Few students of the subject of intoxicants and traffic safety now doubt that marijuana, like alcohol, can exert detrimental influence. Just how detrimental is debatable. The debate pits optimists ("it's much less of a problem than alcohol") versus those on the pessimistic side ("but who needs any new problems?"). Yet there can be no question that some drivers who met their ends on the highway would be alive were it not for marijuana.

At 4:10 one morning, a divorcée of twenty-five, dressed only in see-through pajamas, went driving in the rain on a major Florida highway. Her car left the road and rolled over, killing her. On her record were three traffic convictions. Blood alcohol was negative. An investigator recognized a strong smell of marijuana in her apartment, and the manager had seen her "higher than a kite" (presumably not long before the accident).25

This lone anecdote may not prove any case. But the studies that we now will describe, most of them based on chemical test evidence, link cannabis to a fourth of some 2,300 drivers in fatal and nonfatal accidents.

As 267 motor vehicles took the lives of drivers, passengers, or pedestrians in the Boston area during a 21/2-year period (1971-74), a five-man study team of Boston University's law school investigated the marijuana usage of the driver "most responsible" for each accident. Interviews and records divulged that 121 of the drivers-45 percent—smoked marijuana and that 43-16 percent—had been under its influence at the time of the accident. Thirteen of the 43 had taken just marijuana within four hours of the accident; the remaining 30 had taken marijuana with alcohol—or, in five of the cases, marijuana with alcohol and another drug. The 30 were among 122-46 percent—under alcoholic influence.

The 267 drivers had a third higher percentage of marijuana smokers than a "control sample" of 801 Boston area drivers, which the team assembled at random and interviewed during the next two years. In each group, the marijuana smoker was more likely than the nonsmoker to drink alcohol often, to be a problem drinker, to have been treated for a psychological problem, and to have made a suicide attempt.

Most of the marijuana smokers among the "controls" (all but thirty) answered questions on
their reactions to marijuana intoxication. The majority found it easier when high "to make foolish or impulsive decisions" (while driving), 76 percent; and "to be distracted" (from driving), 65 percent. Further, the majority found it harder when high "to make sudden physical movements" (such as braking or turning), 74 percent; "to remember things" (such as car instruments or road directions), 73 percent; "to make sudden decisions" (for instance, in response to traffic lights or danger), 71 percent; and "to concentrate on a job or project" (like a driving task), 60 percent. Fifty-four percent considered it more difficult to drive during marijuana intoxication than during sobriety; 38 percent saw no difference; and 8 percent said driving during intoxication was easier.

Of the 801 drivers, 34 percent (272) smoked marijuana. These controls, never involved in a fatal motor vehicle accident, approximately matched the 267 drivers in place of residence; age, nearly all being under forty; and sex. Women made up 9 percent of smokers and 11 percent of nonsmokers among the 267.

In a report to the sponsoring National Highway Traffic Safety Administration, the authors, Sterling-Smith and Graham, tended to be statistically conservative. For instance, they did not rank with the 43 marijuana-influenced "most responsible" drivers 18 other drivers suspected of being under the influence. Moreover, although 19 (7 percent) of the 267 and 49 (6 percent) of the 801 had used marijuana once or twice in the past year, they entered the nonsmoking columns. Most smokers in each group used marijuana weekly or more often.26

When he was a medical corps officer in the U.S. Army, Europe (196872), Forest S. Tennant, Jr., "saw many [motor vehicle] accidents that appeared to be related to hashish consumption." Most of the mishaps were minor, Dr. Tennant, from Los Angeles, testified before a Senate committee (1974), but these were two tragic cases from his files:

"1. K.S., under the influence of hashish, drove his motorbike under a truck and decapitated himself. His roommate said he made a usual practice of smoking hashish while riding his motorbike.

"2. A 21/2-ton truck carrying several soldiers drove over a cliff while attempting to make a turn. Eight soldiers were killed. My investigation revealed, via information from soldiers who were not killed, that the driver smoked two pipe-bowls of hashish about one hour before driving."27

Coroners and medical examiners throughout the United States sent specimens of blood, urine,
bile, and swabs from 710 fatally injured drivers to the Midwest Research Institute in Kansas City, Missouri. There
E. J. Woodhouse (1974) analyzed them for forty-four commonly abused drugs by a variety of methods.

