

Alcohol: The Friendly Foe

by Robert B. Millman

The favorite drug of millions throughout history, alcohol can warm the heart and sharpen the wit, and create a living hell for its addicts

The patient is a high-ranking bank executive, 50 years old, with a wife and two children, a house in a prosperous suburb of a large city, and a summer home in the country. He tells his doctor he is losing weight, feels chronically tired and depressed, and has difficulty getting his work done at the bank. He does not sleep well, often awaking at 4 or 5 A.M., unable to go back to sleep. He complains of tingling and numbness in his toes and stomach pains.

The doctor's examination shows that he has a ruddy complexion, slightly elevated blood pressure, an enlarged and tender liver, some numbness in his legs, and his hands tremble. Laboratory tests reveal anemia and signs of liver damage. In response to the doctor's questioning, the patient reveals that he has been drinking more heavily lately because of work, family, and health problems. He says he usually buys a pint of vodka on his way to the train in the morning and has his first drink on the train. He then continues to drink small amounts steadily throughout the day until the bottle is empty. He also has several drinks with friends or business associates at lunch, several more in the club car of the train going home in the evening, a cocktail before dinner, and several nightcaps before going to bed.

When the physician suggests that alcohol may be causing some of his problems, the patient angrily denies it. He protests that he is drinking *because* of his problems, that he is not drinking any more than his friends and contemporaries, and that he can stop at any time.

This man is abusing alcohol; his excessive drinking has adversely affected his health and how he functions socially. He is not alone. Between 5 million and 9 million Americans are hooked on the psychoactive drug *ethanol* (ethyl alcohol), the active ingredient of any alcoholic drink. They are high school students and senior citizens, ordinary people and public figures. Rock star or sports star, doctor or

pilot, these men and women share a bond with the skid-row derelict. They are alcoholics. Their personal struggles and tragedies add up to an international problem of enormous proportions.

Although alcoholism may take years to develop, it can strike even the young. A 1978 report by the Department of Health and Human Services estimated that more than 3 million 14- to 17-year-olds in the United States were problem drinkers. Some of these were already alcoholics. Others ran a serious risk of developing the disease.

Alcohol abuse is considered to be the primary cause of more than 200,000 deaths annually in the United States. It is involved in one-third of all suicides, half of all murders and traffic deaths, and up to 40 per cent of all industrial accidents. In recent years, scientists have found alcohol to be the third leading cause of birth defects involving mental retardation. Alcohol-related costs are estimated at more than \$50 billion per year in accidents, lost production, medical bills, and other expenses in the United States alone.

Alcohol is the most widely used, most easily obtained, and most socially acceptable of the mind-altering drugs. Its use to heighten pleasure and dull pain probably goes back beyond the beginning of history. Like any drug, it can be abused. Accounts of drunkenness are found in Genesis, the first book of the Bible, and other early writings. The Greek physician Hippocrates, the father of modern medicine, described symptoms of alcohol withdrawal in the 400s B.C.

Most people who drink can handle alcohol reasonably well. But alcohol can become a life-threatening problem for some 10 per cent of the estimated 100 million social drinkers in the United States. And despite many years of scientific research, alcoholism is still a complex, controversial, and poorly understood affliction — part physical, part psychological. Some regard it as a disease; to others, it is a character weakness, or even a sin. Its victims endure more than physical torment and mental anguish, they must suffer the scorn of those, luckier than they, who do not understand.

Many alcoholics do not know they have a problem — at least in the early stages. The banker's refusal to admit that he has a problem with alcohol comes in part from the fact that there is no sharp line that distinguishes the moderate use of alcohol — social drinking — from problem drinking and alcoholism. An early alcoholic also tends to deny his preoccupation with liquor, or attempts to rationalize his need by assertions that he drinks no more than his friends. These denials are often unconscious in the drinker.

