IN THE EIGHT YEARS that have passed since the first controlled experiments on marijuana, hundreds of human subjects and countless laboratory animals have been given enormous amounts of the drug, day in and day out. The results have been recorded in thousands of articles in scientific journals alone, and coverage by the mass media is impossible to measure. Not one of the findings that demonstrates marijuana's potential for harm has been consistently replicated by other research or could be regarded as proved. Few of the oldest, most publicized findings—those concerned with the areas of brain damage, lack of motivation, psychosis, and the stepping-stone-to-heroin theory — are now supported by any member of the scientific community, regardless of where he stands on marijuana. The remarkable thing is that these studies got as much attention as they did, a fact that can only be ascribed to the fears rampant at the time. The articles continue, despite comments like this one by Michael Baden, made back in 1972: "We know more about marijuana than we do about penicillin."

In summarizing the major findings on marijuana, I will consider the above possible effects of use, as well as chromosome damage (birth defects), a reduction in immune response, an incitement to crime, a health hazard, and impairment of sexual activity.

If I have overlooked an article here or there, it is not because it represented a point of view contrary to my own. At the same time, I am aware that objectivity in marijuana research is difficult; a study of the literature indicates that scientists on both sides of the marijuana question have been influenced by their prejudices.

The accompanying chart characterizes the views expressed in the writings on marijuana use and its effect in the seven most important areas of contention. The charges that marijuana leads to crime and is a general health hazard are not included on the chart because they lack continuity and support.

In addition to itemizing the results of actual research, the chart also lists key public reports, investigations, and important media responses. Key reports and investigations had to be included because they often generated data or summed up existing data. I included media responses because one of my basic conclusions—perhaps the most essential one—is that scientific data do not determine society's responses to the marijuana question. Instead, these responses reflect the complex of emotions expressed through the media. Hence, former President Nixon's rejection of the report of his own National Commission on Marijuana and Drug Abuse (Shafer Commission) belongs on the chart, as does Ann Landers' column containing her pronouncement on marijuana use. In one sense, the entire chart reflects media responses, for none of the articles from scientific journals would have excited interest unless they had received coverage.

Amotivational syndrome.

The term "amotivational syndrome" was used by Louis J. West, Chairman of the Department of Psychiatry at UCLA, in 1972 to describe the belief that marijuana use reduces the capacity to think straight, and produces a loss of will. In 1970 the National Clearing House for Drug Information had reported that marijuana users appeared to do about as well academically as nonusers. Within the month, the Federal Bureau of Narcotics and Dangerous Drugs issued a report claiming the opposite. In 1971 two reports claimed that marijuana caused physical dependence (addiction). In 1972 the second annual HEW report on Marijuana and Health summed up a number of studies in colleges and high schools that showed no difference between users and nonusers. About the same time an interview with West appeared in the Los Angeles Times, and within a month an article was published that showed that countries (usually described as "primitive") where marijuana use was not generally punished had always accomplished less than other countries.

Throughout 1972, the notion that marijuana sapped the will received enormous media coverage and almost certainly became the conventional wisdom. Yet that year also witnessed the appearance of several reports favorable to marijuana use. First, there was the release of the Shafer Commission's first report, which denied the existence of an amotivational syndrome, followed by the initial release of data from the Jamaica study authorized by the Commission. The Jamaica report compared chronic users physiologically and psychologically with a control group of nonusers. The users had smoked seven to 25 cigarettes of strong Jamaican marijuana a day, averaging about three percent THC, the active ingredient in marijuana, for between 10 and 25 years. This report of long-term use revealed no differences in motivation between users and nonusers, although it did hint that the users were better motivated.

In 1973, the American Journal of Psychiatry published a study by Joel Hochman and Norman Brill. They had studied a random sample of 140 UCLA students and found no motivational dif-

The volley of charges against pot and the claims for it have made it our most researched drug. Here, a respected psychiatrist details what we know—and what we don't—about a drug millions use daily. by Norman E. Zinberg

ference between users and nonusers, even with heavy use. The Hochman and Brill study was rebutted by a Department of the Army claim that, among soldiers, users were more poorly motivated than nonusers, but this report did not describe how the subjects had been selected.

In 1974 the Canadian Le Dain Commission report echoed the findings of the Shafer Commission, and for a time nothing more was heard of the amotivational syndrome. Then Senator James O. Eastland of Mississippi launched a series of hearings, which he introduced by stating that the proponents of marijuana had been commandeering the headlines and he now wished to give the opponents their day in the sun. He was successful, for the hearings revived much of the belief about the harmfulness of marijuana, including the amotivational syndrome.

