

ALCOHOL.

ITS PLACE IN THE REALM OF MATTER, AND
ITS INFLUENCE ON ANIMAL LIFE.

BY J. F. SANBORN, M.D., D.D.S.

Everything we can recognize by our five senses is matter.

Alcohol is matter; where is its place in the various grades of substance that constitute our world, and what relation does it bear to animal life?

Matter may be organic, the result of growth, as a tree, or it may be inorganic, as a stone.

Inorganic matter may be either solid, fluid, or gaseous, while living organic matter is both solid and fluid.

THE SIMPLEST FORMS OF MATTER are the elements. Among the solids we have gold, silver, tin or iron; among the gases oxygen, the part of the air that we breathe to support life. When elements that have an affinity for each other unite they form stable compounds. Oxygen and hydrogen are gaseous elements, they unite to constitute water (H_2O). Water is a stable compound

and very difficult to decompose; any other elements uniting so as to balance each other's affinities form stable compounds. The less the number of elements uniting to form a compound the more stable is the compound.

The converse is equally true, for the more complex the compound the more bands are required to bind, and the more bands the greater the liability for some of them to become broken, and the elements scattered.

Matter occupies

FOUR PLANES OF EXISTENCE.

First and lowest we have the elements, as carbon, hydrogen or oxygen; second, stable compounds, constituting a combination of elements; thirdly, compounds produced by the force of vegetable life combine to form vegetable tissue as cellulose, starch or grape sugar, and fourthly we have animal life whereby matter on plane three is raised to a still higher plane, where the complex compounds of starch, dextrin and gluten become the tissue of animal structure. This change of plane in matter may be represented by a ladder: the first round represents the elements, the second round the stable compounds, the third

the vegetable kingdom, and the fourth the animal kingdom.

Vegetable life, by the force it derives from sunlight, takes the stable compounds of the second plane and raises them to plane three; animal life takes the complex compounds of the third plane and raises them to plane four. By the action of oxygen matter is reduced from planes three and four to plane two, as stable compounds. Through this cycle matter is constantly passing.

Science teaches that

NO SUBSTANCE IS EVER ANNIHILATED, or force ever lost; so that the force expended in raising matter from one plane to another till it has reached the highest is not lost, but is stored up, as the vegetation of millions of years ago is stored in the coal bank to enable us in this age to prosecute the various enterprises of an energetic people or for domestic comforts as fuel and lights; or to that of a weight, the higher it is raised the greater the force of the blow in its fall. Matter raised to the height of the vegetable kingdom is not high enough to produce nerve force by its fall, for this reason the vegetable king-

dom has no nervous system, or power of voluntary motion. Vegetation, on its destruction or decay, falls from plane three to two, the animal kingdom is on plane four, and when it falls to plane two it has twice as far to fall and the force of the blow will be more than twice as great.

The animal kingdom is on a plane too high to be able to reach down to the plane of stable compounds, and raise materials to its own plane, so the vegetable kingdom is placed by the wise Creator

BETWEEN THESE TWO PLANES
to raise matter to a height to be within the reach of animal life force. The animal kingdom takes matter from the vegetable kingdom and raises it to its own.

Force was stored in the growth of vegetation, and an additional amount is stored in the assimilation of it into tissue of the animal using it as food. Now we have a sufficient height to cause a force by its fall adequate to produce nerve and brain power to maintain and carry on animal life.

All actions of animal life are governed by nerve force. Nerve force, respiration and circulation are mutually dependent

actions; suspend either and life action ceases.

Nerve force is the power that keeps the vital machinery in its normal, balanced activity. It is the action of oxygen on the tissues of our bodies that reduces them from the high plane of the animal kingdom to the plane of stable compounds. The tissues are consumed just as truly as is the fuel in the furnace of a railroad engine, and for the

PURPOSE OF DEVELOPING FORCE
to run the vital machinery—in co-ordinating voluntary and involuntary motion. Thus we eat and drink to furnish materials for the formation of tissues, and keeping up repairs. The tissues then are consumed by the oxygen for the purpose of developing force to carry on vital action.

The mind is the Sovereign Ruler, the body its willing subject, ever ready to live to do its behests, or die to enhance its power. The grand end of these vital activities is to evolve in us the power that will enable us to think and act.