Because of conflicting social, cultural, religious, and political perceptions of how people should use this mind-altering drug, it is difficult to define normal drinking in terms of how much people drink. Problem drinking can be defined, however, as use of alcohol in a manner that significantly impairs biological, vocational, or social function. Problem drinking or alcohol abuse varies in intensity from intermittent episodes to the full-blown disease of alcoholism.

An alcoholic is one who becomes physically dependent on alcohol and overwhelmingly involved in getting and using it. Four clinical features are essential to the diagnosis of alcoholism: loss of control, "craving" or drug-hunger, tolerance, and physical dependence. Loss of control describes the inability to regulate alcohol intake after starting to drink. Many alcoholics tell of occasions when they resolved to have just one drink at a bar with friends, only to remain long after their friends had left, drinking until their money was gone or the bar closed. Others recall buying a bottle of liquor with the intention of having a few drinks, and then finishing the bottle at one sitting. Craving, the continual and overwhelming desire to drink alcohol, occurs whether the alcoholic is drunk or sober. It is marked by dreams about drinking, and ingenious rationalizations that excuse renewed drinking after a period of abstinence.

Tolerance to alcohol results mainly from the relative resistance of central nervous system cells to the effect of a given concentration of alcohol in the blood. Many heavy drinkers and alcoholics can consume large amounts of alcohol without significantly impairing their behavior or coordination. The level of alcohol in their blood may be twice the amount that authorities use as the legal limit in drunk-driving cases, for example. Thus, people who hold their liquor well may just drink too much too often.

Repeatedly using alcohol, or certain other drugs, produces physical dependence. This requires the alcoholic to continue drinking in order to prevent the characteristic symptoms of withdrawal, or abstinence. After a bout of acute intoxication, a person usually suffers a hangover — general discomfort, headache, nausea, diarrhea, agitation, tremulousness, depression, and inability to sleep. Hangovers are similar to the first symptoms of the withdrawal syndrome. Continued heavy drinking for prolonged periods will increase the severity of this syndrome. The drinker's hands begin to tremble as early as six hours after he stops drinking. He may have auditory and visual hallucinations. In severe cases, grand mal seizures similar to major epileptic seizures may occur from 12 to 24 hours after drinking ends. In even more extreme cases, delirium tremens (DTs) may occur, marked by confusion, disorientation, delusions, hallucinations, agitation, and high fever and may culminate in collapse of the heart and other major organ systems. Delirium tremens is a potentially lethal disorder that requires hospitalization and intensive care.

Acute, or short-term, alcohol withdrawal usually occurs when a person suddenly stops drinking after several years of heavy intake. Withdrawal may last four to six days, after which most patients are discharged from the hospital or treatment program. Their physical dependence on alcohol is believed to be over and they are cautioned not to begin drinking again. Unfortunately, most of them relapse to alcohol abuse. Doctors and other observers formerly believed that, once the withdrawal syndrome is over and presumably much of the

craving is diminished, people relapse because of moral or psychological weakness, lack of will, or mental illness.

However, recent evidence suggests that a protracted withdrawal stage follows the acute stage. During this period, the patient experiences tremulousness, anxiety, depression, and insomnia. Abnormal brain-wave activity shows up on electroencephalograph readings. During this time – for perhaps as long as six months – some people experience *anhedonia*, the inability to feel pleasure. Scientists do not fully understand these prolonged withdrawal symptoms, but some believe that they may be the basis for persistent alcohol craving and may be important stimuli for the patient to begin drinking again.

Some scientists suggest the existence of a feedback system between nerves and hormones to explain these findings. They point out that if a patient takes a thyroid hormone drug, for example, the body senses that there is sufficient thyroid hormone present and the thyroid gland slows down or stops producing the hormone. Continued use of the hormone drug may cause the gland to atrophy, permanently impairing natural hormone production. The same sort of problem may exist with some neurotransmitters. The neurotransmitters are chemicals that carry nerve messages, such as the dopamines, which are involved in many brain functions, and the endorphins, the morphinelike brain substances discovered independently in the 1970s by several groups, including neuropharmacologist Solomon H. Snyder and his associates at Johns Hopkins University in Baltimore.

