tion of the changes in progress is in general too vague to admit of the formation of profitable theories.

We have seen that it is possible to trace the solar system back to a primitive nebula with some degree of confidence, and that there is reason to believe that the stars in general have originated in the same manner. But such primitive nebulæ stand in as much need of explanation as their stellar offspring. Thus, even if we grant the exact truth of these theories, the advance towards an explanation of the universe remains miserably slight. Man is but a microscopic being relatively to astronomical space, and he lives on a puny planet circling round a star of inferior rank. Does it not, then, seem as futile to imagine that he can discover the origin and tendency of the universe as to expect a housefly to instruct us as to the theory of the motions of the planets? And yet, so long as he shall last, he will pursue his search, and will no doubt discover many wonderful things which are still hidden. We may indeed be amazed at all that man has been able to find out, but the immeasurable magnitude of the undiscovered will throughout all time remain to humble his pride. Our children's children will still be gazing and marveling at the starry heavens, but the riddle will never be read.

G. H. DARWIN.

SCIENTIFIC BOOKS.

Index Filicum, sive Enumeratio omnium generum specierumque Filicum et Hydropteridum ab anno 1753 ad annum 1905 descriptorum adjectis synonymis principalibus, area geographica, etc. By CARL CHRISTENSEN. Copenhagen, H. Hagerup. Fasc. I, pp. 1–64, May 5, 1905; fasc. II, pp. 65–128, July 1, 1905. Price 3s. 6d. per fascicle.

The present notice of the first two fascicles of Herr Christensen's 'Index Filicum' is offered not so much in the nature of a review as with the especial purpose of calling the work to the attention of botanists and librarians, and of urging the desirability of immediate and deserved support. For, as we have been informed by the author, unless very definite encouragment is given at once in the shape of additional subscriptions it will be impossible to bring the printing to a successful conclusion. The manuscript is said to be quite complete, comprising ten or twelve parts in all, the result of years of patient, tedious effort. How unfortunate the discontinuance of publication would be is realized most by those who have borne in some measure the burden imposed by the lack of such a compendium.

The work when complete is to be under three heads: (1) A systematic enumeration of the genera of ferns, based mainly upon the treatment of Engler and Prantl; (2) an alphabetical arrangement of all valid specific names and synonyms published from 1753 to 1905, with mention of names in use among gardeners; (3) an alphabetical catalogue of references to the principal systematic literature of ferns. Of these it is undoubtedly the second which, under present conditions, will prove of greatest service to botanists; yet the first is assuredly a great desideratum, and the last will be of unusual benefit to younger students.

The want of an index has been pressing. An authoritative estimate upon the validity of the exceedingly numerous species proposed in the past is, of course, a prime consideration; but it can not be denied that this is best determined, or at least maintained, in an extended descriptive work that shall afford a general view of related species. It is too much to expect that in the present instance the treatment of species will carry the weight of monographic authority. Nevertheless, there is every indication that the author's estimate is a fair one; and, at any rate, deviation from this treatment will not detract materially from the usefulness of the work.

The main value of the volume will reside in the strictly bibliographic phase; the chief requirement being, in brief, that we may be able

to determine readily under which genera a given specific name has been applied, precisely at what place and, incidentally, by whom. The nomenclatorial confusion resulting from the widely differing schemes of classification adopted by various writers has long since become so pronounced as to offer a very serious obstacle to constructive work. What the 'Index Kewensis' has meant to botanists in general and Paris's 'Index Bryologicus' latterly to students of mosses, those who have dealt with ferns have realized only partially, hitherto, in consulting Moore's 'Index Filicum,' a work that was printed from A only midway through G in the years 1857–1862. It is true that Salamon's 'Nomenclator der Gefässkryptogamen' (1883) has been of assistance, although citations are entirely omitted; but, if we consider the activity of fern students in the last two decades alone, it becomes evident from the wide range of descriptions in periodicals—botanical and otherwise—how little security in the use of new specific names has been justified, and some idea may be gained of the difficulties that have lain in the way of ready reference to original descriptions. Christensen's 'Index' is designed to meet this condition. Judging from the character of the two parts at hand we have little doubt that opinion can not fail eventually to be substantially and deservedly favorable.

With regard to the mechanical execution of the work little but praise may be said. The typography is exceedingly well adapted to its purpose; and the method of citation is practically in accord with the common American usage, the sequence being: (1) name, (2) author, (3) title of serial, (4) series, if any, in Roman capitals, (5) volume number in bold-faced Arabic, (6) page and (7) date. In a very few cases well-known works and periodicals are abbreviated in an extreme fashion which, for the sake of avoiding cumbrous repetition seems quite justified. Accepted species stand under their proper genera in heavy-faced print; very doubtful species and those known only among gardeners in italics; synonyms in ordinary brevier. The listing of subgenera in distinctive typography is also to be strongly commended; for, although our latest American rules contain no provision that these must be taken up in the event of segregation, yet the desirability of their later use is scarcely open to question, and it is of high importance that such as are needed be used in their proper sense and that all be held available.

