

May 4, 1981

THE MARIJUANA EPIDEMIC

I get a sick feeling in the pit of my stomach when I hear talk of marijuana being safe. Marijuana is a very powerful agent which is affecting the body in many ways. What the full range of these consequences is going to be, we can only guess at this point. But from what we already know, I have no doubt that they are going to be horrendous.¹

Dr. Robert DuPont
Former Director of the
National Institute on Drug
Abuse.

INTRODUCTION

Marijuana smoking has reached epidemic proportions in the United States. Some sixteen million Americans are now regular users; and among high school seniors, about one in ten are daily smokers -- averaging 3½ joints a day.

The extent of current marijuana consumption raises many important concerns. While use of the drug is widespread throughout the world, for instance, only in the United States is it so prevalent among young people of all classes that an entire generation is affected. In other countries, the smoking of marijuana is not usually found throughout the entire society -- generally use is confined to certain religious groups or classes. Only in this country does it involve the whole culture.

¹ Washington Post, July 30, 1978.

The most frightening aspect of the widespread use of the drug is that the overwhelming majority of smokers have no knowledge of the demonstrated medical effects of marijuana. Most regard it as completely harmless, or at least as no worse than alcohol or tobacco. During the 1960s, when the drug became common in America, reliable scientific evidence was sparse. Marijuana seemed harmless enough to most people, and the very expression of doubt by experts was all too often discounted as deriving from opposition to the political and social attitudes of the users.

This absence of hard evidence regarding the consequences of the drug caused many scientists and legislators to take a liberal view of marijuana usage -- how could one condone alcohol and tobacco and then condemn marijuana? But in the last ten years, the climate has changed. Many detailed studies have been published on the medical aspects of the drug, and a body of scientific literature has been assembled which was unavailable only ten years ago. The National Institute on Drug Abuse (NIDA), a division of the Department of Health and Human Services, has taken the lead in sponsoring over a thousand tests, employing sophisticated procedures to control dosage, strength, etc., consistent with patterns of social usage. Other organizations have funded similar research projects.

It took sixty years of studies to establish a strong correlation between tobacco smoking and a number of serious diseases. Yet the results of experiments carried out in the last decade already suggest a strong relationship between the use of drugs and several medical disorders. Marijuana appears to impair memory, learning performance, motivation and may permanently damage brain tissue. It would also seem to have damaging effects on the lung, reproductive organs and the immunity system.

The powerful evidence now available has caused many experts to revise their position from one of indifference to one of great concern. Dr. Robert DuPont, quoted above, is a case in point. In various senior governmental positions, he did much to soften attitudes towards the use of marijuana -- indeed he was often cited in the literature of the decriminalization lobby. But now, as president of the American Council on Marijuana, he is in the forefront of a campaign to end the consensus that marijuana is no worse than many other drugs taken for pleasure. That belief, he says, "is a disaster and I feel very badly to have contributed to [it]."² Like so many of those who have changed their minds in light of the evidence, Dr. DuPont is particularly anxious about the long-term consequences of marijuana smoking on the current school population.

² "Reading, Writing and Reefer," NBC News Report, broadcast December 10, 1978.

This Backgrounder will review the scientific evidence which has led to the dramatic change of heart by so many people. It will then examine the policy options available to deal with the situation.

THE GROWING USE OF MARIJUANA

What is Marijuana?

Marijuana (also known as pot or grass) comes from the plant Cannabis Sativa (Indian hemp or hashish), which has been cultivated for hundreds of years as a source of rope. The principal psychoactive, or mind-altering, ingredient of marijuana is a substance known scientifically as delta-9-tetrahydrocannabinol (or THC), although several hundred other chemicals with various effects are also present.

An intake of between five and ten milligrams of THC into the bloodstream is usually sufficient to induce intoxication -- a "high." In the 1960s, when the drug was becoming fashionable, most of the marijuana smoked in this country was of domestic origin. At that time, most American marijuana had a rather low THC content (0.2 percent to 1 percent), and so a 1 gram joint might contain in the region of 2-10 milligrams of THC. By 1970, however, Mexican marijuana with an average THC of between 1.5 percent and 2 percent, had begun to dominate the market. By the end of the 1970s, Jamaican and Colombian varieties, with concentrations of 3 percent to 4 percent THC began to enter the country in increasing quantities. In addition, liquid hashish, with a concentration of 30 percent to 90 percent THC, began to appear. At a potency rate of 50 percent THC, an ounce of this oil is sufficient to intoxicate one thousand people. In 1974 alone, 369 pounds were seized by federal agents.³

The rise in potency of marijuana available in the United States is central to any discussion of the medical impact of the drug. The early, inconclusive studies carried out in this country were based on the low-potency marijuana then being consumed. But now we are dealing with far stronger varieties, and the studies using these strains of marijuana are far from inconclusive.

Usage of Marijuana

Twenty years ago, marijuana was hardly used in this country. Only in the late 1960s did the drug become widely used, and not until the mid-1970s did it become commonplace. The increase in use has been dramatic by any measure. The most recent major study on usage was conducted by the National Institute on Drug

³ J. N. Jenson, Testimony before the Senate Subcommittee on Internal Security, May 1975, ref. 81, pp. 431-450.

Abuse, using a national sample carefully broken down by age and other characteristics.⁴ As Table I indicates, this study found that 68 percent of young adults in 1979 had tried marijuana, compared with only 4 percent in 1962. Among 12- to 17-year-olds, the proportion had grown over the same period from just 1 percent to 31 percent. Even among 12- to 13-year-olds in 1979, the study showed 8 percent had been introduced to the drug. When NIDA examined current users (those who had used the drug within the last month), the pattern illustrated by Table II emerged. As the figures indicate, widespread use now occurs among children of high school age and 40 percent of the college-aged population are current users.

Among those who reported current use of the drug, the NIDA study found that about two-thirds of young adults and one-half of older adults and youths have used marijuana five or more times in the last month. Of our high school seniors, some 10 percent were found to be daily users, consuming an average of 3½ marijuana joints every day. Not only has the proportion of daily users doubled among high school seniors since 1975, but it now exceeds the number who use alcohol on a daily basis (stable at about 6 percent since 1975).

When one remembers that the potency of the average marijuana joint has increased many fold in the last ten years, it becomes clear that we are dealing with a staggering increase in the consumption of THC, particularly among the student population. In the 1960s, the medical implications of marijuana use were of direct concern only to a small number of people, and the dangers of heavy chronic use to an even smaller group. But today, the drug is so widespread that the medical evidence is important for the entire population.

The volume and market value of the marijuana trade now makes it a major industry. According to the Wall Street Journal even domestically produced marijuana rivals some leading farm crops. In California, the value of production may soon pass the \$1 billion grape industry -- the state's number one farm commodity. In Hawaii, the level of marijuana production and sales may exceed the islands' largest business, the \$300 million sugar industry.⁵ The Federal Drug Enforcement Administration (DEA) estimates that domestically produced marijuana now accounts for up to 20 percent of the value of the entire trade. The American growers have specialized in recent years on developing very high grade varieties, by selective breeding. The most potent California strains