In 1975, however, the tide broke in the other direction. The Drug Abuse Council reported that one year after the State of Oregon had decriminalized marijuana, there had been no appreciable increase in use or problems from use. When Consumer Reports issued one of its summaries of the evidence on marijuana and health, it backed the Jamaica study as the most definitive research to date. Nevertheless, in July 1975, Reese T. Jones, of Langley Porter Neuropsychiatric Institute, gave the final word for the year when he reported that 42 volunteers showed tolerance and dependence after using marijuana for a month in a clinic ward. Since a study contradicting Jones has not had time to emerge, I should point out that each of his subjects received at least 210 milligrams of THC per day; that approximates 50 to 100 cigarettes a day. If that much grass cannot produce some change in one's way of life, a lot of people in this country are wasting their time.

Chromosome damage (birth defects).

The first important article in the 1970-1975 period to discuss the effect of marijuana on chromosomes or birth defects was one by David Dorrance and his associates in 1970, who included marijuana in their study of hallucinogens, along with LSD and mescaline. Considering marijuana a hallucinogen was a misconception that had just about stopped by 1968, but Dorrance's definitive work, which refuted previous charges that LSD caused chromosome damage, was written before the marijuana chromosome scare arose.

In 1970, the Federal Bureau of Narcotics and Dangerous Drugs report already referred to appeared. It damned marijuana in every way. It was countered in the following year by the HEW report, and in 1972 by the Shafer Commission's first report, which found no birth defects associated with marijuana use.

The seesaw between opposing views of marijuana use also symbolizes the path of a media adventure involving Wesley Hall, then President-elect of the American Medical Association. On March 6, 1971, he said at a Las Vegas news conference that a continuing American Medical Association study on marijuana showed that it caused sterility and birth defects. On March 25, 1971, after being taken roundly to task by the National Institute of Mental Health and the chairman of his own

AMMUNITION IN THE GRASS WAR

	WARNING REPORTS		CALMING REPORTS	
Amotivational Syndrome	1970:	Bureau of Narcotics & Dangerous Drugs	1970:	National Clearing House
	1972:	L. J. West	1972:	2nd Annual HEW report on Marijuana & Health; Shafer Commission report
	1973:	U.S. Army; Nixon	1973:	Hochman & Brill in American Journal of Psychiatry
	1974:	Eastland Committee hearings	1974:	Le Dain Commission
	1975:	Reese T. Jones	1975:	Drug Abuse Council; Consumer Reports; Jamaica Study
Chromosome Damage and Birth Defects	1970:	Bureau of Narcotics and Dangerous Drugs	1970:	David Dorrance
	1971:	Hall, AMA Pres.	1971:	HEW; Hall, AMA Pres.
	1973:	Stenchever; Curtis; Landers; Nixon	1972:	Shafer Commission
	1974:	Eastland hearings; Morishima	1973:	NORML
			1974:	Le Dain; Nichols; Thorburn; Pace; Neu
			1975:	Consumer Reports; Jamaica Study
Brain Damage	1970:	BNDD Report	1971:	HEW
	1971:	A.M.G. Campbell; Rat experiments	1972:	Shafer Commission; Grinspoon
	1973:	Prevention article; Nixon	1973:	Stunkard
	1974:	Eastland hearings; Heath	1974:	Le Dain Commission; Axelrod
			1975:	Jamaica Study
Psychosis	1971:	Kolansky & Moore	1972:	Shafer Commission
	1973:	Nixon	1974:	Le Dain
	1974:	Eastland hearings	1975:	Jamaica Study
	1975:	Reese Jones		
Stepping-Stone to Heroin	1971:	Coleman	1971:	Carlin & Post; Cameron
	1973:	Landers; Nixon	1972:	Shafer Commission
	1974:	Eastland hearings; Paton	1974:	Le Dain; David Duncan
			1975:	Jamaica Study
Immune Response	1973:	Study by Nahas	1975:	White; Silverstein & Lessin; Jamaica Study
	1974:	Nahas; Gupta; Eastland hearings		
Sex Impairment	1972:	New England Journal of Medicine	1974:	Mendelson
	1974:	Kolodny (NEJM)	1975:	Brecher

AMA Committee on Drug Dependence, he said that there was no evidence linking marijuana with loss of sex drive or birth defects, but he added gratuitously, "I still care about morality and decency and I'm tired of phrases like 'credibility gap.'"

The big blast on chromosome breaks came with the publication of an article by Morton A. Stenchever in the American Journal of Obstetrics and Gynecology. He found that 20 women and 29 men who had used marijuana showed almost three times more breakage in chromosomes than a control group of 20 nonusers. One of the most damning findings, quoted and requoted since, was that of the users, 22 used marijuana only once a week or less. It seemed to make no difference whether use was light or heavy. At a lecture in Cleveland in April 1973, Stenchever began by saying, "We're concerned that marijuana may be legalized and that it may be a much more dangerous drug than we realize." That phrase and his findings received enormous press coverage, which publicized the idea that chromosome breaks resulting from marijuana use might result in birth defects.