A normal balance in these vital functions constitutes health; the loss of it is the cause of disease; and disease is nature's effort to restore the balance.

Death is the cessation of vital changes. The action of oxygen in the break down of tissues reduces the various compounds that constitute the tissues to the condition of the stable compounds, where life action in vegetation commences.

Bearing these principles in mind,

WHAT INFLUENCE DOES ALCOHOL EXERT on vital actions? Is it a help or a hindrance? Is it a good or an evil? Where is its place in the four planes of matter? Is it high among the products of vegetable life? or where do we find it?

In the development of vegetable tissues from stable compounds the number of atoms to the molecule are increased. Carbonic dioxide has three; water has three; ammonia has four; these are stable compounds; starch, a product of vegetation direct from these stable compounds, has twenty-one, and grape sugar, from which alcohol is always produced, has twenty-four ($C_6H_{12}O_6$).

A barrel is composed of many staves held together by bands; as long as these are in good condition the barrel may be useful, but if they become decayed the barrel drops to pieces.

In grape sugar each molecule with its

twenty-four atoms ($C_6H_{12}O_6$) is held together by bands somewhat like the hoops on the barrel; but in the fermentation of sugar for the manufacture of alcohol these bands decay and the complex molecule drops to pieces; and for each molecule of sugar we have two molecules of carbonic dioxide (CO_2) and two of alcohol (C_2H_6O). The former rises to the surface of the fermenting mass and is lost in the air; the latter is distilled from the water of the fermenting mass. Fermentation then is

A PROCESS OF DECAY,

alcohol forms one class of the fragments and carbonic dioxide the other.

The part of the sugar represented by the carbonic dioxide has been reduced from plane three to plane two and is a stable compound; but the alcohol, the other fragment, is capable of a still farther reduction before it reaches plane two, occupying a halfway place between planes two and three. The vital force of animal life can reach down to plane three and raise matter to its own level, but it cannot reach below that; therefore alcohol cannot nourish animal tissue. We have oceans, seas, gulfs, bays, lakes, riv-

ers, creeks, springs and wells—water in abundance. Without it vegetables and animals would languish and die. Fish live in it as their native element, but die in anguish if placed in alcohol; so that water is a prime necessity to both the animal and vegetable kingdoms. "Water is a beverage prepared by God himself to nourish his creatures and beautify his footstool;" but alcohol is nowhere found as a product of growth either in vegetable or animal tissue; but is

FOUND AMONG THE DEAD REMAINS of the fairest products of earth, as one of the poisons remaining when decay has rent asunder their fair proportions, and destroyed them for every use for which God had caused them to grow.

The voice of all nature is that alcohol is matter within the realm of death and decay. The affinity of alcohol for oxygen is like that of a drunkard for whiskey—it must be closely imprisoned where oxygen is absolutely out of its reach or it will have it if stealing will procure it, and thus get down into the gutter with other dead matter, where it will be in a quiescent state of stable compounds, as carbonic dioxide and water. When a man imbibes it is it a wonder that he too

should sink into the gutter? When we take food into the stomach it is digested, if alcohol is taken does it digest? No. Its very name shows that it will not. It is from the Arabic—"al," which corresponds to the definite article "the," and "kohol" means finely divided—Alkohol, the finely divided. If taken into the stomach it does not remain there and digest like milk or bread; it is at once absorbed by the veins of the stomach and passed by the portal vein to the liver, and from there to the heart and lungs; in ten minutes it may be scented in the breath.

There is a prevailing belief that alcoholic bitters do promote digestion and therefore are a benefit. The stomach digests the nitrogenous food by the gastric juice, the solvent powers of which are in the pepsin therein contained. If you add alcohol to the gastric juice of some animal the pepsin will be changed from the fluid active form to the solid inert condition.

Todd & Bowman tell us that, "The use of alcoholic stimulants

RETARDS DIGESTION

by coagulating the pepsin and thereby interfering with its action." "Were it

not that wine and spirits are rapidly absorbed from the stomach they would be a complete bar to the digestion of food, as the pepsin would be precipitated from the solution as quickly as it was secreted by the glands of the stomach." So much for its help in the process of digestion.

