

CONTRIBUTED ARTICLES.

ALCOHOL.

BY DR. C. I. STOCKLEY.

PART I.

"ALCOHOL and its effects on the human body," is my subject, and I am going to treat it purely from the medical standpoint and all the mass of evidence for its good or bad effects, its use and its abuse, will be drawn mostly from the medical literature of our time. Let us consider—

1. The Chemistry of Alcohol.
2. The Physiological results of alcohol on the human frame.
3. Disease and its relation to alcohol.
4. The food value of alcohol.
5. Alcoholic beverages and the National Health.

I.—*The Chemistry of Alcohol and Alcoholic Beverages.*

When in everyday life we speak of alcohol we think either of one particular substance or of the beverages which cause intoxication.

Anyhow all these beverages possess one point in common for they contain the powerful chemical substance called "ethyl alcohol." Alcohol is prepared in a number of ways but for our purpose it is sufficient for me to say, that as a rule it is made by the fermentation of sugars. Yeast (a microscopic plant consisting of a single cell) is put into a sugary solution, and it ferments the sugar, breaking it up into water and carbonic acid.

When the alcohol in the solution reaches 13% the growth and multiplication of the yeast plant stops. In order to obtain a higher percentage of alcohol another process has to be carried on, known as distillation, which is really a process of concentration. By heating the fermented liquid, the alcohol is driven off in vapour. This vapour is collected and condensed again to the liquid condition by means of passing it through a long coil or distiller in a water jacket.

Alcoholic beverages may be classified into 3 groups: (i) Beers, (ii) Wines, (iii) Spirits or distilled liquors:—

(i) Beers, the principal beverages belonging to this class are port, stout, lager beer, which are largely a fermented sugar containing a bitter and contain 4 to 7% or even 10% alcohol.

(ii) Wines are made by the fermentation of grape juice, and the percentage of alcohol never goes above 13%. But during the maturing of the wines by age, mixed ethers are formed which modify the action of the alcohol.

Port Wine 16—18%

Home-made wines—

Sherry 13—18%

Currant

Claret } —10%

Raspberry

Champagne }

Gooseberry

} 5—12%

Medicated Wines—15 to 23 %

Medicated Wines are decoctions which come under the description of Secret Remedies, and Sir Thos. Barlow in 1913 addressed the International

Medical Congress, as President of the Royal College of Physicians, with these words, "Let us adopt the common sense, which ought to belong to our profession, and stamp out these medicated wines."

Indeed the Select Committee of the House of Commons said in 1914, "that grave injury is caused to the public by the existing sales of medicated wines The alcoholic content of these wines is very high, indeed the recommended dose of Wincarnis, equals one glassful of whisky per day and its proportion of meat extract is 1.2% (or about $\frac{1}{2}$ % of the flesh-forming constituents of a lean beef steak). Lemco Wine contains only .6% of meat extract but 12% of sugar Alcohol moreover cannot contain meat extract in solution, and presumably any medical man desiring to administer meat extract would prefer to do so without mixing it with alcohol.

"There can be no doubt that many persons acquire the drug and drink habit by taking these wines, either knowing that they are alcoholic, or in ignorance that they are highly intoxicating liquors. "Hall's Coca Wine" contains also 1 gr. of the extractive principle of the coca leaf which is mainly cocaine. Bugeaud's Nutritive Tonic Wine contains quinine and cocaine."

Dr. Robert Hutchison in a book on "Diet and Dietetics" says, "The use of such liquors by an invalid on his own responsibility or even by prescription exposes him to the great danger of becoming by degrees the unconscious victim of alcoholism, and in the case of coca wines of the cocaine habit as well. On every ground their manufacture and sale should be strongly deprecated by the medical profession."

(iii) The Spirits or distilled liqueurs.—These are formed by the process of distillation, brandy 35—50% of alcohol is made by distilling wine; whisky with a percentage of 44—50% is distilled from fermentated grain or malt; and gin, which is like whisky, containing 31% of alcohol contains also turpentine, coriander seed and juniper berries; rum 40—50%; vodka 60%.

The liqueurs contain, such as absinthe, as much as 70% of alcohol.

II.—*The Physiological Effects of Alcohol.*

(i) Externally—The effect of alcohol on the skin is to cause, by its volatility, a cooling and then by its other properties a hardening process. It is a vaso-dilator and an antiseptic.

(ii) Internally—By direct contact for the first time alcohol in small doses increases the flow of saliva, and causes a greater digestive power over farinaceous food.

When it reaches the stomach it augments the flow of gastric juice but does not induce the cells to secrete an active ferment. In small amounts it slightly accelerates the digestion of proteids and it is very rapidly absorbed from the stomach, and it increases the absorption of substances dissolved in it, e.g., its use on tinctures. In large doses, and continual small amounts, alcohol clots and coagulates all protoplasm, the cell shrinks, becomes granular and is thrown off. When this occurs in the stomach, it results in patches of the lining membrane becoming more or less denuded of their natural covering. Alcohol acts as an irritant, and the mouths of the glands, which secrete the

gastric juice, become blocked with debris of epithelial cells and with mucus. The lining membrane of the stomach becomes bright red owing to the dilatation of blood vessels, and catarrh follows.