Many scientists believe that some neurotransmitters control or moderate emotional states such as calm, optimism, anxiety, or depression. The continued use of alcohol or opiates may turn off the production of certain neurotransmitters by a complex feedback system. For example, alcohol may enhance the power of the neurotransmitter gamma-aminobutyric acid (GABA) to inhibit anxiety.

Continued heavy drinking may lead to decreased production of GABA. Then, when the drinking stops, the body may be depleted of the transmitters, leading to acute withdrawal. It is also possible that these emotional control systems do not return to normal for long periods of time, leading to protracted withdrawal.

The progression from harmless social drinking to problem drinking varies greatly with individuals. Most people begin drinking in a controlled and social fashion. They then slip imperceptibly, without conscious intent, into excessive drinking. Increased drinking frequently occurs during periods of unusual stress. A person takes a few extra drinks to unwind, to forget, or to sleep. In some cases, repeating this practice leads to both psychological and physical dependence and the compulsive use of alcohol. The bank officer fits this pattern.

The neurological and psychiatric disorders that appear during alcohol withdrawal are only part of the medical cost of excessive drinking. Alcohol affects nearly every system in the body. Its misuse is related to a bewildering number of afflictions, including heart attacks and cancer, muscle deterioration, and anemia. Perhaps the most serious problems occur in the stomach and intestines.

"Use a little wine for thy stomach's sake," wrote Saint Paul in his Epistle to Timothy. It was a counsel of moderation. In excess, alcohol has far-reaching effects, including inflammation and cancer of the esophagus, stomach inflammation, and chronic diarrhea. Alcohol

abuse causes the small intestine to absorb nutrients poorly, which can lead to vitamin deficiencies and such nutritional diseases as beriberi, pellagra, and scurvy. Fat levels in the blood may be elevated and sugar levels depressed by heavy drinking.

The most common and serious damage occurs in the liver. One major role of this chemical factory, the largest internal organ in the body, is to deactivate drugs and foreign chemicals – including ethanol. An overload of ethanol over a long period of time produces fatty liver, a degeneration of liver tissue. In many cases this can lead to alcoholic hepatitis, a liver inflammation, and cirrhosis, in which scar tissue forms throughout the liver. Cirrhosis is now the fifth leading cause of death in the United States. In fact, the incidence of cirrhosis in various countries appears to be linked closely to rates of alcoholism and alcohol consumption. Epidemiologists Jan DeLint and Wolfgang Schmidt at the Alcohol and Drug Research Foundation in Toronto, Canada, noted an increase in alcohol consumption in the United States between 1950 and the mid-1970s. Cirrhosis deaths, in both males and females, increased during the same years. Cirrhosis of the liver may now be the most rapidly increasing cause of preventable premature death.

Other countries have reported similar findings. France, Portugal, and Italy, where wine is popular, have extremely high per capita alcohol-consumption rates and the highest cirrhosis rates in

the world. Interestingly, Ireland, with a reputation for a high rate of alcoholism, has a low cirrhosis rate and, presumably, the actual alcoholism rate is similarly low.

Biochemist Charles S. Lieber and his co-workers at the Veterans' Administration Hospital in the Bronx, N.Y., reported on the nature of liver damage in chronic alcoholism in November 1977. They administered a nutritious liquid diet to a group of baboons in which alcohol comprised 50 per cent of the total calories. Over a period of nine months to four years, the entire range of liver injuries seen in human alcoholics was produced in the animals. Lieber found that there was a progression from fatty liver to alcoholic hepatitis and alcoholic cirrhosis and that these diseases resulted from the direct toxic effects of alcohol rather than from poor diet, as many had formerly thought.

Use of such animal models may permit researchers to study many of the unsolved problems related to alcohol abuse and addiction, as well as to trace the mechanisms of tissue damage. Research with rat liver cells by pathologist Francis A. X. Schanne and others at Temple University School of Medicine in Philadelphia, for example, has provided a clue to how alcohol damages liver cells. The Philadelphia researchers suggested in April 1981 that alcohol may weaken cell membranes so that they are more susceptible to injury.