"When alcohol has entered the circulation it spreads through the liver, heart, lungs and brain, it penetrates every organ and traverses every tissue, and leaves no part unvisited." Prof. E. L. Yeoman says: "Our first necessity is for air to breathe, and secondly for water to drink. God has supplied the one equal to the demands of all the animal kingdom and it is always everywhere present; the other is so abundant as to cover three fourths of the surface of the globe, and so essential is it that where it abounds there life is exuberant, but where it is lacking we find the desert."

Eighty-eight per cent of our weight is water; this shows how necessary it is to animal life.

Dr. Tanner could fast from food for forty days, but water he must drink to dissolve his tissues to sustain vital action, where the destruction of a part is made

to save the life of the whole; but how long could he have lived without water, even if the supply of solid food had been abundant?

Therefore, next to air, water is the most essential to man's physical well-being.

For an indefinite time dead animal tissues may be

PRESERVED IN ALCOHOL.

It does this by depriving them of the water they normally contain, and protecting them from the action of oxygen. To form these tissues there are several alimentary principles variously compounded, among these is albumen.

This is the lean of meat; the casein of milk, from which cheese is made; the gluten or sticky part of flour, and the white of eggs; they are each chemically the same, whether derived from the vegetable or animal kingdom.

In the process of digestion these albuminous foods must be changed from a solid to a fluid condition to enable the absorbents to pass them from the stomach to the circulation; alcohol would prevent this by coagulating them. When these albuminoids have been digested and absorbed into the circulation they

become fibrin. This is the part of the blood from which most of the tissues are formed; in the blood it is a fluid, but in its assimilation into tissue it is changed to a solid. The action of alcohol in the blood on this fibrin is to render it a permanent fluid like the blood of persons killed by lightning.

This

TWOFOLD ACTION OF ALCOHOL

on the leading constituents of the blood, first to retard the transformation of albumen into fibrin and then to prevent the assimilation of fibrin into tissue, must inevitably depress the plastic powers of the blood and greatly disturb the nutritive operations. Prof. Yeomans says: "On account of the nutritive and reparative powers being too low under such circumstances, surgeons hesitate in undertaking formidable cases."

Prof. J. N. Carnahan, of New York City, says: "I must declare I always look on patients who have been in the habit of using spirituous liquors as least likely to recover from serious maladies, or from shocks following capital operations; and also as patients most likely to require a longer time for cure of diseases of a more simple character." "I have at times

met with cases of fracture of bones occurring in persons of intemperate habits in whom the

BONES WOULD NOT UNITE

by bony union, but remained flexible and useless."

Thus persons jeopardize both life and limb by the use of alcoholic liquors.

Dr. Huntsman, Pres. of the Iowa State Medical Society, said in his annual address in 1885: "The impression prevails that intoxicants are indispensable in concussion, collapse, typhoid fever, consumption, dyspepsia, and kindred diseases; but a long course of observation and experience has forced me to the most positive conviction to the contrary. In typhoid fever, who would to-day rely on intoxicants, when an ounce of beef-tea will accomplish more toward recovery than a pint of whiskey? I probably ought to ask pardon of the beef-tea for the comparison."

The whole address was in keeping with this extract.

ALCOHOL INTRODUCED

into the system may be divided into three parts:—

1st. A portion is removed from the blood through the lungs in the breath. This part occasions the least injury.

2d. A part is decomposed by the action of oxygen; and

3d. The part that is neither expelled in the breath or decomposed by oxygen, but remains in the system for a greater or less time as alcohol.

As all combustion and decay is effected by the action of oxygen, this third part will preserve the tissues from its action, as oil will prevent iron and steel from rusting, so that the tissues that have subserved the ends of life as living structure, and which should be removed to give place to new, is not, but is preserved by alcohol just as animal tissues are preserved in a bottle of spirits. Such persons become palsy, and may be called fat.

It is abnormal matter, preserved in alcohol, and is carried about as a mass of useless substance, that would go to decay at once but for the preserving influence of alcohol.

A person in such a condition may well say as did the apostle Paul, "Who shall deliver me from the body of this death?"

Persons of aldermanic proportions pro-

duced from this cause may boast of their heathful appearance, when in fact the vital activities are

AT THE LOWEST EBB,

and should disease supervene, almost sure death must follow.

