the first term offenders under NRS 453.336, 161 through 191, calls  
for ~~24~~ imprisonment of not less than 1 year but not more than 6 years with a fine  
of \$2000.00. This of course, is utilized at the discretion of the Courts,  
wherein one individual may receive the maximum and others much less.

Conviction of 'felony' creates adverse circumstances, such as the right  
to vote; the right to bear arms (federal stats) and further, Nevada law  
requires the registration of "ex-felons".

Thank you.

Janet B. Allen