

and secondly, whether, if such organized poisons should gain access, there is any sufficient guarantee or not that they will be destroyed or removed before the water reaches the consumer. It is because the chemical analysis affords us at present a better clue than the bacteriological examination as to whether a water has received sewage or not that it is of more general applicability than the latter; but we must appeal to a bacteriological inquiry in order to ascertain whether, in the event of sewage gaining access to the water, there is a guarantee in the subsequent history of the water that the zymotic poisons, which may at any time accompany the sewage, would undergo removal. In short, the object of nearly all water examinations is obviously to ascertain whether the water may at any time be dangerous to health, and not, even if this could be with certainty determined, whether it contains a zymotic poison at the particular moment of examination. On the other hand, the fact that the microbe, which is now pretty generally accepted as the inducing cause of typhoid fever, has been on more than one occasion actually discovered in drinking-water which was under suspicion of producing an epidemic of that disease, affords most important evidence as to the manner of its distribution.

There is much need of a similar work to this in English, as each year an increasing number of younger medical men are coming forward for the degrees in Public Health which are now granted by several of our Universities, and to these a practical and critical treatise such as this would prove of great value. It is of great importance that such Public Health students should be impressed with a sense of the responsibility which attaches to the examination of waters for domestic purposes, and that most serious mischief may and often does result from such investigations being intrusted to incompetent persons. It is gratifying to see that the authors do not undertake to prescribe any of those artificial standards of purity for drinking-water which so frequently figure in books of this kind, and which are attended with the greatest danger, leading as they do the ignorant to believe that they can pronounce upon the fitness or otherwise of water for drinking purposes from the numbers which they have obtained in a few simple quantitative determinations. For it must never be forgotten that the sanitary examination of water is surrounded with such difficulties that it is only by bringing to bear on each particular case all the evidence that it is possible to obtain, and then interpreting this evidence by the light of an extended experience, that a sound judgment can be arrived at.

P. F. F.

OUR BOOK SHELF.

Botany: a Concise Manual for Students of Medicine and Science. By Alex. Johnstone, F.G.S. (Edinburgh and London: Young J. Pentland, 1891.)

DURING recent years many books on botany have been published, specially for the use of students preparing for examinations. In these a few types and phases of plant life have been described somewhat in detail. In the present case a much wider range has been taken, the result being an illustrated botanical note-book, condensed but not meagre. In the preface the author takes it for granted that every student nowadays attends lectures

or demonstrations, and "therefore does not so much require a manual with diffuse explanations, but rather a kind of illustrated digest and general note-book, which will enable him to quickly arrange and make most effective use of the various facts and theories treated of by his teacher." A book on these lines Mr. Johnstone has been successful in producing. It consists of 260 pages and 226 illustrations. Some of the latter are the ones which seem by custom to be considered necessary for reproduction in every fresh botanical manual, while others appear to be new. The outline ones, such as those on p. 30, illustrating the branching of cells, give a much clearer idea than could be done by pages of letterpress. A short introductory chapter points out the position botany holds in science. The strictly botanical part of the work is treated of in four sections, viz. (1) morphology; (2) external morphology or organography; (3) physiology; and (4) taxonomy.

Under morphology, the structure, life-history, contents, and modifications of the cell as an individual are first treated of, after which the combinations of cells to form tissues are described, a special chapter being reserved for the consideration of systems of permanent tissues. The section on external morphology will be found very useful to beginners in systematic botany. It could be wished that the chapter on physiology, although containing much useful information in its 15 pages, had been more extended. The greater part of the remainder of the book is devoted to taxonomy, in which the leading characters of each class (arranged in ascending order) are given, followed by the names of some of the genera, which may be regarded as typical of their respective classes, and interspersed with illustrations. The orders of Angiosperms most frequently met with are represented by short diagnoses and floral diagrams. A useful glossary and index complete the book.

The arrangement throughout the book is good. The various headings, &c., printed in type differing according to their importance, have been very carefully set out, and give a good *résumé* of botany in a tabular form. As an illustrated note-book for a teacher, as well as a student, this work will be found of great use.