In a country already terrorized by the thalidomide scandal, this threat packed a real punch. There were a few attempts, notably one by R. Keith Stroup, head of the National Organization for the Reform of Marijuana Laws, to explain that even if marijuana did cause chromosome breaks, we don't really know what the breaks mean and have no evidence that they result in birth defects. Many common substances, such as aspirin or caffeine, cause chromosome breaks. Most important of all, as Stroup pointed out, the Stenchever study had obtained no information about the condition of the subjects before they used marijuana. Thus, the possibility that they had previously used other substances was not ruled out.

Despite the attempts to minimize the effect of Stenchever's findings, the media responses continued for months. Two are included on the chart: one by the medical columnist Lindsay B. Curtis and the other by Ann Landers. These columnists stated the case as if proved—Ann Landers' headline read, "It's Medically Proven: Grass Can Harm Babies"—and their columns were picked up and reported on by wire services in the news sections of the daily papers.

The Canadian Le Dain Commission report of 1974 minimized Stenchever's findings, but it received little publicity in the United States. In July 1974 W.W. Nichols and his co-workers published in Mutation Research a report showing that the 24 people they studied experienced no chromosome breaks. Nichols had checked the condition of his subjects' chromosomes before giving them marijuana and rigidly excluded, for the study period, the use of any substance that might cause chromosome damage. Scientifically, Nichols' work is definitive. It has not been seriously challenged, and in fact has been supported by the Jamaica study and by studies at the University of Mississippi and the Upstate Medical Center of SUNY. Yet there were no Landers columns about W.W. Nichols, and while the name Stenchever is well known in circles interested in drug use and abuse, I venture to say that Nichols is virtually unknown.

Each of his subjects received at least 210 milligrams of THC per day. That would produce 50 to 100 cigarettes a day. If that much grass can't produce change, a lot of people are wasting their time.

W.W. Nichols, M.J. Thorburn of the University of West Indies (a director of the Jamaica study), H.B. Pace of the University of Mississippi, and Richard L. Neu of the State University of New York were not mentioned at the Eastland Commission hearings. An Akira Morishima came to prominence, however. Morishima testified that his research on lymphocytes showed that the lymphocytes of marijuana smokers contained one third fewer chomosomes than did a control group of nonsmokers and that his work supported Stenchever. It took the ever-vigilant Consumer Reports to inform even careful readers that Morishima had studied only three people. To my knowledge, this fact was not mentioned during the extremely well-publicized hearings.

Brain damage. The belief that marijuana causes irreversible brain damage goes back to the 1930s and the original scare stories about marijuana. This view came up in the 1970 report of the Federal Bureau of Narcotics and Dangerous Drugs; the next year it was countered by the HEW report. In early 1971, an experiment on rats claimed that marijuana damaged the brain. The report got a flurry of attention, but the real bomb was dropped later, in December 1971. A.M.G. Campbell and his associates reported in The Lancet, a highly respected British medical journal, that X-ray studies of the brains of 10 heavy marijuana smokers showed "evidence of cerebral atrophy." That is, these smokers showed an actual diminution of brain tissue when they were subjected to a rather hazardous procedure called an air encephalogram. Due to the nature of this procedure, no one has repeated the enormously publicized Campbell project. But it has been challenged, first, by the Shafer Commission report that President Nixon rejected, and again in 1972 in a critique by Lester Grinspoon published in Contemporary Drug Problems. Grinspoon pointed out that Campbell referred to his 10 subjects as addicts, a term not usually applied to marijuana users. Not only had all 10 already used LSD, but eight had used amphetamines, four had suffered significant head injuries, and a number had used sedatives, barbiturates, heroin, or morphine. All had used alcohol, a drug for which there is proof of eventual brain damage. Therefore, Campbell's association of marijuana use with cerebral atrophy followed no principle of science or logic.

In the spring of 1973, a flurry of marijuana brain-damage articles appeared. One long piece in Prevention stated that Campbell had found "marijuana smokers' brains to have actually shriveled." In April 1973 the Journal of Nervous and Mental Disease published a study by A. J. Stunkard and his associates, which compared a group of 29 students using marijuana regularly over a period of at least three years with a nonusing control group. On the basis of a wide range of neurological and neuropsychological tests, Stunkard found no differences between the two groups.

In the light of Stunkard's study, as well as the Le Dain Commission report, the belief that marijuana caused brain damage should have been set to rest. But no. Robert G. Heath emerged from the Eastland Committee hearings to report that six rhesus monkeys with electrodes planted in their brains showed persistent changes in brain-wave patterns after re-

ceiving heavy doses of marijuana over a period of several months. At this point, no less an authority than Julius Axelrod, 1970 Nobel Prize winner for his studies of the effects of drugs on the brain, and himself an Eastland Committee witness on the dangers of marijuana, took up the cudgels. He noted that Heath had violated the cardinal principles of pharmacological research. By forcing the monkeys to take doses equivalent to over 100 marijuana cigarettes a day, he had paid no attention to dose-response curves. All he might have done, said Axelrod, was discover a toxic dose.