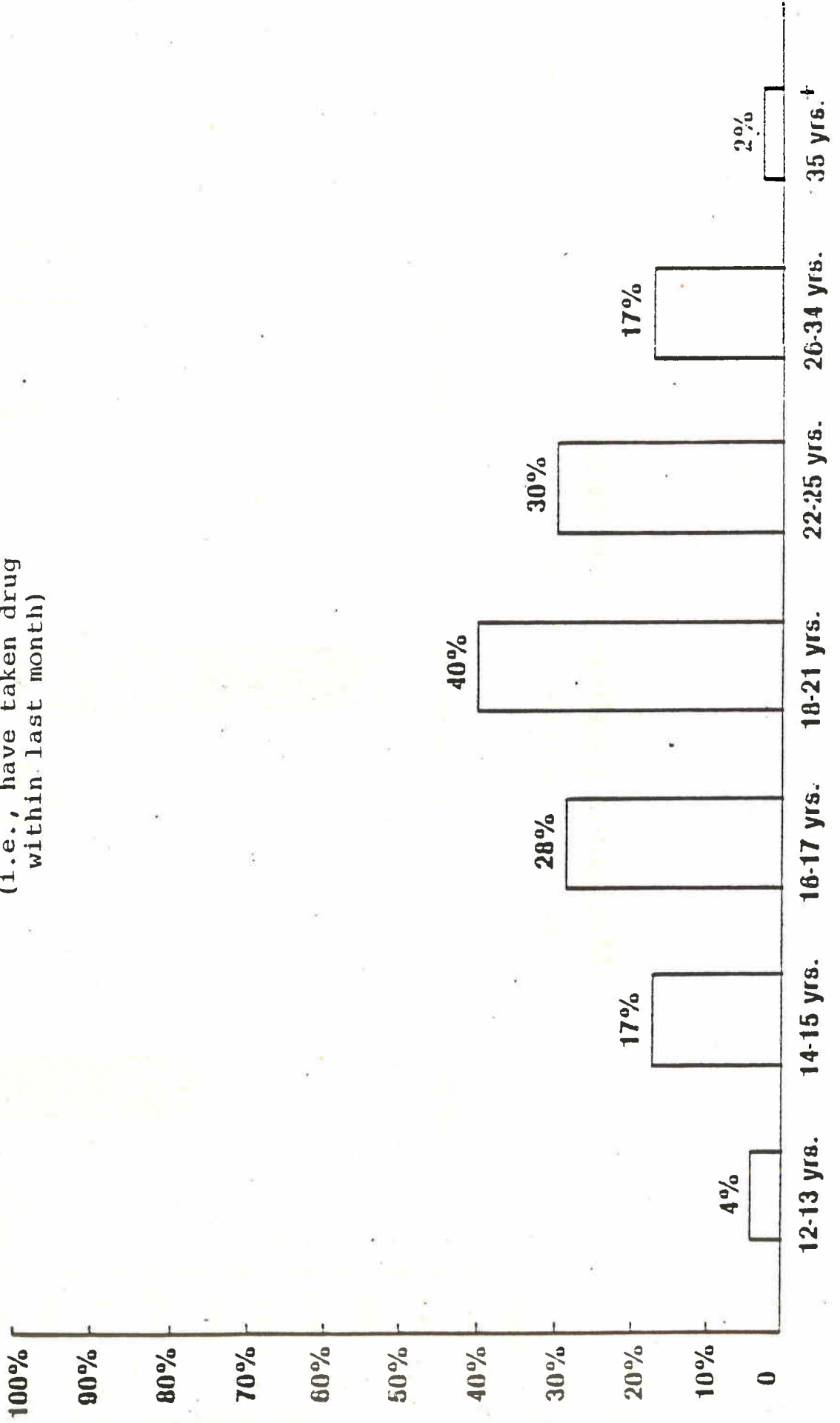
⁴ National Institute for Drug Abuse, National Survey on Drug Abuse: Main Findings 1979 (Rockville, Maryland: NIDA, 1980).

⁵ Wall Street Journal, August 4, 1980.

TABLE II

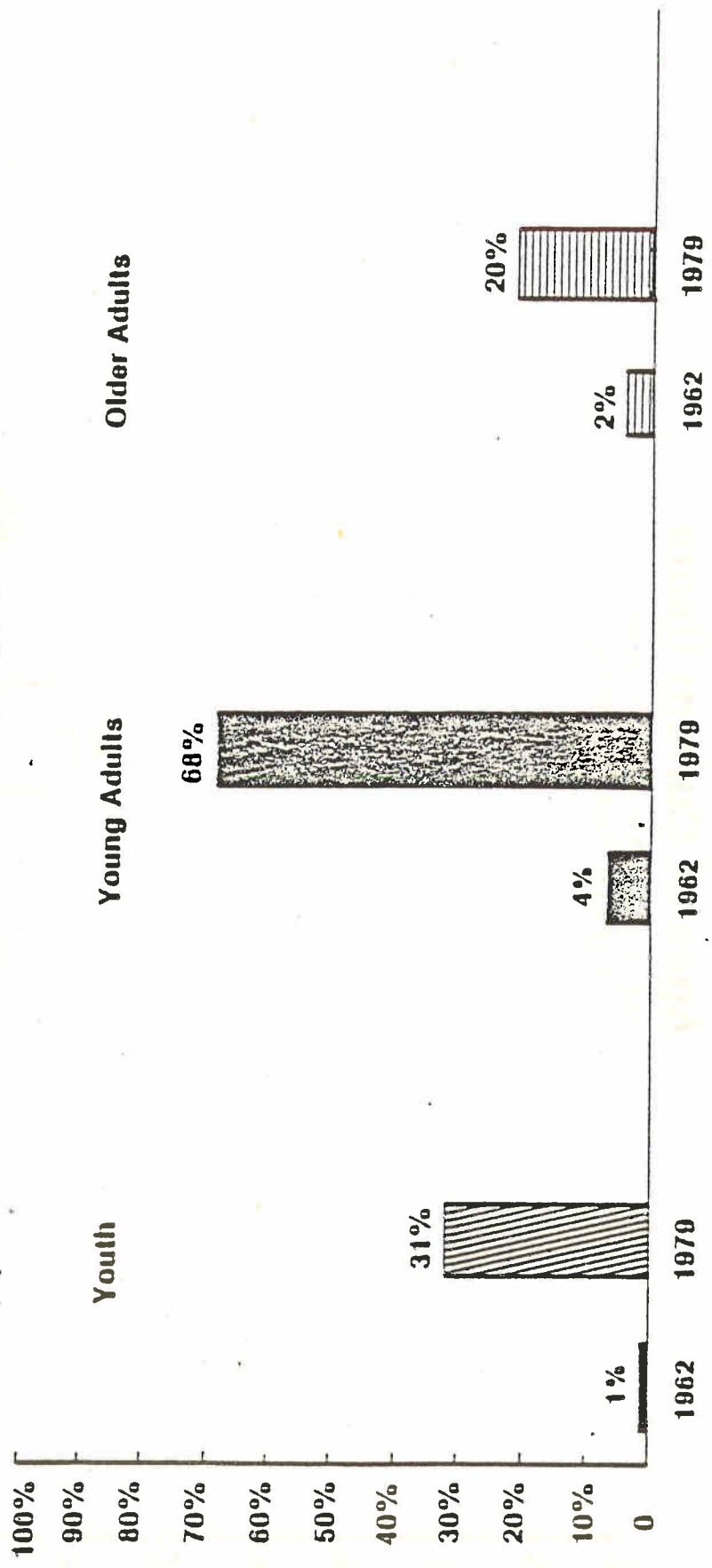
Marijuana 1979 Ages of Current Users

(i.e., have taken drug
within last month)



Source: A Drug Retrospective.

TABLE I
Marijuana Lifetime Prevalence
 (i.e., have tried marijuana)



Source: A Drug Retrospective (NIDA, 1980).

Note: Youth: persons 12-17 years old
 Young Adults: persons 18-25 years old
 Older Adults: persons 26 years and older
 40% of young adults who have tried the drug reported that they had done so at least 100 times

can contain as much as 6 percent pure THC. A single plant, on a three-foot diameter plot, can yield \$1,000 -- a moderate-sized garden will produce \$100,000 worth of the drug.⁶ The size of the total American trade, including imports, can only be determined roughly, but it has been estimated that the amount of marijuana coming into this country every year is between ten and twenty thousand tons, with a street value in the region of \$20 billion.⁷

The 1970s also saw the rapid growth of what has now become a multi-million dollar industry providing drug-related paraphernalia, magazines and books. Publications such as High Times (which boasts a readership of four million), carry in-depth articles on the use of drugs and legal issues, and are full of glossy advertisements for drug equipment. High Times even provides full listings of the prevailing market prices for many drugs, much as the Wall Street Journal carries the latest stock market quotations.

While the commercial return available on marijuana has been a major contributor to its ready availability, there are other important factors behind the growth in usage. In the late 1960s and early 1970s, the drug was an integral part of the non-conformist lifestyle in universities and elsewhere. The attempt by "authority" to stamp out marijuana consumption, or even discourage it, was seen as an attack on the alternative lifestyle, and the illegality of the drug was quite probably a significant stimulus to its consumption. This mood of resistance was only encouraged by exaggerated claims (on the basis of then available evidence) regarding the health dangers connected with marijuana.

