

must harmonise with the laws of our being and the laws and facts of the new era. So much of our present unrest, so many of our difficulties are due to maladjustment, to the retention of obsolete ways of living or thinking, that we are apt to overlook the unexplored possibilities of the new age to which Mr. Filene's book directs attention. We are as yet too shaken if not terrified by the problems of leisure to determine whether it may not be true that mass production after all is destined to liberate mankind increasingly from a mere struggle for existence and permit the greater satisfaction of life's deeper needs. At least in these pages, without giving us the satisfying details of a solution for our problems, Mr. Filene gives us a glimpse of the possibilities of the new order and presents a challenge to an adventure in co-operation which will ultimately enable us to bring the forces of Nature through science under human control.

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Chemistry of Vital Changes

Chemische Grundlagen der Lebensvorgänge: eine Einführung in biologische Lehrbücher. Von Prof. Dr. Carl Oppenheimer. Pp. vii + 298. (Leipzig: Georg Thieme, 1933.) 22.50 gold marks.

THE study of vital change is becoming more and more a question of chemistry, and biologists, physiologists, as well as the medical profession, are all seeking the help which the chemist is likely to be able to afford them. A stage has been reached when the structure and the properties of all the essential substances which go to build up the living being have been established, though we must still be prepared for surprises, for new views and new interpretations. Essentially, however, we know enough about the fats, the sugars, the proteins and the pyrrol colouring matters and the way in which they are built up and decomposed, to be able to formulate at least an approximate picture of what is happening in what may be likened to a very busy laboratory. Further, the knowledge of colloids and their behaviour has taught us, or at least made it possible to postulate, that many of the actions in the cell take place at surfaces rather than in pools. Such knowledge has enabled some progress to be achieved in the understanding of the mode of action and significance of the enzymes, or ferments as the Continent terms them, a word which is more expressive perhaps of the turmoil that they are causing in the cell.

From this point onwards there is chaos as we enter the arena of the conflicting views into which modern physical chemical theories intrude, which are in vogue to explain the mechanism of metabolism and the energetics of the living cell. The chaos is that of the battlefield; it conceals an orderly advance on many fronts, each with its co-ordinated supply system: each advance is subject always to the vicissitudes of the battle elsewhere. Just as no general can hope to survey the whole battle from the front line, so the scientific worker is mainly occupied with his specialist problem as he sees it. There arises thus the need and the opportunity for books which will survey a problem from as many aspects as possible, and convey to a worker whose outlook is mainly biological the interpretation of a problem as it appeals to one whose outlook is chemical, or vice versa.

Prof. Oppenheimer's book is largely written from this point of view. The older and more established facts are set out in condensed and summary form, whilst the bulk of the treatise is devoted to the more problematic and disputable points to which we have already made reference. The scope is best indicated by naming the five sections into which it is divided. These are the living substance as a chemical system, the essential components of the living substance, the synthesis and degradation of nutritive and skeletal materials, the chemical mechanism of cell changes, the energetics of the living system. It is mainly in the two latter that the subject is expanded, rival views indicated and considerable reference made to the original literature.

The treatment is involved, perhaps necessarily so; there are so many trees that the wood is seldom visible as such; and though we are in hilly country, the summits give us no views. This is perhaps inevitable but scarcely helpful to the reader. A marked feature is the invasion of mathematical treatment into so much of the field: whatever may be its value, it does not lighten the task of the biologist proper.

Criticism in detail is obviously impossible; on the whole we are inclined to think that too much has been attempted and that it is preferable for the worker to maintain his contact with his subject in the broader sense through the specialist monographs, particularly those contributed by a number of experts, and through original communications.

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