gas and electricity. For a year and a half the curator, Miss Tyler, has been classifying and cataloguing the collection and preparing suitable labels, giving name and location of the specimen, together with a reference to some book where a fuller description can be found, thus making it, not what too many collections are, a dead affair, but really a thing of life, which shall help in your search for knowledge. I hope additions may be made, by those interested in these things, of such objects as shall be worthy and useful in aid of the work in hand. Should persons have in their possession any objects of merit, illustrative of natural science, which they do not care to donate, but would like to loan, they may be shown to the trustees, and, if approved, may find a lodgment in the museum and be marked "loaned," to receive the same care as is bestowed upon the rest of the collection.

"It is my expectation that studies in the natural sciences will be introduced into our public common schools in all grades, from the primary to the senior, and that arrangements may be made between the prudential committees of the schools, the faculty of the academy, and the trustees and managers of the museum, for classes to be held in the class-room of the museum at such times as are best. Objects from the collection may thus be used by way of illustration under suitable and proper regulations. In this way the museum will truly become a factor in the education of our children and young people.

"It is my desire that its usefulness may not be restricted to the public schools or academy of this town, but that it may be open to the inspection and use of any school or class in the county or State. It is my desire that this institution shall take its place with other public institutions, as an educator for the young, lifting all who shall avail themselves of its advantages to a higher and larger knowledge concerning the things of God's creation, which lie all about us, now, practically, for many, a sealed book.

"It is my desire that the museum shall be opened free to all at such times as the trustees may direct, and that the public observe such rules and regulations as seem necessary and wise to be made.

"I cannot let this opportunity pass without grateful mention of the very valuable aid rendered, and advice given, by her who is the sharer of my joys and sorrows, the companion of my home. For years we have worked together in making this collection and in planning for this building, and to her I feel that much of its success is due.

"And it gives me pleasure to say that here is no debt upon the building or land, and that the institution is endowed, with an amount sufficient to maintain it for all time, if the funds are properly invested and the income judiciously expended"

BOOK-REVIEWS.

Fossil Botany, being an Introduction to Palæophytology from the Standpoint of the Botanist. By H. GRAF ZU SOLMS-LAUBACH, Professor in the University of Göttingen. Authorized English Translation by Henry E. F. Garnsey, M.A., Fellow of Magdalen College, Oxford. Revised by Isaac Bayley Balfour, M.A., M.D., F.R.S. New York, Macmillan. 8°.

THE suberb English edition of Count Solms-Laubach's "Einleitung in die Paläophytologie" which the Clarendon Press has recently brought out is now in the hands of paleontologists and botanists. The original German edition, which appeared in 1837, was briefly noticed by the present writer in the *American Journal of Science* for July, 1888 (p. 72), after a careful reading, and the impression which such a reading produced was then recorded. The daily use of the work since that time as a laboratory textbook has somewhat modified that impression, and an English translation of it is, to say the least, a very welcome accession.

The attempt has been several times made to reduce the science of fossil plants to a form adapted to general use. There is no science which is less accessible to the student from the scattered and fragmentary character of its literature, and every effort to collect this and present it in compact form should be thankfully received. Among other works that have claimed to do this should be mentioned the Marquis Saporta's "Monde des plantes avant l'apparition de l'homme" (1879), the late Dr. Schenk's "Fossilen Pflanzenreste" (1888), and Sir William Dawson's "Geological History of Plants" (1888). Of these the first-named realizes much more nearly than any of the others this claim, being popular in its treatment and covering the entire field, both geologically and botanically. The second is a condensation or abridgment of the elaborate treatise on the general subject in Zittel's "Handbuch der Paläontologie," begun by Schimper and finished by Schenk. But the abridgment is carried too far and the mode of presentation can scarcely be called popular. Sir William Dawson's work avoids these defects, but has the more serious one of both geological and botanical incompleteness, making it little more than a popular account of the paleozoic flora of Canada. The present work is open to a similar criticism, as it confessedly takes no account of anything later than the mesozoic, and has nothing to say about the geological history of the type of vegetation now dominant on the globe, viz., the dicotyledons, which, nevertheless, are known to have flourished in earliest cretaceous times, and which of all fossil plants may, at the present time, at least in America, be said to be the most interesting from the botanical, and the most important from the geological point of view.

The merits of this work, therefore, consist neither in its popularity nor in its generality. In what, then, do they consist? To what class is the work useful, and how can it be used? The treatment of the several forms of extinct vegetation which the author has selected is too thorough, minute, and technical for the non-botanical reader to follow. It is of little use to the geologist because, as stated on the title-page, it proceeds from the botanical standpoint. Botanists proper, who ought to profit most by it, are not likely to do so on account of the lamentable divorce of botany from paleobotany, as though fossil plants were not plants, and as such as worthy of study as living ones. If this work succeeds in dispelling to some extent this illusion it will certainly be useful. But dealing wholly with the lower forms, and largely with their internal and minute structures, so greatly neglected by botanists, it is not likely to accomplish this to any great extent.

