Marijuana use in the United States, once restricted primarily to the urban poor and the rural southwest, is rapidly becoming a middle-class phenomenon. Its use by college and high school students has increased tremendously in the 1960s, and in the last few years it has spread downward to junior high and elementary school children, as well as upward to young professionals and businessmen. Concurrent with the increase in the number of marijuana users has been an increasing desire for information about the consequences of smoking marijuana. Unfortunately, much of what passes for information is really misinformation distorted by the biases of the source. Thus on the one hand we have many law enforcement officers, judges, teachers, and physicians claiming that marijuana is addictive and that its use leads to moral degradation, psychological instability, and antisocial behavior. On the other hand, we have increasing numbers of young"pot smokers claiming that marijuana is completely harmless. It seems reasonable to say that this divergence of opinion is largely due to different value systems and life styles of these various groups. Marijuana has served to widen the generation gap; Goode, in his excellent article "Marijuana and the Politics of Reality" [see below, pp. 168-86], indicated that this difference might never be resolved because of the vast differences that exist in the perception of reality between the two generations. (1)

Despite the confused legal and social situation in the last few years the tight controls on marijuana research have begun to loosen, and a body of factual information is emerging that will perhaps shed some light on this controversy. With increasingly widespread use of marijuana, an accurate evaluation of the possible dangers of such use takes on increased social significance. This paper reports the preliminary results of a toxicological analysis of a large group of marijuana users.

Several studies on marijuana use in other countries—notably India —have indicated addiction, physical degradation, and psychiatric disorders as consequences of long term marijuana use. These studies, however, were of users of hashish (the gummy resin from the leaves of the female Cannabis sativa plant) which is more potent than the marijuana preparations commonly used in the United States. Furthermore, social and cultural factors are important determinants in the effects of marijuana use; hence cross cultural comparisons are risky. For example, in India heavy hashish smoking is primarily a lower caste phenomenon, as
are disease and malnutrition. It is impossible to tell whether the same degree of organic
deterioration would result even if no drugs were used. The best studies in this country indicate
that marijuana as commonly used in the United States is not addictive and does not of itself
cause criminal behavior, moral deterioration, or psychological instability. It can, however,
produce toxic reactions, both acute and chronic. A description of the nature of these reactions
and an examination of their causes are the specific concerns of this article.

Methods

In studying marijuana toxicity we made a survey of a population using marijuana with clinical
methods and participant observation. The survey and most of the clinical case studies came
from contacts made through the Haight-Ashbury Medical Clinic, through interviews held in the
bay area suburbs and through lectures on drug abuse across the country. This clinic has a
two-year history of sympathetic treatment of young people with medical and psychiatric
problems, often related to drug use. During this period approximately 40,000 patients (2) were
treated, 95 percent of whom had experience with marijuana. (3) The clinic has gained the trust
and acceptance of drug users in the bay area; and includes as patients college students,
professionals, and working-class people, as well as residents of the Haight-Ashbury district.

Opportunity for a good deal of naturalistic observation also came through clinic contacts. The
clinic provides ready access to a large marijuana-using population since about 90 percent of the
thousands of patients seen each year use marijuana. Furthermore, the senior author has had
both clinical and social contact with marijuana users during his professional travels to many
parts of the country, and the junior author has immersed himself in several pot-using
subcultures in the bay area, which has allowed him access to information not ordinarily
available to a clinician.

