

cells and tissues of the whole body, still it is on the brain, or indeed the whole nervous system, that its most far-reaching and malign influences are exerted.

The preliminary stimulation accelerates the heart's action, thereby increasing the amount of arterial blood sent to the brain. This produces the stage of exhilaration, excitement, brilliancy and sometimes frenzy and delirium.

"Owing to the loss of contractile power of the vessels, the increased blood-supply can not be returned to the veins from the brain with sufficient rapidity, and thus there is a block, causing impediment of the circulation, which ought to be free and unimpeded, to allow duly aerated fresh arterial supplies. This is the stage of depression, of depression and collapse, when the memory fades, speech is thickened, voluntary movement ceases, sensation is dulled and consciousness fails. This process frequently repeated sets up permanent tissue changes. The covering envelope is so thickened and otherwise injured that proper nutriment can not be conveyed to the brain, and thus that organ is badly nourished. The shape of the brain cells is altered, and the physical degradation of the cerebral substance sadly impairs the intellectual and moral faculties." (Dr. Norman Kerr.)

I believe the correctness of this picture can be vouched for by nearly every physician. Indeed, good illustrations of it are constantly seen, sometimes even at medical banquets. Nor is this all, for under the influence of alcohol the brain begins to think awry. It can not think straight (Dr M. S. Holbrook), and its influence on psychic processes is curious, for while it renders them much slower, the individual under its influence believes them to be much quicker than usual (Dr. Lauder Brunton). Indeed, experiments made in Heidelberg University show that the consumption of alcohol, whether in large or small doses, produces a tendency to paralysis of the mental faculties (Dr. Adolph Barr).

In view of these facts, I am led to believe that the so-called tonic or strengthening effects of alcohol are due more to its anesthetic and paralyzing power than to any true nutritive or tonic properties it may possess. As Dr. Kellogg has very felicitously said, alcohol is a "nerve-fooler." It makes the person who indulges in it believe his condition is very different from what it really is. If he gorges himself with too much food, alcohol may quiet the protests of his digestive organs and paralyze him into the belief that it is aiding his digestion and increasing his strength, whereas it is doing nothing of the kind.

While he may believe that his senses are keener and his powers of endurance greater, experiments with scientific instruments of precision have demonstrated that his acuity of vision is lowered, his power of hearing reduced, his sense of smell blunted and his taste so obtunded that he can swallow fiery and even caustic liquids without wincing, and his muscular strength, which he believes to be greatly augmented, is shown by the dynamometer to be materially reduced, and even his soul-stirring eloquence and poetic flights are largely discounted in the estimation of the man who has not been imbibing.

Since alcohol thus deceives the person who uses it, and as most of the beneficial results claimed to arise from its use are based on the subjective sensations of those using it, I believe we are justified, after a careful consideration of all phases of the question, after examining the arguments for and against and apply-

ing to alcohol the same tests that we use in determining the utility of other substances used as food, in concluding that if it possesses any food value at all, it is to a very limited extent, and that the dangers connected with its use are so great and far-reaching that it, as every other narcotic poison, should only be used after the greatest possible precautions have been taken to guard against its untoward effects.

#### DISCUSSION.

Dr. STUVER, in closing the discussion—I do not wish to be understood as claiming that alcohol does not have any food value. The point on which I wish to insist is, that in view of the great possibilities of doing harm, every case should be carefully investigated, and alcohol should not be prescribed in any form unless we are fully satisfied that its dangers and disadvantages will be more than compensated by its good effects in the patient's case. In short, alcohol should be used with as much care as morphin, strychnin or any other poison, and not in the careless, indiscriminate manner in which it has been in the past.

### ALCOHOL IN HEALTH AND DISEASE.

Presented to the Section on Physiology and Dietetics at the Forty-ninth Annual Meeting of the American Medical Association, held at Denver, Colo., June 7-10, 1898.

BY V. D. MILLER, M.D.

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It is with some hesitancy that I present this subject for your consideration, knowing, as I do, the extreme differences of opinion in regard to the effects of alcohol upon the human system, especially in disease. It is over sixty years since the composition of alcohol and its effects upon the human body have claimed the special attention of chemists, physiologists and philanthropists. Since this time very many investigations and observations have been made, and numerous important and scientific works written by investigators whose names stand high in the annals of chemistry and physiology.