It is, then, the paleobotanical student who, if any one, is to use this work. If he wishes to cover the whole field he usually has access to most of the literature of the subject, and is already familiar with the sources from which most of the work is compiled. If he wishes to make a systematic review of this literature he naturally goes to Schimper's "Traité de Paléontologie Végétale," and Zittel's "Handbuch der Paläontologie," Abtheilung II., where Schimper, and after his death Schenk, have admirably condensed it, but still have left it much more full than here. If he wishes to acquaint himself with the original investigations thus summarized, he goes to Williamson, Renault, Grand'Eury, Zeiller, Weiss, Saporta, and the rest, who have furnished the facts. In so far as Count Solms has himself contributed in this work to these original investigations, a not inconsiderable part of it, it is useful to this class of students. But unquestionably the most important service which he has here done has been to put on record the matured judgment of a structural botanist of the first rank respecting the probable nature and significance of the many problematical extinct forms of vegetable life that have been found in ancient strata. Whenever one of these problems arises the first question the paleobotanist now asks is, What does Solms-Laubach say? It is true that he entirely omits many such forms, that he frequently contents himself with stating the opinion of others, and that quite as often he declares that the facts do not warrant an opinion. But on many points his mind is made up, and it must be said to his credit that he has not attached himself to any particular school, but appears to be guided entirely by the evidence as he understands it.

It is a great comfort, for example, to know that he regards the Cordaiteæ as gpmnosperms without asserting that they are conifers; that he does not accept the views of some French paleobotanists that the secondary or exogenous growth in Sigillaria, Stigmaria, and Calamodendron necessarily relegate these forms to the phanerogams; that he considers Stigmaria as the roots of Sigillaria, Lepidodendron, etc, and does not admit the two kinds of Stigmaria maintained by Renault; that he opposes the view of Renault that Sphenophyllum is related to Salvinia, and while regarding the

group as *sui generis* and incapable of being brought within any classification of living plants, inclines to see its nearest affinities in the Lycopodiaceæ; that of all the different views that have been held as to the affinities of Spirangium he regards that of Nathorst as the most attractive, viz., that it may represent the gigantic sporangia of Chara surrounded by spirally twisted envelope-tubes; and that he leans to the conclusion that Williamsonia belongs to the Cycadaceæ, or to some analogous type of vegetation.

The most serious charge that must be made against this English edition is that it has not been revised to date. No science is progressing more rapidly than paleophytology, and the department that is advancing the fastest is our knowledge of just such problematical forms as those considered in this work. In making a translation it would have been easy to introduce the result of the investigations of the last four years, and the value of these results would have been very great to the class who are certain to make the most use of the work. But although it is said to be an authorized edition, it seems to be nothing more than an exact translation of the German edition of 1887.

For, example, nothing new is presented in relation to Bennettites, on which the author has been so long engaged. On page 97 the remark of the original edition that "the sketch here given of Bennettites, which I hope to make more complete at some future time," etc., is repeated without modification. But the "future time" came more than a year ago, and the Count's able researches on this form were published in the *Botanische Zeitung* for 1890 and noticed by the present writer in the *American Journal of Science* for April, 1891, p. 331. Still later the interesting specimen from Golden, Col., which Lesquereux called *Zamiostrobus mirabilis*, has been sent to him, and he has made sections of it and referred it to the same genus, which he now properly calls by Buckland's earlier name, Cycadeoidea. All this new matter should have been incorporated in the English edition.

We are never sure that we have the author's present opinion on the most problematical forms. Nothing is said of the recent discoveries of Zeiller, Saporta, and others respecting Spirangium and Fayolia, from which these authors are now disposed to give them over entirely to the zoologists as probably of animal origin. We should be glad to know what the successor of De Bary thinks of this. And it is amusing to read on page 371, where Williamsonia is under discussion and the early views of Saporta and Marion are considered, to learn that "it is hoped that a publication yet to come from Saporta will contain further and more convincing particulars on this subject." Paleobotanists have been familiar for at least three years with the "publication" referred to, as it appears in the "Paléontologie française, Plantes jurassiques," Livraisons 36–39, pp. 87–191, where the subject has received the most exhaustive treatment yet given to it, illustrated by seventeen plates. What we want to know is whether the professor of botany at the University of Strasburg agrees with the conclusion of the Marquis Saporta that the Williamsonias, without being precisely Pandaneæ, may have had a genetic relationship with that family (op. cit., p. 117). Solms Laubach's own conclusion, quoted above is given without the knowledge of Saporta's work, which might have modified it. It is also given without acquaintance with the important discovery by Nathorst of the inflorescence of *Williamsonia augustifolia* attached to the stems and foliage of *Anomozamites minor*, a supposed cycadean plant,[1] and, although this is confirmatory of the views above expressed, it would be interesting to know to what extent he regards it as conclusive; and, in general it would be very useful to know what this author's attitude now is toward Saporta's views as here expressed (op. cit., pp. 229–236), according to which not only Williamsonia, Weltrichia, and Goniolina, but Cycadeoidea, Anomozamites, and other forms hitherto uniformly referred to the Cycadaceæ, are taken entirely out of the Gymnosperms and assimilated to the angiospermous orders Balanophoreæ and Pandaneæ, and are grouped under his new and extinct class of Proangiosperms.