The exact condition of the lining membrane of the stomach, under the action of alcohol, was observed many years ago by a certain Dr. Beaumont. His patient was a man called Alexis St. Martin, who injured himself very seriously by the explosion of a gun. Only after many months did he recover and even then a hole in the front of his body refused to heal. This hole led to his stomach and through this window the condition of the organ was observed.

Dr. Beaumont invited Alexis to become his attendant and to stay with him, on condition that he would allow his stomach to be examined from time to time; and in this way for years careful observations and notes were made. The man was in good health in spite of the opening; in fact, he married and had children. Let me give you an extract from Dr. Beaumont's diary:—

“St. Martin has been drinking ardent spirits pretty freely for eight or ten days past; complains of no pain, nor shows any symptoms of any general indisposition; he says he feels well, and has a good appetite.

August 1st, 8 a.m.—Examined stomach before eating anything, inner membrane morbid, considerable redness, with small whitish ulcers. The secretion of gastric juice 3 ozs. in amount, was viscid and not clear as in health.

August 8th, 7 a.m.—The inner membrane of stomach unusually morbid, the reddish patches more extensive, and spots more vivid than usual, and blood was exuding from some. The little white ulcers were more extensive. The gastric juice was mixed with ropy mucus, muco-purulent matter, slightly tinged with blood, resembling the discharge from the bowels in some cases of chronic dysentery.

St. Martin complains of no symptoms, except an uneasiness and tenderness at the pit of the stomach, some giddiness; has a thin brownish coat on his tongue and his countenance is rather sallow. Pulse uniform and regular, appetite good.”

Thus we see from actual observations considerable damage may be done to the stomach, without the patient being aware of the fact. The numbing effect of alcohol on the brain and probably on the nerve endings in the mucous membrane of the stomach is made use of by many to allay the pangs of hunger.

Instead of aiding digestion it merely exerts a narcotic influence on the gastric nerves, and because of this, many a man believes alcohol aids his digestion, while in reality it aggravates his dyspepsia and embarrasses his digestion. Sir Wm. Roberts, M. P., says that half a glass of sherry will treble the time taken to digest ones food.

On the *Circulatory System* it has a stimulating action. For instance, on the pulse it excites or slightly accelerates the rate in small doses; while in large doses the rate becomes slower by its action on the medulla. It is hard to exclude the physiological effect of excitement and the irritation of the stomach, which both cause an increase in the pulse rate. On the heart it has a small but definite stimulant action by causing a greater force of contraction, and Dixon says it has some title to a circulatory stimulant.

The blood vessels are dilated in all cases; some say that in small doses the systemic vessels are constricted, but this has not been proved, and in large doses they are certainly dilated.

The body temperature is lowered about 0.5°C by 1 to 3 oz. of alcohol through the exaggerated elimination and the dilatation of the superficial vessels.

On muscle its action is indefinite except in large doses when it causes fatty degeneration. Rivers says that alcohol in 20 cc. doses has no effect on muscular action; while Prof. Dixon says, he has no reason to suppose it has any direct action on striped muscle. But we will consider the effect of alcohol on work later and see its practical value.

To the *Respiratory System* it is an indirect stimulant, small doses increase oxygen absorption by 3.5% and increases the CO_2 by 4.5%. All such organs as the liver and kidneys have their work increased, because the vessels are dilated and the degeneration caused in the liver is so proverbial that I need not dwell upon it, for we all are familiar with beer drinkers' liver and the granular kidney of the alcoholic.

The Central Nervous System.—There are two theories in regard to the action of alcohol on the nerve cell. Binz believes that alcohol first stimulates and then depresses; while Schmiedeberg holds that the nerve cell is always depressed and Professor Dixon, of Cambridge, says that there is now overwhelming evidence that the second theory is right. George W. Crile, M.D., a physiologist of repute, says "that according to their effect upon the brain cells drugs may be divided into three classes; first, those that stimulate the brain cells to increased activity as strychnine; secondly, those that chemically destroy the brain cells such as alcohol and iodoform; thirdly, those that suspend the functions of the cells without damaging them such as ether and morphine."

(To be continued.)

SELF-CONTROL.

By MISS M. E. BUTCHER.

EDUCATION, is it not designed to equip the new-comer for the battle of life? Changing as conditions change? Growing with the growth of our civilisation? We learn by example and from the mistakes of our forbears, the very obvious ones, but alas! changes from one system to another are often made with too little consideration for essentials. Our grand-parents chose repression, governing by force or fear, for their children. Then the pendulum began to swing back and our fathers treated their children with leniency; later came the full swing back, and indulgence from the cradle upwards, children practically ruling the house, and school made as pleasant as possible with little deep thought as to where this would lead. Self-control was not substituted for parental control, and this is the great lack. The subject of this paper is one on which I have the strongest opinions formed from first-hand evidence and personal observation. The lamentable want