

buted enormously to the results of modern research, and indeed to a large extent conditioned them, call for notice.

1. The first is the improvement of the Microscope,² an instrument with which you are doubtless all familiar. This instrument was brought to a high state of perfection both mechanically and optically, so that now by its means it is possible to view an object magnified about 1,250 times in each direction, *i.e.*, roughly, as if a postage stamp were viewed enlarged to the size of the floor of a hall 100 feet by 75 feet. Further, by means of controlling the color of the light used for illumination, many fresh details of the minute structure of animals can be made out, and permanent photographic records taken of them. Means of taking accurate measurements of the objects under the microscope have also been invented.

2. The second, are great improvements in the methods of dealing with minute objects or parts of larger objects, and rendering them transparent for examination under the microscope. These have been made along three lines. Firstly new methods of fixing the animals, *i.e.*, killing the animals in such a way as to leave their intimate structure as nearly possible like that when alive, have been devised. Secondly, a large number of different coloring matters can be used for staining the preparations, and these, in particular the coal tar dyes, enable us to stain the various constituents of animal tissue in different ways. Lastly, by means of an instrument called the microtome, it is now possible to cut material that has been properly prepared into thin slices or sections $1/1,000$ of a m.m. or less than $1/25,000$ of an inch thick. Indeed, it is a more or less simple matter—after some years of training and practice—to cut a tiny animal into a series of such sections, 2,500 of which together would only measure one inch.

3. The third advance is a method of making models, which reconstruct small animals on an enlarged scale,

2. *vide* Beck, "The Theory of the Microscope." Cantor Lectures, Royal Soc. of Arts, London, 1908; or any modern book on the microscope, of which there are many.