A test for contact with marijuana gave positive responses for 38 percent of the cases. That is, close to two out of every five drivers had handled the drug and presumably used it. The test examined the alcoholic washes of face and fingers (by thin-layer chromatographic and colorimetric methods). According to other tests, 58 percent of the drivers had drunk alcohol, 47 percent to the point of being legally drunk, and 13 percent were on prescription drugs. 28

Kier in Colorado (1974) studied a dozen consecutive motorists injured in one-vehicle accidents and admitted to the emergency room at Denver General Hospital. From the test of lips and hands that he had devised, five showed signs of marijuana (one of them with an opiate), six showed alcohol, and one showed opiate (alone). 29

On an English highway one afternoon in 1975, a nineteen-year-old driver of an MG, evidently crossing double white lines while gassing, crashed head on into a truck. He was killed; the truck driver was unhurt. Inspection of the car revealed packets of cannabis leaf and a special smoking pipe beneath the seat. A postmortem examination showed no evidence of disease and no alcohol in blood or urine. Tested by a new English method, both fluids showed an exceedingly high concentration of THC and metabolites. The coroner recorded a verdict of accidental death. The victim had been a railway signalman.

"Cannabis, like alcohol, produces euphoria and impairs judgment. There can be little doubt, therefore, that it contributed to the accident in the present case," wrote J. D. Teale and colleague (1976).

"Its current social acceptability and ease of use makes cannabis, as the present case exemplifies, a potentially dangerous drug, not only to those actually using it, but to others as well. This is emphasised by the victim's occupation as a railway signalman."

Sixty-six more blood specimens from fatally injured motorists (fifty-four car drivers and twelve motorcyclists) arrived in 1976 and 1977 at the University of Surrey's biochemistry department,
mostly from coroners in England and Wales. Six of the sixty-six—9 percent—contained cannabinoids. (Three of these samples came from car drivers and three from motorcyclists.) Only one of the six contained alcohol. Teale and five others (1977) claimed a method "permitting the rapid routine screening of samples." That, together with another method (high-pressure liquid chromatography), gave specific THC measurements, they said.

In one of the cases, a twenty-year-old male fell off a motorcycle and was run over by a following car. The victim carried cannabis in a pocket. At about 8:30 P.M., half an hour after the accident, a blood sample was obtained. It showed no alcohol or other drug but did contain rather low levels of cannabinoid. The Teale group found it "difficult to relate" a THC-cannabinoid level "with a degree of intoxication" without knowing the time and amount smoked.

A dozen teenagers, fourteen to nineteen, were riding in a fast-moving compact pickup truck on a winding country road near Crofton, Maryland, bound for a party at Patuxent River Park on the evening of April 23, 1979. The truck, a 1978 Ford Courier, was speeding far past the limit of twenty-five miles per hour. Passengers yelled to its eighteen-year-old driver to "slow down!"

At about 9:15, approximately a mile from their destination, the vehicle missed a left curve. It skidded, careened on its two right wheels, sideswiped three trees about seven feet from the pavement, and rolled over, ending upside down on the road.

The accident took the lives of ten of the riders, killing seven of them instantly. One passenger suffered serious injury but survived. The driver-owner was only slightly injured. Seven of the victims had been riding in the rear (including the one surviving passenger) and three in the cab.

Behind the wheel was an uninsured young man, a carpet cutter, a high school dropout with "family problems" who periodically stayed away from home for several days. He had been cited for speeding a year earlier. On the day of the accident, he said, he loitered around a bowling alley on the Fort Meade military base and drank four beers.

He admitted being a user of marijuana, PCP, and cocaine but claimed to have last used any of these, marijuana, the night before. However, five teenaged witnesses saw him smoking marijuana at various times and in varying amounts on the day of the accident. Their statements
proved that he had smoked "an appreciable amount of marijuana" that day, the National Transportation Safety Board reported. He took a blood test but no analysis was performed for cannabis. (The alcohol content of his blood was 0.06 percent five hours after the accident. At the time of the accident, it probably had been below the 0.15 percent level at which Maryland law deemed a driver "intoxicated" but above the 0.10 percent mark of most other states.) The safety board did not determine exactly how the marijuana affected this driver but commented, citing scientific literature, "it is known that high risk-taking behavior is frequently associated with alcohol and marijuana intake."

The board found the probable cause of the disaster to be "high speed, reckless driving of a vehicle by a driver who was under the influence of alcohol and marijuana." Investigators had estimated from scuff marks that the truck had been going between sixty-four and seventy-eight miles per hour. The fact that passengers rode in the open bed contributed to the tragic consequences, the board added. Its report went to high school driver-education instructors throughout the country. This was the first accident that the board ever blamed, at least in part, on marijuana.

"I would consider it an emerging and increasing problem," John Keryeski, investigator in charge of the accident, said to us. Alcohol used to be the single substance problem in traffic safety and still remains the most important, he said. "But recent research indicates that there is an increasing problem of drug use in accidents."

The driver? Convicted on ten counts of manslaughter, he received a sentence of probation, community service, and a suspended license.