It is worth mentioning here what appears to us to be difficulties with statistical and clinical
reports in this area. Ungerleider et al. (4) reported the results of a statistical survey of 2,700
professionals (psychiatrists, psychiatric residents, general practitioners, internists, and
psychologists) in Los Angeles County. The survey was primarily concerned with adverse
reactions to LSD, but it included a reporting of 1,887 adverse marijuana reactions. Unfortunately
no definition of "adverse reaction" was offered, and in view of the statement of one respondent
(he considered all LSD reactions adverse), we wonder what sorts of marijuana reactions were
reported as adverse. A good deal of the marijuana use observed by professionals consists of
youths who experimented with marijuana who were then brought in for treatment by anxious
parents. Neither marijuana smoking as a form of rebellion, nor parental anxiety should be
considered adverse marijuana reactions. On the other hand, mild overdose reactions are
unlikely to be observed by professionals because they are normally treated by the user's friends or by the marijuana user himself. Therefore, it seems that a survey of professionals is not an effective way of estimating the incidence of adverse reactions in a drug-using population. Statistical study of adverse marijuana reactions requires direct access to a marijuana using population and at least a general definition of what constitutes an adverse reaction.

Toxic Reactions to Marijuana

Toxic reactions to marijuana may be considered as any effects that result in physical or psychological damage, that are subjectively experienced as unpleasant by the user, or that produce significant interference with adequate social functioning. We specifically exclude the relaxed euphoric feelings the user describes as being "high" or "stoned."

Actual physical damage resulting from marijuana use is as yet unproved. Claims of brain damage from chronic use in India are not well supported as nutritional deficiency as a possible cause was not analyzed or controlled experimentally. Since marijuana in the United States is ordinarily smoked we can suspect as a chronic effect increased susceptibility to respiratory disease, as with tobacco smoking, though this effect has not yet been documented with marijuana. If an individual smokes 10 or more tobacco cigarettes for 15 or more years, his chances of getting lung cancer are 20 times higher than those of the non-smoker. Such levels would be impossible for the marijuana smoker to achieve without continuous yearly intoxication to the point of virtual anesthesia, and therefore it is highly unlikely that a link between marijuana smoking and lung cancer will be established. Death in human beings from marijuana overdose is almost impossible although death by coma can be produced in animals by deliberate massive overdose.

Unpleasant experiences induced by marijuana and its effects which hinder social functioning are best discussed in terms of acute and chronic toxicity. Acute toxic reactions are those unpleasant effects, usually of rapid onset, resulting from a single marijuana experience. Typical examples are nausea, anxiety, paranoia, and disorientation. Chronic toxic reactions are those undesirable effects that result only from prolonged marijuana use. Inasmuch as chronic physical damage from marijuana has not yet been satisfactorily demonstrated, the main chronic toxic reaction seems to be an impairment of social functioning in the form of an amotivational syndrome or generalized loss of desire to work or face challenges.

Acute Toxic Reactions
Many marijuana users report a variety of minor symptoms which should not be considered adverse reactions. They include such things as reddening and burning of the eyes, dryness of the mouth, excessive hunger, and lethargy. These are so minor as not to merit further discussion, and are best thought of as minor side effects.

Somewhat more serious effects that may occur with marijuana intoxication are paranoia, disorientation, confusional states, short-term memory loss, and a variety of perceptual alterations. Whenever these effects are desired by the marijuana user (as the last three often are), they cannot be considered toxic reactions. When, however, they are considered unpleasant by the user, and particularly whenever they produce concern or fear, they constitute acute toxic reactions. Anxiety reactions, psychotic breaks, and overdose reactions are the major acute toxic reactions. These may be so serious as to lead the user to seek professional help. We will discuss these major reactions in the context of their primary causative factors.

Toxic reactions to any psychoactive drug depend on the nature and strength of the drug used, the personality and mood of the user, and the social context in which the drug is used. Any instance of marijuana toxicity will involve all three factors; proper analysis requires evaluation of all three variables.

**DRUG FACTORS**

In examining toxic marijuana reactions there is a tendency to overemphasize the role of the drug. When we first began seeing acute toxic reactions in experienced marijuana users, we (and many of the users) suspected that there were adulterants in the marijuana. Now, however, we minimize this possibility for three reasons.

1. In the few cases where we have been able to chemically analyze the drug producing the acute toxic reaction, it has invariably been demonstrated to be unadulterated marijuana.