In all probability the most important cause of the explosion in use has been simple ignorance. If, as most people believe, the drug is fairly harmless, then why not use it if it is pleasant? As we shall see in this study, nothing could be further from the truth, but survey after survey shows that while the dangers of alcohol and tobacco are widely appreciated, those associated with marijuana are not.⁸

THE SCIENTIFIC EVIDENCE

General Considerations

Before we examine the evidence regarding the effects of marijuana on the body, it is important to put this evidence in its historical perspective. The early American studies on marijuana, such as they were, were unsatisfactory for several reasons.

⁶ Washington Post, February 15, 1981.

⁷ 20,000 tons would be sufficient to make approximately 13 billion joints.

⁸ See, for instance, L. D. Johnston, J. G. Bachman, and P. M. O'Malley, Drug Use Among High School Students, 1975-1977 (Rockville, Maryland: NIDA, 1977).

The strength of THC in test samples was often not known with precision, and so it was debatable in many instances what was actually being measured. In addition, as has been explained, the THC strength of the average joint has increased dramatically in recent years. We are dealing with a totally different level of consumption than was the case in the 1960s. Using typical test results from the 1950s and 1960s as a guide to the effects of present-day use patterns is rather like trying to determine the consequences of a bottle of gin a day on the average person by testing the effects of a single daily martini!

Given the shortcomings of early tests, it is not surprising that many were inconclusive, and this gave powerful ammunition to the pro-legalization lobby. Even among the scientific establishment, a comparatively sanguine attitude seemed justified.

The first determined challenge to this consensus came from clinical psychiatrists -- particularly from those associated with educational institutions where the drug was in heavy use. Clinicians have often been the first people to warn the world of the unforeseen effects of a drug -- thalidomide being perhaps the most well known case -- and the importance of their front-line role cannot be understated. Typical of such clinicians was Dr. Harvey Powelson, head of the Psychiatric Division of the Student Health Service at Berkeley between 1964 and 1972. Powelson's eight years of extensive exposure to Berkeley students during the period in which marijuana use accelerated greatly make him probably the most experienced campus psychiatrist in the country. Like so many of his associates in the 1960s, Powelson took a tolerant attitude to marijuana in his early days at the University of California; but as he watched individual users over an extended period of time his attitude changed completely, to the point where he came to believe that it is the most dangerous drug with which the nation must contend.⁹

It was the conclusions of observers such as Powelson that created the pressure for the very thorough testing which began in the early 1970s. This series of tests have been far superior to the research of the 1950s and 1960s: more carefully controlled THC doses have been used, for instance, and strength levels in both human and animal tests reflect current usage. It should be noted, however, that there are still some unavoidable obstacles to testing. Marijuana is an illegal substance, and so it is not always easy to obtain statistically perfect volunteer groups. In addition, early studies showed that THC is highly toxic, and that it may pose significant dangers to certain individuals and to the fetus. So there are strong moral and legal impediments to certain important types of study, necessitating the use of animals rather

⁹ D. H. Powelson, Testimony before the Senate Subcommittee on Internal Security, May 1974, ref. 80, pp. 18-29; and "Marijuana: More Dangerous Than You Know," Reader's Digest, December 1974.

than humans for test purposes. But in these cases, the animals possess medical characteristics that parallel human functions, and dosages given to the subjects have been equivalent to those taken by humans. Furthermore, the results with appropriate animals correspond closely with clinical observations of human users.¹⁰

THC and the Body

Unlike water soluble drugs such as alcohol, which is metabolized and "washed out" of the system within twelve hours, THC is fat soluble and remains in the body for a considerable time. The THC in marijuana has a half-life of about three days; that is, it takes three days for half the THC in a joint to leave the body. It may take over three weeks for all the THC to be broken down. According to one expert, observations suggest that the younger the age of first use, the greater may be the long-term effects resulting from the THC in the body.¹¹

This pattern of retention in the body means that even the occasional marijuana smoker may never be free of THC. Furthermore, there is strong evidence from animal tests that the toxicity is cumulative -- small amounts of THC administered over a period seem to be far more harmful than the same total quantity in one dose.¹²

The fat solubility of THC, which is exceeded only by substances such as DDT, affects the way in which the substance is distributed within the system. Intravenous injections of radioactive THC confirm that it concentrates in the fatty tissue, and also that it lodges in the liver, lungs, reproductive organs and the brain. It was not until the early 1970s, with the work of Julius Axelrod and others, that the pattern of THC absorption by the body, or the period for which it was retained, was known with any real certainty.¹³ Until then, it was assumed that THC was broken down and removed from the body as quickly as alcohol.

¹⁰ For excellent reviews of the scientific studies concerning marijuana, see George K. Russell, Marijuana Today (New York: Myrin Institute, 1980 -- published in cooperation with the American Council on Marijuana); Gabriel G. Nahas, Keep Off the Grass (New York: Pergamon Press, 1979); "Twelve Things You Should Know About Marijuana," Consumers Research Magazine, April 1980; I. Lantner, J. O'Brian and H. Voth "Answering Questions About Marijuana Use," Patient Care, May 30, 1980.

¹¹ Carlton Turner, Associate Director, Research Institute of Pharmaceutical Sciences, University of Mississippi, Address to Seminar sponsored by the J.M. Foundation, New York, September 9, 1980, (unpublished transcript).

¹² W. D. Patton, Testimony before the Senate Subcommittee on Internal Security, May 1974, ref. 80, pp. 70-79.

¹³ Ibid.; Also D. S. Kreuz and J. Axelrod, "Delta-9-Tetrahydrocannabinol: Localization in Body Fat," Science, 179 (1973).

This discovery that THC is retained for a considerable time in certain organs of the body is crucial to a proper understanding of its effects. It means that the drug is quite unlike alcohol, with which it is often incorrectly compared. And the moderate user is running far greater risks than the moderate user of alcohol and many other drugs.

Tolerance and Addiction

A discussion of the cumulative effects of a drug leads to the issue of tolerance. One of the popular misconceptions regarding marijuana is that the user develops a "reverse tolerance" -- he needs gradually less and less THC to produce the same "high." It is possible that this belief developed from an examination of the effects of the low dosages commonly used in the 1960s. There may also be a "learning effect" that develops with low doses that leads to a greater appreciation of the high by the user. In addition, it is possible that low doses of THC may cause the release of quantities of the drug stored in the body's organs.

But it has now been firmly established through careful studies with doses typical of current use that a profound tolerance develops -- that is, steadily larger doses are necessary to produce the same effect.¹⁴ Tolerance means that the heavy chronic smoker must increase his THC intake to obtain the same psychoactive results; which in turn means that he must increase the concentration of THC in his brain, lungs and other organs. Tolerance effects also encourage the user to try more potent drugs, such as LSD, and to combine marijuana with alcohol or other available drugs.

One reason why marijuana is considered as relatively safe by so many people is the belief that it is non-addictive. But a misconception regarding the nature of addiction lies at the heart of this impression. If the sole criterion is physical addiction, meaning a physical dependence on the drug followed by severe physical withdrawal symptoms, then the evidence would indeed suggest that marijuana is only mildly addictive, even at high doses.¹⁵ Of much greater concern, however, is the degree of psychological dependence that is associated with marijuana. Many users dismiss the notion of psychological dependence as synonymous with "liking marijuana" in the sense that one might like chocolate ice-cream or tennis. But the term implies a more subtle and dangerous effect on the user. As Gabriel Nahas of Columbia University has explained:

¹⁴ Marijuana and Health: Eighth Annual Report to the U.S. Congress (Rockville, Maryland: NIDA, 1980), p. 26; Marijuana Today, p. 70.

¹⁵ R. T. Jones and N. Bachman, "Clinical Studies of Cannabis Tolerance and Dependence," Annals of the New York Academy of Science, 282:221 (1976). Because of the slow elimination of THC from the body, withdrawal effects are not severe.

The desire for instant gratification is a profound psychological reinforcer...Addiction to a drug is not a function of the drug to produce withdrawal symptoms. Drug dependence results basically from the reproducible interaction between an individual and a pleasure-inducing biologically active molecule. The common denominator of all drug dependence is the psychological reinforcement resulting from reward associated with past (use) and the subsequent increasing desire for repeated performance.¹⁶

It is this psychological dependence that makes the marijuana habit difficult to break. It is clear from clinical evidence that it is very common for heavy users to continue smoking even when they concede that it severely impairs their health and motivation, and that professional help is regularly needed to enable a user to give up the drug. The plain fact is that in the case of marijuana, the distinction between physical and psychological addiction is semantic, not real.