Psychosis. Except for a few reports in the late 1920s, little attention was paid to the question of whether marijuana causes psychosis until April 1971. The explanation by Howard Becker, a professor at the Department of Sociology at Northwestern, that the early cases were probably the result of the smokers' secondary anxiety at their inability to accept the strange drug effects, rather than a direct drug response, was generally accepted. In April 1971, however, the Journal of the American Medical Association published a report by Harold Kolansky and William Moore concerning 38 patients whom they had seen in their psychiatric practice. Eight had become psychotic, four had attempted suicide, and the others had shown varying degrees of promiscuity and breakdown in their lives after smoking marijuana. The publicity was enormous. Kolansky and Moore testified before the Shafer Commission that marijuana, and marijuana alone, was the villain in these bizarre cases. Many eminent authorities questioned this insistence by Kolansky and Moore on a direct association between marijuana use and the problems described in their report. For example, they cited the case of a 17-year-old boy seduced by a homosexual who also gave him marijuana; the youth became psychotic. But the insistence of these researchers that it was clearly the marijuana that was responsible for the psychosis hardly convinced other psychiatrists.

The reports of the Shafer Commission and the Le Dain Commission, the Jamaica study, and a variety of other medium- and long-term studies have in no way substantiated Kolansky and Moore's findings. Further, the lack of any confirmed clinical accounts of a psychotic response following acute or chronic marijuana use is convincing, particularly

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since about 20 million people now use the drug with some regularity. Nevertheless, the rat-tat-tat of the claims that marijuana causes brain damage and lack of will, no matter how little substantiated, has contributed to the public's general uneasiness about the use of the drug.

Steppingstone to heroin. The belief that young people begin on marijuana and proceed step by step through harder drugs to heroin addiction is hoary with age. The 1963 Kennedy Commission on Drug Abuse in the United States definitively dismissed that notion, and a score of later reports, including those of the Shafer and Le Dain Commissions, have called it nonsense. Nevertheless, the suggestion reappears with regularity and continues to receive considerable media attention. In May 1971, Lester Coleman, a syndicated medical-advice columnist, wrote a strong column supporting the marijuana-to-heroin theory, which frightened many readers. In November, the Journal of the American Medical Association published the research of Albert Carlin and Robert Post. Their study of more than 100 marijuana users specifically discounted the notion that such users develop an interest in other drugs, particularly opiates. And a few days later, Dale Cameron, head of the World Health Organization's Drug Dependence Unit, reported the same findings on the international front.

Neither the reports of the three commissions nor the private research studies deterred Ann Landers from publishing a passionate column in early 1973. It restated the steppingstone warning. And in 1974 the Eastland Committee pushed the same notion hard, going so far as to import W.D.M. Paton, Professor of Pharmacology at Oxford and probably the leading exponent of the theory that marijuana leads to heroin, to give testimony. He said his piece and was duly reported.

Since that time, one definitive study on the question has appeared. Written by David F. Duncan of the University of Texas Health Sciences Center at Houston, it explores the initiation of drug use by heroin addicts and correctly criticizes all other studies for not noting in sequence the different drugs used for intoxication. Experimenting with two groups of heroin addicts, one drawn from a prison and the other from a methadone clinic, Duncan analyzed the subjects' drug use step by step. He found that alcohol was the first intoxicant regularly used by 73 percent of these addicts, whereas marijuana was used as the first intoxicant by only a small percentage of both groups. Marijuana rarely figured prominently as the preferred drug.

"Speed"—that is, some form of stimulant amphetamine—came second (61 percent) to alcohol as the first intoxicant of the heroin addicts in prison. Since heroin is a depressant, the role of a stimulant as a drug of choice for the same group of users is hard to explain.

Duncan's study shows—it does not simply indicate—that marijuana use does not lead to heroin use. He believes that there are no distinct steppingstones from one drug to another. The initial use of alcohol by a large percentage of his sample only follows the cultural norm and does not mean that alcohol or amphetamines or any other drug leads to heroin addiction.

Immune response. The next big marijuana scare broke in May 1973 when The New York Times published a long letter to the editor from Gabriel G. Nahas and his associates. They declared that marijuana was generally dangerous and that the drug interferes with the capacity of the body's white blood cells to fight disease. Such a claim was serious indeed because the immunological defense provided by T-lymphocytes operates against infectious diseases, foreign protein substances, and possibly even against some types of cancer. Nahas reported that the T-lymphocytes of marijuana smokers resembled those of patients with cancer and kidney disease, producing 40 percent less potential immune response.

