

*Temperance
Alcohol
Physical Effects*

The Physiological
and Psychological
Effects of Alcohol
and Their Social
Consequences

Dr. Haven Emerson, author of "Alcohol and Man" says: "The prevention of disease is the most notable contribution of the present age of civilization." The discontinuance of the use of alcohol will mark a greater advance in public health protection than anything else since the application of our knowledge of the bacterial origin of disease.

Mary Lewis Reed, R. N.
New York City

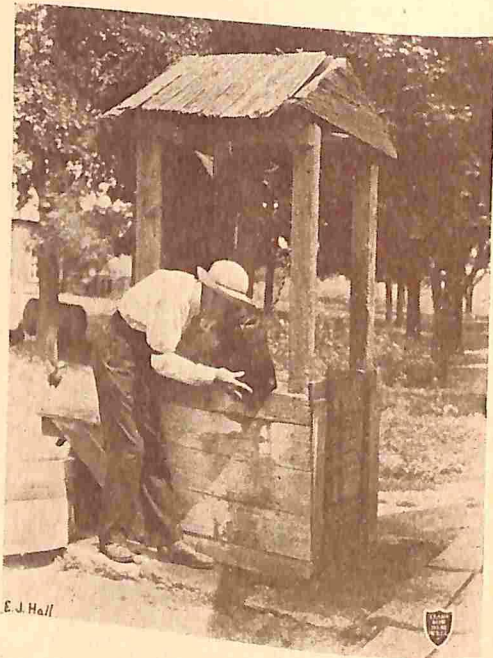
A SYMPOSIUM

MARY LEWIS REED, R.N.
New York City

WHEN Dr. R. H. Crowley was discussing the subject of alcohol with students of Berea College last spring, he said: "Scientists differ among themselves as much as people in other walks of life and their opinions are influenced by their prejudices quite as much as teachers and preachers. Allowing for errors of every kind, we have a body of scientific knowledge about alcohol and its effects on the human mind and body which is quite sufficient for our purposes." It is this body of knowledge which I wish to present to nurses, since, as someone has said, "prejudice is to be down on a thing you are not up on." Dr. Haven Emerson was careful to say in his address as president of the American Public Health Association in 1936: "Lack of information is largely responsible for the use of alcoholic beverages as if they were necessary or in any way useful to a healthy man or woman."

First, let us consider what alcohol really is and what it does. The chemist tells us that the origin of alcohol is in the decay or decomposition of sugar by the action of little plants, molds, yeasts and ferments.

"These little plants from the air feed on the sugar in grain—chiefly barley—in making



NATURE'S GIFT

Reproduced through the courtesy of the E. J. Hall Estate with the permission of Dr. Gilbert White, Associated Lecturers, Incorporated, Madison, Tennessee.

beers; on apple juice in cider and on the juice of grape in the making of wine and produce two new distinct substances—one a gas—carbon dioxide—the other a liquid—ethyl alcohol. This is most commonly found in alcoholic beverages or rather in all intoxicating drinks such as malt liquors, beer, ale, porter, also cider and wine."

"Ethyl alcohol is one of a family of alcohol poisons, only two of which, methyl and ethyl, need be considered here. Ethyl alcohol is produced in quantity only with the aid of man.

"No one questions that methyl or wood alcohol is a poison but many object to hearing ethyl so classed. The two members of this family resemble two members of some human families, in that, while the names look alike and sound alike, they behave differently."

Methyl (CH_3OH) alcohol, when taken into the blood stream has a peculiar action upon the optic nerve, causing paralysis of the nerve and blindness.² The effect of drinking ethyl ($\text{C}_2\text{H}_5\text{OH}$) or beverage alcohol is not so generally understood. This effect is also definite. It results in a numbing of the nerve centers causing all the functions to be less acute and active, but its action is not so perceptible and startling to the drinker "because the numbing makes him less able to judge his true condition."

"Away back in the early eighties, Schmiedeburg, the pharmacologist, first demonstrated that, far from being a stimulant, alcohol is a depressant—that is to say a narcotic. Innum-

erable studies the world over sustain his conclusion."³

Our nerves are made up of cells, fibers, and the supporting tissue. The cells composing the nervous system are "insulated" in a film which is a fat-like substance called lipoid. "Two German scientists, Overton and Meyer, a few years ago found that narcotic substances act as solvents on the lipoids (fats) in our nerve cells and disturb their functions. Another scientist, Verworn, in his research found that narcotics, when they enter the cell, interfere with the proper consumption of oxygen in the cells and bring about asphyxiation."

"There seems to be an erroneous impression that the word 'poison' applies only to those substances which, when taken internally, cause death. We all know that a poison is anything that, absorbed into the blood, harms or interferes with the proper operation of any of the organs of the body. Some substances may be poison—that is, interfere with the proper functioning of the body—to one person and not to another, as poison oak does not injure all who touch it and strawberries do not bring out hives on all who eat them."² The reason lies in the physiological differences in individuals. "A comprehensive statement by Dr. Emil Bogen, chief physician in a California sanitarium and a specialist in the symptoms, causes and nature of disease points out: 'No other poison causes so many deaths, or leads to or intensifies so many diseases, both physical and mental, as does alcohol in the various

forms in which it is taken.”“

“Outside the body ethyl alcohol is second only to water in its usefulness in the arts and sciences in industry. It has two distinct chemical actions. Alcohol is a *solvent* and is used as such in industry because it will dissolve fats, oils and other substances which water will not dissolve. Alcohol is a *dehydrant*, making it a good preservative or hardener as experiments show when a piece of liver, sugar, bread or egg is put into alcohol. Water softens the same things. . . . When alcohol is taken *into the body* (whether in beer or whiskey) its two actions continue the same,—*dissolving* (that is disturbing) the lipoid which protects the nervous system and *dehydrating* the cell material.”

These two actions produce four effects on living tissue. First, as mentioned above, alcohol is a narcotic, quickly affecting the nervous system; second, alcohol is a depressant and deterrent to bodily functioning in that it slows down the action of the mind, the stomach, the liver and other organs; indeed “it was found that alcohol, so far from destroying pus germs, actually paralyzed the (phagocytes) white blood corpuscles and handicapped them in their combat with bacteria”; third, alcohol is habit forming, by creating a craving for itself. As Allen Starr Jordan has said: “Alcohol is always a habit-forming drug, the greater the injury to the nervous system the more insistent the demand for it, and the weaker the will power in resistance.”