2. In most cases careful questioning revealed that either the user had smoked from the same batch previously without ill effects or other people shared his “grass” with no unusual effect, which indicates that an adulterant is not a factor.
3. Street talk of marijuana cured with opium, cocaine, DMT [Dimethyl tryptamine], or some other psychoactive substance far exceeds the amount of marijuana actually so treated.

Random analysis of the more potent marijuana circulating in HaightAshbury (given such names as "super grass") indicated that it was unadulterated, although it did contain a high concentration of THC (the active ingredient in marijuana). Hence, the "effects one may experience with marijuana purchased in the Haight is more rationally explained in terms of the amount of active ingredient, rather than attributing it to a contaminant in the marijuana as the community often does." (3)

The amount of the active ingredient and the quantity smoked, together with the tolerance of the user, interact to determine the degree of intoxication. This is important in that acute adverse reactions are more likely when one is highly intoxicated than when only mildly "stoned."- The greater the amount of active ingredient, the more intoxicated the marijuana user feels. This response, however, is modified by the user's tolerance level. Interestingly enough a form of reverse tolerance with marijuana has been reported by Weil. (5) Novices generally require more marijuana than experienced users to feel "high." Recent work by Jones et al. (6) has indicated that this represents the psychosocial effect of learning how to get "high"; Jones found a greatly increased incidence of placebo reactions with the experienced marijuana user than with the novice. Our clinical research, however, indicates that tolerance to marijuana is even more complicated than this, for we found several regular heavy users who could smoke ten or more "joints" per day and yet be only mildly "high," which indicates an increased tolerance with very heavy use. Furthermore, several experienced users have indicated to us that they get high more easily after a period of nonuse than during periods of regular daily use. This suggests that the degree of marijuana tolerance is best described as a J-shaped function: that is, the novice has a moderate degree of tolerance; with increasing exposure to marijuana tolerance appears to drop so that the occasional user has a low degree of tolerance; and with increasingly heavier use tolerance rises again so that a very heavy user has a high degree of tolerance. We indicate a J–shaped function because a very heavy user can undoubtedly tolerate more marijuana than a novice without ill effects. This J–shaped function may be a partial explanation of why heavy users rarely suffer acute toxic reactions. It appears that the initial negative tolerance is a learned phenomenon as suggested by Becker (14), but that the later increased tolerance may be pharmacologic in origin.

This lack of experience with marijuana by the novice user may also explain the "first time" cannabis induced toxic psychosis reported by investigators such as Talbott et al. (16) who cited 12 acute toxic psychosis in Viet Nam soldiers after their first exposure to marijuana. However, Talbott also emphasized the importance of environment on the drug reaction, questioning
whether there are factors in Viet Nam, not present in the United States, that predispose to psychosis. He also supported our finding that most adverse marijuana reactions do not come to the attention of medical facilities.

The most common acute toxic reaction with marijuana is nausea, dizziness and a very heavy, "drugged" feeling where every motion seems an extreme effort. The following case is an example.

Case 1: A 23-year-old white female secretary, an experienced marijuana user, shared several "joints" with a few friends in a quiet setting. She got very high, and about an hour after smoking she felt that she was nauseated and had diarrhea. With effort she stood up and walked to the bathroom, but neither vomited nor had a bowel movement. When she left the bathroom she felt dizzy and looked very pale. After sitting down again and eating something she felt better, but she remained weak and slightly nauseated until she fell asleep later that night. There was no hangover or residual symptoms the next day.

This is analogous to an alcohol overdose—getting too drunk. In fact, regular marijuana users often describe these symptoms as "getting too stoned." The main difference is that generally there is no hangover with marijuana.

We are aware of this type of reaction through our rather direct contact with a marijuana-using population and find it not at all rare. The average physician, psychiatrist, or psychologist, however, would likely be unaware of this condition, since it, like drunkenness, is generally treated at home without professional help.

