plasm, itself a chemical compound, greater in perplexity indeed than the others, but still related closely to the rest of the series. Life was one of its properties. Now since the chemist found himself easily climbing this ladder, round by round, he saw nothing in the way of the belief that some day he would reach the top. If he did reach the top, and make protoplasm, he would, in accordance with the doctrine of protoplasm, have succeeded in creating life. As a result of such ideas it began to be confidently predicted that at no distant day the chemist would climb to the summit of the ladder and thus make a real living thing. This prediction was not an unlikely one, for steadily, year by year, the chemist has continued to climb the ladder of organic compounds. Recently he has actually been able to make some organic proteids, which are among the very highest in the series, and stand close to protoplasm. The only question in regard to the fulfilment of the prophecy is whether, after mounting to the top, he will find protoplasm in the series. If this substance does stand in the series, then, beyond a doubt, its artificial manufacture would be a possibility and indeed a probability.

All of this has, however, now changed. The chemist is still climbing the ladder, and with ever accelerated speed. His confidence in reaching the top is greater than ever. But the studies of the last fifteen years have shown that he is no more likely to find protoplasm at the top of the ladder than he is to find a steam-engine.

So long as protoplasm could be regarded as a definite chemical compound, the belief in the possibility of its manufacture by chemical means was legitimate enough. But the modern microscope and microscopical methods have shown that the substance is not a chemical compound. It is rather to be looked upon as a very complex machine, with many integral parts, all adapted to each other to act in harmony. The limits of this article do not allow any very extended description of the protoplasmic machine. Such a cell machine consists of many parts. There is a network of fibres, in whose meshes is a watery liquid. Intimately connected with the network are minute granules, which frequently move to and fro. In the middle of the machine is the so-called cell nucleus, which is in itself even more complicated. It is surrounded by a membrane, and contains a network and a liquid, similar to those in the cell body. In addition, it has an extraordinary material called chromatin, which is sometimes in the shape of a network, at other times forms a a thread or a tube or a star. There is still another body in the cell, the centrosome, lying in a clear space, the centrosphere. When the cell is in action this centrosome sends out rods or fibres. These rods seize the bits of chromatin, pull them around into new positions, separating them from each other, and sometimes actually pushing them out of the cell for the purpose of getting rid of them. The centrosome acts like an engineer, and seems to be the controlling centre of the complex machine.

All of these parts are adjusted to each other and act in harmony, and the life activities are the resultant of the action of the machine. It is true that not all types of living matter are quite as complicated as the one figured, but in all there is found a complex machine, with part adjusted to part.

It is plain that protoplasm can no longer be looked upon as a chemical compound, the very essence of which is homogeneity. It is equally plain that chemical forces can no longer be looked upon as adequate to produce a bit of living matter. For this purpose would be needed some force capable of adapting part to part to form a harmoniously acting machine. The forces demanded for this are mechanical, not chemical, and all attempts to search after living substance by chemical means are doomed to failure. Not until we can find the forces which can produce the parts of such a machine, and then unite them into