Nahas' work was quickly discounted in some circles because he was known to be strongly opposed to marijuana use. But in October of the following year Sudhir Gupta and his associates sup-

ported the Nahas position by stating in the New England Journal of Medicine that the reaction of marijuana smokers' T-lymphocytes to sheep red blood cells in laboratory cultures was weaker than that of nonsmokers. Further, a bewildering variety of reports from laboratory investigators in places as various as East Tennessee State University, the University of Laval in Quebec, the Medical College of Virginia, the University of Toronto, the Mason Research Institute, and the Pasteur Institute stated a weakened immune response in cultured cells after exposure to very potent solutions of marijuana. All of these findings got a thorough review at the Eastland Committee hearings.

As usual, there are contradictory findings. Unfortunately, these more favorable findings cannot be exactly matched to the unfavorable findings and therefore cannot be taken as discounting them absolutely. For example, the study of S. C. White and his associates, reported in Science in April 1975,found no significant differences in microcultures of blood lymphocytes between 12 long-term marijuana smokers and a control group. But this group of smokers, like the group reported on by Melvin J. Silverstein and Phyllis J. Lessin of UCLA, smoked an average of three or four times a week, which may not constitute sufficiently heavy use. The UCLA study is of particular interest, however, because it investigated the immune response in individuals and not in tissue culture. Silverstein and Lessin's 22 marijuana smokers showed intact skin immune responses when compared to a control group with impaired responses. These unimpaired responses were confirmed by trying other foreign substances on the subjects that led to identical results with users and nonusers.

Even more effective in contradicting the impaired-immune-reaction theory is the Jamaica study. The 30 long-term users had no greater history of infection than the control group, and an extremely thorough physical examination failed to reveal any evidence of physiological impairment. It could be argued, however, that other heavy users whose immune reactions had been affected had dropped by the wayside.

In the long run, epidemiological studies will settle the issue. So far the reports emerging from college health services, free clinics, or other health facilities frequented by marijuana users have not indicated the higher incidence of infection that would be expected if the immune reaction had been damaged. This fact demonstrates that moderate marijuana use, as shown by the White and Silverstein studies, simply leaves the immune reaction untouched. Certainly, the number of extremely heavy users in this country is too small to affect the national disease rates appreciably.

The claim that marijuana causes sexual impairment is all the more frightening because it is unexpected. The word from users has been that sex and marijuana go together like bacon and eggs.

Incitement to crime.

The claim that marijuana use is associated with crime and violence dates back to the 1930s. Only politicians have leveled such charges during the period covered by this summary. In May 1971, for example, Representative John Murphy (Democrat-N.Y.) made the headlines by asserting the U.S. soldiers in Vietnam committed "bizarre acts of murder, rape, and aggravated assault" as a result of marijuana use. Similar but more sedately worded comments emerged during the Eastland Committee hearings. Today this marijuana myth has been dropped, perhaps because of the painstaking 1930s study of 17,000 offenders by Walter Bromberg and, more recently, a study by Jared Tinklenberg of Stanford, which show no relationship between marijuana use and crime.

General health hazard.

The claim that marijuana is a health hazard has appeared, vanished, and reappeared over the last six years. It has been asserted, for example, that marijuana causes skin cancer or a profound metabolic change in various kinds of animals, usually mice or rats. So far none of these reports has been substantiated. Interestingly, not all of the unsustained, extravagant research studies have found marijuana harmful. One researcher reported that marijuana stopped three kinds of cancer in mice; another noted that mice gained in creativity but scored lower in authoritarianism. The claim that marijuana adversely affects electrocardiograms, which appeared in the July 1973 issue of the Journal of the American Medical Association, acquired weight through the publication of an editorial in the same issue supporting those findings. In November 1973 the Journal printed a short letter that persuasively discredited the original study, but this was done without editorial fanfare. Lung damage due to marijuana smoking is mentioned now and again, but this particular fear, which is probably realistic, has been partially negated by the fact that marijuana, unlike nicotine, causes vasodilatation and expansion of lung bronchioles.

Sex impairment.

In recent years, the biggest fear has resulted from the claim that marijuana causes sexual impairment, at least in men. The claim is all the more frightening because of its unexpectedness. The word from users has been that sex and marijuana went together like bacon and eggs.

Consequently, when a letter in the November 1972 issue of the New England Journal of Medicine said explicitly that marijuana contains a feminizing ingredient and claimed that it causes gynecomastia (breast enlargement and a milky discharge from the nipple) in men, there was general disbelief. Gynecomastia in adolescence is not unknown, and the author of that letter apparently made no effort to find a comparable control group. Sophisticated users argued among themselves. Perhaps, they said, the increased empathy toward one's partner during sexual experience could represent a feminization of the man; on the other hand, since a similar thing happened to women, that would speak against a general increase in the feminine hormone. Thus this finding was generally discounted.