The route of administration of the drug can also be an important factor. Smoking allows self-titration so that the user can stop with the first signs of a toxic reaction. Taking the drug orally is more likely to lead to a toxic reaction because overdosage cannot be so easily prevented. Six subjects in the La Guardia report (7) suffered brief psychotic episodes, all after the drug was ingested rather than smoked. Furthermore, the study reported in general a greater incidence of unpleasant symptoms with eating than with smoking the drug.

PSYCHOLOGICAL FACTORS
The effect marijuana has on an individual depends to a large extent on his personality structure, his expectations and attitude toward marijuana, and his mood at the time of use. The great variability of these factors makes the effects of marijuana rather unpredictable; hence in this country it is generally considered unsuitable as a medicinal agent. These same psychological factors—personality, mood and setting—are largely responsible for the most serious acute toxic reactions.

Marijuana can precipitate an acute psychotic reaction in a marginally adjusted or poorly organized personality. The following is an example.

Case 2: A 21-year-old white unemployed male experienced an acute psychosis after smoking marijuana with three other people in Golden Gate Park. When he came to the Haight-Ashbury Medical Clinic—about one hour after smoking marijuana—he was talking in such a fashion that he would increase his speed until he simply babbled. He would then return to a fairly rational state only to begin babbling again. Flight of ideas, depersonalization, and transformation of personality were evident. One hundred milligrams of Thorazine given over a two-hour period returned him to a reasonably normal state. During the next four days he "tripped out" several times, though he used no drugs during this period. It was difficult to determine whether these were true "drug flashbacks" or recurrent psychotic episodes (8).

Further questioning indicated that he had recurrent feelings of depersonalization and hallucinations during these four days. He was on welfare, had recently been arrested, had a history of epilepsy, had a brief psychotic break at age 12, and gave the impression of a marginally adjusted borderline psychotic. Two weeks after his initial adverse reaction he reported that he felt fine, and no further follow-up could be obtained. In cases such as this the psychosis is characteristic of the personality structure of the user, not of the drug. The drug intoxication merely triggers the psychosis, as happens with a variety of other drugs, including alcohol, amphetamine, and LSD.

Even with better organized personalities marijuana can precipitate severe, though less profoundly disorganizing, psychological changes, particularly in the presence of excessive stress. The intoxicated state may produce a keener awareness of existing stresses and may hinder the ability to maintain structural defenses. The following case illustrates this reaction.
Case 3: A 27-year-old white female student complained of a depressive reaction to marijuana on three separate occasions. She has been a casual user for five years. The adverse reaction on these three occasions was characterized by a feeling of isolation and detachment from people, lack of energy, and excessive sleeping over the period of a week to ten days following marijuana use. In each case she was in a socially awkward or frightening situation while under the influence of the drug. Furthermore, the first two instances occurred in the context of a more general social stress: she was in a foreign country traveling with friends for whom she felt an excessive amount of responsibility. In the third instance she still felt "stoned" upon awakening the day after marijuana use and began to fear that she was schizophrenic or going crazy. Approximately one month later she came to the clinic.

Further questioning revealed that her mother was excessively dependent; consequently the patient assumed the primary responsibility for the care of her younger siblings. As a result she had a great deal of trouble breaking away from home and making a life of her own. She had a tendency to adopt an undue amount of responsibility for others' problems. She was usually slightly manic: always very much on the go and involved in more things than she could generally handle comfortably. It appears that the patient was a manic-depressive personality, and that in stressful situations laced with excessive responsibility marijuana triggered the depression. After gaining some insight into her problems, the patient has set some limits for herself and seemed to be gaining firmer control over her life.

Again, the prolonged reaction is a result of personality problems which the drug merely serves to unmask. A long term psychotic state induced by marijuana (as opposed to a brief psychotic reaction lasting a few hours) in a well-integrated stable personality, if it occurs at all, is exceedingly rare in this country. Some studies in other countries indicate that Cannabis is an important cause of psychosis, but most American authors disagree that the drug is causative in these cases.

