

and more, is quite certain ; but that they require it, or that it is good for their health, will not bear discussion.

Up to the age of 40 very little stimulant is, as a general rule, really desirable for healthy persons, and I expect most people of average health would get on better without any. My own personal experience is this :—I was never very strong, though always able to get through a very considerable amount of physical exertion without suffering from fatigue. Up to the age of 40 I hardly ever touched stimulants of any kind, and when I did take a little I not unfrequently experienced an attack of sick headache before my ordinary condition of health was restored. Lately, however, I have found the advantage of half a tumbler of ale daily ; and I can bear half an ounce, and sometimes three or four ounces, of wine without suffering. I dare say, as I grow older, I may, like most persons, require a little more ; but when in the country, and taking plenty of exercise, I feel very well and contented without any stimulants whatever. The experience of some members of my family who have lived to be old, and that of many persons of whom I have inquired, accords with my own. In old age, I believe, stimulants are really necessary, and sometimes are even more important than food itself. I feel sure the life of many old people is prolonged by the judicious use of alcohol, and I think that some, who have been very careful all through life, take far too little stimulant when they grow old.

*Of the Probable Action of Alcohol in the Body.*—But we may now very briefly consider the influence of alcohol upon the organism, and its probable operation as an article of diet. What becomes of alcohol when it is taken into the stomach ? There is no doubt that if the spirit is strong when introduced, it is much diluted by the pouring out of fluid from the vessels and glands of the stomach, and that it is quickly absorbed, in its diluted state, into the blood. That this is so is proved by the familiar fact that the smell of alcohol is often very perceptible in the breath. Moreover, as is well known, alcohol has been detected by chemical tests in the breath, in the sweat, in the urine, and the other secretions by a number of observers. Alcohol has also been proved to exist in the blood. There is, therefore, no doubt that alcohol, as alcohol, may not only be taken up by the blood, but may circulate with the nutrient fluid, and eventually pass away from it unchanged. But it must not therefore be concluded that *all the alcohol every person takes* is thus absorbed as alcohol, caused to circulate through the body as alcohol, and at last excreted unchanged ; for such a conclusion would be opposed to the facts of observation and experiment. The truth seems to be, that some of the alcohol taken is unchanged in the system, but that a considerable and very varying proportion of the total quantity introduced is caused to disappear altogether as alcohol, and to pass through most important changes, escaping at last from the organism probably as carbonic acid and water.

A certain quantity of alcohol is *digested* and *assimilated* ; and it is quite certain that the capacity for the digestion of alcohol varies very remark-

ably in different individuals. It is most probable that the alcohol is taken up by, and carried with, the portal blood to the liver. It is then appropriated with other substances by the bioplasm of the hepatic cells, and completely changed. Its elements are rearranged, and added to the constituents which form the liver-cell, and which gradually break up to form the ingredients of bile, the liver-sugar, and the so-called amyloid matter.

It is the living matter of the yeast-cell that splits up to form alcohol and carbonic acid, water, and a form of cellulose. We shall not be surprised to find that another form of living matter—that of the liver-cell—has the power of appropriating alcohol, rearranging its elements, and causing them to combine with other elements to form compounds having properties very different from those of the materials out of which they were made. And it seems probable that under certain circumstances other forms of bioplasm of the body are able to take up and appropriate alcohol ; for it is certain that in some prolonged cases of exhausting disease a large amount of alcohol is readily assimilated, while ordinary foods can only be taken in such infinitesimal amount that we cannot attribute to them much influence in the maintenance of life. In severe cases of fever, as I shall again have occasion to state, the greater proportion of the alcohol introduced is probably not oxydised as used to be supposed, but appropriated. Its effect is to lower, not to elevate, the temperature ; and, so far from increasing the dyspnoea in bad cases of bronchitis, pneumonia, etc., by throwing increased work upon the lungs, as used to be affirmed, it has a directly contrary effect.

Dr. Parkes has shown that diluted alcohol, given daily in such proportions that not more than two ounces of absolute alcohol are consumed in the twenty-four hours, in most cases improves the appetite, and slightly quickens the heart's action ; but that larger amounts have an opposite effect as regards the appetite, and greatly increase the cardiac beats.

Anstie and Dupré showed that if doses of alcohol sufficiently large to produce narcotic effects are taken, alcohol escapes in the excretions, but when smaller quantities are taken it is not to be detected. This may be the true explanation of the fact that alcohol in certain cases cannot be detected in any of the secretions at all. It is certain that the quantity required to produce narcosis varies greatly in different individuals, and perhaps this may account for the different results obtained in the course of different experiments.

Dr. Dupré has quite recently proved that, of the alcohol taken in moderate doses (48 to 63 grammes of absolute alcohol), only a minute fraction is excreted as alcohol, while by far the larger proportion is disposed of in the system in some other manner. Dupré's observations show that this alcohol is not stored up in the system as alcohol, and slowly evolved in the form of alcohol. He remarks that the amount of alcohol eliminated per day does not increase with the continuance of the alcohol diet, and that, therefore, all the alcohol taken daily must