C. H. W.

Hand-book of the Ferns of Kaffraria. By T. R. Sim, Curator of the Botanic Garden, King Williamstown, South Africa. 66 pages, 63 plates. (Aberdeen: Taylor and Henderson, 1891.)

THIS little book contains popular descriptions and outline plates of the ferns of Kaffraria, with a chapter of definitions of the botanical terms used in describing ferns, and another giving directions how to cultivate them. The Cape, considering the general interest and remarkable individuality of its phanerogamic flora is very poor in ferns. Kaffraria yields only 68 species, about the same number as Great Britain. Amongst them are two tree ferns, a *Cyathea* and a *Hemitelia*, and several herbaceous species of a distinctly subtropical type, such as *Vittaria lineata* and *Marattia fraxinea*. Associated with these are several species with which we are familiar at home, such as *Aspidium aculeatum*, *Cystopteris fragilis*, and *Adiantum Capillus-Veneris*. No doubt by further exploration the list will be considerably increased. The author does not seem to have known anything about the Rev. R. Baur, a Moravian missionary who made large collections of ferns and other plants in Transkeian Kaffraria. The two new species which Mr. Sim claims to have added to the Cape flora cannot be admitted as novelties. *Blechnum remotum* is a variety of the American *B. hastatum*, which I do not think can stand as distinct specifically from the common Cape *B. australe*. The plant figured as *Lomaria lanceolata* on Plate 25 is no doubt *Lomaria inflexa* of Kunze, which was gathered long ago in the colony, by Gueinzus, and is beautifully figured by Kunze from specimens which he forwarded. By the aid of this book there can be no difficulty, even to an amateur, in

recognizing any of the Kaffrarian species; and perhaps at some future time Mr. Sim, who was trained at Kew, will extend his area so as to cover the whole colony, for which the total number of ferns known is between 130 and 140.

J. G. BAKER.

Rider Papers on Euclid. Books I-II. By Rupert Deakin, M.A. (London: Macmillan and Co., 1891.)

THIS little book consists of a series of graduated riders so arranged that the beginner may be able to thoroughly understand and grasp the principal propositions of the first two books of Euclid. One of the chief errors that the author endeavours to avoid is the great stress teachers lay on some of the propositions, which are treated as most important, while others are more or less overlooked.

The method he adopts is to treat each proposition first as a rider, and by giving the enunciation and drawing the figure, see if any of the class can show how it is proved. By this means the subject can be made interesting, as beginners can then look upon each rather as a puzzle than as a stiff piece of work.

The two books are divided into nine parts, each part consisting of six papers, and the riders in each paper, with the exception, of course, of the first, deal with all the preceding propositions. The student is advised in the first six papers only to draw the figures, in order to accustom himself to one of the chief difficulties which, as the author says, "experience shows me that all students feel more or less in solving riders."

At the end are printed the enunciations of the propositions of the two books, followed by several papers set at various examinations. Altogether, teachers will find this an admirable help for classes in which the subject is being treated for the first time.

Die Krystallanalyse oder die chemische Analyse durch Beobachtung der Krystallbildung mit Hilfe des Mikroskops mit theilweiser Benutzung seines Buches über Molekularphysik. Bearbeitet von Dr. O. Lehmann. (Leipzig: Engelmann, 1891.)

WE have so recently noticed at length the splendid work of Dr. O. Lehmann on "Molecular Physics" (see NATURE, vol. xlii. p. 1) that it is only necessary in this place to call attention to this pamphlet of 82 pages, illustrated by 73 woodcuts, in which the author gives the necessary directions for the work of micro-chemical analysis. The instruments used and methods employed are concisely stated, and all the essential details of the operations are supplied to the chemist in this little hand-book. Dr. Lehmann claims, not unjustly, that the methods of micro-chemical analysis must play the same part in the laboratory of the organic chemist as spectral analysis does in the laboratory of the inorganic chemist.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The University of London.