There is a Japanese proverb which says—

First the man—takes the drink,

Next the drink—takes the drink,

Then the drink—takes the man.

“Fourth, alcohol is a protoplasmic poison in that it affects the life-germ so that it is not quite normal. This may ‘show up—’ only in a nervous and mental unbalance, or it may emphasize certain hereditary weaknesses which tend toward developing those weaknesses.”“

“When the nerves are affected by this narcotic the senses are less acute for the victim sees, hears, tastes and feels less than usual. For example if one is tired and takes beer or wine the alcohol dulls the nerves in a few minutes and the drinker *feels less*, that it feels less tired and *thinks* he is rested. The chief effect of drinking fermented juices is to “deceive” the drinker in regard to his own condition and make him incapable of understanding it.”“ The degree of misunderstanding or deception is in direct relation to the amount taken; much alcohol—much injury; little alcohol—little injury; but *no* alcohol—*no* injury.”“

A drink when the individual is chilly makes him *feel less*—feel less cold and therefore he thinks himself warmer; a drink on hot days makes him feel less—feel less warm and therefore he thinks himself cooler, a drink of sociability makes him feel less—feel less self-critical, less fear of talking too much or too foolishly, a drink when he is in pain makes him feel less—feel less pain and so he thinks he is better.

The numbing has been known to last for three or four hours or longer according to the amount taken but alcohol does absolutely nothing to remove the cause. It only deadens the power to feel the pain or the care or responsibility and thereby only deadens the power to judge the real effect. To continue the deadening, the doses must be larger and taken oftener until at last the complete loss of sensibility to all that is highest and best."¹²

"The physical effect of continued drinking even of small amounts is slow poisoning; statistics of life insurance companies indicate that the moderate drinker has an average life expectancy of 13.75 years less than the abstainers, for he gives the tissues and organs no time to recover from the effects of even small amounts."²

"The amoeba with no nervous system can function in a solution of which 15 of 100 parts are alcohol, while man with the most highly developed nervous system dies when the concentration in his blood reaches 5 parts alcohol to each 1000 parts of blood, an amount too small for the imagination to grasp."²

The degree of intoxication is determined not by the amount of liquor taken into the stomach but by the amount of alcohol which is absorbed into the blood where it comes in contact with the nervous system. Enough alcohol has been found in the blood within less than fifteen minutes after it was consumed to begin its narcotizing effect.

"We know today that the mind is more

sensitive than the body and a man may stagger in his mind long before he does in his feet."² A person may be poisoned a little or a great deal. "The personality suffers first, mental capacity about as promptly, and those vegetative and reflex functions involving locomotion and use of hands and arms and eyes which we note in an obviously intoxicated person follow only later and from larger doses of the drug."³ Small quantities keep the nerves in an irritated condition as the alcohol acts as a local irritant.

"Today one must be considered under the influence of alcohol when he has absorbed an amount sufficient to impair any of his faculties to such an extent that they are not able to fully discharge their responsibilities at a particular moment."¹

Professor William James stated in his "Psychology": "The drunken Rip Van Winkle, in Jefferson's play, excuses himself for each fresh dereliction by saying, 'I won't count this time!' Well! He may not count it and a kind Heaven may not count it but it is being counted none the less. Down among his nerve cells and fibres the molecules are counting it, registering and storing it up to be used against him when the next temptation comes. Nothing we ever do is, in strict scientific literalness, wiped out. Of course this has its good side as well as its bad one. As we become permanent drunkards by so many separate drinks,

so we become saints in the moral, and authorities in the practical and scientific spheres by so many separate acts and hours of work." Helen Wills Moody once said: "In playing tennis one glass of beer or one cocktail is enough to impair coordination and balance. The precision that tennis demands makes necessary total abstinence even from beer." "You can't win with alcohol" was the statement often heard before the Olympic Games in Los Angeles.

"Science and everyday experience mutually support each other in recognizing progressive, but not sharply defined stages of intoxication. In the first stage, (the 'Don't Care' stage) the highest functions of the mind are damaged; self-criticism is blunted; judgment and selfcontrol are weakened. The presence of company coupled with the weakened judgment and loss of the sense of personal responsibility leads to a 'don't care' attitude of mind as to what the individual says or does and he is ready to yield to further invitations to drink.

"In the second stage (the 'Clumsy' stage) sense perception is dulled, the field of observation is narrowed, which may have serious consequences in automobile driving. Muscular coordination is weakened, so that clumsiness takes the place of precision in skilled movements, resulting in loss of efficiency or in small mishaps. The emotions are released from intellectual control and mental and physical activity respond to the influences of the movement. The will is disassociated and

motions seem to escape without intention. One of the subjects in experiments in type-writing reported: 'My fingers appeared sometimes to strike the wrong key in spite of my best endeavors to strike the right one!'" These disturbances would pass unnoticed by the casual observer, which makes the individual in this stage all the more liable to endanger others.

"The third stage (or 'Stupid' stage) of alcoholic intoxication is one in which ordinary symptoms of drunkenness are manifested. Control of locomotion and other muscular movements is more or less disturbed. 'The intellectual process of judgment and self-criticism and control are virtually suspended; the functions of sense perception and of skilled movements are grossly impaired; and the emotional tendencies themselves are invalidated and weakened, so that only strong appeals to them suffice to evoke any response. In their absence, the drinker sinks inert and nerveless into a heavy sleep, which lasts until the alcohol absorbed has been oxidized.' These conditions, which are recognized as signs of drunkenness, are only the *last* stages of alcoholic intoxication. It *began* when the narcotic effect of alcohol on the higher brain centers made the drinker appear gay and unrestrained." "Alcohol is absorbed into the blood very rapidly but is oxidized very slowly and the effects last after it has disappeared."

Bringing the application nearer home, it means that after a nurse takes an intoxi-

cating drink while she is off duty and then returns to her responsibilities, her thinking will be hazy and work requiring precision by the proper correlation of mind and hands will be impaired showing errors in her work. These errors may be noticed in breakage of a glass container or hypodermic point, or in the disconnected writing of reports, or in the careless preparation and administration of medicines and treatments, etc., effects which are quite apart from the injury to the nurse's own health and peace of mind both in the present and for the future.