Among the seventy-six known elements, there is one called carbon (chemical symbol C). This element is termed an organic substance, as it occurs abundantly in living matter; it is a waste product of animal and a reconstructive product of vegetable life—that is a food for plants and an effete matter of animals. The atomic weight of this element is 12, and its quantivalence is 1, 2, 3 or 4, making it twelve times as heavy as our standard—hydrogen (H). It may replace atom for atom, or 1 for 2, 3 or 4. Owing to its great latitude of power it unites very readily with hydrogen, nitrogen, oxygen, sulphur (H, N, O, S) and their radicals, forming a great number of chemic compounds, among which are many of the new therapeutic remedies. We also have sugar, fat, oils, ether, chloroform and alcohols.

In forming these different classes of compounds carbon follows out definite and fixed laws from which it does not vary. Through the decomposition of vegetable matter a gas is generated known as marsh gas ( $\text{C}_2\text{H}_6$ )—methane. To this gas add OH and you have an alcohol. There are many gases to which if you add OH alcohols are formed. The alcohol ( $\text{C}_2\text{H}_5\text{OH}$ )—ethyl alcohol—is the one used for medicinal purposes, and is one of the best solvents we have. It readily unites with gums and resins, dissolving them; it coagulates proteids, because of its eagerness to unite with water ( $\text{H}_2\text{O}$ ), generating heat sufficient to cook the contained albumin. This is what takes place in the human tissues which contain albuminoid matter. The heat generated by contact of alcohol and living albuminous tissue first coagulates



the albumin and renders it unfit for chemic reaction.

Professor Hodge of Clark University says that alcohol retards, prevents and is destructive in either large or small doses to normal growth and development; it lowers the working power.

Dr. Chittenden of Yale University says amounts of alcohol equal to 5 per cent. are markedly injurious and retard digestion.

Drs. Zimmerburg of Germany and Marvaud of France by their experiments proved that small doses of alcohol increase the frequency of the pulse, that large doses increase at first, then diminish the heart's action; very large doses depress at first.

Professor Martin of Johns Hopkins University, in his demonstrations of alcohol on the action of the heart, says that an ounce of whisky or brandy always lessens the force of the heart, but generally increases its frequency. The habitual use of alcohol is certain to work a change in the muscular structure of the heart and arteries.

Dr. Woodbury of Philadelphia (Board of Health) says nothing in clinical medicine is more certain than that the continued use of alcohol stimulates the development of connective tissue all over the body, therefore it is a prolific source of disease.

G. Newton Pitt says 75 per cent. of the cases of alcoholic neuritis and 20 per cent. of cirrhosis of the liver was found on postmortem to have tubercular lesions; these lesions assume the fibroid form.

Dr. J. F. Pain of St. Thomas Hospital, London, says that one of the effects of alcohol is to produce an accumulation of fat in the liver. In speaking of its effects upon the nervous system he gives cases of paralysis of the phrenic and pneumogastric nerves, also changes in the peripheral nerves producing hyperesthesia, paresthesia, anesthesia, with loss of knee jerk at every stage, this symptom constituting the symptoms of alcoholic ataxia.

Dr. N. S. Davis says when alcohol is taken into the human stomach it is rapidly absorbed, carried directly into the blood, consequently it undergoes no digestion or assimilative change in the digestive organs and is not converted into elements capable of contributing to the growth or repair of the organized structure of the human body. It has been many times detected as alcohol unchanged in the blood, liver, brain, lungs, kidneys and all the other structures of the body.

Chemistry shows us that alcohol is not a tissue builder, containing none of the elements from which the tissues are made. Its use in health can not be of any value. It is true the grains from which it is made contain gluten, fibrin, etc.—elements of great importance in the development of the human system—but in the production of alcohol a chemic change is produced, so that there is nothing which the tissues of the body can appropriate to their use, consequently, from a physiologic standpoint, we are forced to admit that its use in health even in small doses is deleterious. Take, for example, a sensitive, intellectual young man, a specimen of anatomic and physiologic perfection, note the deleterious changes which the habitual use of alcohol has upon him. The blood becomes impure, as evidenced by the red nose, pimples and blotches on the face; his nervous system deranged, as evidenced by his coarse language, irritable disposition and high temper, often abusive to the mother to whom in former years he gave most reverential and respectful attention. To the wife, whom

he once adored and would have given his life to protect, he becomes cold, harsh and abusive, often treating her with contempt. The children, once his pride, he neglects or often robs, and to his best friends he even becomes insulting. Will some advocate of the "social glass" explain to us the physiologic and beneficial effects of alcohol upon the brain in this case? If alcohol is of no benefit, but decidedly deleterious in health, can we find a use for it in disease?