In both cases two and three patients had been occasional users of marijuana for several years. Both were quite familiar with the drug. It was the confluence of various psychosocial stresses quite distinct from marijuana use that helped precipitate the toxic reactions described above. In many cases, however, it is the marijuana use itself that creates the stressful situation. Since marijuana use in the United States is illegal and most of us have been exposed to strong warnings about its dangers, the novice experimenting with marijuana often finds himself in an emotionally charged situation. He may fear discovery and arrest with consequent loss of respect, loss of job, straining of family relations, and possible incarceration. He may harbor secret fears that marijuana intoxication will produce physical damage, will make him lose control and do things he does not want to do, or will drive him insane. Such a strong negative attitude toward marijuana can, of itself, produce sufficient stress to create a state of panic when the influence of the drug is felt. The altered mental state produced by the drug seems only to
confirm the fears, and a full-blown anxiety reaction develops. The following case illustrates this point.

Case 4: A 34-year-old single, hard working, white male business executive, in his capacity as president of a small and rapidly growing company, had a good deal of responsibility. He was well dressed, drove quality cars, had his own airplane, and fit the role of the dashing urban bachelor. He was a regular user of alcohol, attended many cocktail parties, and was a heavy smoker of cigarettes—approximately two packs per day. At the suggestion of various friends and out of curiosity he decided to smoke marijuana. He shared one marijuana cigarette with two other individuals; then they all went to dinner. During the course of his conversation he noted that he would forget what he had just said; as a result he became very disturbed. His anxiety increased because he felt he was losing control of himself; he said later it was like what he thought would happen if one lost his mind. The other two individuals who had smoked approximately the same dosage were having a very good time and showed no adverse effects. This individual, however, became quite panic stricken and was taken home and given a sedative. After a good night's sleep there were no residual effects, but the individual described his marijuana experience as being most unpleasant, and said he greatly preferred alcohol. Subsequent interviews indicated that the threat of being arrested while under the influence of marijuana was also one of his major concerns.

Even if a negative mood or set is not present, the unexpected nature of marijuana and the fear of altered reality may prove disastrous to the user. Anxiety may also result from a misunderstanding of the physical symptoms of marijuana intoxication. We have seen cases where the mild increase in heart rate that occurs with the early stages of marijuana intoxication was interpreted under increased sensory awareness as resembling the onset of a heart attack with a subsequent anxiety state. More commonly, though, the altered state of consciousness adds to the picture. The altered time sense may give a feeling of disorientation, and an increased sensory awareness may make breathing or talking seem to require a great deal of effort. All this may produce a sense of loss of control over one's body or mind, which creates great anxiety, as in the following case.

Case 5: A 26-year-old professional man experienced an anxiety reaction the second time he smoked marijuana. His first experience with the drug was in combination with alcohol and he had no distinct experience of being high on marijuana. His second experience was with friends who were experienced users. After becoming quite high, he noticed altered time perception and found that his words came slowly and with great difficulty when he tried to speak. This loss of control proved very frightening; he even feared he might be going insane. When the group moved to a different environment he developed a full-blown anxiety reaction with some paranoid ideation. He was given Thorazine at the Haight-Ashbury Medical Clinic. About four hours later, after returning to his friend's house, he fell asleep. The next day he was lethargic,
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uncoordinated, and unable to work properly.

He reported that at the time of this experience he was under a good deal of psychological stress and was seeing a psychotherapist. He recalled that at the time he feared for his professional career if he were to be caught with marijuana, but that the primary fear was loss of control and fear of going insane. Since then he has smoked marijuana several times with only pleasant results.

These last two cases are examples of novice anxiety reactions—anxiety reactions of an inexperienced user that resulted from unfamiliarity with and (often repressed) fear of marijuana. As in the last case, this kind of reaction does not necessarily occur the first time marijuana is smoked; if it is going to occur at all, it generally occurs at the first instance of strong intoxication. In view of the generally high tolerance of the novice, this may well be the fourth or fifth intoxication.