Dr. Charles Mayo, in addressing a large convention of Boy Scouts, said in part: "You can get along with a wooden leg, but you can't get along with a wooden head. The physical value of a man is not so much. Man as analyzed in our laboratories is worth about ninety-eight cents. Seven bars of soap, lime enough to whitewash a chicken coop, phosphorus enough to cover the heads of a thousand matches, is not so much you see. It is the *brain that counts*, but in order that your brain may be kept clear you must keep your body fit and well. That cannot be done if you take liquor."

"From a purely physiological standpoint there is no defense for alcohol," writes Dr. W. A. Osborne, professor of physiology in the University of Melbourne, Australia, in his recent book "A Primer in Dietetics." "It is a poison and any pleasure obtained from it is short-lived and paid for heavily. There are

higher and purer luxuries in literature, art and music that cause no depression afterwards, that do not beget evil habituation and do not dull the powers of restraint which are man's highest possessions."

"Alcohol may be likened to frost which affects the youngest and tenderest first, and puts the most delicate faculties to sleep, beginning at the top."

As Dr. A. C. Ivy, Department of Physiology and Pharmacology, Northwestern University, Evanston, Illinois, recently said—"Alcohol gives temporary relief from worry; abolishes mental tension, disguises difficulties, relieves a feeling of inferiority; makes a weak person feel strong, an ignorant person feel smart, a poor person feel rich, an oppressed person feel free, a bad person feel good (euphoria) and makes one imagine himself a good driver who may be potentially a motor car murderer. But it is a very poor policy to play with fire or 'fire-water.' It is dangerous to play with a habit-forming poison or narcotic such as alcohol. Alcohol depresses the critical and most sensitive faculties of the brain. Alcohol disturbs normal motor control. Alcohol affects memory and learning. Alcohol is a direct and principal cause of several types of mental disease. The drink habit is usually formed in early adult life and continues for several years before the mental breakdown, principally between the ages of forty to forty-five, the prime of life. A person should have a more intelligent and less dangerous way to

The Chemical Determination of Acute Alcoholic Intoxication

Alcohol in 1 cc. Urine

Less than 1 mg.



DRY AND DECENT

1-2 mg.



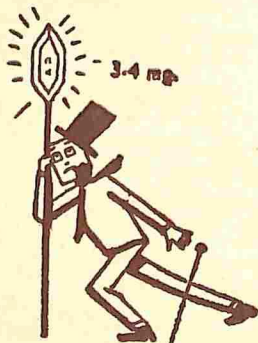
DELIGHTED AND DEVILISH

2-3 mg.



DELINQUENT AND DISGUSTING

3-4 mg.



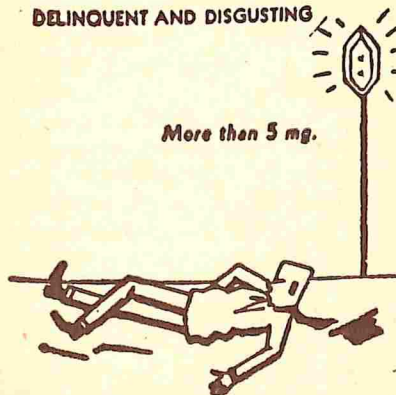
DIZZY AND DELIRIOUS

4-5 mg.



DAZED AND DEJECTED

More than 5 mg.



DEAD DRUNK

It has been suggested that the first caption be changed to "Deceived and Dangerous".
From "Alcohol and Man", edited by Haven Emerson, M.D. Courtesy Macmillan Company, publishers.

escape and relax." Dr. Ivy continues, "I do not have to take a narcotic like alcohol to forget my worries and to relax from the tensions of the day. I would suggest that the ideal substitute for alcohol is a *hobby*, by which I mean a pursuit which absorbs one's interest without unduly exciting the emotions. . . . Everyone knows of several pursuits which cause them to relax and escape from the worries and anxieties of the day. Sports and nature, a walk in the woods or park, are usually best because they exercise the body and free the mind from care."

EFFECTS UPON CELL TISSUE

"Two American scientists, Professors Wilder D. Bancroft and George H. Richter, at Cornell University, have given special attention to the effects of certain drugs upon our cells. They found that narcotics will coagulate (clot or curdle) the biocolloidal substance (living matter) in the cells, and that this process of coagulation of the colloids is also reversible. That is, this process of coagulation can be stopped and the cells can begin to throw out the poison and so recover eventually. If, however, the coagulation due to a narcotic substance goes so far that the process is *not* reversible, then the cell dies."¹

In explaining the inroads of alcohol to lay people the following quotation from a paper by Dr. Alfred Salter, member of Parliament, England, proves very useful:

"Very few people, except medical men, have ever seen the brain of a human being and few doctors have seen the brain of a monkey. Suppose I submitted to you the brain of a new born baby and that of an adult chimpanzee on the same dish, practically none of you would notice much difference in appearance. They are almost exactly the same in size and shape. Supposing however, that I made microscopic sections of the two brains and showed them to you, you would notice certain cell groups in the human organ that are absent from that of the ape. I can demonstrate the difference by an illustration. Assume that my closed fist represents the brain of an adult chimpanzee; I then envelop it in a handkerchief; it would now represent the brain of the human infant. That is to say, in addition to the nervous structure which constitutes the simian brain there is a covering layer or cloak of cell tissue over the surface or cortex of the human brain, which is not present in the chimpanzee—this is called the *neo-pallium*."

DESTROYING NERVE PADDING

"What is the function of this layer? Its groups of nerve centers are the seat of the highest human faculties and mental functions—judgment, self-control, the sense of values and self-criticism. That *neo-pallium* is, in point of fact, the only structural feature in your body that marks you off from the beast."

— Now what is the first effect of alcohol on the human system? (I am not talking of excessive quantities, but just moderate or so-called dietetic quantities). The first effect of alcohol in small doses is to narcotize the cells and centers of this highest level of the brain. Alcohol is primarily a narcotic drug. That is not a matter of opinion but a fact. Any authoritative text book will tell you that.

"A narcotic is a substance that sends you to sleep, that depresses and dulls the highest faculties, that puts out of action, wholly or in part and for the time being, certain portions of the central nervous organization—the degree of suspension being dependent upon the quantity and concentration of the drug. When you take a moderate dose of alcohol you are affecting and putting out of action in whole or in part that very portion of your anatomy which is distinctively human, the part that marks you off from the beast of the field." . . .