Despite many costly and painstaking studies, no test has ever been devised that can accurately predict how, or when, a person becomes an alcoholic. Many psychological, biological, and social factors are associated with alcohol abuse and alcoholism, but no research has proved that these factors are clear-cut causes of alcoholism.

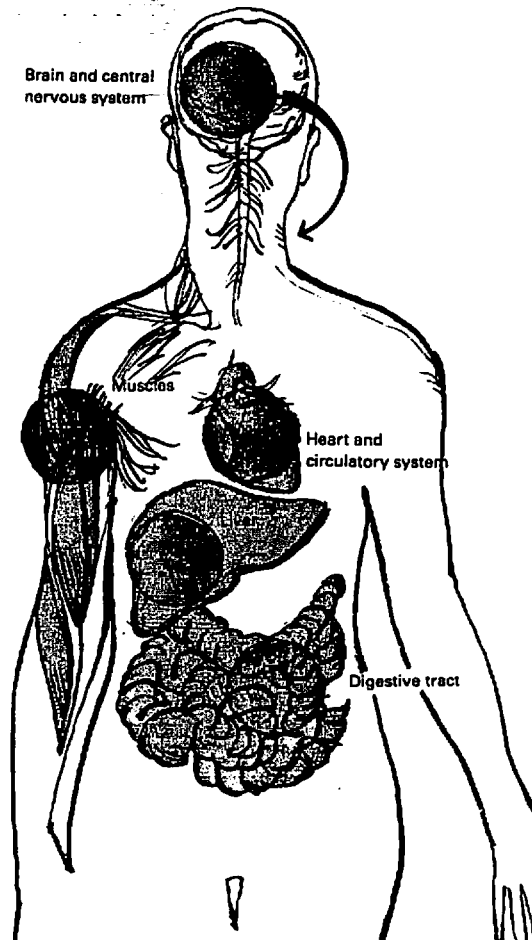
Nonetheless, some factors indicate at least a statistical vulnerability to the disease. For example, individuals in certain occupations are apparently more vulnerable to alcoholism. Bartenders, waiters, longshoremen, writers, musicians, and reporters have relatively high cirrhosis rates; account-

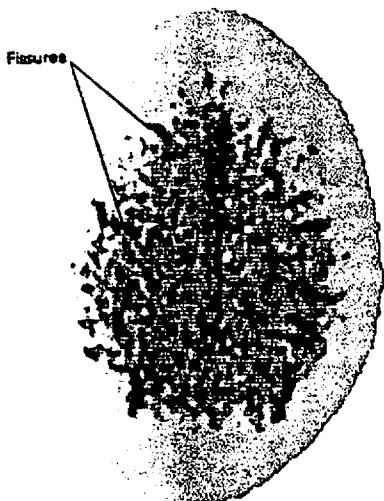
ants, mail carriers, and carpenters have relatively low rates.

Personality characteristics in alcohol-abusing persons vary considerably. Alcoholics run the gamut from the severely disturbed to the reasonably normal. Some use alcohol as self-medication for painful psychological conditions that existed long before they began to drink excessively. In others, the psychological disturbance may be a result of compulsive alcohol abuse in a society that condemns the drug-dependent life.

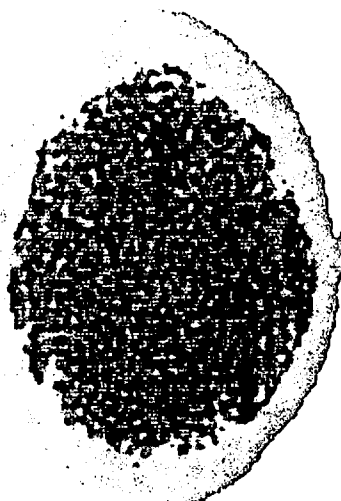
A family history of alcoholism significantly increases the risk that an individual will develop the disease. According to several studies, about 25 per cent of the fathers and brothers of alcoholics were themselves alcoholic. Family studies also show other psychiatric illnesses associated with alcoholism. There may be an excess of depression, criminality, antisocial behavior, and abnormal personality traits in the families of alcoholics. Depression seems more common in the female relatives of alcoholics and alcoholism or antisocial behavior in the male relatives.