Recently fully half of the acute toxic reactions we have seen at the Haight-Ashbury Medical Clinic have been novice anxiety reactions, and a majority of them have involved "straight" people over 25 years of age. We can expect such anxiety reactions whenever people with rigid personality structures committed to the current dominant value system experiment with illegal psychoactive drugs. As more young professionals, businessmen, and middle-class parents (at the urging of their children) experiment with marijuana, we can expect an increase in these acute toxic reactions.

SOCIAL FACTORS

The effects one experiences with marijuana intoxication are greatly influenced by the setting—the immediate environment in which the drug is used. Young couples smoking "grass" together are likely to experience increased erotic feelings, whereas a student listening to classical music under the influence of "grass" will likely describe his experience as aesthetic. In many circles marijuana is used at parties as a social lubricant to relax inhibitions, reduce tension, and promote a feeling of social warmth—much as alcohol is used at cocktail parties.

A marijuana user is particularly susceptible to the influence of the people around him while he is intoxicated. If companions are disliked or seen as threatening, a toxic reaction may result, as
in the following case.

Case 6: An 18-year-old white female at a midwestern college was having numerous experiences with marijuana and with sexual exploration, both of which were foreign to her previous way of life; she felt liberated and part of the "new morality." One evening, however, she had one marijuana cigarette with friends and a boy whom she had only recently met. When he made rather vigorous sexual advances, she became quite frightened and cried hysterically. She cried for about four hours until reassurance by friends gradually brought this under control. Following this acute panic reaction she became quite depressed. Her father had to withdraw her from school and she sought psychiatric help. After about six months she was able to resolve the various conflicts that were plaguing her and returned to school.

The girl's unresolved sexual conflicts were a root cause in this reaction, but it took the threatening environment to precipitate the anxiety reaction.

The larger social context of marijuana use is also important. As mentioned previously, a member of the dominant culture committed to middle-class values is fairly likely to be fearful when experimenting with marijuana. On the other hand, a member of the Haight-Ashbury community, where marijuana is the drug of choice, is extremely unlikely to be paranoid about its use.

Most acute toxic marijuana reactions seen at the Haight-Ashbury Medical Clinic involve students and relatively "straight" young adults from surrounding areas; it is exceedingly rare for a "hip" resident of Haight to present himself with an acute marijuana reaction, because even if he overdoses himself he does not seek medical attention but merely "sleeps it off." There are probably several factors involved here, such as the fact that most Haight residents are experienced users who have learned to "handle their grass," but an important factor is undoubtedly the social acceptance of marijuana use. Group reassurance as to the harmlessness of marijuana is undoubtedly therapeutic in preventing anxiety reactions.

**Spontaneous Recurrences**

The spontaneous recurrence, in a drug-free state, of the intoxicating effects of a psychoactive drug is commonly called a flashback. LSD flashbacks have been widely reported in the literature
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(9, 10, and 11), and we have seen many cases at the Haight-Ashbury Medical Clinic. Keeler et al. have reported four cases of marijuana flashbacks (12).

A flashback in and of itself does not constitute a toxic reaction. For example, two of the cases reported by Keeler (12) found these recurrent states not at all unpleasant. If, however, the spontaneous recurrence produces anxiety or impairs physiological or social functions, then it constitutes a toxic reaction.

In discussions of the spontaneous recurrence of a drug effect, it is important to make clear what should not be considered a flashback. Users of marijuana sometimes report that when they are with a group of friends, all of whom have smoked marijuana and are feeling quite high, they themselves feel high, though they have not smoked the drug. The phenomenon is referred to as a "contact high." This is the result of social suggestion—not a flashback—and is related to the great susceptibility of the marijuana user to environmental influences as described by Jones (6).

Keeler (12) points out that recurrence of psychopathology that was present during the drug intoxication does not constitute a flashback. However, it is often difficult to make this distinction, as in the following case.

