Such being the manner in which Mr. Spencer supposes nerve-fibres to be evolved, he further supposes nerve-cells to arise in positions where a crossing or confluence of fibres gives rise to a conflict of molecular disturbances; but it is unnecessary for our present purposes to enter upon this more elaborate and less satisfactory part of his theory.* All I desire now to point out is the *à priori* probability that nervous channels become developed where they are required simply from the fact of their being required—that is by use.

And this *à priori* probability derives so much confirmation from facts that it is scarcely possible to refrain from accepting it as an answer to the question above propounded, namely, How are we to explain the fact that the anatomical plan of a ganglion with its attached nerves comes to be that which is needed to direct the nervous tremours into the particular channels required? It is a matter of daily observation that "practice makes perfect," and this only means that the co-ordinations of muscular movement which are presided over by this or that nerve-centre admit of more ready performance the more frequently they have been previously performed—which, in turn, only means that the discharges taking place in the nerve-centre travel more and more readily through the channels or nerve-fibres which are being rendered more and more permeable by use. So much, indeed, is this the case, that when an associated muscular

theory by my own work on the physiology of nerves in Medusæ. For a full account of this, I may refer to a lecture published in the *Proceedings of the Royal Institution* for 1877, on "Evolution of Nerves." The principal facts are that when physiological continuity of a sheet of neuro-muscular tissue is interrupted by overlapping or spiral sections, so that the passage both of visible or muscular waves of contraction and invisible or molecular waves of stimulation are blocked, after a long succession of contraction waves are allowed to break upon the shore of the physiological interruption, they at last begin to force a passage, and very soon this passage becomes perfectly free, so that neither the waves of contraction nor those of stimulation are any longer hindered. Whether in such a case a definite nerve-fibre is developed, or only a "line of discharge," I cannot say; but most probably the passage is effected through previously existing fibres of the plexus which become more functionally developed by their increase of activity.

* Less satisfactory, not only because more speculative, but because the whole weight of embryological and histological evidence appears to me to be opposed to the speculation. For the whole weight of this evidence goes to show that nerve-cells are the result of the specialization of epithelial or epidermal cells—that is, that they arise, not out of undifferentiated protoplasm, but by way of a further differentiation of a particular kind of already differentiated tissue, where this is exposed to particular kinds of stimulation.