An appendix in which the anatomical characters are brought together for easy comparison, a list of the literature cited, and a good index close the text, following which are the plates, all excellent half-tone reproductions of photomicrographs of wood sections.

In the chapter on general phylogeny the author gives us his ideas as to the phylogeny of the Coniferales in a suggestive diagram (page 161). Proceeding from the main stem of the Cycadofilices are two considerable branches the Cycadales (including *Bennettitaceae* and *Cycadaceae*), while the other through *Poroxylon* soon subdivides into Cordaitales (*Cordaites, Dammara, Walchia* and *Araucaria*), Gingkoales and Coniferales. In the latter *Taxaceae* and *Podocaepaceae* constitute a primitive side line: later we find *Taxodineae,* then as another side line *Cupressineae,* while the main line terminates in the close group, *Abies, Tsuga, Pseudotsuga, Picea, Larix, Pityoxylon, Pinus.* The last-named genus is regarded as the highest differentiation of the Coniferales.

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*Royal Society of London Catalogue of Scientific Papers, 1800–1900.* Subject Index, volume I., Pure Mathematics, Cambridge; at the University Press. 1908. Pp. lviii + 666.

This is the first volume of a subject index, which is to be published as "separate index-volumes for each of the seventeen sciences of the schedule of the International Catalogue, viz., mathematics, mechanics, physics, chemistry, astronomy, meteorology, mineralogy, geology, geography, paleontology, biology, botany, zoology, anatomy, anthropology, physiology and bacteriology." This index will complement the great Catalogue of Authors which is being issued by the same society and of which twelve large volumes (1800–1883) have been published, while the volumes covering the period from 1884 to 1900, inclusive, are in preparation. These two catalogues will have close contact with the "International Catalogue of Scientific Literature" which contains an author and a subject catalogue of the scientific publications beginning with 1901. The present work is arranged in accordance with the schedules of the different sciences which form the basis of the International Catalogue.

The preparation of a complete subject index of the scientific papers published during the nineteenth century is an enormous undertaking which can, however, be well justified by the usefulness of such a work when completed. The volume before us is said to contain 38,748 entries referring to 700 serials. While these numbers may appear large, yet they are too small for a complete index of the mathematical papers appearing during the nineteenth century, and it is not difficult to point out omissions. In fact, a number of fairly well-known mathematical periodicals were overlooked altogether, and a complete list of mathematical papers would have demanded reference to about 1,100 periodicals instead of to 700. As instances of omitted periodicals we may mention, *Zeitschrift für mathematischen und naturwissenschaftlichen Unterricht* and the *American Mathematical Monthly.*

Although the volume under review exhibits clear evidences of incompleteness, it contains such a large amount of information in a convenient form that it is difficult to see how a live mathematician can afford to get along without it, especially since there is no other work in existence which can take its place. By limiting itself to periodic literature, it complements Wölffing's "Mathematischer Bücherschatz" (1903), which aims to give a complete list of the most important mathematical text-books and monographs published during the nineteenth century. Unfortunately, Wölffing's work, arranged under 313 headings, is still less complete than the one under review, and presents numerous other evidences of hasty preparation.

A very commendable feature of this great bibliographical undertaking of the Royal Society is that it tends to make it easier to keep in touch with the advances that are being made in several great subjects of scientific inquiry. If the volumes devoted to the various subjects are parts of the same set and are arranged according to the same gen-

eral plan, the scholar is much more apt to acquaint himself with advances outside of his particular field, and thus such an arrangement tends, at least in a slight degree, towards maintaining that community of interest and sympathy which is so helpful in the harmonious development of science. As Darboux pointed out in his recent address before the International Congress of Mathematicians at Rome, there is danger of estrangement even in a single science, and this danger is still more real as regards the various sciences which should be mutually helpful.

In arranging the material of the present volume we are told that it frequently became necessary for a specialist to examine the articles in some detail, as the headings were often too vague to give a definite idea in regard to the results which were reached in the articles. This is especially true of those which appeared between 1884 and 1900, while most of the earlier papers were classified according to their headings. Although great care seems to have been exercised, it is not difficult to find instances where the classifier did not exhibit sufficient knowledge of the subject. For example, it is difficult to see why a note on "Test of a simple group" should be classed under general group theory while such a general article as that of Dyck on "Groups of discrete operations" is classed among the more special articles on discrete groups of finite order. An instance where the classification according to the headings of articles is entirely misleading is furnished by the papers by Cockle which appeared in volumes VI., VII. and VIII. of the *Cambridge and Dublin Mathematical Journal,* under the title of "Method of vanishing groups," although they relate to a species of indeterminate analysis and have nothing in common with what is now regarded as group theory. In the present volume they appear, however, under this general heading.

An instance where the classifier seems to have misunderstood the meaning of a technical mathematical term is furnished by the note on *permutants,* published by Bilenki in *Nouvelles Annales de Mathématiques* (1900). As the heading implies, this note relates to the theory of matrices, but it is classified with substitutions and permutations in the present volume. It may be of interest to observe that the term permutants does not appear in Müller's "Mathematisches Vocabularium," although this valuable work contains more than ten thousand technical terms with their French equivalents.

These instances suffice to make it clear that the scholar can not regard the present index as final authority, either as regards completeness or as regards reliability. On the other hand, extensive historical research among the literature of the historical century will still be richly rewarded. The present volume will, however, be of great assistance in making such research on the part of the mathematician more effective, and it is to be hoped that later editions will be free from many imperfections which could scarcely have been avoided in the first edition of such a very extensive work. The undertaking is a highly laudable one and bespeaks in clear terms a willingness to render an important service, which offers little reward beyond the pleasure in rendering such a service. From this viewpoint the bibliographical activity of the present time exhibits a most inspiring picture of the trend of thought actuating scientific men.

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## *NOTES ON ENTOMOLOGY*

THE Germans have always been considered the authorities on forest entomology, and their text-books the standards. Now a most excellent work has been issued in English by A. T. Gillanders.[1] Mr. Gillanders is manager of the forests of the Duke of Northumberland, and so has had much practical experience. The insects are considered under the order to which they belong; there being tables to families, and often to the genera. After each group there is a short bibliography. Many of the illustrations are photographs of injured parts of the tree, and of the insect upon it. The last chapter contains a list of trees with their injurious insects. Perhaps the weakest

[1] "Forest Entomology," pp. 422, figures 351. W. Blackwood and Sons, London, 1908.