Marijuana and Other Drugs

Little could be further from the truth than the idea that a daily joint is merely the equivalent of a lunch-time martini. There are crucial differences. In the first place, as has been pointed out, alcohol leaves the system far more rapidly than marijuana. Even when taken to excess, the effect of alcohol is short-lived. It takes very heavy drinking over a long period to cause irreversible damage to the liver, or to the proper functioning of the brain (and then it is due primarily to a protein deficiency resulting from liver deterioration). The effects of THC, on the other hand, occur with only moderate dosage, and it appears to cause damage to more organs in a much shorter space of time.

There is also little evidence to suggest that alcohol and marijuana are in fact considered as alternatives by users. The usage of alcohol among school students, for example, has not fallen during the period in which marijuana smoking has rapidly increased. If anything, there appears to be a small positive correlation between marijuana use and the taking of other drugs, due in large part to the fact that a combination of THC with many other drugs leads to a greater effect than that achieved with either drug alone.¹⁷ Alcohol in combination with marijuana, for example, enhances the sedative result obtained with just the same dosage of alcohol. This is also the case with Valium, Librium, antihistamines, barbiturates, and narcotics such as opium, heroin,

¹⁶ G. G. Nahas, Marijuana - Deceptive Weed (New York: Raven Press, 1973).

¹⁷ A. J. Siemaszko, "Effects of Cannabis in Combination with Ethanol and Other Drugs," in R. Peterson (ed.), Marijuana Research Findings, 1980 (Washington, D.C.: U.S. Government Printing Office, 1980).

morphine and codeine. With other drugs, the combination with marijuana increases the stimulant effect, followed by a heavier depression. Such drugs would include cocaine, Benzadrine and Dexadrine.

The reason for this enhancing effect may be that the cells of the liver perform as identifiers and disposers of foreign chemicals in the body through the action of enzymes. When the THC is taken, however, the efficiency of this liver function is impaired and detoxification is reduced. Consequently, the power of the other drug to affect the body is increased.¹⁸

With some therapeutic drugs, the combination with THC may have the opposite result, leading to a reduction in the effectiveness of the prescribed drug. Taken with anticonvulsants such as Dilantin and Pegamone, for instance, THC antagonizes the drug and lowers the seizure threshold. Similarly, THC can inhibit the results of beta-blockers, used to treat hypertension and some heart conditions. And when taken by a diabetic, marijuana can alter the amount of insulin necessary to maintain balance.¹⁹

The incidence of marijuana use in combination with other drugs is increasing. Not only is the enhanced effect sought of itself by the user, but it is also a means of obtaining better "value for money" from more expensive drugs. The availability of low-cost marijuana may therefore increase the use of harder drugs.

Psychological Effects

Summary:

There is now a considerable body of scientific data regarding the behavioral effects and intellectual impairment resulting from marijuana use. Roy Hart and Gabriel Nahas have surveyed the extensive foreign literature. As Hart points out, impairment of memory, judgment, intellectual functions, orientation and motivation have been accepted as consequences of marijuana use for many years.²⁰ The evidence from this country leads to the same conclusion. Dr. Powelson has summarized the clinical evidence as follows:

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 marijuana impairs the

¹⁸ Nahas, Keep Off the Grass, p. 62.

¹⁹ Lantner, "Answering Questions About Marijuana," p. 137.

²⁰ R. Hart, "A Psychiatric Classification of Cannabis Intoxication," Journal of the American Academy of Psychiatric Neurology, 1, iv (1976), pp. 83-97; Nahas, Marijuana, and Keep Off the Grass.

user's ability to judge the loss of his own mental functioning.

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.

Chronic heavy use leads to paranoid thinking.

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

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 marijuana 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 adding to the confusion that (the scientific community) is obliged to ameliorate.²¹

Behavioral Effects:

Broadly, light marijuana smoking results in enhanced sensitivity to sensory stimuli. Heavy smoking tends to result in apathy and withdrawal. Research conducted on moderate and heavy smokers shows that a distortion of reality is common, together with confusion, memory loss, diminished concentration, reduced motivation, and hostility towards discipline and authority. Among relatively inexperienced users, acute anxiety can develop as the smoker grows aware that reality is becoming distorted. The same anxiety can also occur when a joint of higher potency is smoked.²² Heavy usage of marijuana accentuates these effects. Marked memory impairment and confusion is common among such users, and there is evidence that heavy smoking can exacerbate mild and latent paranoia and schizophrenia.²³

The consequences these effects have on adolescents may be very damaging. At precisely the time that difficult arrangements need to be made, marijuana may distort both the reality that must be faced and the judgment needed to deal with it. The maturing process is inhibited, and a concern with the moment overshadows any assessment of the future. Dr. Mitchell Rosenthal, president of Phoenix House in New York, has summarized the consequences of marijuana use among adolescents as follows:

²¹ Powelson, Testimony before the Senate, May 1974, quoted in Russell, Marijuana Today, p. 22.

²² Marijuana and Health, p. 21.

²³ Ibid., pp. 21-22.

To grow, to develop, to achieve adulthood, adolescents must cope with the emotional storms and squalls of the troubled teenage period. They turn to marijuana or to alcohol to self-medicate and to relieve the anxieties of the moment. They do not cope and they do not know how to cope. They blow away their troubles in clouds of smoke and they blow away their chance of becoming mature and responsible adults.²⁴

Social Behavior:

Marijuana use does appear to foster alienation, towards both the family and society in general. In school and college settings, the tendency of users to form subcultures hostile to prevailing social customs and attitudes is well known. A large-scale study of Boston schoolchildren, for example, showed that early use of the drug was closely correlated with truancy, alienation from authority, poor academic achievement and the early use of alcohol and tobacco.²⁵

It remains to be seen what sort of society will emerge as a generation so heavily associated with marijuana attains the position of leadership.

Intellectual Functions

Motivation:

It is all too common to hear of a marijuana user who appears to have lost all will to succeed. The decline in motivation among heavy and moderate smokers -- and even some occasional users -- is probably the effect noticed most often by a user's friends. Chronic heavy use can lead to almost total withdrawal (often rationalized in such terms as "getting out of the rat race"). Clinicians dealing with high schools and colleges report constantly of gifted students who are marijuana users and who lack the drive necessary to reach their full potential.²⁶ The user is often quite unaware of just how great a decline in motivation he is experiencing, and increasingly, as Dr. Franz Winkler

²⁴ M. Rosenthal, "Marijuana and Effects on Adolescents," given at "Marijuana: Biomedical Effects and Social Implications," Second Annual Conference on Marijuana, New York University Post-Graduate Medical School and the American Council on Marijuana, New York, June 28-29, 1979 (unpublished transcript).

²⁵ G. Smith and C. Fogg, "Psychological Predicators of Early Use, Late Use, and Non-Use of Marijuana among Teenage Students," in D. Kandell (ed.), Longitudinal Research on Drug Use (New York: Halstead Press, 1978).

²⁶ See, for example, H. Kolansky and W. T. Moore, "Effects of Marijuana on Adolescents and Young Adults," Journal of the American Medical Association, 216 (1971), pp. 486-492; and "Toxic Effects of Chronic Marijuana Use," Journal of the American Medical Association, 222 (1972), pp. 30-35.

has pointed out, the smoker loses all interest in normal student activities:

The lasting effects of moderate amounts of marijuana are minimal in contrast to the harmful effects of even a couple of reefers a week....An early effect of marijuana and hashish use is a progressive loss of willpower, already noticeable to the trained observer after about six weeks of moderate use....Soon all ability for real joy disappears, to be replaced by the noisy pretense of fun. While healthy teenagers will eagerly participate in all kinds of activities, such as sports, hiking, artistic endeavors, etc., a marijuana user will show an increasing tendency to talk aimlessly of great goals, while doing nothing about them.²⁷

A particularly disturbing aspect of this reduction in motivation is that in some cases it may be permanent. It will be shown later that THC appears to have long-term physical effects on the brain, and clinicians such as Powelson have cited several instances of patients who gave up marijuana and yet are still unable to regain their normal level of motivation and concentration after a year or more of abstinence.²⁸

Learning and Skills:

The decline in motivation common among marijuana users is closely related to a general reduction in intellectual performance. Chronic use of the drug can seriously inhibit powers of comprehension, judgment and learning -- and this effect is not confined to the period of intoxication. The most distinctive influence is on short-term memory. THC appears to interfere with the transfer of learned information from the short-term memory, leading to difficulty in recalling material learned when intoxicated.²⁹ Given the widespread daily use of marijuana among school children, this effect has most serious educational implications.