"You may say that that is a strong statement and that it is an exaggeration of the position. 'Do we not know,' you say, 'as a matter of every day experience, that many people take their glass with their meals and no one can notice any difference? They appear to be and behave precisely the same afterward as before.' What is to be the reply to that?"

"Suppose I have two bags of equal weight in my hands with 300 marbles in each. I hand them to you and you can detect no difference in the weight. I take three marbles out of one bag and then hand both back to you to see if

you can decide from which I have abstracted the marbles. Again you cannot tell any difference. If I take eight marbles out of one of the bags you still could not tell from which I had taken them. An experiment like this does not require a highly equipped laboratory—you may try it for yourself at home; but the fact is that the human nervous system is not sufficiently sensitive to enable you to discriminate between two weights unless the difference is at least *one-thirtieth of the total*. That is to say I must remove at least ten marbles before you can appreciate which bag has been tampered with. For some people I might have to take twelve, fifteen, or even twenty.

MEASURABLE DIFFERENCES

"Put the bags on the scales, however, and I have only to take out one marble and the scales will immediately show the difference."

"You see the man before he has taken his alcoholic drink at lunch and after, and you recognize no difference. But put him on the scales, i. e., subject him to exact scientific investigation and you will see that something has gone from him. In a dozen different respects he is an altered man. His reaction time is increased. For example, before he takes a drink if he is driving a car and sees another car coming, a 'latent period' of $1/5$ of a second has to elapse before his muscles can respond to the brain stimulus to contract

and to operate the steering gear, brake or accelerator, as the case may be. Let him have his glass and then check his reaction time again. It is definitely increased, it is perhaps two, three or even four fifths of a second before his muscles can respond to the brain stimulus. His accuracy is impaired. His 'choice reactions' are delayed. Thousands of experiments have been conducted in various parts of the world and all have shown that operations requiring correlation of hand and eye and brain are impaired, that is they are slower and less accurate after taking alcohol, although the man himself *believes* he is doing things more quickly and accurately than before.

"This means that if you take alcohol you are reducing your efficiency, unknown to yourself, and unobserved by others. This reduction in the case of a motor driver in an emergency may mean the difference between life and death."

Dr. Haven Emerson, Professor of Public Health Practice, Columbia University describes alcohol as follows: "Alcohol is a depressant, habit-forming narcotic drug. Alcohol is a protoplasmic poison. Alcohol is drunk to get the drug effect, and whenever it is so taken in whatever amount, it exerts to some degree its depressant and toxic effects. Alcohol causes disease; psychoses, multiple neuritis, gastritis and cirrhosis of the liver. Alcohol causes deaths from acute and chronic poisoning. Alcohol reduces resistance to infection. Alco-

hol diminishes likelihood of recovery from acute infections, such as pneumonia. Alcohol increases liability to accidents and delays recovery. Alcohol reduces endurance, accuracy and rapidity of muscular action of all kinds even when used in such small amounts as to show effects inappreciable subjectively by the user. Alcohol decreases expectation of life. Alcohol reduces the chance of survival of offspring. Alcohol deteriorates emotional and nervous control, as expressed in unreliable judgment and self-control, and hence contributes to the incidence of venereal disease."

Dr. Emerson continues: "We cannot apparently control repeal, but we can control what goes into mouths."

He also says: "The prevention of disease is the most notable contribution of the present age to civilization." The discontinuance of the use of alcohol will mark a greater advance in public health protection than anything else since the application of our knowledge of the bacterial origin of disease. This expresses scientifically what Abraham Lincoln expressed philosophically when he said: "Liquor may have defenders, but it has no defense."

In the words of Sir Victor Horsley: "We can come to only one conclusion—that from a scientific standpoint total abstinence must be our course if we are to follow the plain teachings of truth."

LAST year there were 38,500 fatal motor accidents in the United States. Investigation proved 60 per cent of these drivers had been drinking one hour before; be it beer or cocktail. "Because automobiles in the United States, in relation to population now number about one to four and one half, and since nearly every adult knows how to drive, the relation of the result of these tests to automobile driving as here given, is of great importance:—

1. Narcotizing the nerve centers causes the drinker to *see less*:
 - a. A normal driver when looking ahead can see objects approaching him from both sides. It was found that as much alcohol as is in a glass or two of beer narrows the eye span. How does this affect safety?
 - b. The normal eye can see distinctly about 30 feet ahead. As much alcohol as in a glass or two of beer was found to reduce distance as much as one-third. (Kraepelin and Reis)
 - c. Red and green lights are signals for danger and safety. Alcohol equal to as much as is found in a glass or two of beer dimmed the perception of colors in many subjects: the red lights seemed less red; the green less green. (Schultz). Have you ever heard a driver say "I did not think I was so close?" These effects

of alcohol were commonly recognized before scientific tests were made.

"The American Railroads years ago adopted Rule G which prohibited employees from the use of intoxicating liquors while on duty and gave notice that 'frequenting places where they are sold is sufficient cause for dismissal'." ^a

2. Narcotizing the nerve centers affects teamwork between head and hand.
 - a. Under normal conditions it takes $\frac{1}{5}$ of a second 'to put on the brake.' It was found that alcohol equal to a glass or two of beer may lengthen that time to $\frac{2}{5}$ or even $\frac{4}{5}$ of a second. (Kraepelin)
If a car is going 60 miles an hour how far does it go in $\frac{1}{5}$ of a second? (Over 17 feet, or those with intellect dulled often drive 68 feet before they can apply a brake.)
 - b. Tests on a typewriter, or responses to light, and to bell signals, on the placing of dots, etc., showed *less accurate* although sometimes quicker movement.

The increased muscular action resulting in such cases is responsible for the tradition that alcohol is a stimulant, like "a spur to a horse." We know now that it acts as a local irritant. Any athletic coach will tell you that alcohol decreases speed and increases errors.

