

in virtue of the reciprocal action of its component cells is another fundamental conclusion of the cell-doctrine. But it is evident that there can be no physiological resting-place here, since metabolism is a chemical process, and must be so expressed in the long run. The life of the city is not intelligible in terms of the houses merely; we must analyse down to the members of each household.

(c) *Embryological Criticism.* More serious perhaps than either of the foregoing is the reaction from the suggestion that development is to be explained in terms of cell-formation. Thus Sachs says, "cell-formation is a phenomenon very general, it is true, in organic life, but still only of secondary importance; at all events, it is merely one of the numerous expressions of the formative forces which reside in all matter, in the highest degree, however, in organic substance". On the zoological side Mr. Sedgwick has forcibly expressed the same view.

"As far as plants are concerned", Prof. Wilson (1896, p. 293) says, "it has been conclusively shown by Hofmeister, De Bary, and Sachs, that *the growth of the mass is the primary factor*; for the characteristic mode of growth is often shown by the growing mass before it splits up into cells, and the form of cell-division adapts itself to that of the mass: *Die Pflanze bildet Zellen, nicht die Zelle bildet Pflansen* (De Bary)."

It may be doubted whether the pendulum of opinion has not been extreme in its reaction from the "cell-standpoint". From the historical point of view, it seems certain that the cell-doctrine has done more for biology than any other generalization, except that of evolution. It may have suggested some erroneous notions, as other generalizations have, but there remains a solid basis of fact, which may be re-interpreted, but cannot be gainsaid.

Of recent years the study of the cell, "cytology" as it is called, has indeed come in as a flood, for almost every week has seen the publication of some fairly important paper, and at times it seems difficult to find firm foothold from which to face

Modern  
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