The use of marijuana has also been shown to have detrimental effects on the smoker's ability to operate certain machinery, such as an automobile or airplane. Several studies have demonstrated a distinct impairment of driving skills, and that users are overrepresented in accidents compared with non-users.³⁰ It must be emphasized that this impairment does not only occur during a "high"; it continues for many hours after the subjective intoxication. Since judgment itself is affected, a driver may be totally unaware that his skills have diminished and that his

²⁷ F. E. Winkler, About Marijuana (New York: Myrin Institute, 1970), quoted in Russell, Marijuana Today, p. 40.

²⁸ Powelson, "Marijuana," pp. 95-99.

²⁹ Marijuana and Health, p. 10.

³⁰ Several of these studies are summarized in Marijuana and Health, p. 11.

reactions are slower. And since the influence of marijuana, unlike that of alcohol, is not easily detected by others, passengers travelling with the user may be unaware of their own danger.

There are certain aspects of the effect of THC on skills and intellectual functioning which need to be understood to appreciate the full impact of marijuana use, and the shortcomings of some studies. In the first place, THC has a much greater influence on the performance of less familiar tasks than on well learned activities. The impact on the student, in other words, is likely to be much greater than on the assembly line worker. Furthermore, the effects are dose related -- the heavy smoker experiences markedly greater impairment than the occasional user (although frequent but light smoking does have a cumulative effect). Thus, studies based on the relatively low doses generally used in the 1960s do not provide an accurate guide to the influence of high-potency marijuana currently used.

Another key feature of the drug is that its effect on skills and performance appears to be correlated strongly with the intelligence level of the user. Thus, the impairment seen among students and professionals is usually greater than that among people of average or low intelligence. More generally, the impact of the drug on middle-class smokers tends to be more significant than in the case of manual or working class users. This is particularly important when examining evidence from abroad, since in countries such as Egypt, Morocco or the West Indies, the use of marijuana is a habit usually confined to the poorer, less educated classes. Only in the United States is marijuana widely used by better educated segments of society -- the very groups most prone to its damaging effects.

By appreciating these distinctions in the influence of the drug one can appreciate the deficiencies of tests such as the "Jamaica Study," which is widely cited by the pro-legalization lobby as a demonstration of the benign effects of the drug.³¹ In this study, the researchers selected a group of thirty ganja (i.e., marijuana) smokers and a control group of thirty non-smokers. The groups were given a battery of psychological and other tests, and their brain wave patterns were examined. No significant differences between the groups were detected.

This study has been faulted on several grounds, some of them technical,³² and the findings ran strongly against the clinical evidence available in Jamaica.³³ But, more importantly, the

³¹ V. Rubin and L. Comitas, Ganja in Jamaica: A Medical Anthropological Study of Chronic Marijuana Use (The Hague, The Netherlands: Mouton Press, 1975).

³² See Russell, Marijuana Today, pp. 28-30; Nahas, Keep Off the Grass, pp. 101-102.

³³ Russell, Marijuana Today, p. 28.

study ignored both the relationship between intellectual capacity and impairment, and the difference in the influence of THC on skilled as opposed to simple and familiar tasks.

Brain Damage

The personality and learning impairment associated with marijuana use leads naturally to the question, "Does marijuana actually cause physical damage to the brain?" There is now a strong body of evidence to suggest that it does -- in ways consistent with clinical observations.

The most important work in this field has been conducted by Dr. Robert Heath of Tulane University Medical School. In the most significant test undertaken by Heath, groups of rhesus monkeys were used to examine the physical effects on the brain resulting from marijuana use. This species of monkeys has a central nervous system very close to that of man, and is widely used as an indicator of the consequences of therapeutic and other drug use on humans. By using monkeys, Heath was able to remove many problems associated with human volunteers -- such as legal issues and the difficulty of keeping a tight control on the level of drug use. He was also able to sacrifice the monkeys and conduct a close examination of the brain tissue of each animal. In the test THC was administered both by smoke inhalation and by injection -- the intake being equivalent to that normally found among human users. The monkeys were exposed to the drug for six months and studied for a further eight months after the drug was withdrawn, using deep and surface electroencephalograms (EEG), after which they were sacrificed and examined.

Heath found distinct changes in the brain wave pattern in the "deep brain sites" of the limbic region -- the area associated with smell, taste, emotion, pleasure, and the control of drives. This change was noticeable after two to three month's use by monkeys subjected to the equivalent of heavy or moderate intake by humans. There was no such effect in the control group. The alteration in the deep brain pattern resembled that associated with conditions such as schizophrenia, and with the reduction of awareness. Heath continued to monitor the deep brain throughout an eight-month period after THC intake was ceased, during which time the change in pattern continued -- suggesting long-term and possibly permanent brain damage.

After the eight-month period the monkeys were sacrificed and their brain tissue carefully studied. Electron microscope analysis revealed distinct damage, particularly at the synaptic junction, where one nerve cell connects with the next -- regions that are crucial to the operation of the central nervous system. This damage included a widening of the synaptic cleft (i.e., the gap between the cells) by an average of 25 percent; which is a condition seen in brain poisoning associated with substances such as carbon tetrachloride and in cases of severe vitamin B deficiency leading to psychosis. Heath also noted that dense material was

deposited in the clefts, and, among other effects, there were changes within the cells active in memory function.³⁴

The changes in the brain observed by Heath correspond with the behavioral and learning function alterations described earlier. His studies show clearly that THC has a detectable physical effect on the brain, even though the implications of the effect are not known. Most disturbing of all, his experiments suggest that the changes in the brain tissue may be permanent, even among moderate marijuana smokers.

While Heath's experiments have provoked considerable controversy, both regarding the methodology and the meaning of the results, there is supporting evidence. A 1971 study, for instance, used air encephalography to examine the brains of a group of young smokers, each of whom had used marijuana consistently for many years and were experiencing severe personality changes. The study, conducted at the Royal United Hospital in Bristol, England, concluded that there was evidence of as much brain atrophy among the group as would be expected in very elderly people. None of the test group displayed clear evidence of any condition prior to smoking the drug that might have produced such a level of degeneration.³⁵

More recent research, using CAT scanners to examine the brains of chronic users, has failed to confirm the Bristol results, however, and so further testing is clearly necessary before any firm conclusions can be reached on the question of brain damage.³⁶ Nevertheless, the weight of existing evidence does suggest that there is good reason to believe that potentially serious physical effects on the brain do result from chronic marijuana use.

Disease and Cell Division

Recent research has shown that THC seems not only to have very damaging effects on the cells of the brain, but also that it may have an impact on cells related to the immunity system. Work by Gabriel Nahas, for example, showed that the cell division rate

³⁴ R. G. Heath, "Marijuana: Effects on Deep and Surface Electroencephalograms of Rhesus Monkeys," Neuropharm, 12 (1973), pp. 1-4; Heath and W. Myers, "Cannabis Sativa: Ultrastructural Changes in Organelles of Neurons in Brain Septal Region of Monkeys," Journal of Neuroscience Research, 4 (1979), pp. 9-17.

³⁵ A. Campbell, M. Evans, G. Thompson, and M. Williams, "Cerebral Atrophy in Young Cannabis Smokers," Lancet, 2 (1971), pp. 1219-1224.