Case 7: A 24-year-old white male laborer came to the Haight-Ashbury Medical Clinic and complained of a marijuana flashback. He has been a casual user of marijuana—and only marijuana—for about four years. About a month and a half previously he and his wife had shared two joints and got very high. Both experienced perceptual distortions, paranoia, and fear. On the day he came to the clinic while at work, the patient started feeling high. He experienced paranoia and a sense of loss of control; he felt like his "mind was closing." When he came to the clinic he still felt high and was somewhat agitated. He was given reassurance and a phenothiazine tranquilizer. He had no recurrence of this during a one-month follow-up.

This is probably best considered a recurrent anxiety state rather than a true marijuana flashback, but the decision is difficult because the patient was not very articulate. It is interesting, nonetheless, that most flashbacks occur after an adverse drug reaction or "bad trip." In addition, Shick et al. (16) suggested a much higher incidence with amphetamine-LSD combinations.
Keeler (12) reports still another effect that should not be considered a flashback. Several people experienced increased perceptual awareness under the influence of marijuana and some degree of this enhancement remained with them.

It is hoped that these negative examples will help clarify the concept of a marijuana flashback; a precise, straightforward definition is difficult to give. Keeler (12) suggests that "spontaneous recurrence of drug effect may be relatively common," but we have yet to see a case we would definitely describe as a flashback. We are inclined to the view that flashback effects, though real, are quite rare.

**Chronic Marijuana Toxicity**

Toxic reactions from the cumulative effects of chronic marijuana use are poorly defined. The brain damage resulting from chronic alcoholism, for example, is a secondary effect of associated malnutrition; such effects do not result from chronic marijuana use in this country, since marijuana acts as an appetite stimulant, and the chronic user continues to eat well.

Reports from India (13) indicate that chronic heavy use of charas (a potent Cannabis preparation equivalent to hashish) may produce increased susceptibility to respiratory and digestive ailments and a kind of social indifference, but that regular use of bhang (a mild preparation comparable to the marijuana used in the United States) poses no social problem.

Chronic heavy marijuana use in the United States is often associated with social maladjustment. It is difficult to know whether the long term use of marijuana leads to changed social values and behavior, or whether changing social values lead to chronic marijuana use. Perhaps more likely the values and behavior interact to produce concomitant change, the marijuana use helping to alter values that in turn reinforce the drug use.

Whatever the causal relations are, it is true that a chronic heavy marijuana user can develop an amotivational syndrome (8). He loses his desire to work, to compete, and to face any challenges. His interests and major concerns may center around marijuana to the point that his drug use becomes compulsive. He may drop out of school or leave work, ignore personal hygiene, experience a loss of sex drive, and avoid most social interaction. The picture in terms of social consequences is then similar to that of a chronic alcoholic, but without the physical
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It is important to realize, however, that such effects depend on the personality and social environment of the user and are not inevitable results of chronic marijuana use. Marijuana use may in fact have a beneficial effect on certain adolescents facing identity problems, as the following case demonstrates.

Case 8: A 15-year-old white male in a wealthy bay area suburb improved his performance in school after he began smoking marijuana. Prior to this time he suffered from free floating adolescent anxiety about "who he was" and "where he was going." There was very little family communication, although his parents continually advised him about his future objectives. The boy stated he was not needed economically or any other way in the family or the community. When he started smoking pot, however, he became a "head" (psychedelic drug user) and entered into the "head subculture" whereby he established a new identity for himself. Temporary resolution of this adolescent identity crisis resolved his anxiety and he was able to perform much better in school.

In summary, marijuana toxicity cannot be understood if one focuses only on the drug itself. One individual with a particular personality structure and set in a particular environment may react one way to marijuana, whereas another individual with different personality and environmental circumstances may react in an opposite way to the same drug dosage. Analysis of marijuana toxicity, then, requires a thorough understanding of the personality and social variables in addition to the individual drug factors.

References

of marijuana in man. Science 162: 1234-42 [See above, pp. 11-34].