Dr. Samuel Wilks, F.R.S., consulting physician Guy's Hospital, London, says: "I found it necessary to withstand the use of alcohol in medicine at an early period of my practice. It lowers the functions, causes degeneration of the nerve centers and produces general paralysis, trembling lips, shaky hand, unsteady walk; muscles undergo a change; heart becomes fatty, nerves hardened and thickened from neuritis. Digestive organs morbid, loathing food. Ulceration, thickening of the walls of the stomach and intestinal tract."

In speaking of alcohol as a drug I do not hesitate to say that those who give it believing it to be a stimulant are totally mistaken in its action. In mitral disease of the heart it adds fuel to the fire. There was a time when brandy was the universal medicine in fever. At the present time its universality is abandoned. A number of medical men hold fast to the old notion that brandy supports. For my part, the reasons for giving it are erroneous. At present its employment by judicious men is almost ignored, and they are certainly better practitioners than those who give it to every patient who had a weak pulse. Our knowledge of the action of alcohol in disease is almost empiric, having so few principles to guide us. So far as my observation goes, those physicians who use it in typhoid fever and pneumonia lose a large per cent. of their cases, while those who treat these diseases without alcohol seldom lose a case.

The effect of alcohol is to stimulate the heart to increased action and increased circulation and respiration. In fever we have too rapid circulation and respiration with high temperature. Why, then, give something to increase this condition? Some of our best physicians with large experience, while noting the increased action of the heart from the use of alcohol, find that its force or power is diminished. May this not be the principal cause of the so-called heart failure which many practitioners give as the cause of death? Alcohol being chemically a hydrate, must, on physiologic principles, increase the heat of the system, which contraindicates its use in all fevers. Some physicians use alcohol in their practice because their preceptor or some writer used and recommended it; others because their mothers believed in and used it, and they, perhaps without being aware of it, inherited an affection for it. In fevers we have a variety of remedies which have a tendency to lower the temperature and shorten the disease, of far more value than alcohol. Our list of tonics (not stimulants) is numerous. With a chemic knowledge of the elements of food and their different combinations we can feed and care for our patient so that very little medicine will be required. Let us banish tradition and treat our patients upon common-sense principles, then we shall have little use for alcohol.

#### DISCUSSION.

Dr. C. B. VAN ZANT, Denver—The question as to the status of alcohol in health and disease is a large one, and one that is arousing the greatest attention throughout the country. Like



every other question it has its extremes and a happy mean. There can be no question that the pendulum is swinging away from the indiscriminate use of alcohol as practiced in former days. This is true in our own profession, as evidenced by the fact that a large number of our best men are earnest members of the American Medical Temperance Association, which stands for a restricted use of alcohol in disease. In my judgment, we ought to deal with alcohol as we would with morphia, recognizing that it is an agent both for good and evil. I have long accepted as a maxim the terse statement of Austin Flint, Jr., that "whenever a sufficient quantity of food, to meet all the needs of nutrition, can be taken and digested, alcohol is not only unnecessary but injurious." This statement applies both in health and disease. I think it is taking up an extreme position to say that alcohol never has a legitimate use either in health or disease, and in this respect the author's views fail to meet my own. In moderate quantities it is surely oxidized, and if oxidized, it must be a producer to some degree of animal heat and force. In disease, where a "sufficient quantity of food can not always be ingested and digested," the importance of the use of alcohol is apparent, as a temporary prop to the vitality of the patient. It is only in these temporary conditions that we find its highest value in disease. As an article of diet in health it is certainly unnecessary, if not immediately and tangibly injurious.