"In the light of the results of the experiments described above, suppose we analyze further the effects of alcohol upon the driver of an automobile. Within two hours after

drinking a pint of beer, his eye span may be as though he wore blinders; the range of vision straight ahead may be shortened as much as ten feet, which is about one-third of the usual range, therefore objects are ten feet nearer before they are within his vision; the ability to see color is impaired;—that is, by two hours after drinking, traffic lights are likely to appear pink, or even white instead of red. Because the dulled mind does not perceive the red light, the driver is likely to conclude that the green light is on. The answer to the question "Why does the intoxicated autoist drive through red traffic light? is probably, 'The driver who had several cocktails at dinner time several hours before does not see red traffic lights.' The vehement denials of those taken to the police courts for violating traffic rules, that they 'did not see the light,' that they 'thought the green light was on,' confirm what scientists say at this point. There is added danger that the movement of hands and feet on wheel, clutch, and brake are considerably slower than when under no alcohol and all the functions are under the direction of a thinking process which has been slowed down by the dulling of the senses."²

The lives of five student nurses and their male driver were recently sacrificed in Middletown, Connecticut, when the young women were returning to Connecticut State Hospital after attending the graduation exercises at Norwalk hospital. Six nurses besides the driver were in the car which crashed into a

tree and only one survived. "Lack of mental alertness on the part of the driver, brought on by the use of alcohol," was the coroner's verdict.

Dr. Francis G. Benedict, writing in *Industrial and Engineering Chemistry* (volume 17, No. 4), declares "Inflexible Science says: 'moderate user, keep off! For at least four hours after a dose of alcohol formerly considered 'permissible,' you, as a motor vehicle operator, may well be considered a 'menace to society'."¹

"Recently an inquiry was made of the railroads of this country as to whether or not there had been any change in the application of 'Rule G.' or whether there had been any revised instructions as to the use of alcoholic beverages on or off duty. In reports received from about seventy-five railways, including the Canadian Pacific and the Canadian National in Canada, the overwhelming majority replied that there had been no change and no revision. In every case where there was a revised rule, it had been strengthened. Some of the roads have added provision against narcotics and gambling in addition to intoxicants. Some also specify that there shall be no indulgence before reporting as well as while on duty."¹⁰

"Dr. Walter R. Miles, Professor at Yale University, reports findings in experiments as follows:

"Ten experiments each with a 10 cc. dose of alcohol revealed for their subject (a very intelligent woman) an average of 21 per cent

increase in errors, as compared with the average performance of the same individual without alcohol. The results were always predictable. Seven of the ten trials showed large error increases, two gave practically no change and for one there was an improved score after the alcohol. In a series of 11 tests with 15 cc. doses, increases in the errors were found in ten of the eleven, averaging 42 per cent increases in the series. Nine experiments were made with 22 cc. Eight of these showed an increase; the total average was 39 per cent. In three tests with 25 cc. all showed large increases in errors; the average was 113 per cent. However, the subjects always *thought* that after taking alcohol, they did better work."

Dr. George B. Wallace, Professor of Pharmacology at New York University, states that "moderate doses of alcohol interfere with the process of logical continued reasoning and with that of precision of movement."

Professor H. E. Himwich, of Yale, after analyzing many experiments of the effects of alcohol on working efficiency, states the case as follows: "Work of precision suffers either in accuracy or efficiency or in the time required for its accomplishment. These results are due to the depressive effect of alcohol on the functions of the brain, including such activities as the ability to memorize, or the speed in performing examples in mental arithmetic and the judgment, attention and will power necessary for the work of a precise nature. It

should be noted that the depression exerted by alcohol is not like that of sleep, for alcoholic coma is *not* followed by refreshing recovery. On the contrary the after effects of alcohol, the so-called 'hang over' are those of continued depression. Additional alcohol may then be taken to overcome this depression and so a vicious cycle is inaugurated."⁸

The writer recently interviewed one of the chief physicians in one of our large New York hospitals who is in charge of a skin clinic there. He said: "There is no doubt that the increase in the consumption of alcoholic beverages is a real cause for the increase in the number of cases who seek treatment for syphilis and other venereal diseases." Dr. Thruman B. Rice in "Racial Hygiene," lists *alcohol* with lead, tuberculosis, syphilis, gonorrhea and modern warfare, as first among racial poisons. The magnitude of this problem of venereal diseases may be judged from the statement of Dr. Walter Clark, director of the Bureau of Social Hygiene in the City of New York, October 15, 1936: "We have each week reported in New York City more than one thousand new cases of syphilis to the Department of Health. We know perfectly well that not all cases under treatment are reported and certainly very far from all the cases in existence in a community are under treatment."

"Dr. F. R. Mott, English mental specialist, emphasizes the interrelationship in saying: "Acute alcohol intoxication is insanity in miniature." If we give the weight which truth

demands to the share alcohol indulgence takes in favoring tuberculosis, and still more in promoting sexual promiscuity to which syphilis is chiefly due and in increasing its severity and duration, it will follow that alcohol is not the least dangerous of the three great enemies of human life and health."¹

"Some physicians consider alcohol as an aphrodisiac, an agent that increases sex impulses, while others say that because alcohol definitely weakens self-control and caution, it increases the tendency to sex indulgence. In either case, the result is the same."²

Many sad cases are reported of both young men and young girls whose first sexual experience resulted from uncontrollable excitement and loss of self restraint, brought on by the first drink, and as a result they contracted a venereal infection on the first night of intoxication. Of patients who seek treatment for the disease, from 75 to 90 per cent seem to have contracted it after taking alcohol.⁴ It was not intoxication, which was the cause but the weakened higher mental faculties, the loss of self-control and the sense of responsibility which turned conduct over to passing influences.⁷

The British Minister of Health said in 1926 in "An Outline of the Practice of Preventive Medicine" "if we are to rear and maintain a healthy race we must deal first with alcoholism, venereal disease and mental deficiency. We have a closely interlocked trinity of causation. Alcohol is the ally and handmaiden of venereal

disease. The two go hand in hand. When alcohol is wedded to venereal disease the offspring is feeble-mindedness."

