

rally met with in the brains of old persons; it is a senile condition. And both in chronic alcoholism and in old age the cause of this accumulation of fluid is the same; namely, it comes from atrophy of the brain substance. The convolutions look small, the sulci deep, and in most cases the pia mater is easily removed.

If it be granted that atrophy of the brain is at least a common result of alcoholism, though not a distinctive one, it yet remains for consideration what the nature of the wasting process is, whether one of simple atrophy, or some special form of degeneration leading to diminution of size.

The answer to this appears to be that there is no special kind of degeneration. The nerve cells are sometimes said to be granular, but in general, no change is described, as at all characteristic of alcoholism. Some observers go so far as to say that the cortical grey matter is very little affected; and one (Wille) refers the degenerative changes almost entirely to the medullary substance. On these points we hope for information from those who have made cerebral pathology a special study.

In a few instances, however, more pronounced changes are met with in the cerebral cortex. The pia mater is adherent to the convolutions, portions of the grey matter being torn off with it. On microscopical examination, patches of degeneration and sclerosis are seen. The inner surface of the ventricles again presents a rough and granular appearance; sometimes with fibrous outgrowths. These are in fact the lesions found in the brain in cases of general paralysis or paralytic dementia.

The relation of chronic alcoholism to general paralysis is a difficult and abstruse question, on which different opinions have been expressed by different observers among those who have had large experience in such diseases. It is only in special practice or special institutions that such experience can be obtained. What I venture to say on this subject is therefore said rather in the way of suggestion.

That so called general paralysis, or paralytic dementia, not now a very uncommon disease, often has for one of its

factors excessive indulgence in alcohol can hardly be disputed. But if I take the statistics of general paralysis on the one hand, I do not find any very large proportion of cases regarded as solely or mainly due to this cause, nor, on the other hand, among the sequelæ of final stages of chronic alcoholism, does general paralysis occupy a conspicuous place. The conclusion appears to be that general paralysis is distinct from chronic alcoholism, and that for the production of the former out of the latter some additional cause is necessary.

Such a cause I believe to be excessive functional strain. The three factors of general paralysis are alcohol, functional strain, and in many cases, congenital incapacity to bear strain; in short, a disproportion between functional activity and power of resistance, especially in the higher cortical centres and the tracts connected with them. I emphasise this suggestion because it appears to confirm the conclusion arrived at on other grounds, that the effects of alcohol on the nervous system, and even on the brain, are independent of its functional effect on the nerve cells, but are those of a tissue poison, acting directly on the protoplasm of various parts. At the same time it remains rather difficult to understand why alcohol so seldom produces inflammation or sclerosis in the brain, the organ which is most susceptible to its physiological effects.

The general subject of the relation of general paralysis to alcohol is one on which I hope we may receive more information from those whose field of observation in asylums has included many cases of each disease.

*Changes in the Spinal Cord.*—I now pass to the changes produced by, or ascribed to, alcohol in the spinal cord. These are not numerous, or frequently observed. Before the period of microscopical examination, the spinal cord was universally said to be healthy in necropsies of alcoholic persons. Of late years a few cases have been recorded in which there was sclerosis, or degeneration of certain tracts, especially the posterior columns, or posterior part of the lateral column (Magnan).