In April 1974, however, the New England Journal of Medicine raised a storm by publishing the findings of Robert Kolodny and his associates at the Reproductive Biology Research Foundation in St. Louis. This study compared the testosterone (male sex hormone) blood levels of 20 marijuana smokers with those of 20 nonsmokers and showed the smokers' levels to be lower. Although testosterone levels for all the subjects were within normal limits, smokers who smoked 10 or more joints

(Continued on page 102.)

Marijuana *(Continued from page 52.)*
a week had lower levels than those who smoked less or not at all. In addition, six smokers had low sperm counts, and two complained of impotence. One of these was cured when he stopped smoking marijuana. There were the usual complaints about this study. First, there had been no determination of the men's testosterone levels before they used marijuana. The marijuana was also of unknown potency.

What did not appear in the exchange of letters in the New England Journal, or anywhere else, was a clear statement explaining testosterone-level variations. For this we are indebted to Edward M. Brecher, the principal author of Licit and Illicit Drugs. Brecher describes the enormous variations in testosterone level from month to month, from day to day, and even from hour to hour, with no known cause and no visible effect. From his report, we can conclude that few human parameters show as much inherent variability as testosterone levels. Thus it is highly questionable if any testosterone research could pass the "so what?" test. Nevertheless, this area touched off another seesaw saga. In November 1974, the New England Journal of Medicine, in whose pages the marijuana sex-impairment battle is apparently being fought, published a study by Jack H. Mendelson of Harvard. Twenty-seven volunteers were locked up in a hospital ward and tested thoroughly for five days; then for 21 days, they were given all the marijuana they wanted and were tested for another five days. The 12 subjects who were occasional users before the study began averaged from one to five joints daily; the 15 heavy users averaged from one to eight joints per day. Mendelson established the men's serum-testosterone levels before administering marijuana, and he knew exactly how much of what type of marijuana was used. He found that the "values are in the upper range of normal adult levels and are not significantly different from each other. High dosage marijuana intake was not associated with suppression of testosterone levels."

The Mendelson study sent Kolodny back to the locked hospital ward. He recruited 13 more marijuana smokers. They first refrained from smoking for two weeks, then were locked in for three months. For 11 days they received no marijuana and then were given several joints of known potency daily. Serum-testosterone levels held up until the fourth week, when they began to fall and continued to do so. Kolodny concluded that he not only had been right about marijuana and serum testosterone in the first place but that Mendelson had simply stopped too soon.

> "No intoxicant or, for that matter, no drug is totally safe. In a sense, no human activity is totally harmless. However, it is my opinion that marijuana involves only a minimal risk of harm to the user."

One of the things we know about serum testosterone is that in humans, sexual excitement raises the levels. Locking up male animals together in close confinement lowers the level. (Nobody has studied the effect of locking up heterosexual males together in a hospital ward for three months.) If Kolodny had included controls in his experiment—if, for example, he had given only half of the group marijuana—he could have determined the effects of marijuana as well as the effects of incarceration. As of now, there is no way of knowing the effects of incarceration on this study or, for that matter, on Mendelson's. If there had been two groups and if the levels had dropped in both, we would at least have learned something about the effects of incarceration. In my opinion, all this puffing has left us without much knowledge about the effect of marijuana on testosterone levels.

Where we stand. This review of the research, with all the disagreements involved, does not mean that we know little about marijuana. I am not enough of a pharmacologist to be able to specify the extent of research done on other much-used drugs, such as digitalis or cortisone, but I believe that we know as much about marijuana as about any drug. We know, for example, that it is an active intoxicant. And, to quote J. Thomas Ungerleider, presidential appointee to the Shafer Commission, "No intoxicant or, for that matter, no drug is totally safe or harmless. In a sense there is no human activity which is totally harmless. However, it is my opinion that marijuana involves only a minimal risk of harm to the user." Thus, despite marijuana's clearly demonstrated intoxicating properties, little clear evidence exists that it is harmful. In fact, the members of the Shafer Commission, whom I criticized initially as having been selected for their antimarijuana bias, have stated: "A careful search of literature and testimony by health officials has not revealed a single human fatality in the U.S. proven to have resulted solely from use of marijuana."

The research, both pro and con, in the three areas of chromosomes, immune reactions, and testosterone levels suffers from our lack of knowledge of what the changes in these factors mean, particularly when they have been tested only in the laboratory. Because we know so little about these areas and because the findings are so vague, I suspect that the claims and counterclaims about the effect of marijuana use will continue to reverberate through the news conferences and journals.

Marijuana epitomizes the new direction of social change. It came to popularity as part of a wave of assault on established social institutions in the late 1960s. Besides being linked with the actually destructive aspects of this assault, marijuana was associated with radicalism, permissiveness, lack of respect for authority, unconventional lifestyle, and interests, ranging from Zen and hard rock to astrology, that were considered kooky if not irrational. The inference was drawn that odd and possibly destructive forces were at work among the young, and people set about trying to pin the blame on marijuana.

