

perception ; *second*, apperception and attention ; *third*, strong revival in mind of the act to be performed ; *fourth*, execution of the idea.

Attention thus belongs to the sensory side ; volition to a specialised and intensive discharge therefrom to the kinæsthetic sphere. Volition is thus a development from attention, and passes on to execution ; it is thus the passing from *attention* to *execution* : in the brain it overlaps the psycho-motor sphere on the one side, and the sensory on the other : its region is, therefore, the *transitional* or association system one between these two.

On the anatomico-physiological side we think the mixed pyramidal or polymorphic system to chiefly represent this association region, partly on comparative and developmental grounds, and partly from pathological considerations. The gradual historical development and elaboration of this system in the mammal, till it attains its acme in man, and the lateness of this lower cortical organisation to complete its growth in the new-born and young indicate that this "accessory association system" of the brain is the chief structure which subserves the higher psychical functions, and especially volition. Further, of all the various cell systems involved in chronic alcoholism, it is the one in which the changes—especially the trophic ones—are most advanced.

### *Pathology.*

We therefore correlate its special implication and various before-described phases and early change with the special neurasthenia of the alcoholic, including the next group of symptoms on our list—diminution of initiativeness in conduct, and laziness with blunted moral and ethical sense behind these.

### *"Motor" Symptoms.*

Coming next we have a definite group of symptoms, viz. :  
(a) *loss of* muscular power, with tremor on exertion. We regard this special condition as due to lesions in the kinæ-

thetic area, affecting both the dynamical and nutritive parts of the nerve apparatus ; *i.e.*, both nervo-protoplasmic connections and cell bodies. Indeed, this Rolandic (or movement) sphere is the commonly used one for its study because the cell elements are large and easy, therefore, for study in this situation ; and perhaps because the further progress of the lesions are apparently more conspicuous and striking here (*e.g.*, atrophy and wasting of convolutions : œdema and thickening of pia-arachnoid, &c.). We have seen in studying the development of the Rolandic region in the young how the increased growth and extent of collaterals from the descending axis-cylinders of the ambiguous and pyramidal cells, and their coming into further contact with the protoplasmic expansions of the lower and larger pyramidal cells constitute a special intrinsic mechanism for the consolidation of movements. These collaterals conspicuously suffer, *viz.*, in the Rolandic area, and to this we attribute the tremor and unsteadiness (dynamical disturbance) in movement. Apart from this tremor there is a true *weakness*, as shown with the dynamometer, which may amount to a paresis of 20-40 pc. below health.

### *Pathology.*

We correlate this with the commencing nutritive degradation of the nerve cells which discharge down the pyramidal tract, inciting thereby the motor cells of the cord. It is, we think, a phenomenon parallel to the muscular weakness of neurasthesia when tested with the dynamometer. This combination of tremor and weakness are the basis for the dyskinesia of alcoholism.

The reinforcement these cells require, even to enable them to act continuously for a time, should be noted. The alcoholic holding a ball or jug in his hand will often drop it if he be not looking—fixing his attention—on it. For the normal tactile and kinæsthetic ascending currents arrived at the brain, have to act on psycho-motor cells of but low energy which may flag. By looking at the object (attention) the sensorial visual excitations arrive after passing the visual