MY friend, Mr. Thiselton Dyer, invites me, by his references to what I have written on this subject, to a discussion in your columns. I am very unwilling to accept the invitation, because I have already and often stated my views, and because I see by the length of Mr. Dyer's letter that I may be led into an interminable labyrinth of side-issues. The official report in which are published the minutes of the evidence given before the Royal Commission which sat on this subject in the year 1888, contains a more lengthy discussion of the subject by myself and others than it is possible to carry through in the columns of NATURE; and I could wish that for once those interested in a subject

would rescue from proverbial oblivion the pages of careful statement entombed in a Blue-book. Since, however, my friend trails his coat, it would be doing violence to my old-established regard for him to refuse to tread on it—just a little.

The question raised by Mr. Dyer seems to be, why should not the examining board in Burlington Gardens undergo certain reforms and continue to be the so-called University of London? It has done good service to education, he says, and with the removal of more than half its members and their replacement by gentlemen who either really know or really care about University education it might do more. If it were, he suggests, to rise superior to all its most solemn obligations and falsify the pledges of its founders by undertaking to teach as well as to examine, it would really be as much of a "teaching University" as is either Oxford or Cambridge, and its non-collegiate supporters from all parts of Britain might enjoy the spectacle of the mother-college (University College) from which this examining board took birth, abandoning in favour of Burlington Gardens those traditions of scientific research which have made the College in some measure a realization of Fichte's ideal.

[Mr. Dyer seems to have forgotten the facts when he contends that such teaching as Fichte sketched in his plan for the University of Berlin, cannot be carried on in the same institution or by the same men who administer the teaching required by a University student at the commencement of his career. Fichte's plan was carried out in the University of Berlin, and has been followed by every other University in Germany. The very questions which we are now debating were debated in the early years of this century in Germany, and the Jesuits' plan of education by examination was rejected. University College was founded (except so far as it was a private enterprise) on the lines of a German University, and only required the *prestige* and independence conferred by the power of granting University degrees to enable it to fulfil in London Fichte's ideal. Its professors have never been (as Mr. Dyer well knows) mere instructors for examination purposes. The researches of Graham, Williamson, Sharpey, and of Michael Foster, Sanderson, Schäfer, Kennedy, and many others have been carried on in its laboratories. The proposal to detach such work from the London Colleges, and to associate it with the examining board in Burlington Gardens, on the ground that it is inconsistent with the teaching of University undergraduates, appears to me to involve an erroneous conception of what University education and University organization should be. This by way of parenthesis.]

The point which I wish to insist on is that, excepting the proposal to undertake higher professorial teaching, I have no objection whatever to the reforms of the examining body in Burlington Gardens advocated by Mr. Dyer.

What I desire (and I merely use the first person singular for the purpose of discussion, and not because I stand alone in my wishes, or undervalue the support of others) is that, without any interference with the Burlington Gardens board, the privilege of granting degrees should be conferred by the Crown upon a combined Senate consisting of the Professors of University and King's Colleges (the authority of the councils of the two Colleges being duly guarded).

The fact that Burlington Gardens are in London and that University and King's College are also in London, as well as the talk about a teaching University "in and for" London, have very little bearing upon the question as to whether it is or is not desirable to grant University privileges to the two Colleges. There is population enough and accommodation enough for a dozen Universities within the metropolitian area. As far as I am able to judge as to the principles which should guide the Crown in bestowing the privilege of incorporation as a University, the only questions to be asked are: "Does the body which asks for this privilege consist of learned men whose work will be facilitated by the granting to them of this ancient and honourable position? Do they give guarantees of material support, and of a public demand for their teaching, which will enable them to discharge the functions of a University with dignity and efficiency, now and hereafter? Will the concession to them of this privilege tend directly or indirectly or both to the public welfare?" I cannot imagine that anyone will undertake to give a negative response to these questions in reference to the combined Colleges, University and King's. Certain it is that during the acute discussion which has been carried on for the last four or five years, no one has ventured to do so. What has happened is simply this, that persons connected with Burlington Gardens have opposed the bestowal of University powers on the two Colleges,