to form carbonic acid gas—the "*choke damp*" of miners, so called because it almost instantaneously destroys life when breathed into the lungs. The other half of the elements of sugar unites to form alcohol—a fluid which, if swallowed in even much smaller quantities than an ordinary draught of water, proves instantaneously fatal; so that by fermentation, the sweet, nutritious, safe, and wholesome substance called sugar is resolved into two poisons—carbonic acid gas and alcohol; one of these may be inhaled into the lungs, but it is not breath—the other may be imbibed into the stomach, but it is not drink.

Fluids, such as pure water or ardent spirits, do not require digestion, they pass directly through the coats of the stomach into the mass of blood circulating in the body.

That alcohol is absorbed, is proved by the odour of the air expired in breathing. If this proceeded merely from a little of the spirit being left in the mouth or throat, a draught of water would remove it. Dr. Ogston, of Aberdeen, remarks, however, in his paper on drunkenness, that "when the patient smells strongly of spirits, its odour will not always be perceived in the stomach, the contrary is sometimes the case, this fluid having been previously absorbed;" and in one case observed by Dr. Percy, of Edinburgh, the spirituous odour continued for three hours after the digestive organs had been washed out by the stomach pump. Magendie was the first to demonstrate the transmission of spirits unchanged from the stomach into the circulation; he gave a quantity of spirit to a dog, and on examination a short time afterwards, found none remaining in the stomach, while it could be obtained by distillation from the blood of the animal. In a similar experiment, Teidemann and Gmelin detected alcohol in the contents of the splenic vein, (that is, the vein which returns the blood which circulates in the stomach) while they could not detect it in the *chyle*, or digested food, which, as a milk-like fluid, enters the circulation through a totally different set of vessels, called lacteals.

The exhalents of the lungs are not, however, the only channels by which the blood seeks to throw off the load of alcohol which it circulates. Sir Anthony Carlile, and Drs. Wolff, Kirk, Buchanan, and Ogston, have each furnished cases in which the fluid effused into the central cavities of the brain was impregnated with spirits, and in some of these even the distinctive character of the spirituous liquor previously swallowed was retained. Thus "Dr. Wolff found that the surface, and still more the ventricles of the brain, had a strong smell of *brandy*." In the case reported by Sir A. Carlile, in which a quart of gin had been previously swallowed for a wager, "the fluid in the brain was distinctly impregnated with *gin*, both to the sense of smell and taste, and even to the test of inflammability"—it appeared to be "as strong as one-third of gin and two of water." Dr. Kirk says, "I dissected a man who died on the first day of this year (1830) in a state of intoxication, after a debauch in 'first-footing.' In two of the cavities of the brain (the lateral ventricles), was found the usual quantity of limpid fluid. When we smelled it, the odour of *whisky* was distinctly discernible; and when we applied the candle to a portion of it in a spoon, it actually burned blue—the lambent blue flame characteristic of the poison, playing on the surface of the spoon for some seconds." And on examining the brain of a man who had killed himself by drinking *rum*, Dr. Percy says, "I could distinctly recognise the peculiar odour of *rum*." There are also cases noticed in which a spirituous odour was discernible in the serous cavities of the chest.* Dr. Percy detected alcohol in the substance of the brain and liver, and also in the blood, the urine, and the bile, the relative quantity found in the brain being so great as to lead him to suppose that there existed some peculiar affinity between the alcoholic fluid and the cerebral substance. And he says, alcohol "may be separated with great facility from the bile and liver; and this may serve to explain the frequency of hepatic disease in habitual drunkards." The following experiment by Dr. Percy will illustrate the potency of alcohol as a poison, and the rapidity with which it may, even in its strongest state, be absorbed into the blood, and circulated throughout the living mass. About an imperial gill of pure alcohol was injected into the stomach of a dog, which for a day or two previously had received but a scanty supply of nutriment, "but scarcely was the injection completed, when the animal uttered a loud plaintive cry, and, being dropped, *fell lifeless to the ground*. Not a gasp was afterwards taken; nor after the lapse of one or two minutes, could a single pulsation of the heart be felt." On inspecting the body of the dog only sixteen minutes after commencing the experiment, Dr. Percy found "the stomach was nearly void, containing only some bilious matter, and the intestines also were generally void and contracted;" but by distillation from the brain, he "obtained a supernatant stratum of alcohol, not less than one-third of an inch in depth, which burned with a blue flame, and dissolved camphor:" he adds, "the blood also, procured from the different cavities of the heart, and great veins of the chest, furnished, on analysis, a stratum of Alcohol half an inch in depth; on opening the chest, a decidedly alcoholic smell was perceived; the brain also was thought to emit a somewhat spirituous odour." Dr. MacNish says, "the perspiration of a confirmed drunkard has often a strong spirituous odour. I have met with two instances, the one in a claret, the other in a port drinker, in which the moisture which exuded from their bodies, had a ruddy complexion, similar to that of the wine on which they had committed their debauch;" and it is an opinion of some medical writers, that the secretion of the milk becomes impregnated with the alcoholic liquor taken by the nurse, and affects injuriously the constitution of the child; indeed, considering the diffusible nature of alcohol, it seems impossible that this or any other secretion can escape contamination. The spirit is carried wherever the red blood circulates, and passes beyond this point into the white substance of the brain, and into those serous cavities, where only the serous or watery part of the blood should enter, and seems so completely to pervade every organ and tissue of the body, that this circumstance has been taken advantage of to explain that most horrible of all bodily diseases, "spontaneous combustion," to which the drunkard is peculiarly obnoxious. Thus Dr. Apjohn, writing on that malady says, "that the bodies of drunkards may become, as it were, *soaked* with alcohol, seems fully established by observation; thus Breschet found the different tissues of the bodies of criminals, opened shortly after execution, to evolve a strong smell of *eau-de-vie*; and a similar observation has been made by Dumeril and Cuvier, upon the body of a labourer at the Garden of Plants, who died from the effects of a large quantity of *wine* which he had drunk for a wager."

Such is the mode in which alcohol acts, and, after this mass of evidence, there can be little doubt that spirituous liquors enter the circulation very much in the state in which they are swallowed, and again, in considerable proportion, pass off unchanged in the breath or perspiration, and in the various secretions of the body. There is reason, however, to believe that the alcohol is not all thrown off in this way. These facts are not inconsistent with the opinion long since advanced by Dr. Trotter, and more recently supported by the eminent German chemist, Liebig, namely, that alcohol enters largely into combination with the oxygen of the blood. The chemical properties of spirituous liquors affect also the various solid tissues of the living body.

* Ether is a fluid very analogous to alcohol, and a case is recorded in the *Lancet*, v. 1, 1836-7, in which, after a quantity of this drug had been administered, "a strong smell of ether was perceived" to proceed from all the surfaces of the brain, and the odour of ether was also observed in those serous cavities which contain the lungs and the heart.