There is evidence of great care in citation, and of unusual effort to prevent a possible misconception as to the authorship and publication of new names and 'new combinations,' of which there are of necessity a good many. In transferring a species from one genus to another, the resulting binomial, if new, is distinctly indicated as such; not, however, in the usual way, by the phrase 'comb. nov.' but by 'C. Chr. Ind. [page] 1905'; by which means the binary name of every recognized species—whether proposed formerly or in this volume—is accompanied by citation of publication. More than a few of Dr. Christ's species are here first referred to other than their original genera; but in most, if not all, of these cases that author is credited with the new binomial (the citation being printed 'Christ in C. Chr. Ind. [page] 1905,') in recognition of assistance received in preparation of the manuscript.

Criticism of the major systematic treatment must be deferred until the appearance of the final brochures, for not until then shall we have a formal presentation of the classification adopted, nor shall we know how widely this treatment departs from that of its professed model, Engler and Prantl. There is, however, some indication of a more liberal acceptance of genera. Still, we can not but regard *Anaxetum* Schott as worthy to stand quite apart, generically distinct, from *Polypodium;* and recent studies[1] have convinced us that a more valid genus than *Adenoderris* J. Sm. is hardly to be found in the whole range of the Dryopterideæ. In the recognition of species the policy of the author has been to follow the disposition of monographers; in this way, de Vries's numerous species of *Angiopteris* are admitted, though under protest, on the ground that there has appeared no later revision.

Aside from the preparation of a modern 'Synopsis Filicum'—an undertaking so difficult and comprehensive that, under present

[1] *Botanical Gazette,* **39**: 366–369. May, 1905.

circumstances, it may scarcely be regarded with well-founded hopes of realization—there is undoubtedly no more worthy single service to be rendered students in systematic pteridology than the publication of precisely such a work as Christensen has undertaken in his 'Index Filicum.' The need of the work is undeniable; the parts already published are of high worth; the manuscript of the remainder is ready for the printer; and we can only express our hope that the necessary support shall be given—and at once—to insure the issuance of the remaining parts.

WILLIAM R. MAXON.

U. S. NATIONAL MUSEUM,
August 15, 1905.

SCIENTIFIC JOURNALS AND ARTICLES.

THE August number of *The Physical Review* contains the following articles:

A. DE FOREST PALMER: 'Thermo-electric Determination of Temperatures 0° and 200° C.'

LOUIS BEVIER, JR.: 'The Vowel A° (as in Raw), O (as in Rope), U (as in Rude).'

WM. J. RAYMOND: 'The Measurment of Inductance and Capacity by Means of the Differential Ballistic Galvanometer.'

J. B. WHITEHEAD: 'The Magnetic Effect of Electric Displacement.'

E. R. DREW: 'The Infra-red Spectrum of CO_2 and Nitrogen.'

THE contents of *The American Naturalist* for August are as follows:

PROFESSOR D. P. PENHALLOW: 'A Systematic Study of the Salicaceæ.'

J. A. CUSHMAN: 'Developmental Stages in the Lagenidæ.'

DR. B. M. DAVIS: 'Studies on the Plant Cell.'—VII.

Notes and Literature: Nature Study; Zoology, Wasps Social and Solitary, Trouessart's Catalogue Mammalium, Supplement.

SOCIETIES AND ACADEMIES.

ORGANIZATION OF A NATIONAL SOCIETY OF TEACHERS OF MATHEMATICS AND SCIENCE.

A CONFERENCE was held at Asbury Park on July 5, 1905, for the purpose of discussing the advisability of organizing a national society of teachers of mathematics and natural science. The conference was attended by thirty-seven teachers representing nearly all the larger associations of teachers of mathematics and natural science in the United States. Many letters received from teachers who were unable to be present expressed sympathy with the proposed movement.

Professor Thomas S. Fiske, of Columbia University, was elected chairman of the conference and Dr. Arthur Schultze, of the High School of Commerce of New York, was elected secretary.

There was absolute agreement in regard to the advisability of forming closer permanent relations among the associations represented, and a large majority were in favor of effecting this by means of a national association. Considerable discussion, however, arose as to whether the new society should be one of mathematical teachers only or one including also teachers of science. The western associations, for the most part including teachers of science as well as teachers of mathematics, strongly advocated a mixed organization, while the teachers from the eastern states seemed, to a considerable extent, to favor a purely mathematical society. The views urged by the western delegates prevailed, and on motion of Professor E. R. Hedrick, of the University of Missouri, a resolution was adopted to the effect that a national society of teachers of mathematics and science be organized.

The details of the organization were referred to the following executive committee: Professor Thomas S. Fiske (chairman), New York, N. Y.; Professor C. E. Comstock, Peoria, Ill.; Professor E. R. Hedrick, Columbia, Mo.; Mr. Franklin T. Jones, Cleveland, O.; Professor William H. Metzler, Syracuse, N. Y.; Mr. Edgar H. Nichols, Cambridge, Mass.

Up to the next meeting this committee is to act as council of the society and a report of its proceedings is to be published in *School Science and Mathematics.*

In the following list of associations represented at the conference the names of regularly appointed delegates are distinguished by the letter (D).

New England Mathematics Teachers Asso-