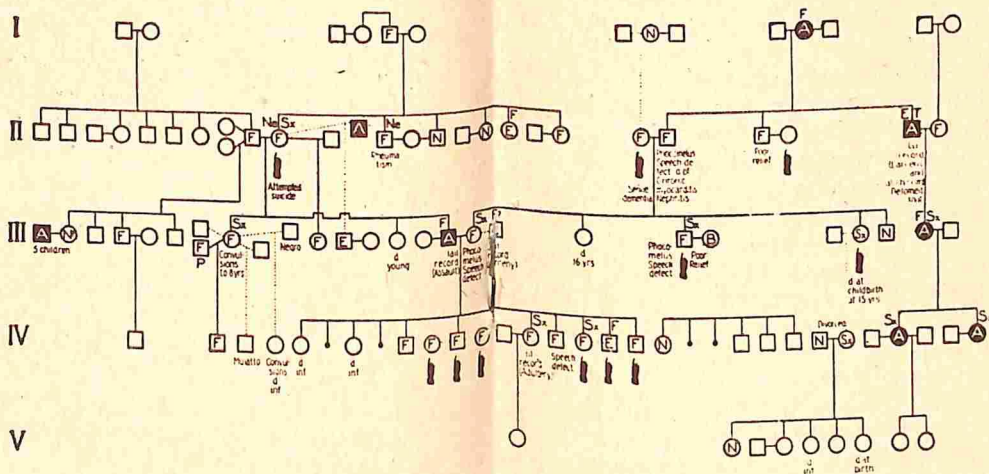
Dr. Frets point out: "It must be remembered when we see that the alcoholic parents have inferior children, that alcohol may be the cause of this in three ways. In the first place as a manifestation of heredity; secondly, as a manifestation of germ poisoning; and thirdly by insufficient care given to the children in the family where the father and still more so where the mother was addicted to drink."¹³

From the *British Medical Journal* comes the statement: "Alcohol is now known to be one of the most important factors in rendering patients more "susceptible" to the attacks of tubercle bacillus and so to tuberculosis."

Another authority in Holland, Dr. D. van Dorp (who is in charge of a hospital for the cure of tuberculosis) says: "Alcohol is one of the main factors having an unfavorable influence on tuberculosis, a fact which cannot be denied." Dr. Dorp is convinced that many tuberculous children have to endure long suffering who, but for alcohol, would have remained sound and that a part of the tuberculosis mortality is to be credited to alcohol. It might be wise for us to remember, when we buy the little holiday seals, that a more determined effort to spread alcohol education during the *entire* year will also be aiding very greatly in the fight against tuberculosis.

Our own Benjamin Franklin said in 1780: "Temperance puts wood on the fire, meat in

ALCOHOLISM AND HEREDITY



A = ALCOHOLIC
Ne = NEUROTIC

□ = MALE

○ = FEMALE

B = BLIND

C = CRIMINALISTIC

P = PARALYTIC

Sx = SEXUALLY

***** = STILLBIRTH OR MISCARRIAGE

E = EPILEPTIC

F = FEEBLE-MINDED

N = NORMAL

IMMORAL

T = TUBERCULAR

■ = AT INSTITUTION

EUGENICS NO. 7

1932 FOUNDATION FOR NARCOTICS RESEARCH

Chart from "Narcotics and Youth Today" by Robert E. Corradini. Foundation for Narcotic Research and Information, Inc., Madison, N. J. This data originally appeared in Eugenics and Social Welfare Bulletin, State Board of Charities, New York.*

the barrel, flour in the tub, money in the

* Unfortunately the small lettering on this chart conceals many of the most pertinent facts. For example, children of alcoholic parents have such records as: "Jail record for larceny and alcoholism"; "jailed for assault"; "alcohol suicide"; "jail record"; "poor relief". Evidence of promiscuity is noted. In three instances children died in infancy, two in convulsions.

purse, credit in the country, clothes on the bairns, intelligence in the brain and spirit in the constitution!" This is not unlike the statement made by Lord Broughton fifty years later: "Drink is the mother of want, and the nurse of crime." During this past summer,

I heard of a father who (when under the influence of alcohol) beat his four-year-old daughter to death while she cried, "Daddy, that's enough—That's enough, Daddy."

"Since repeal," states Frank E. Gannett in the *Civic Bulletin*, "there has been a decrease in the consumption of milk in the State of New York of approximately 6,000,000 quarts per month." As individual resistance to disease is partly dependent upon good nutrition how much better it would be for our public health if this were *not* the truth.

From Italy, one of the two great wine drinking countries, comes the opinion of Dr. Leonardi Bianchi, Professor of Nervous and Mental Diseases in the Royal University of Naples: "An alcoholic mother gives to the world either a prostitute or a delinquent, when she does not give an epileptic, an idiot, or a lunatic."⁴

"Chemical substances, as germ poisons, may injure the new individual. . . . The poison may affect either the male or female germ cells or the germ-plasm, namely before conception, or the developing germ in the various stages of development, namely after conception."¹

Dr. Frets, cited above, shows how "alcohol, circulating in the blood stream, can have a direct effect on the protoplasm before conception, also during the whole period of the child's prenatal development. Alcohol has been found in the ovaries and in the sperm."¹

Professor Demme of Berne, Switzerland,

has made a study of the intimate history of ten families which drank and ten families which were non-users of alcohol. The record which these parents were making for their children was as follows: "The drinking families had fifty-seven children, twelve of whom died in infancy, thirty-six were idiotic, epileptic, malformed, or had serious nervous trouble, nine of them were normal. The non-drinking families had sixty-one children, of these five died in infancy, only six were handicapped as compared with thirty-six in the drinking families. The abstaining families had fifty normal children against only nine in the drinking families."¹

"A most striking example of alcoholic degeneracy is afforded by the study of 117 families by Professor Alfred Gordon of Philadelphia. In 90 per cent of these families there were 200 children, all of whom showed the stigmata of degeneracy; 150 or three-fourths of the whole 200 were epileptic. Of 78 children found in twenty families whose parents and grandparents were alcoholic 35 were imbeciles and 25 insane."¹⁵

As Dr. Arthur T. Bevan of Rush Medical College has said: "There can be no doubt that the greatest single factor that we can control in the interest of public health would be the elimination of alcoholic drink. This is not tyranny—it is evolution, it is science, it is civilization."

"Every man who comes to the front of a profession," said Sir Andrew Clark, "is marked

by this characteristic, that the more busy he gets the less in the shape of alcohol he takes and his excuse is, "I cannot take it and do my work'." Thomas Edison expressed it thus: "To put alcohol in the human system is like putting sand in the bearings of an engine."

"Dr. Emerson analyzed the place of alcohol as a food as follows: "A food is not merely something which is useful for the normal life, growth, development, and reproduction of the human body, but it may be a fuel to be used as a source of energy. There are three classes of foods, first those which supply energy and also materials out of which the body grows and repairs itself, such as milk, meat, eggs; next, those which serve as fuel directly, and can be used to store up the fuel supply of the body, as sugars, starches and fats; and lastly such as can serve as a fuel but only for immediate use, and are incapable of making body material or building up body reserves. Alcohol belongs to this third class and is the only substance used in diets which has this limited food value. In the sense that a food is intended for body growth and repair, and storage of energy, alcohol has no food value.