Only in such an atmosphere of anxiety and social concern could a respectable journal such as The Lancet have published the report of Campbell's uncontrolled research on brain damage. In the U.S., too, the recent discoveries that show "marijuana not to be as harmless as previously supposed" lack good scientific grounding.

My conclusion, therefore, can only be that marijuana is a remarkably innocuous substance. There is no reason not to agree with Dana Farnsworth, Vice-Chairman of the Shafer Commission, who has said: "Since publication of the Commission's report in 1972 numerous new studies have been reported. This work of the last three years has not fundamentally changed the data base on which recommendations were made."

Only long-term epidemiological surveys can show definitively whether

there is truth to the claims of impairment in sexual drive, lack of resistance to disease, and birth defects. In the meantime, the counterclaims, the arguments against the harmfulness of marijuana use, appear to be stronger. And we cannot proceed as if long-term data did not exist.

As a matter of fact, this country has already begun to generate its own long-term epidemiological data. When we examine marijuana smoking in the United States, we are no longer looking at a few youngsters with a new fad. A 1972 forecast made by the Federal Bureau of Narcotics and Dangerous Drugs predicted that by 1976, 50 million Americans would have tried marijuana. That figure may be low, and we are not talking about using the drug only once or twice. In 1972 the Shafer Commission surveys found that over 13 million people regarded themselves as regular users of marijuana, a finding that prompted the Commission to declare: "What this shows is that there are three recreational drugs in this country: alcohol, tobacco, and marijuana."

The data show further that it is no longer simply the young who use marijuana. Previously, some authorities believed that high-school and college use was a passing fancy that was abandoned in serious adult life. The arrest rates now indicate that marijuana use continues into the late 20s and 30s. One recent survey revealed that 14 percent of users were in professional occupations, and another 11 percent in trades that netted incomes of over $15,000. The evidence accumulates that we have a sizable body of citizenry who are long-term, regular users.

I have mentioned the Jamaica study again and again, and it may seem that, like those I have criticized, I am building a large edifice of my preferences on a tiny base of actual data. But the Jamaica study was not just a carefully controlled examination of 60 subjects, 30 chronic users and 30 nonusers. It was also a splendid piece of anthropological research. The team spent 18 months in carefully selected rural and urban areas gathering convincing natural data about marijuana use and its effects. Not only did they find its use extremely widespread—in some areas involving over 60 percent of the population—and heavy but they found that it was being used in various ways: smoked, brewed, rubbed on, and mixed with other things. They discovered many legends about the medicinal, herbal, and enhancing effects of the drug, but *no* legends indicating that users were more prone to illness, sexual difficulties, sterility, or that it caused birth defects. That sort of natural data, also found in Greece, is accumulating in this country. It makes the argument that we must wait and wait for long-term epidemiological data seem more of a cover-up for an ideological or political position than a firm stance on the evaluation of evidence.

Obviously there are areas of concern. Drawing any hot substance into the lungs cannot be good for anyone, but we should remember that no marijuana smoker in this country uses as many cigarettes a day as tobacco smokers do. Also, marijuana is an intoxicant; and despite the research showing that someone high on marijuana does better on a driving simulator than someone high on alcohol, driving under the influence of any intoxicant must be considered a real danger. Finally, it is my absolute conviction that adolescents below the age of 18 should not use intoxicants of any kind, whether nicotine, alcohol, or marijuana. The 14-, 15-, or 16-year-old struggling to develop in this complex society needs as clear a head as possible. One argument made some years ago for the legalization of illicit substances was based on the possibility that parents and other authorities could more readily control above-ground use of licit substances than they could control the underground use of illicit substances.

While searching through the thousands of pages I read for this report, I reached one other conclusion that again places me in opposition to Senator Eastland. Eastland stated that the reason he needed to give the opponents of marijuana a chance to be heard was that the mass media overwhelmingly favored marijuana proponents. I planned to quantify the number of words in selected periodicals on both sides of the question, but I lost patience and have had to leave that research to others. It is my guess, however, that space has been given to opponents as against proponents at a ratio of five or six to one.

In my review of the writings on marijuana use, I found that certain "straight" world periodicals tilted as consistently away from marijuana as counterculture publications tilted toward it. The difference was that the straight magazines and papers always presented themselves as reporters, while the counterculture publications had the grace to admit they were giving opinions. Those reading only Good

Housekeeping would have to believe that marijuana is considerably more dangerous than the black plague. Until very recently The New York Times also showed a distinct bias, as evidenced by the space devoted to scare stories and the general antimarijuana tone of other stories. Worst of all, Science, the official organ of the American Association for the Advancement of Science, has not fulfilled its position as the representative of objective science. This has been evident in its editorial reports on marijuana. How else could one account for the fact that in one article of a series on marijuana, published on August 23, 1974, the retrospective Stenchever experiment rated a careful discussion while the prospective Nichols report was casually lumped in with other research? One important record must be righted. Ann Landers relented. She signed a National Organization for the Reform of Marijuana Laws petition calling for decriminalization of marijuana, defending her change of heart in her column of November 14, 1974.