The other part of alcohol to which reference has been made as No. 2 by the action of oxygen, goes back to stable compounds, carbonic dioxide and water. The oxygen we breathe consumes a part of the tissues, to develop nerve force as it is needed to keep up vital and organic actions of life.

Alcohol, to enable it to get back to stable compounds, steals a part of this oxygen and thus robs the system of the wherewith to evolve brain force for the co-ordination of muscular action, and all the symptoms of intoxication are apparent. For each molecule of alcohol let down to carbonic dioxide (CO_2) and water (H_2O) there are six atoms of oxygen (O) taken from the blood, four of which will combine with the two atoms of carbon in the alcohol, to produce two parts of carbonic dioxide 2 (CO_2) and two to unite with the hydrogen and the oxygen one in the alcohol, will together

reduce the six parts of hydrogen to three parts of water $3(\text{H}_2\text{O})$. Chemical formula: $\text{C}_2\text{H}_6\text{O} + \text{O}_6 = 2(\text{CO}_2) + (\text{H}_2\text{O})$.

Thus is the system robbed of its oxygen for the sole purpose of getting rid of that which has done no good.

Alcohol on going to the stomach

PRECIPITATES THE PEPSINS

from the gastric juice, so that digestion is suspended until the alcohol is absorbed and a new supply of gastric juice has been secreted. So we see that alcohol on its first entrance into the system acts as a brake on the wheels of life.

On being absorbed from the stomach it passes to the liver, which becomes hardened by the coagulating of the albumen of its tissue, so that it cannot perform its functions. Here again it acts as an obstruction to vital action; it then passes to the heart and lungs, where a portion of it is given off in breath; from the lungs it passes to the heart and arterial circulation.

In the lungs the red blood corpuscles unload carbonic dioxide and load up with oxygen. On making this change, the dark color of the venous blood is replaced by a lighter color peculiar to arterial blood.

Alcohol as it comes in contact with the arterial blood

DEPRIVES IT OF ITS OXYGEN

to a variable extent, and, while in the arteries, changes the blood from arterial to venous by replacing the oxygen with carbonic dioxide. If the quantity and strength of the alcohol is sufficient to absorb all the oxygen there would be none left to be used to oxidize the tissues, and vital action would cease for want of force to carry it on. This would occasion a very sudden death by asphyxia—a deprivation of oxygen, and analogous to drowning.

The word toxic means poisonous; to intoxicates means to poison, and by general usage it means to poison with alcohol.

The toxic effect varies with different persons.

If only enough is used to absorb a part of the oxygen and there is still enough left for the heart and lungs to keep up vital action, but not sufficient for the brain to enable it to continue voluntary action, then the person will be dead drunk.

The action of alcohol in displacing water from fresh animal tissue, is also

injurious. Liebig took 141 grains of fresh animal membrane which contained 34 grs. of dry substance and 107 grs. of water: this he soaked in alcohol; when removed, the membrane contained 32 grs. of alcohol and had lost 99 grs. of water. For every volume of alcohol retained, more than three volumes of water had been expelled.

This property of alcohol, to

DISPLACE WATER IN THE TISSUES,

explains why a person is so thirsty on recovering from a drunken debauch; the system is calling for water to enable it to go on with its life's work.

Verily alcohol acts as an enemy whenever it comes in connection with life action.

If the quantity of alcohol is still less and the amount of oxygen it absorbed from the blood is still less so that the brain has more or less power of co-ordinating muscular action, then just in ratio as it has this power furnished it, just in that proportion is it able to control voluntary motion, and the person may stagger or walk straight as the case may be.

Alcohol is matter between planes three and two, and its fall follows the law of

falling bodies: the nearer it approaches the stopping place

THE MORE FEARFUL

are the wounds it gives.

Alcohol used in small quantities is said to act as a stimulus. The word stimulus is from the Latin, and means a goad, a spur, a whip, a something to urge on.

Whenever there is animal life there must be a time for action and a time for rest. In accordance with this law the heart has its time for action and its season for rest.

During the hours of our activity it beats 72 times a minute, 4,320 times an hour; but during hours of rest it beats 62 times a minute, and for the 24 hours it averages 100,000 beats, which is equal to the labor of raising a ton 115 feet.

