

pollen grains of the South American *Podocarpus* in the snow of South Orkney by Dr. Fritsch.

There are only two phanerogams known from the Antarctic, *Descampsia* and *Colobanthus*, which are the most southerly flowering plants known. There are no ferns, and mosses form the major terrestrial plant population, 52 species being known, of which 24 are endemic. The lichens are conspicuous, but few in species. The algæ, especially the unicellular kinds are abundant.

All the known facts, according to Dr. Brown, point to a Fuegian origin for the flora. A greater former extension of glaciation, which is well proved, is regarded as inimical to the descent of any part of the present flora from that of Tertiary times.

Beside the chapters on the botany of the South Orkneys, Gough Island and Ascension Island by Dr. Brown, Cardot contributes a general review of the mosses; Gepp, Holmes, Foslie and Fritsch treat of the fresh-water and marine algæ; and Harvey Pirie contributes notes on Antarctic bacteriology. The volume concludes with a useful bibliography of Antarctic botanical publications.

WM. H. DALL

*A Text-book of Physics.* Edited by A. WILMER DUFF. Third Edition. P. Blakiston's Son & Co. 1912.

The third edition of Duff's "Physics" is a great improvement typographically over the previous editions, and is consequently so changed that if it were not for the uniform binding of the three editions it would appear at first glance to be an entirely new book. Practically all the cuts have been made over from new drawings, with a noticeable increase in clearness and uniformity of size, or have been replaced by other and better ones. This, with the choice of better type, makes the reading much easier. As in the previous editions, the main subdivisions are by different men, but the order has been changed, "Wave Motion" coming after "Mechanics," and "Sound and Light" after "Electricity"; and there seems to be more unity of treatment in the

whole and a natural connection between the parts which saves them from appearing as disjointed treatises. The text of the "Mechanics," by A. W. Duff, is practically unchanged from the previous edition, and the same may be said of "Wave Motion," by E. P. Lewis, and "Sound," by Wm. Hallock. "Conduction of Electricity through Gases and Radioactivity," by R. K. McClung, has a few changes and additions noticing some recent developments, but is otherwise unchanged. "Light," by E. P. Lewis, has been reduced in amount and improved by being partly rewritten and rearranged (though it previously possessed considerable merit). The portions on Heat and Electricity and Magnetism are entirely new. The part on Heat is by C. E. Mendenhall, of the University of Wisconsin, replacing that by K. E. Guthe in the other editions. The arrangement of the subject matter seems to be more logical and more briefly stated, and there is an improvement in the choice of illustrations, but in places there is less clearness of statement and treatment than in the previous edition. Nowhere is the improvement in the drawings more noticeable than in the case of "Electricity and Magnetism," by A. P. Carman, of the University of Illinois, which replaces that by A. W. Goodspeed in the previous editions and comprises also the former section by Professor Carman on Electromagnetic Induction, thus securing a desirable unity of treatment in this subject. Taken as a whole the parts of the book are remarkably well welded together, and, having as authors specialists in the different departments, it should rank among the best college texts of the day.

LOUIS A. PARSONS

*Maschinen und Apparate der Starkstromtechnik* (Machines and Apparatus for Heavy Currents). By GUSTAVE M. MEYER. Published by B. G. Teubner, of Leipzig and Berlin. 1912.

So rapid has been the development of machines and apparatus used in connection with the many applications of electricity to power purposes that it is well-nigh impossible

for any one to follow carefully the progress in inventions and research. Electrical engineers have desired some book which would give in concise form descriptions of electrical machinery and numerous auxiliary devices used in conjunction with them. Few of us have time or opportunity to become thoroughly familiar with more than one specialty.

Furthermore, preliminary work in universities requires a book which describes briefly the most important features of various forms of electrical apparatus. There are at present electrical treatises which specialize and at the same time emphasize theory more than they do practical operation. Other books are practically compilations of extracts from patent specifications and catalogues, many of them describing obsolete or impracticable apparatus; such works are usually lacking in critical comment. Appreciating the need for this type of book, Mr. Meyer has brought forth in his "*Maschinen und Apparate der Starkstromtechnik*" a book which would meet the existing demands. Believing that books on electric lighting and railroads are now sufficiently numerous, the author has omitted these phases of the subject. On the other hand, he has endeavored to give such information as the consulting engineer and student desire, relative to high-voltage apparatus and their applications, as well as descriptions of turbo-generators and alternating current commutator motors.

The book is divided into two principal parts, viz: Direct Current and Alternating Current. The first part the author devotes to direct current measurement, control and storage of electrical energy; direct-current generators and motors, their uses, specific applications, and auxiliary apparatus. The second part, comprising about two thirds of the book, deals with measurement and control of alternating currents; construction and performance of alternating current generators and induction motors; alternating current transformers; distribution of electrical energy by means of alternating currents; and several kinds of attendant or auxiliary apparatus used in conjunction with alternating current.

The author has devoted considerable attention to the characteristics of alternating current machinery such as turbo-generators, synchronous generators and motors, and induction motors, as well as to speed control by means of commutator motors, these including the systems of Scherbius and Kraemer. Space is also given to various forms of alternating current commutator motors, such as the repulsion, the series and compensated types, with which latter the names of Latour, Winter and Eichberg are associated.

It could hardly be expected that a book covering so great a field could be without errors. For example, a means is given for determining the regulation of A.C. generators from the no-load saturation and short-circuit characteristics, and while armature reaction, and armature self-inductance and resistance are considered, the effect of incremental pole leakage with load has been entirely neglected. It is well known that when the poles are saturated, the change in pole leakage with load at fractional power factors has a not inconsiderable influence upon the regulation. More emphasis than is necessary is placed upon the influence of the resistance of the stator at zero power factor; this is generally negligible when the current lags behind the electromotive force by 90 electrical degrees.

The book has a remarkably small amount of mathematics and hence it should be easy for any one to follow who is studying along these lines or attempting to familiarize himself in a general way with a part of the subject differing from his specialty. The text contains 590 pages, including 772 illustrations pertaining, so far as possible, to modern machines, both European and American. It would be impossible, however, for a book of this character to be up-to-date some years hence, as electrical apparatus becomes obsolete in a comparatively short period. The author has wherever possible given his authority, so that any one desiring further information can refer to same for a more complete understanding of the subject.

CARL J. FECHHEIMER

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