"Even accepting alcohol among the foods in this extremely limited sense its use in nutrition is restricted narrowly by its poisonous effects upon the tissues of the body, and particularly upon the brain and other portions of the nervous system.

"Furthermore when compared with our ordi-

nary foods capable of supplying energy, beverage alcohol costs (under all conditions of modern commercial production and distribution) excessively in proportion to its fuel value."—"Alcohol is not included in the list of some thirty-seven food essentials known to be desirable to ensure healthy growth of the human body."

"As long as the world is full of good food there is no excuse for substituting beer for a balanced diet," says an editorial in the *Journal of the American Medical Association*.

Quoting from the annual report of the Keely Institute at Dwight, Illinois, we find: "The figures show that more people took the cure for alcoholism at this place in 1936 than at any other time in the last thirty years." The secretary reports: "Ninety per cent of the women taking the Keely cure are married; 77 per cent are housewives. The remainder are divided among school teachers, nurses, bookkeepers, saleswomen, office and restaurant keepers."

"Here is a great chronic emergency," says Dr. Merrill Moore and Mildred Geneva Gray, M.A., in the *New England Journal of Medicine* for September 2, 1937. Dr. Moore is associate in psychiatry, and Miss Gray is research fellow in neurology in the Harvard Medical School. They report in summary:

1. "Patients suffering from alcoholism have never been welcomed to the Boston City Hospital, but approximately 50,000 of them (or 5 per cent of total admissions) have been

treated there in the past seventy years.

2. "The annual number of alcoholic admissions has varied from 1 to 14 per cent of total annual admissions, with an average of 7 per cent.

3. "The annual total of all patients admitted has steadily increased, and the ratio of patients with alcoholism to total admissions has likewise increased, so that on an absolute as well as on a relative basis the problem of alcoholism at the hospital is now greater than *ever* before.

4. "During the years of national prohibition more alcoholic patients were admitted than at any other previous time. Repeal has increased the number requiring hospital treatment.

5. "The majority of alcoholic patients admitted are males, and they outnumber females in the proportion of 7:1. Males are admitted in largest numbers between the ages of 36 and 40, and females between 41 and 45.

6. "About 84.1 per cent are discharged relieved, but very many of these are readmitted as 'repeaters' within a short time.

7. "Of the patients who die in the hospital, many are admitted in a state of coma and many die soon after entry.

8. "Deaths from alcoholism are increasing out of proportion to the increase in alcoholic admissions.

9. "The ages of many fatal cases are unknown, but the largest number of men who die are between 46 and 50, and of women between 36 and 40.

10. "Many cases suffer from diseases of the nervous system, especially neuritides and deficiency diseases. (From 1910-1935 there were 1,064 cases admitted with types of diseases of the nervous system resulting from alcoholism.)

11. "A small number receive treatment in the outpatient department following discharge from the hospital.

12. "A considerable number of patients have been engaged in the liquor trade, despite the common assumption that such persons do not become alcoholics. Of this group, the largest number are bartenders."

Dr. Carl M. Bowman of Bellevue Hospital reports 12,000 cases of alcoholism admitted to Bellevue in 1936; in 1935 there were 9,000; in 1933-1934 there were between 7,000 and 8,000. Statistics so far available for 1937 indicate that there may be less admissions during 1937 due not necessarily to less incidence but rather to the use of available beds for other purposes.

CONCLUSION

Since beverage alcohol is the major narcotic problem in the world today¹ particularly affecting the public health in every country, a group of registered nurses representing 287,000 women who have chosen this field of helpfulness to suffering humanity, could best serve others by studying the scientific truth available on the subject and wisely using such information to show that we believe in *prevention*

(which is the chief aim of modern medicine) rather than in *cure* and that we are willing to put our belief into practice by constant education on this point.

The following dates quoted from "Progress of Scientific Investigation of the Action of Alcohol upon the Human Organism" by Bertha Rachel Palmer, national director of alcohol education, Evanston, Illinois, are very useful in focusing scholarly attention upon the problem.

1850—Dr. Jewett, Huss (Swedish Scientist), Grinrod refuted medicinal value formerly attributed to spirits. Huss found many drinkers who had never been obviously drunk, died from the effects of alcohol: he was the first to call this "alcoholism."

1863—Dr. Benjamin Ward Richardson (English) refuted the theory that alcohol is a stimulant, and pronounced its effects in every particular to be a depressant, the increased heart action being caused from narcotized inhibitory nerve.

1881—Dr. Otto Von Bunge (Swedish) refuted the theory that alcohol taken in moderation is harmless: supposed "stimulation" results from irritation resulting in a manifestation of paralysis.

1895—Dr. Emil Kraepelin (German psychiatrist) found effects of alcohol upon the mind reduce re-action time, the powers of perception, association and memory.

1918-24-32—Dr. Walter R. Miles of Yale showed the relations of the concentration of

alcohol in the blood to the stages of intoxication and that the effects of drinking beverage alcohol containing as little as 2.78 per cent lowered the efficiency.

1935—Dr. Herman Heise, Milwaukee, reaffirmed Miles: in study of fatal highway accidents found alcohol in 60 per cent of cases, some as little as in 2 glasses of beer.

"Education does not consist in teaching people what they do not know but in causing them to behave as they do not now behave," said John Ruskin. We all know that cures are not always permanent. The late Dr. Allen Starr, a noted neurologist, in effect, said, "In all my experience, I have never known of a case of drunkenness that could not be permanently cured through the influence of religion." Our effectiveness, as nurses, is to bring to the patient the influence which will help to make that cure permanent. In some instances this may mean building up an individual's self-respect; in other instances it may mean an appeal to family pride or the memory of a mother; in still others it may mean the substitute of more worthwhile aims in life—new and more worthwhile companions; in some it may mean a reintroduction to their faith in a higher Being—a reliance upon a will that is stronger than their own.

Those who are ready to do preventive education along these lines will find many tools to their hand. This article does not pretend to be a textbook or even an outline of the points to be taught. I have referred on several occa-

sions to the teaching syllabus compiled by Miss Bertha R. Palmer, who previously acted as state supervisor in the public school system of one of our large western states. This is both scientifically and pedagogically sound, and will prove of great help to the teacher in the school of nursing or to the public health nurse who wishes to bring this message to public groups.