³⁶ B. Co, D. Goodwin, M. Gado, M. Mikhael, and S. Hill, "Absence of Cerebral Atrophy in Chronic Cannabis Users," Journal of the American Medical Association, 237 (1977), pp. 1231-1232; J. Kuehne, J. Mendelson, K. Davis, and P. New, "Computed Tomographic Examination of Heavy Marijuana Smokers," Journal of the American Medical Association, 237 (1977), pp. 1229-1230.

for the lymphocytes of a group of human users was over 40 percent lower than for a control group (lymphocytes are white blood cells that divide rapidly and attack viruses and foreign tissue). This result would mean a drastic reduction in the ability of users to fight diseases -- a reduction comparable with that found in cancer patients and kidney transplant patients receiving immunosuppressive drugs to prevent rejection (these patients are highly prone to illness).³⁷

The influence of THC on cell division seems to extend even further than the immunity system. Research findings presented by twelve different medical groups at a 1978 international conference on marijuana indicated that use of the drug causes strong interference with the synthesis of proteins, DNA and RNA (the basic "building blocks" of cells) in a wide range of cell types. The substance was also shown to impair the rate of tissue growth, to lead to unnatural cell division, and to the production of cells with an abnormal number of chromosomes.³⁸ Further work is needed in this area, but it should be noted that chromosome damage in certain cells does lead to leukemia and other conditions; and similar damage to gonadal tissue could affect the physical and mental characteristics of children conceived from the sperm or egg cells of a marijuana user.

Reproduction

Several studies have been conducted recently to determine the effect of THC on the male reproductive system. Research by Dr. Robert Kolodny, using a group of young males who were heavy users (averaging 9.4 joints per week), found that the principal male hormone, testosterone, was reduced by 44 percent within the group (although this was still within the normal range for the population).³⁹ The hormone plays an important role in sexual change during adolescence, and in sperm production. Whether this reduction has a significant effect, or if it is permanent with chronic use, is not yet known.

Two other studies of smokers indicate that chronic heavy use does result in abnormalities in the sperm count, and that it affects the mobility and physical characteristics of sperm.⁴⁰

³⁷ G. Nahas, N. Suciú-Foca, J. Armand, and A. Marishima, "Inhibition of Cell-Mediated Immunity in Marijuana Smokers," Science, 183 (1974), pp. 419-420; Nahas, Keep Off the Grass, pp. 116-122.

³⁸ G. Nahas, W. Paton and J. Indanpaan-Heikkila (edit.), Marijuana: Chemistry, Biochemistry and Cellular Effects (New York: Springer Verlag, 1976).

³⁹ R. Kolodny, W. Masters and others, "Depression of Plasma Testosterone Levels in Chronic Intensive Marijuana Use," New England Journal of Medicine, 290 (1974), pp. 872-874.

⁴⁰ W. Hembree, G. Nahas and H. Huang, "Changes in Human Spermatazoa Associated with High Dose Marijuana Smoking," in G. Nahas and W. Paton, Marijuana: Biological Effects (New York: Pergamon Press, 1979); M. Issidorés, "Observations in Chronic Hashish Users: Nuclear Aberrations in Blood and Sperm and Abnormal Acrosomes in Spermatazoa," in Nahas and Paton, Marijuana: Biological Effects.

Reports from Jamaica, Morocco, India, and this country also indicate a high level of impotence among long-term users.⁴¹ As yet, there are no published reports of a correlation between marijuana use and abnormal offspring.

Testing the effects of THC on women -- especially pregnant women -- poses ethical and legal problems. Rhesus monkeys have therefore been used for certain of these tests, both to overcome such problems and to enable dosage to be tightly controlled. But there is also a good deal of clinical human evidence available.

Research by Dr. Carol Smith on monkeys has shown that exposure to THC for just a few days during the menstrual cycle can lead to the suppression of ovulation and the disruption of the cycle, due apparently to an interruption in the production of necessary hormones.⁴² The menstrual cycle returns to normal two to three months after use of the drug ceases. Dr. Joan Bauman of the Masters and Johnson Clinic in St. Louis, studied the menstrual cycles of young volunteers who were frequent users of marijuana (an average of 4 joints per week), and had been so for at least six months. The group was then compared with a control. Dr. Bauman found that 38 percent of the marijuana users experienced problems with their cycles, compared with 12.5 percent of the control group, and a substantial number of them failed to ovulate. The users were also prone to other irregularities, such as hormone imbalance.⁴³ Although it is not possible to monitor precisely the drug habits of such volunteers, the human results compared sufficiently closely with more exact animal tests for the conclusion to be reached that marijuana use results in definite irregularities in the cycle.

More serious than the evidence on the menstrual cycle, however, are the strong indications that THC may be very damaging to the unborn. Tests by Dr. Ethel Sassenrath of the University of California Primate Research Center, in which rhesus monkeys were exposed to moderately heavy doses of marijuana (the equivalent of between one and two joints per day), resulted in a 42 percent loss of offspring by the monkeys through spontaneous abortion, fetal death, stillbirths or death in early infancy -- four times the rate in the control group. Post mortem examinations of the offspring, moreover, revealed a number of abnormalities, such as fluid in the brain, together with vascular, liver and kidney

⁴¹ J. Hall, Testimony before the Senate Subcommittee on Internal Security, May 1974, ref. 80, pp. 147-154; H. B. Jones and H. C. Jones, Sensual Drugs: Deprivation and Rehabilitation of the Mind (New York: Cambridge University Press, 1977).

⁴² C. Smith, M. Smith, N. Besch, R. Smith and R. Asch, "Effect of Delta-9-THC on Female Reproductive Function," in Nahas and Paton, Marijuana: Biological Effects.

⁴³ J. Bauman, "Effect of Chronic Marijuana Use on Endocrine Function of the Human Female," in Nahas and Paton, Marijuana: Biological Effects.

disorders.⁴⁴ Experiments using radioactive THC (allowing its progress through the body to be traced) have shown that the drug appears in the milk of the mother and passes into the bodies of the infants being nursed. Furthermore, there is evidence that THC passes through the placental barrier, and lodges in the fatty tissue and various organs of the fetus, including the brain.⁴⁵

These results are very alarming. The consequences of marijuana use by pregnant women and mothers has yet to be fully determined, but the evidence so far indicates that use of the drug may be extremely dangerous or even fatal to the unborn child.

The Heart and Lungs

Marijuana use tends to increase the heart rate, leading to a reduced capacity for exercise -- although this effect does diminish as tolerance to the drug builds up. For young, healthy users this presents no particular danger, but in the case of smokers with pre-existing heart conditions, marijuana can accelerate the development of chest pains and heart irregularities.⁴⁶

Results of test examining the effect of marijuana smoking on the lungs are more disturbing, indicating not only that the drug is connected with lung damage, but also that this damage may be more severe than that associated with tobacco. The U.S. Army's drug program in Europe, between 1968 and 1972, for example, revealed a high incidence of serious respiratory ailments among soldiers with access to the very potent strains of marijuana then available in Europe. Bronchitis and emphysema were seen even among young smokers. Emphysema, in particular, is a disease usually associated with later life, and to find it among young soldiers was most unusual. As Dr. Forrest Tennent, who headed the study, testified to the Senate:

Even though a person can get bronchitis and emphysema from cigarette smoking, one must usually smoke cigarettes for 10-20 years to get these complications. We became alarmed about this because we began seeing these conditions in 18-, 19-, and 20-year-old men.⁴⁷

-
- ⁴⁴ E. Sassenrath, L. Chapman and G. Goo, "Reproduction in Rhesus Monkeys Chronically Exposed to Delta-9-Tetrahydrocannabinol," in Nahas and Paton, Marijuana: Biological Effects.
- ⁴⁵ R. Vardis, D. Weisz, A. Fazel and A. Rawitch, "Chronic Administration of Delta-9-Tetrahydrocannabinol to Pregnant Rats," Pharmacology, Biochemistry and Behavior, 4 (1976), pp. 249-254.
- ⁴⁶ R. Prakash and W. Aranow, "Effect of Marijuana on Coronary Disease," Clinical Pharmacology and Therapeutics, 19, iv (1976), pp. 94-99.
- ⁴⁷ F. Tennant, Jr., Testimony before the Senate Subcommittee on Internal Security, May 1974, ref. 80, pp. 288-314.

An examination by Dr. Harris Rosenkrantz of the Mason Research Institute in Massachusetts, found that the exposure of laboratory rats to only moderate amounts of marijuana smoke led to a distinct alteration in lung tissue. These effects included intense inflammation, a breakdown of the air sacs, and the formation of deposits in the lung tissue. The air capacity of the lung was also reduced by 15-20 percent. Control experiments showed clearly that far more damage occurred than with the same degree of exposure to tobacco smoke.⁴⁸

Test conducted with humans have reached similar conclusions. A University of California study, for example, matched a group of healthy users with a control group and found a 25 percent higher airway resistance in the lungs of the marijuana smokers after just two months of heavy use.⁴⁹ This level of resistance rarely occurs among tobacco smokers before fifteen or twenty years of use.