Dr. H. R. SLACK, Lagrange, Ga.—I regret exceedingly that the author of this paper is not present, for I would like to inquire whence the quotation of Dr. Martin was obtained. It was my good fortune to have studied under Professor Martin at the Johns Hopkins University, and he taught: "According to circumstances alcohol may be either a poison or useful; when useful it may be regarded either as a force-generator or a force-regulator. It is sometimes a valuable medicine, but does no good in a healthy body. Its proper use is as a whip, to stimulate the flagging energies, and it enables the physician to win many a race for life that otherwise might be lost." Dr. Osler recommends its use strongly in typhoid fever, and in pneumonia says: "It is the only remedy in many instances capable of tiding the patient over the dangerous period." There is no substance in the whole range of medicine concerning the uses and effects of which there is a greater diversity of opinion than alcohol, some as the writer, holding that these are wholly bad and that "no good thing can come out of Nazareth," while to others it is an ideal stimulant, tonic and food. I hold an intermediate position, one that I consider the golden mean, and the position of Dr. Martin as stated before. I have seen many cases where its beneficial effects were marked. It is a well-known fact that the mortality from typhoid fever in the London Temperance Hospital has for the last twenty years been 15 to 16 per cent.; much greater than in other hospitals where alcohol is used. I believe that at present we have no medicine in the pharmacopeia that can replace alcohol as a stimulant, and in some cases its use is necessary.

## DIETETIC CAUSES OF INEBRIETY.

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Inebriety is one of the most complex neuroses and obscure border-land diseases known. To the average practitioner the inebriate is simply a weak, wilful, vicious man, who has full power to do different but will not exercise it. When the inebriate is examined carefully, and all the facts of his inheritance and of his nutritional, and also mental life and growth are grouped, a uniform progressive line of disease is found. The pathologic conditions which precede alcohol and the conditions which follow from the use of alcohol, are marked in different degrees. The former are not recognized and the latter only recently have come into prominence. The use of alcohol is followed by conditions which differ very widely, and are unexplainable except by a study of preceding conditions before spirits was used. One of these conditions is heredity, that is the transmission of defects and predispositions to degenerate in certain directions, with or without special exciting causes. Another is nutrition, a third

is disease and traumatism and its sequelæ, a fourth is culture and environment, and so on through a long list of causes. In all cases, it may be said that the nerve centers suffer from practical starvation, and the narcotism from alcohol is grateful in covering up the irritation and pain demands for help. In my studies the nutrition of childhood has been found to be an active cause in many cases. I have divided these into the *overfed* and *underfed* cases. In the former the clinical history would follow these general outlines: The nursing child would be surfeited both at the breast and by infant foods. The central thought of the parents would be the danger of starvation and the need of constant ingestion of food. When indigestion followed, another nurse and changed foods in equal quantities would be given. Later, when the child was able to occupy a place at the table with his parents, all discrimination was left to his own tastes, the parents reasoning that the appetite was the best guide and the child's food inclinations should be followed. Anything the child called for as foods or fluids were given freely. The disturbances of digestion which follow are usually treated as weaknesses and tendency to diseases. Consumption, rheumatism, disease of the liver, stomach and kidneys, and other formidable diseases are discerned in the horizon by the worldly-wise physician. Patent foods, climate cures, changes of school and culture and many remedies are tried. Finally puberty is passed, and the digestion is permanently impaired. The appetite is lawless and without control. The body is ill-nourished. Already fatty deposits have begun. The demand for foods and fluids are mere impulses. The taste is disordered. Large quantities of certain classes of foods are taken, then abandoned. The same of fluids, teas, coffees, mineral waters, beers, wines and anything used at the table.

Indigestion and obscure or well-defined nerve failures, nerve disturbances, irregularities of sleep all follow. Then finally comes the subtle tonic bitters containing from 20 to 40 per cent. of alcohol, or the wines or whisky, and inebriety has come. The relief which spirits brings is so marked that it is continued, and then follows a rapid, sharp degeneration, and the inebriety is chronic and complex mental and physical changes appear; opium and other narcotics follow, changing from one to another. This picture is not confined to children of wealthy persons, but occurs in all the various circles of society, in the families with moderate means, and occurs among children who are obliged to begin the serious work of life at an early age. The dietetic delusions of parents are engrafted and graven in the minds of children and the end is inebriety. Some of these cases take on paroxysmal forms, after spirits are used. Thus, an attack of acute indigestion is followed by a drink craze which after a certain time subsides, and breaks out again after a free interval. They become periodic drinkers, and when they die show in the postmortem remarkable stomach degenerations. It is found that the sudden, unreasoning outbreaks of what is called alcoholism, or the use of spirits to prolonged intoxication, occur in those delusional dyspeptics who, from infancy, have had no dietetic or food control. Such morbid eaters occur often among prominent men, and when they begin to use spirits they have no power of control and are soon pronounced inebriates. In these cases digestion is early strained and stimulated far beyond the needs of the body, and the food, non-