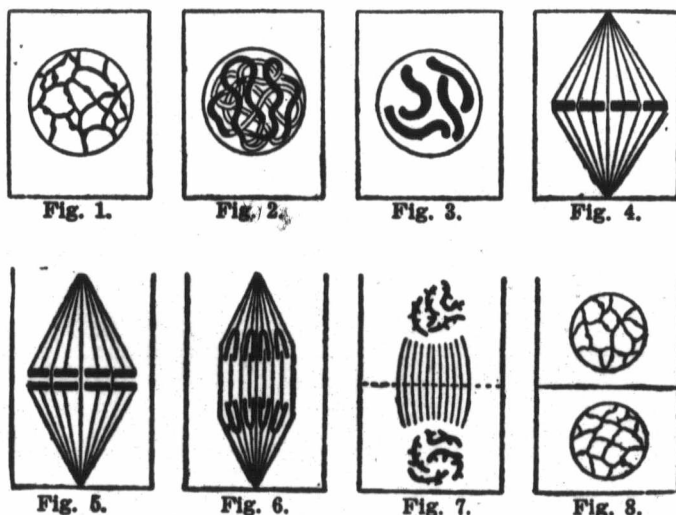


ILLUSTRATIONS SHOW DIAGRAMMATICALLY THE CELL AND  
INDIRECT CELL DIVISION.



"The first change in the appearance of the nucleus which indicates that a division is about to take place, consists in a rearrangement of the chromatin net work, which now takes place on the appearance of a tangled thread (Fig. 2). The outwardly directed loops of this skein often correspond to the separate portions into which the thread eventually breaks up. The thread gradually grows shorter and thicker, and presently becomes divided into a number of pieces known as chromosomes. In the chromosomes the shortening and thickening process is continued until these bodies arrive finally at the form of stumpy rods, each of which, often becomes bent into the form of a horse shoe. Meanwhile the nuclear membrane, breaks down, so that the hyaline substance of the nucleus becomes continuous with that of the cell body surrounding it. A fresh phenomenon now becomes visible. A spindle-shaped arrangement makes its appearance consisting of a number of minute fibrils which connect together two points—the poles of the spindle—situated at opposite ends of the cell. The chromosomes now change their position so that they come to be in the plane of the equator of the spindle, and about this line each chromosome splits longitudinally into two great portions (Fig. 4 and 5). This splitting in the case of each chromosome takes place in the equatorial plane of the spindle, so that one member of each pair of daughter chromosomes faces towards one pole of the spindle and the second towards the other pole. The members of each pair of daughter chromosomes now begin to move away from one towards the two poles of the spindle, and as they do so the first indication of a dividing wall between the second new cells begins to make its appearance in the equatorial plane. Arriving at the poles, the daughter chromosomes begin to elongate and to put out processes which finally meet and fuse with those of their neighbors to form the chromatin reticulum of the new nuclei. (Fig. 7.) Surrounding each new nucleus, thus developing at either pole of the now rapidly disappearing spindle, a new nuclear membrane makes its appearance; the dividing wall in the position of the equator of the spindle develops into a complete partition in the case of plants. (The animal cell is without a cell wall.) The division into two new cells is thus completed. (Fig. 8.) Each new cell is provided with a nucleus into which has entered precisely its fair share of the chromatin which was present in the parent nucleus."

—Illustration and description after Locke.