Therapeutic Uses for Marijuana

Like many drugs that exhibit damaging effects with chronic usage, THC does seem to have some useful properties for patients with certain conditions. It appears to be effective, for example, in providing relief for certain glaucoma sufferers -- although non-psychoactive drugs can achieve the same results in many cases.

Of much greater importance is the possibility of using THC as a treatment for severe nausea often associated with chemotherapy. The National Cancer Institute recently embarked on a \$1 million program to distribute THC capsules to a large number of cancer patients undergoing chemotherapy. By using THC in capsule form, rather than cigarettes, the possibility of lung damage is avoided. Some critics of the program do, however, maintain that capsules are inferior to smoking the drug, and there is some evidence available to support such a claim in the case of certain patients. Further testing is necessary to determine the cases where inhalation might be an appropriate method of administering the drug until an effective synthetic version becomes available.

The use of THC for therapeutic purposes is not without its problems. Patients run the risk of the damaging results of marijuana discussed earlier, but these risks are much lower in medical programs. Most of the damaging effects associated with the drug appear to result from moderate to heavy use for a longer period than is usual in medical purposes. And the drug can be

⁴⁸ H. Rosenkrantz and R. Fleischman, "Effects of Cannabis on Lungs," in Nahas and Paton, Marijuana: Biological Effects.

⁴⁹ D. Tashkin, B. Shapiro and others, "Subacute Effects of Heavy Marijuana Smoking on Pulmonary Function in Healthy Men," New England Journal of Medicine, 294 (1976), pp. 125-129.

avoided in the case of high-risk patients. But if THC was widely distributed, even under prescription, it would be difficult to ensure such control. Another problem with the drug is that its psychoactive effects can be very disturbing to some patients, particularly older ones. Again, carefully controlled use allows these side-effects to be detected at an early point. Certain drugs that are chemically similar to THC (such as levo-nantradol) are currently being tested to see if they may be superior in certain instances.⁵⁰

Consideration of THC as a therapeutic drug is not in any way inconsistent with the position that it is very harmful in general. Some highly dangerous drugs are very beneficial in certain circumstances, but this does not imply that they should be made freely available. Occasional use of THC capsules by some carefully chosen patients is not the same as chronic heavy smoking of marijuana.

PUBLIC POLICY CONSIDERATIONS

Marijuana Use and the Law

The inescapable conclusion from the scientific evidence now available is that marijuana is a dangerous substance. The increase in potency in recent years means that we are now dealing with a very different problem than the one faced in the 1960s. The evidence also shows that THC is quite different from alcohol in the way that it lodges in certain organs and causes damage to them in a short period of time.

Yet the question remains, "What, if anything, should be done?" There are many things that we do which are dangerous. Is the use of marijuana any different than these?

There are really four aspects to this question, and each raises important philosophical and practical issues:

1. To what extent should society interfere with the individual's decision to pursue a dangerous activity?
2. Is there harm, or a cost, to non-users?
3. Does society have the right to enforce some collective lifestyle on the individual to preserve some notion of "culture" or "way of life"?
4. Is an effective law possible, given a resolution of the other issues?

⁵⁰ Washington Post, November 11, 1980.

Taking each of these questions in turn:

a) Marijuana and Individual Freedom

It has always been a tenet of the idea of liberty that the individual has the right to pursue a dangerous activity, or to knowingly damage his own health. If it were otherwise, we should ban everything from hang-gliding to eating candy.

On the other hand, it has usually been conceded that there may be another justifiable position in the case of certain segments of society. When a person does not realize the consequences of an action, it is reasonable to warn him, and perhaps to physically prevent him from undertaking it. Most smokers of marijuana have very little understanding of the likely consequences of taking the drug. It would seem quite appropriate to embark on a program of education, particularly in schools, to reduce this ignorance. In addition, a policy aimed at making the drug less available, by presenting obstacles to supply, would reduce the likelihood of casual access by the ill-informed -- while the determined user would still be able to obtain supplies.

Drugs do, of course, involve a complication when considering the ability of the user to judge the consequences of his actions. We recognize that children should be protected from many things because inexperience and poor judgment can lead to unforeseen results. But some drugs actually cause reduction in the power of reasoning, or the ability to cease using the substance. This is one reason why we ban heroin but not hang-gliding. Whether there is a sufficient observable effect on the processes of the brain for us to class marijuana with heroin rather than hang-gliding is open to serious question. Yet there is probably sufficient evidence available to suggest that THC does affect motivation and the will to resist higher doses, and other drugs, to justify a policy of active discouragement.

b) Harm and Cost to Others

When a drunk decides to drive his automobile, he poses a physical threat to others, and so it is reasonable for society to impose heavy penalties on such actions for the protection of innocent parties. There is plenty of evidence for us to conclude that the use of marijuana interferes with the reactions and skills of people who drive or fly, and that this is hazardous to other people. In addition, the effects of marijuana usually last longer than those due to alcohol. It is quite reasonable, therefore, for society to punish marijuana users who drive or fly under the influence of the drug. Sophisticated laboratory techniques are now available to enable the level of THC in the body to be known with reasonable accuracy, and routine detection equipment should soon be operational. So it will be possible to provide clear guidelines, and penalties, to deal with the smoker-driver.

The idea of cost is not so simple. If the brilliant scholar becomes a heavy smoker, quits college, and goes on welfare, he is taking from society rather than contributing to it. Yet only a small minority of users could be said to impose costs such as this. Active discouragement would seem to be the most practical way of dealing with the situation.

c) The Imposition of Society's Standards

This is in many respects the most difficult issue of all, and marks a clear difference of opinion between the libertarian and the conservative. If one believes that "society" is simply a collection of individuals, it is difficult to argue that the spreading use of a drug is detrimental to society in any sense, assuming individuals other than the users are not harmed. On the other hand, if one feels that the strength of a society, and the benefits that it can provide to its members, depends on the broad acceptance of certain obligations and customs -- and that the individual is hurt when these customs are eroded -- then it could be legitimate to discourage certain activities.

It is at least arguable that the widespread use of marijuana, leading to a decline in motivation, educational achievement and health, may reduce the benefits of society for us all. If this is so, then it would provide an additional reason for active discouragement.

d) Just and Effective Law

(i) Legislation:

It has been argued by many that we are in a form of "prohibition era" with respect to marijuana. The drug is illegal, but the law is openly and widely flouted, just as it was when alcohol was made illegal. The law is held in disrespect and the punishment of marijuana users is deeply resented. According to this argument, otherwise law-abiding people find themselves dealing with criminals, and only complete legalization will restore faith in the law and get the business of marijuana out of the hands of criminals.

While this argument does have a surface plausibility to it, it is fraught with dangerous implications. In the first place, the almost universal public ignorance of the harmful consequences of marijuana use lies at the heart of the discontent with the law. If the drug were to be legalized, making it available at the corner drugstore, it would confirm the general belief that marijuana was fairly harmless. If the drug were freely available, with the consent of government, it would be virtually impossible to persuade users that they face real dangers. How could one justify a situation where marijuana was made legal when every attempt had been made to ban saccharine?

Illegality may not stop the use of marijuana, but it may serve to hold the line while people are educated as to its dangers. To remove the legal restrictions on its use could also remove any chance of reversing the trend.

(ii) Decriminalization:

There is, of course, a distinction between the issues of legalization and decriminalization. In the one case we are considering making the distribution and consumption of a drug a legal activity; while on the other we are talking about reducing the penalties for taking the drug.

It is a little difficult to justify putting someone in jail when they are probably ignorant of the consequences of taking marijuana. Even if they are fully aware of the possible damage, it does seem unreasonable to apply harsh criminal penalties when no other person is affected. While full legalization would undoubtedly lead to an explosion of use, non-criminal penalties for the possession or use of small quantities of marijuana, together with criminal sanctions for the possession of large quantities or supplying marijuana to children, would be a more just and acceptable position.

