

powers of the intellect. Faraday's career was a truly remarkable one, judged from almost every point of view. Deprived of all the advantages of a careful training in early life, and commencing the study of science at an age when the deficiencies of early education are not easily remedied, he yet, by strenuous effort and single-minded devotion to a high ideal, succeeded in working his way to the very front rank of the scientific workers of his day. Again, although in his time electrical theory was being largely developed by the great French mathematicians, and mathematical analysis was regarded as an indispensable instrument of research, Faraday, without the use of a single symbol, succeeded in discovering those great fundamental facts on which the whole structure of modern electrical engineering rests, and in determining their exact quantitative relations; he further succeeded in explaining many obscure phenomena which had eluded the grasp of the great continental mathematicians. As Clerk Maxwell discovered, he was no mathematician, yet achieved results apparently only attainable by such methods.

In the small volume before us the account of Faraday's researches is admirably rendered, and is presented in a connected manner, which enables the reader to follow the trains of thought that suggested to Faraday many of his experiments. Of peculiar interest are those negative results which must now be regarded as dim foreshadowings of later discoveries—such as the attempt to discover whether a magnetic field had any effect on the refrangibility of light when applied to its source.

But interesting as is the account of Faraday's researches to those with a moderate knowledge of physics, the general reader will probably prefer to confine his attention to the earlier and later chapters in the book, in which Faraday is presented to us from the purely human standpoint. The extracts from his letters—some of which now appear for the first time—give us interesting glimpses of his inner life. His warm human sympathies, his delight in the beauties of nature, his deep and life-long attachment to his wife, his sturdy adhesion to the religious sect in which he had grown up, his relations to illustrious contemporaries—are all topics full of interest to the general reader; and they are handled in a manner well calculated to rivet his attention and enlist his sympathy. We congratulate Prof. S. P. Thompson on having successfully brought out and emphasised the quaker-like simplicity of Faraday's character, and the remarkable freedom from complexity in which he kept his life, notwithstanding the height of his fame.

*Untersuchungen über Strukturen.* By O. Bütschli. Pp. viii + 411; Atlas to ditto; Plates 27. (Leipzig: W. Engelmann, 1898.)

In this work the author sets forth in great detail the results of investigations, extending over six years, upon the minute structure of various bodies, products, for the most part, of the activity of living organisms. The object of these researches was to extend, and to put to the test, certain conclusions reached by the author in 1892, in his well-known work on the structure and physical constitution of protoplasm. In an appendix to the work in question he gave an account of some observations upon the minute structure of certain substances, such as gelatine and egg albumen, which exhibit the phenomena of swelling or of coagulation, and came to the conclusion that these substances possessed a minute structure which was finely honeycombed or alveolar ("Wabig"). In the present work these observations are renewed and greatly extended, both as regards minuteness of detail and in the variety of material. Besides researches upon gelatinous and coagulable substances such as gelatine, celloidin, albumen, and so forth, the author has studied the minute structure of various sphaerocrystals, of natural and

artificial cellulose structures, of starch granules, and finally of a number of natural products of animal tissues, such as chitin envelopes, spongin fibres, matrix of hyaline cartilage, and other similar structures.

To give an adequate account of these exhaustive researches, which cover more than 400 pages in the setting forth, is impossible in a short space; and it is to be regretted that the author has not anywhere given for the benefit of his readers a general summary or review of the results obtained by him. The book is, in fact, a collection of separate investigations, of which preliminary accounts have already appeared during the past seven years, bound up with an introduction and two discussions. In the introduction, the author gives an account of the order and sequence of his researches, and describes his methods of investigation, especially with regard to the technique of micro-photography. The two discussions deal with the question of the reality of the structural images obtained with the highest magnifications, and with certain phenomena of polarisation. On the other hand, the many interesting and important results obtained by the author have to be sifted out by the reader from a great mass of facts and arguments, which is no easy matter for those not specially conversant with the subject. It may be briefly stated, however, that in all the substances investigated Bütschli finds a distinct alveolar structure, which in the case of coagulable bodies is of the nature of a true foam ("Schaumig-wabig"), but which in crystallisable or sphaero-crystalline bodies is composed of an aggregation of minute globulites ("Globulitisch-wabig"). Amongst the many interesting facts which the author brings forward, attention may be specially drawn to his observations upon colloids, which when fixed in a state of tension develop appearances very similar to those seen in karyokinetic figures, suggesting the conclusion that the nuclear spindle is an expression of the effects of tension, rather than of actual differences of material between filar and interfilar substance. The author's results are supported by an atlas containing twenty-seven plates of beautifully executed micro photographs, as well as by numerous figures in the text. All those who are interested in this very important field of investigation, to which Bütschli has devoted so many years of patient and laborious research, will welcome the appearance of this work, constituting as it does a solid contribution of facts which cannot lightly be brushed aside by those who may be opposed to his theories.

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*A Manual of Library Cataloguing.* By J. Henry Quinn, Librarian Chelsea Public Libraries. Pp. 164. (London: Library Supply Company, 1899.)

THIS book is in several respects favourably distinguished from others of its class that have recently seen the light. The animosities of the library world are not imported into its pages, and in several ways the writer deprecates the subordination of practical common sense to a display of learning. He does not, for instance, condemn the unfortunate reader in search of the works of George Sand to remember that her real name was Dudevant, and to look under that heading. The book is avowedly not designed for workers in a learned institution, but is most admirably adapted for those engaged in cataloguing the contents of an ordinary library. Mr. Quinn's rules are set forth with singular clearness, and endowed with a wise elasticity. He is on the whole in favour of the "dictionary" system, wherein each book may be found, under a single alphabetical arrangement, under its title, the name of its author, and the particular portion of human knowledge with which it deals, but he also gives an adequate account of the system of "classified catalogues." An appendix gives most valuable help to the librarian in his dealings with the printer of his catalogue, and gives completeness to a most valuable little work.