

tion these extraordinary and most objectionable proposals. To judge from the correspondence which we have printed on the subject, they appear to find favor with no one—for even Sir Henry Roscoe could only find something to say for them by making a suggestion for the removal of the Spirit Museum to a distant site which other equally high authorities have shown to be inadmissible—and they have elicited protests of unanswerable cogency from naturalists of such high authority as the master of Christ's and Dr. Gilbert Bourne, as well as from the Linnean Society, the Entomological Society, and the Royal Horticultural Society. Moreover, the emphatic protests on other grounds and from other points of view of Lord Wemyss and of Lord Dufferin and those associated with him are by no means to be overlooked.

The plain truth is that, as the trustees put it in their final letter to the Office of Works, "to attempt to accommodate three important institutions, the Natural History Museum, the Imperial College of Science, and a much enlarged Science Museum, on so restricted a site shows a want of appreciation of the inevitable future of these institutions which is bound to lead to confusion and a waste of public money. Not only the Natural History Museum, but all three institutions, would soon be hampered in their growth." The propositions here advanced scarcely admit of dispute. The trustees point out that they have recently been enabled by the government to purchase land at Bloomsbury sufficient to provide for the extension of the departments located there in such a manner as to satisfy prospective needs of those departments for 100 years to come. Yet all that the Office of Works can say on behalf of its unhappy scheme for extending the Science Museum at the expense of the Natural History Museum is that "the vacant space to the east and west of the Natural History Museum is so great that it is hardly possible to suppose it will not afford abundant facilities for any extension of the Natural History Museum which may be required for the next twenty-five years"—which is just a quarter of the period for which

the government have empowered the trustees to make provision at Bloomsbury. The comment of the trustees on this significant contrast appears to us to be quite unanswerable. They "feel bound to protest against the reversal at South Kensington of a policy so carefully considered and so universally endorsed"—as regards the departments at Bloomsbury, that is—"and they can not therefore, with due regard to their responsibilities, consent to give up land which will be urgently required in the near future for the extension of the Natural History Museum." To this most reasonable *non possumus*—reasonable because based on indisputable facts as well as on the authority of all competent experts—the Office of Works could only reply by a departmental *hoc volo, sic jubeo*, backed by the authority of the government. "The question of the revision of the boundaries has been considered by his majesty's ministers, and they have decided that such a revision can not be avoided in view of the pressing necessity for the building of a Science Museum." So far as we are aware no one disputes the pressing necessity for the building of a Science Museum. But surely no one who has studied the official correspondence or who has followed the discussion in our columns can defend or approve the policy of building such a museum at South Kensington in such a manner as must fatally hamper its own expansion and that of the Natural History Museum in the near future. There is manifestly no room for all three institutions on the same site. Two of them are there already, therefore the third must go elsewhere. That is the only rational solution of the problem, and it certainly ought not to be rejected by the mere fiat of his majesty's ministers without giving parliament and public opinion an opportunity of pronouncing judgment on the matter.—*London Times*.

SCIENTIFIC BOOKS

The Principles and Methods of Geometrical Optics. By JAMES P. C. SOUTHALL. 8vo. Pp. xxiii + 626. New York. The Macmillan Company. \$5.50 net.

Professor Southall, in his book on geometrical optics, undertook to put in one volume most of that which is valuable on the subject, especially as applied to optical instruments. He was filled with enthusiasm, inspired by a sincere belief in the value of the subject and an ambition to supply the admitted deficiency in the English language.

Partly with the object of supplying this deficiency, and partly also in the hope (if I may venture to express it) of rekindling among English-speaking nations interest in a study not only abundantly worthy for its own sake and undeservedly neglected, but still capable, under good cultivation, of yielding results of far-reaching importance in nearly every field of scientific research, I have prepared the following work. . . .

It is such enthusiasm as this that holds one to the severe labor of preparing a large book and of making it a good book. While it is doubtful whether any large number of scientific men will follow Professor Southall in his very high estimate regarding the relative value of geometrical optics and in his optimism respecting its future, the careful and exhaustive book which he has prepared will undoubtedly do much to bring the geometrical theory of optical instruments into greater favor in this country.

Professor Southall treats in successive chapters the fundamental properties of geometrical optics, the properties of rays of light, reflection and refraction at a plane surface, refraction through prisms, reflection and refraction of paraxial rays at a spherical surface, refraction of paraxial rays through thin lenses, the theory of optical imagery, lenses and lens systems, exact trigonometrical formulæ for tracing rays through spherical surfaces and centered systems of spherical surfaces, theory of an infinitely narrow bundle through an optical system, theory of spherical aberrations including Seidel's theory developed to aberrations of the third order, color-phenomena and chromatic aberrations, aperture, and field of view and brightness of images. It is seen from this how extensive is the subject-matter treated. In general, all the chief discussions of the more important

topics have been given. This has led to a duplication in very many instances; particularly, many subjects are treated both geometrically and analytically. This, of course, is not to be regarded as a positive fault in an exhaustive treatise, for the one method will appeal to some and the other method to others. But probably many will wish, on reading the book, that especially the first part had been written more concisely and with fewer repetitions of subject-matter under different forms. This would not be, however, in harmony with the obvious plan of reproducing essentially all that is of value in the subject. The alternate plan is to adopt a definite point of view and to develop the subject systematically from that point of view.

Probably the greatest service rendered by Professor Southall has been in setting forth clearly and consecutively the splendid optical theories of the German writers of the last half century, particularly those of Seidel and Abbe. His book may inspire us to divide with the Germans the future developments in these lines. At any rate all who have an interest in the subject will thank him that he has so well done his part, for it will not be questioned that he has prepared the best and most exhaustive work on geometrical optics in the English language. So far as the question of completeness is concerned there seems room for regret, and that mostly on the part of practical opticians, only in that the theories are not illustrated more by numerical examples based on the glasses of commerce.

F. R. MOULTON

A Laboratory Manual of Inorganic Chemistry.
By EUGENE C. BINGHAM, Ph.D. (Johns Hopkins), Professor of Chemistry, Richmond College, Richmond, Va., and GEORGE F. WHITE, Ph.D. (Johns Hopkins), Associate Professor of Chemistry, Richmond College, Richmond, Va. New York, John Wiley & Sons; London, Chapman and Hall, Limited. 1911. 12mo, pp. viii + 147. Cloth, \$1.00 net (4s. 6d. net).

In the preface the authors state that, in their opinion, "a course in inorganic prepara-