This is the amount of work performed by the heart of a healthy full-grown man under ordinary circumstances of life.

Experiments have demonstrated that 4 oz. of alcohol used in 24 hours will increase the heart's action from 100,000 to 112,226; if the quantity be increased to 6 oz., 17,388 extra beats will be made; and if half a pint be used, 24,000 extra, or 1,000 extra beats per hour. This is equal to raising a ton 28 feet ex-

tra, after getting it up the 115 feet, or 143 feet. For so small an organ as the heart, to raise a ton 115 feet in 24 hours is as much labor as it should be required to perform.

If the normal condition of the heart's action requires a certain length of time for rest,

HOW MUCH TIME DOES IT HAVE

for rest when it is forced to beat 1,000 extra times an hour?

There is four times the expense to a railroad company to run its trains 40 miles an hour that there is in running them 20; the wear and tear of the vital machinery is no exception to this law.

By the use of an alcoholic stimulant the vital machinery is made to run too fast, and therefore as soon as it is expended the vital forces will be proportionately weakened; this explains why depression follows stimulation.

The more the whip is used on a team the sooner it becomes exhausted; the more the stimulant is used the sooner the vital force will break down. Good food, fresh air, a plenty of sunlight and pure water keep the vital machinery in normal condition, and are not stimulants

to urge us on to over exertion at the expense of that beautiful balance in vital action that constitutes health. The International Medical Congress which met in Philadelphia in 1876, at which over 600 delegates were present from this country and Europe, adopted a report in which "alcohol was declared to have

NO FOOD VALUE WHATEVER,

and to be so injurious in its effect on the human organism as to leave a grave doubt as to whether even as a medicine it did not do more harm than good."

Pres. Huntsman further says: "It is settled by medical science that the gastric juice has no effect on alcohol, and hence it is indigestible.

"It is a foreign substance in the blood retarding the circulation. It draws the water and albumen from the blood corpuscles, and only tends to disorganize the system."

While this is true of every other part of the tissues, it is most emphatically so of the brain and nervous system. The mind is the grand object for which the body lives and for which a portion of itself is being continually immolated.

Whatever interferes with this "daily sacrifice" is sacrilege.

The nerves and the brain are largely albumen; this

ALCOHOL COAGULATES AND HARDENS,

so that they are more or less paralyzed; the circulation of the blood is retarded, thereby increasing the heart's action; the capillaries are congested, and the countenance bears the seal of the destroyer that is apparent to every casual observer. By it the very structure of the brain and the finer sensibilities of the soul become hardened.

Ether, chloroform and nitrous-oxide gas are so poisonous that a small quantity taken into the blood by inhalation paralyzes the sensibilities of the brain and nervous system, thus producing unconsciousness; a similar "diminution of sensibility or anæsthesia is developed in direct ratio to the quantity of alcohol taken, as may be seen in all stages from simple exemption from all fatigue, pain and idea of weight, exhibited by ease, buoyancy, hilarity, to that of complete unconsciousness and loss of muscular power. It is this anæsthetic effect of alcohol

that has led to all the popular errors and contradictory uses which have proved so destructive to human health and happiness."—(Dr. W. S. Davis.)

Verily, "Wine is a mocker,"—the victim is deceived, his best friend is considered an enemy, and may be murdered on account of the delusion; the wife of his youth is forgotten and left to starve; his children to suffer with cold and hunger; the once happy home has long since passed to the possession of his more thrifty neighbor; his patrimony is wasted for that which is not bread, and the accumulated earnings of years of hard toil and economy for that which does not satisfy. His language is senseless gibberish; profane and obscene words are the utterances of the half-paralyzed tongue. The half developed thoughts are reiterated as though they were pure eloquence.

Language is

TOO FEEBLE TO PAINT

the extent of the fall and degradation of some of the finest intellects of earth, and all from the effects of alcohol.

Verily, at the beginning it is a mocker—a deceiver; its end the bite of a ser-

pent and the sting of an adder. As alcohol in its relationship to animal life is antagonistic to every physiological action, how can we expect to violate these laws of our being and be in condition to enjoy the happiness and usefulness which is commensurable with God's gifts to man?

Scientific teachings are in harmony with Scripture in that "Wine is a mocker, and he that is deceived thereby is not wise."

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