In a school of nursing two or more senior nurses, who have had the necessary background in nursing specialties—tuberculosis, obstetrics, clinic work involving venereal conditions—might be given the subject as a special assignment. The references appended and the short bibliography will minimize their search for appropriate material. Their personal reports might be preceded by class experiments by the chemistry instructor to show the effect of alcohol on foods, cell tissues, etc. Usually the social histories of several patients known to individual nurses will help to emphasize the close-tie up of alcoholism with heredity and the nurses' reports on these help to make the problem alive and pressing.

In teaching this, as in any other subject, I need not remind you that we remember only 10 per cent of the facts that are *told* us, but that we remember 40 per cent of the impressions which come to us *through our eyes*, and that those facts which are associated with action on our part register in 80 per cent of the cases. With these thoughts in mind it is worth emphasizing all important points through

visual memory, and, where possible, through student-executed experiments. To aid visual perception you have now at hand an excellent film entitled "The Beneficent Reprobate" (meaning alcohol) which treats historically this whole subject of the nature and properties of ethyl alcohol. In it students can see some excellent experiments performed by medical research workers at Northwestern University, Evanston. The film is a Burton Holmes production and may be secured free (except for transportation charges) from Young Men's Christian Association offices at 347 Madison Avenue, New York, or 19 South La Salle Street, Chicago, or from Screen Addettes, Inc., 925 N. W. 19th Street, Portland, Oregon.

In some measure the effectiveness of teaching can be negated in certain institutions and in certain localities where doctors continue to use alcohol medicinally. However, even in those circumstances nurses who have (through their three year course) seen physicians hold diametrically opposed opinions on all forms of medication are not ready to follow such opinions blindly unless the facts of scientific truth are intentionally ignored through personal bias. To counteract such personal points of view (which are sometimes, at least, colored by the personal habits of those expressing them) it is important to quote outside authorities in the field of research. For example Dr. Débove, then dean of the Paris Faculty of Medicine, had no hesitancy in saying: "Alcohol causes or prepares the ground for a

great variety of diseases." And I can remember the triumph in one small community when its nurses heard a broadcast by Dr. W. A. Evans, professor of Sanitary Science at Northwestern University Medical School; speaking over a national hook-up, say: "Having found alcohol valueless and even harmful, doctors have discontinued using it in and after disease until now it is not claimed to be a cure for anything." And quite recently I saw an article by the well-known New York specialist, in this field, Dr. Alexander Lambert, in which he stated that alcohol led to permanent cell deterioration, while certain drugs whose use is indicated under identical conditions leave no permanent mark on the cell tissues or on the personality.

The whole purpose of preventive education as the facts relate to alcohol should not only be to increase efficiency (both personal and national) and to reduce accidents in our sick-rooms, in our homes, in our industries and on our highways but to produce life which may be more abundant from generation to generation.

REFERENCES

1. Corradini, Robert E. Narcotics and Youth Today. Foundation for Narcotics Research and Information, Inc., Madison, N. J. P. 7, 17, 18, 19, 39, 90, 91, 94.
2. Palmer, Bertha R. What Alcohol Is and What It Does. Signal Press, Evanston, Illinois. P. 4, 10, 11, 17.
3. *Union Signal*, Nov. 21, 1936.
4. Palmer, Bertha R. Syllabus in Alcohol Education. Signal Press, Evanston, Illinois. P. 11, 24, 26, 34, 38.
5. Palmer, Bertha R. Simplified Story of Alcohol.
6. Salter, Dr. Alfred M. P. The Nation Challenged. Signal Press, Evanston, Illinois.
7. Transeau, Emma. Effects of Alcoholic Drinks. Signal Press, Evanston, Illinois. P. 19, 47.
8. Emerson, Dr. Haven. The Effects of Alcohol on Man in Health and Disease; 1932. Macmillan Company.
9. Emerson, Dr. Haven. Alcohol, A Food, A Drug, A Poison—Foundation for Narcotics Research and Information, Inc., Madison, N. J. Pamphlet P. 6.
10. Colvin, Mrs. D. Leigh. Transportation Forbids Alcoholic Indulgence by Employees; *Union Signal*, July 17, 1937.
11. Palmer. Alcohol Education. Series "No. 4."
12. Weeks, Dr. Courtenay C. Alcohol and Human Life. H. K. Lewis & Co., Ltd., London, p. 15.
13. Frets, Dr. Y. P. Alcohol and Other Germ Poisons. Maltimus Nyohoff, The Hague, 1931.
14. Horsley and Sturge. Alcohol and the Human Body.
15. Kellogg, Dr. John, "Race Degeneracy," page 29, September 9, 1911. Eugenic Society.

BIBLIOGRAPHY

1. Miles, Walter R. Alcohol and Human Efficiency. Carnegie Institute of Washington, Washington. March, 1924.
2. Rice, Dr. Thurman B. Racial Hygiene. The Macmillan Company, New York, 1929.
3. Davenport, Dr. Charles Benedict. Heredity in Relation to Eugenics. Henry Holt and Company, New York. 1915.
4. Pickett, Deets. Temperance and the Changing Liquor Situation. Methodist Book Concern, 150 Fifth Avenue, New York. \$.75.
5. Gordon, Ernest. When the Brewer Had the Stranglehold. Foundation for Narcotics Research and Information, Inc., Madison, N. J. \$1.00.
6. Bogen and Hisey. What About Alcohol? Signal Press, Evanston, Ill. \$1.50.
7. Emerson, Dr. Haven. Alcohol, Its Effects on Man. D. Appleton-Century Co. \$1.00. 5th Edition, Macmillan Co., London, 1915.

"For complete living it is necessary that there shall be escaped the incapacities and slow annihilations which unwise habits entail."

Quoted by SIR VICTOR HORSLEY.

"Through the accumulation of small injuries it is that constitutions are commonly undermined and break down long before their time.

SIR HERBERT SPENCER.

"Health is always in some way undermined by it (Alcohol)."

ANDREW CLARK, M.D.,
Physician to Queen Victoria.

Prices: Single Copy, 15 cents

100 at .10 each; 500 or more at .07½ each

Reprinted from THE TRAINED NURSE AND HOSPITAL REVIEW, October and November, 1937. Copyright by Lakeside Publishing Company, New York City, 1937.