In such studies, it is often difficult to distinguish between the influence of "nature," or genetic





Brain scan taken one month after patient's last drink



Brain scan eight months later

In X-ray brain scans of an alcoholic, made four weeks after his last drink, *left*, the dark lines around the edges are enlarged brain furrows, indicating alcohol damage. The furrows are less prominent in scans made eight months later, *right*, indicating that the brain may have reversed much of the damage done by alcohol.

factors, and “nurture,” or learned factors, because most people—including alcoholics—are raised by their biological parents. Moreover, it is likely that children who see adults drinking excessively in order to cope with stress or anxiety will themselves abuse alcohol as adults, even though they have experienced the destructive effects of alcohol-related behavior. In an attempt to distinguish between nature and nurture, scientists have undertaken studies of twins because of genetic similarities, and of adoptees because they are reared by nonbiological parents.

A twin study done by psychiatrist L. Kij at the University of Lund in Sweden in 1960 found that *monozygotic* (single-egg, or identical) twins with identical genetic makeup were approximately twice as likely both to become alcoholics as were *dizygotic* (two-egg, or fraternal) twins of the same sex. Another twin study, conducted in Finland by epidemiologist J. Partanen and associates at the University of Helsinki, found that while the quantity and pattern of drinking was more alike among monozygotic than among dizygotic twins, both twin types were equally likely to become alcoholic pairs.

A series of pioneering studies on adopted people in Denmark conducted in 1973 by psychiatrist Donald W. Goodwin and his co-workers at the Washington University School of Medicine in St. Louis, Mo., served to clarify these issues further. Goodwin's group studied 133 Danish men who had been separated from their biological parents within a few weeks of birth, and then adopted. The researchers found that the sons of alcoholics raised by unrelated nonalcoholic adoptive parents were four times more likely to become alcoholic by an early age than were adopted sons of nonalcoholics. But they were no more likely to have other psychological disturbances and no more likely to be classified as heavy drinkers. These findings suggest that there is a genetic component to alcoholism. Other studies confirmed

these findings and indicated, conversely, that simply being raised by an alcoholic parent, whether a biological parent or a foster parent, does not necessarily increase the risk of alcoholism.

Daughters of alcoholics, both those raised by their alcoholic parents and those raised by nonalcoholic adoptive parents, had higher rates of alcoholism than the population as a whole. Studies by Goodwin in 1977 also found that the daughters of alcoholics raised by their own parents had higher rates of depression, suggesting that the home environment may cause depression in children of alcoholics.

Apparently, both genetic and environmental factors help to determine who will abuse alcohol. Some alcoholics probably inherit a number of traits that increase their susceptibility to alcoholism, rather than one metabolic or psychophysiological characteristic. Of course, many people who become heavy drinkers do not have a family history of alcohol abuse or alcoholism.

Like many other medical illnesses such as diabetes or schizophrenia, alcoholism is a chronic disease marked by remissions and relapses. No real cure is known. Many people resume drinking despite the best intentions. Treatment must involve short-term measures, long-term follow-up of "recovering alcoholics," and rapid intervention in the event of relapse.

The first step is to help the alcoholic appreciate that he has a problem with drinking and that he will probably need help. This is often difficult, given the extent of denial that is commonly present. After drinking has been ended, the short-term effects of alcohol withdrawal must be managed. This may require hospitalization, tranquilizers to control severe symptoms, and diet supplements to improve nutrition. Other diseases brought on by alcoholism, such as liver disease and pneumonia, must be looked for and treated.

Controlling the disease over the long run is a much different problem. The recovering alcoholic needs the support and understanding of family and friends, and trained health-care personnel.