There are, however, many experts who feel that even decriminalization would be a grievous error. This view has been put forward very cogently by Dr. Robert DuPont, the former NIDA director:

For many years, while I was in government, I supported decriminalization of marijuana and was actively publicized by the marijuana lobbying organizations as one of their chief advocates or supporters. I was never this, but I did for some years favor decriminalization of marijuana. I have changed my mind completely on that point and I now strongly oppose decriminalization. I am persuaded that we, as a nation, are dealing with a massive epidemic with grave consequences for our society, and that decriminalization is a signal in this political debate that, however much one might feel that it is not a good idea to put people in prison for possession of small amounts of marijuana, support for decriminalization is seen as support for marijuana. We all need to recognize that the battle lines are drawn and that decriminalization is the major line that is drawn across the political landscape right now.⁵¹

The argument surrounding the decriminalization issue is thus not so much one of principle as one of practical politics. If removing criminal penalties for the possession of small quantities

⁵¹ Address to seminar sponsored by the J.M. Foundation, see note 10.

of marijuana (while maintaining criminal sanctions for distribution) would not lead to a significant increase in use, or to overwhelming pressure for legalization, then decriminalization would have the support of many people who nevertheless consider the drug as very damaging.

ACCESS AND SUPPLY

A policy of active discouragement and education may be pursued in several ways. A number of states, for instance, have banned so-called headshops, where drug-related equipment is sold. The determined user can still find ways of obtaining paraphernalia, but open encouragement to the non-user is reduced by such a measure.

A much more effective form of discouragement, however, would be to actually reduce the level of supplies reaching this country. Enormous quantities of marijuana reach the United States from the Caribbean and South America. It is a multi-billion dollar traffic that involves radio warning planes, large cargo ships, high-speed pickup boats, secret landing strips, and large payoffs to local police. It is not uncommon for seizures of ships to reveal loads of marijuana worth up to \$40 million at street prices.

The Coast Guard has been overwhelmed by the volume of the trade, and the tenacity and equipment of the smugglers. Seizures now account for probably less than 15 percent of the total -- making but a small dent in massive profits.⁵² If anything is to be done to contain the staggering increase in the quantity of marijuana reaching this country, there must be a significant boost in the resources made available to the Coast Guard, the Drug Enforcement Administration, and other services involved with drug interception. Only by driving up the risks faced by smugglers do we stand much chance of reducing the drug flow.

Some argue that reducing the availability of marijuana in this country might actually be counterproductive. If you deny people marijuana, they claim, they will merely turn to something more dangerous. This is a spurious argument. For the heavy user with psychiatric problems, marijuana is generally only a stepping stone to hard drugs, or a means of enhancing the effect of other substances. If these people are denied marijuana it would make little difference to the damage they will inflict on themselves. Far more important is the person who tries marijuana because it is inexpensive and freely available, and who then becomes a chronic user or moves on to hard drugs. A reduction in the supply of marijuana would lessen the chances of a casual introduction to the drug. Even among existing users, a switch to alcohol or tobacco is far more probable than to hard drugs.

⁵² For an account of a typical Coast Guard encounter see the Washington Post, December 20, 1980.

Of course, the marijuana reaching this country has to come from somewhere, and that can present sensitive policy issues. In certain countries, the cultivation of marijuana for export to the United States has become a significant part of the domestic economy, and a major source of foreign exchange. There have been cases of the United States supporting the actions of foreign governments seeking to reduce cultivation, such as Mexico, but this kind of cooperation is rare and not very effective.

Jamaica is a good example of the kind of problem faced by the United States. The country is a major supplier of marijuana to America. The trade is worth well over \$1 billion a year, equal to Jamaica's entire foreign debt, and greater than all other exports combined. Jamaica is also unstable and bankrupt, and is a target of Cuban penetration.

When the Jamaican government changed hands in 1980, the United States found itself in a very delicate situation regarding the drug business. The new Prime Minister, Edward Seaga, is a friend of the West, and so the United States is understandably hesitant to undermine what is left of the island's economy. But marijuana is crucial to the economy. As Seaga pointed out recently, "The ganja (i.e., marijuana) trade in the last several months was virtually what was keeping the economy alive."⁵³ According to him, the trade is "here to stay," and the question is not whether it should be wiped out but whether it should be completely legalized:

so as to bring the flow of several hundred million dollars in this parallel market through the official channels, and therefore have it count as part of our foreign exchange -- which would mean an extremely big boost to our foreign exchange....

Mr. Seaga's tidy, businesslike approach to the drug trade is complemented by a convenient interpretation of the scientific evidence. Medical reports, he states with authority, "seem to suggest there's no conclusive evidence that ganja is harmful...."⁵⁴ Mr. Seaga would be well advised to talk to some of Jamaica's leading psychiatrists at Kingston Hospital, who seem to have reached somewhat different conclusions regarding the effects of marijuana.⁵⁵

While the situation in Jamaica may be outrageous, dealing with it presents many problems. It would be easy to drift into the feeling that really nothing can be done without damaging the

⁵³ Washington Post, November 10, 1980.

⁵⁴ Ibid.

⁵⁵ See, for example, the report by Dr. John Hall, Chairman of the Department of Medicine at Kingston Hospital, Jamaica, quoted in Russell, Marijuana Today, p. 28.

fabric of the country. But if the government of Jamaica (or any other country) condones the cultivation and exportation of a drug that is harmful to the people of the United States, it has only itself to blame for the consequences. It is an absurd form of foreign aid for the U.S. government to stand idly by while a country encourages the supply of a dangerous drug to America, simply because that country needs foreign exchange!

In the interests of its own citizens, the U.S. government should state clearly that marijuana is dangerous and a threat to the American population; that it is an unfriendly act for any government to condone it and that policies will be adopted to dissuade such tacit support. The idea that Jamaica can only survive if marijuana cultivation is allowed continue is ridiculous. The reason that the industry is now so important to Jamaica is that it is highly profitable. If the incentives were altered, other industries would develop. It should therefore be the goal of U.S. policy to apply penalties against Jamaica and similar countries if they continue to allow the trade to flourish, while offering American assistance to develop other industries. Tolerating the present state of affairs is an abrogation of responsibility by Washington. How can we justify putting our citizens in jail for using marijuana when we refuse to deal effectively with the chief suppliers of the drug?

EDUCATION

While effective action must be taken to deal with the flow of marijuana into this country, the other weapon in the battle to control the marijuana epidemic is education. People simply do not know the damage that the drug may do to them, and this misunderstanding of its consequences is at the root of the growing disrespect for the law dealing with it. We spend enormous sums of money teaching children how to use birth control devices but very little educating them about the effects of a drug which large numbers of them use during the school break. The scale of the problem is so great that a major drug education program in the schools should be a priority.

But education should not be confined to the schoolroom. Most adult users know little of the drug's effects, and parents usually have no idea how to recognize the symptoms of use -- or how to deal with the situation if they do recognize them. There are a number of organizations that do seek to educate parents, such as the Citizens for Informed Choices on Marijuana, based in Stamford, Connecticut. The work of groups such as this is crucial and should be encouraged. In addition, groups such as the American Council on Marijuana, in New York City, have taken the lead in providing succinct, readable scientific information for the layman. But a great deal more needs to be done, and both private and public resources should be made available.

CONCLUSIONS

1. Marijuana is a dangerous drug. It is quite unlike alcohol and tobacco in the way in which it remains in the system and the lasting damage it can cause with only moderate use.
2. While it may seem unjust to impose penalties on users, legalization -- and possibly decriminalization -- would be taken as an official declaration that the drug was safe. This could lead to the acceleration of an already rapid growth in use.
3. The thrust of public policy should be a combination of active discouragement and restriction of supply, rather than increasing penalties for use.
4. The public should be made aware of the effect of marijuana on the ability to drive. Firmer penalties for driving under the influence of the drug should be enacted at the state level, and drivers should be made aware of the dangers and the penalties involved -- as they are regarding alcohol.
5. For medical purposes, marijuana should be treated like any other drug that appears to have some benefits for certain patients. Research should not be discouraged because the drug is used illegally for non-therapeutic purposes.
6. The government and private institutions should take the lead in discouraging use of the drug, through a greatly expanded program of education in the schools, and among the general population.
7. Measures should be taken to interrupt the flow of marijuana into the country. Resources should be made available to enable the seizure rate to be increased substantially. In addition, tougher steps should be taken to interrupt domestic production.
8. Sanctions or other pressures should be adopted against countries which allow the cultivation of marijuana for the American market. Damaging the health of U.S. citizens should no longer be considered acceptable as a means of relieving the economic plight of other nations.

Stuart M. Butler, Ph.D.
Policy Analyst