In the end, after all this work and all these words, I still find myself echoing the remark made by Daniel X. Freedman of the University of Chicago, after a Drug Abuse Council conference on marijuana. "Nobody can tell you it's harmless. Each person must decide for himself what he wants to do." With each passing day, however, more people agree with Andrew T. Weil's remark that marijuana is "among the least toxic drugs known to modern medicine."

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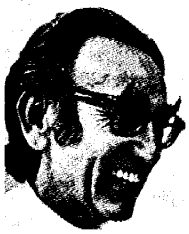

For more information, read:

Grinspoon, Lester. Marihuana Reconsidered; Harvard, 1971. $15.00.

Miller, Loren L., ed. Marijuana: Effects on Human Behavior; Academic, 1974. $29.00.

Tinklenberg, Jared R. Marijuana and Health Hazards; Academic, 1975. $8.50.

Zinberg, Norman E. and John A. Robertson. Drugs and the Public; Simon and Schuster, 1972. $8.95.

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Good News *(Continued from page 78.)*

or competitive, trusting or suspicious? We believe the answer lies in the "we"/"they" dichotomy mentioned earlier. In fact, we were in the process of investigating that dichotomy when our wallet-dropping experiments were so radically skewed by the assassination of Robert Kennedy.

Those and similar experiments also indicated that when a pedestrian was like the person whose wallet or identification he had picked up off the street, he was most likely to return the lost item. A sense of similarity, in other words—whether of religion, politics, race, or whatever—is truly a sense of identification. It creates a social bond.

Bad news breaks this social bond. It teaches us that other people are not like us. The disruption of group ties, in turn, leads fairly logically to various selfish, distrustful, and antisocial attitudes and behavior. And all on account of some "irrelevant" bit of news about the human capacity for evil.

Similarity and prejudice. An experiment that one of our colleagues, Sharon Kaplan, conducted with a group of high-school boys seems to have confirmed our theory. She told the boys that she was giving them a test of "estimation styles," and after they took the test she informed each one that he was either an "overestimator" or an "underestimator." She gave each boy a little label—in other words, a mini-identity.

Next, Kaplan asked the boys to examine two groups of boxes, supposedly built by two different people. All she told them about the box-builders was that one was an overestimator and the other was an underestimator. This meant, of course, that one set of boxes was built by someone similar in estimation style, whereas the other set was built by someone dissimilar. (The boys didn't know it, but the two groups of boxes were actually identical in every respect.)

She then asked some of the boys to pay each box-builder according to the merit of his work. The results were consistent with what we had found in our earlier experiments. After hearing bad-news stories, the boys discriminated sharply between the two groups of boxes. They discriminated between builders who were like them or unlike them. And they showed great favoritism toward the similar box-builder by paying him better for his "superior" work. Bad news, in short, produced the rankest sort of prejudice, dividing the boys into "us" and "them."

After the good-news story, by contrast, the boys displayed almost no prejudice, and they paid the two box-builders—both the one who supposedly resembled them and the one who did not—equally.

Our method of establishing similarity and dissimilarity in this study was obviously trivial. The results of the experiment, however, are all the more interesting for that very reason. Even trivial differences are exaggerated by demoralizing news stories. Overestimator or underestimator might be rewritten as black or white, Russian or American, Jew or Gentile. Any number of distinguishing characteristics may provide a basis for establishing the bonds of "we" or the barriers of "they." The point to remember here is that the lessons about human nature presented in the daily news can either strengthen those bonds or weaken them.

This series of experiments has important implications in several fields, particularly in the interrelated fields of social psychology, ethics, politics, and journalism. It is now clear, for example, that newscasts have serious and immediate consequences that are completely unintended. Far from just imparting facts, news stories about morality or immorality in action impress us at least temporarily, with corresponding views of human nature—views that tend to move us, quite unconsciously, to behave in ways appropriate to such views. At worst, as we have seen, newscasts can break down the kinds of group ties that cause people to help and trust their fellows.

The actions of others. Yet our findings may also be cause for optimism. They imply, after all, that group barriers are malleable. Distinctions between "us" and "they" do not remain fixed. They shift with the course of social events and with information about these events. As one of the authors, Harvey Hornstein, wrote in his recent book Cruelty and Kindness, "There is nothing inherent in any distinction between human beings that compels us to see others as *they*."

Social scientists have felt for a long time—and the evidence is still accumulating—that people learn to hold beliefs and act in the ways they do by observing the actions of others. Benevolent and malevolent actions are, of course, among those we observe. Our firsthand social experiences provide us with a continuous stream of raw, funda-