The *Sphenoglossum quadrifoliatum* of Emmons,[2] twice mentioned,[3] was carefully considered in 1883 by Professor Fontaine, and referred doubtfully to Actinopteris, a genus of ferns, in a work with which the author should have been acquainted,[4] and in treating the Cycadaceæ in this volume, as well as in his later studies of the Portland Cycadeoideæ, he seems to be equally unfamiliar with the important cycadean trunks discovered by Tyson in 1860 in the iron ore beds of the Potomac formation of Maryland, and described also by Professor Fontaine in his great monograph of the flora of that formation.[5]

The "forty-nine illustrations" so prominently mentioned on the title-page as a high recommendation are indeed excellent and largely the author's own, but in view of the uses to which this work is likely to be put, as explained above, this number is obviously far too small. To have secured the maximum usefulness, even to the small class to whom it is adapted, several times that number would have been required.

The English publishers have left nothing undone to render the volume handsome and attractive, and as usual, where the publisher's point of view is alone followed, the convenience of the reader and user is often sacrificed to style and appearance. This is notably the case, and applies to the German edition as well, in the avoidance of italics. It may be admitted that the printing of all words having the Latin form in italics produces, in works of this class, a very unseemly effect, but the compromise which limits them to strict binomials, i.e., cases in which the species requires to be mentioned, reduces this evil from the esthetic point of view to a degree which is many times counterbalanced by the increased value which it gives to a work that is to be in constant use by busy students, who in nine cases out of ten are looking for some particular name. To compel this class to pore over a whole page for what, if italicized, would instantly catch the eye, is a positive cruelty to a deserving animal, and should be prohibited by penal enactment.

The placing of the references to the appendix to the literature in foot-notes at the bottom of the pages is a decided improvement from all points of view over the unsightly microscopic superior figures in the German edition, and perhaps in a work like this, where the same memoirs are frequently several times referred to, this general plan is upon the whole justifiable, but after all nothing is so simple, easy, and clear as the old way, in which the reader finds all he wants in foot-notes on the page he is reading, and this simplicity, ease, and clearness usually atone for considerable repetition as well as for whatever offence these foot-notes may give to the most fastidious eye.

If, from all that has been said, it should appear to any that the work before us consists entirely of a bundle of defects, let him hasten to divest himself of so false an impression. It is rather our purpose to point out these defects than to extol its excellencies, and should the latter be attempted it would require much more space than has been needed for the former task.

LESTER F. WARD.

[1] Ofversigt af Kongl. Vetenskaps-Akademiens Förhandlingar, June, 1888. No. 6.

[2] "American Geology," Vol. VI., p. 134, pl. v., fig. 2.

[3] Ibid, pp. 182 and 315.

[4] "Contributions to the Knowledge of the Older Mesozoic Flora of Virginia." By William Morris Fontaine. Monographs of the U. S. Geological Survey, Vol. VI., Washington, 1883, p. 120.

[5] "The Potomac or Younger Mesozoic Flora." By William Morris Fontaine. Monographs of the U. S. Geological Survey, Vol. XV., Washington, 1889. Text, pp. 186–193; Atlas, pl. clxxiv–clxxx.

AMONG THE PUBLISHERS.

THE Century Company is about to publish, in cheap tract form, the editorials on "Cheap Money Experiments" which have been appearing in *The Century*

— Houghton, Mifflin & Co. will issue early next year John Fiske's work on "The Discovery of America." It has involved a vast amount of research, and Mr. Fiske is reported to regard these two volumes as his most important contribution to American history.

— In "The Platform: Its Rise and Progress," Mr. Henry Jephson, private secretary to Mr. Forster and Sir G. Trevelyan, beginning with the days when an open meeting for discussion of public affairs was condemned as scarcely less than overt treason, traces the slow growth of political speech making and analyzes the ele-