A car moving rather speedily left the road and hit a tree in North Carolina, killing the vehicle's sole occupant. Analysis of a blood sample (by a new method developed in that state) eliminated the possibility of alcohol but indicated that the driver had used cannabis shortly before the accident. He became one of 340 victims of fatal one-car crashes tested for THC over a two-year period (1978-80) by the state's Office of the Chief Medical Examiner and the University of North Carolina's pathology department.

But few of the cases showed the influence of marijuana so clearly. Six percent of the 340 samples contained THC; that is, at least twenty-one of the drivers had smoked marijuana (or taken cannabis in another form) shortly before their accidents. Of these, fifteen also had an illegal level of alcohol in their blood (0.10 percent or more); three showed a little alcohol; and the
other three (including the car-tree accident victim) had no alcohol at all. Blood of two-thirds of the 340 killed (or surviving less than an hour) contained alcohol in excess of the legal limit. 

Testing for ninety drugs, public and private investigators examined 401 drivers and 83 pedestrians fatally injured in traffic accidents in Ontario, Canada, during a twelve-month period (1978-79). They detected thirty-four drugs (not counting alcohol), of which cannabis was the most common. Twelve percent of the victims evidenced cannabinoids in urine or blood. Next came salicylate (7 percent), diazepam (3 percent), and codeine (2 percent). Cannabis users included 48 drivers and 11 pedestrians, with only one female in each category. Of these 59 victims, 41 had also drunk alcohol, 17 showed only cannabinoids, and just one had cannabinoids in combination with drugs other than alcohol (codeine and diphenydramine).

The investigators expressed concern that cannabis might be a threat to traffic safety, particularly in combination with alcohol.

The Traffic Injury Research Foundation of Canada, in Ottawa, and the provincial government of Ontario, in Toronto (Centre of Forensic Sciences and Office of the Chief Coroner), jointly made the investigation, financed by Research on Drug Abuse, Health and Welfare Canada. Limited to drivers and pedestrians over thirteen who died within an hour after impact and could supply both blood and urine specimens, the study included about a third of a year's total of traffic deaths in Ontario.

The rate of cannabinoid detection was nearly the same for both the (48) drivers and (11) pedestrians. The ages of these victims ranged from fifteen to forty-two, averaging twenty-two. They included 46 percent of the 129 victims with drugs (not counting alcohol).

Cannabinoids could be detected in blood (as well as urine) in only 16 of the 59 cases. In the remaining 43 cases, signs of cannabis appealed only in the urine.

Toxicologist George Cimbura et al. commented (1980): "It is unlikely that behavioural impairment from the use of cannabis existed in these victims [the forty-three] at the time of the crash. This reduced the proportion of cases with potential cannabis impairment to 3%, sufficient, however, to justify some concern."
They seemed to be most conservative in this assessment. In a preliminary experiment (by Cimbura et al., 1979) in which ten subjects each smoked four marijuana cigarettes, blood levels of THC (which never rose high and could not be detected in one case) were disappearing two hours after smoking. Many marijuana smokers remain high considerably longer than two hours.

Fifty-five percent of the victims were found to have consumed alcohol. Alcohol alone was found in 41 percent; and alcohol combined with drugs, 14 percent. Twelve percent of the victims showed drugs without alcohol.

Pointing out that in fourteen of the sixteen cases where THC appeared in blood the victims had also drunk alcohol, the authors of the report declared that "the issue of cannabis-alcohol interactions would seem to be of substantial importance, both for future research as well as for traffic safety in general."

While they could not establish direct causality, they concluded that "there is still cause for concern that drugs may represent a threat to traffic safety. Of particular concern are cannabis and diazepam [Valium] which were found with sufficient frequency to warrant study on a priority basis."33

According to writer Peggy Mann (1983), over seventy research studies have shown the driver-impairing effects of marijuana. 34

In a 22-minute documentary film, "Danger Ahead: Marijuana on the Road," with Jason Robards (produced by the National Association of Independent Insurers, 1981), a young man says: "I have been in personally, what I can remember, six different auto accidents because we were too stoned to know what we were doing, and there was one in particular where we had sideswiped a car and it ran off the road into the ditch and it flipped over and we just kept going. It scared us, you know, and we just flew, and we found out later that the lady was hospitalized for quite a few weeks and everything. It was just all a big joke to us."
Pictured in a wheelchair in the same film, a young woman describes a party and its aftermath. "... It was out in the country... There was a lot of pot—just all kinds of pot. A guy was... dealing it out... I got so loaded that I don't remember too much of it... I was in my own world. The next thing I knew... we were on motorcycles. I was with a friend... We were holding hands... and we came to a corner... right in front of a light... We were supposed to be going thirty-five miles and we were going seventy... He went off one way and I went off another way into the field. They say that he will never walk again. I was lucky that I have a fifty-fifty chance... I almost died four times. I didn't realize what was going on for two weeks I was in a coma. Now that I look back through it all, I think, 'Why was I ever so stupid?'"