Long-term treatment may require individual, group, and family therapy; specialized care centers for alcoholics; behavior-modification techniques; and, rarely, long-term drug therapy. The degree of commitment of the treatment team, the amount of time they spend with each patient, and the care with which they follow the patient for long periods may be as important as the treatment method.

Alcoholics Anonymous (A.A.), a voluntary self-help organization, is an important form of group treatment for alcoholics. It was developed by two "recovering alcoholics" in 1935, and now has an estimated membership of 1 million in thousands of local groups all over the world. Many groups have their own focus and some are comprised of particular ethnic, social, or vocational group members. In New York City, for example, there is a physicians' A.A. group, several groups made up of homosexuals, and one comprised of people who work in the advertising industry.

Although A.A. is nonsectarian, it places great stress on spiritual values. The support of the group is particularly important because many alcoholics are typically people who drank alone as a means of solving personal problems. Instead of depending on alcohol, A.A. members are encouraged to depend upon one another. Through helping others, members reinforce their own sobriety and build up self-esteem.

Drugs may be used in the long-term treatment of alcoholism. Disulfiram (Antabuse) is often a valuable aid in the treatment process. If a patient drinks alcohol within three to five days after an Antabuse dose, the liquor causes a violent reaction, including nausea, facial flushing, vomiting, and cramps. Patients taking Antabuse daily will not drink, or even be tempted to drink because of the anticipated effects. Some people may continue this aversion therapy for many months, and in some cases, for years.

On occasion, severe psychiatric problems are uncovered when patients withdraw from alcohol. In these cases, the patient may need drugs such as strong tranquilizers or antidepressants.

Alcoholism-prevention programs have generally focused on educating the drinker to the risks that alcoholism poses for him. Other social programs try to provide reasonable and attractive vocational, educational, and recreational alternatives to alcohol abuse for those most at risk, the young and socially disadvantaged.

Some theorists suggest increasing taxes on liquor to raise the price significantly or restricting its distribution so that fewer people will drink. Interestingly, in recent years, the price of alcohol in Western countries has not kept pace with the increased prices of other items.

Others suggest that all societies through the ages have had intoxicants and people will use them whatever the cost. Those who abuse alcohol are also likely to develop illegal systems to obtain it.

The abuse of alcohol is an enormous public health problem, yet society and the medical profession cannot agree on how to deal with it. Alcoholism has been described at various times as a spiritual, moral, psychological, and medical problem. The disease itself has often been confused with its medical and social consequences — the damage to mind and body, the traffic accidents, the divorces and broken families, and the murders. These effects of alcoholism must be understood in order to provide appropriate treatment for the disease, but the effects are not the disease.

The disorder should be seen in terms of its main clinical features — loss of control, craving, tolerance, and physical dependence — and research efforts must be concentrated in these areas. Alcoholism is behavior determined by the complex interaction of social, psychological, and neurochemical factors. These, too, need further study.

But as our knowledge continues to grow, treatment will remain specific to each individual. The struggle of the recovering alcoholic is an intensely personal one.

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WITHDRAWAL

/ANHEDONIA

/HANGOVER

ETHANOL

/WOW

hangover - general discomfort, headache, nausea, diarrhea, agitation, tremulousness, depression and inability to sleep. Withdrawal - hands tremble as early as six hours, auditory and visual allucinations, grand mal seizures 12-24 hours, delirium tremens, confusion, disorientation, delusions, hallucinations, agitation withdrawal may last for four to six days. A protracted withdrawal stage follows the acute stage. with tremulousness, anxiety, depression and insomnia. Abnormal brain-wave activity for perhaps as long as six months--some people experience anhedonia, the inability to feel pleasure. Alcohol misuse is related to a bewildering number of afflictions including heart attacks and cancer, muscle deterioration and anemia. Perhaps the most serious problems occure in the stomach and intestines, including inflammation and cancer of the esophagus, stomach inflammation, and chronic diarrhea, liver disease and pneumonia.