

40 to 71 species. *Bigelovia*, which fifty years ago had a single representative in the Atlantic states, now, as extended, contains 19 species, with its centre of distribution beyond the Rocky Mountains; whence, of late years, have come, of course, the principal additions to our flora. Similar comparisons might be made indefinitely between the composition of our flora as now understood and that of the earlier part of the century, were such comparisons necessary to illustrate the importance of the work under consideration, or to impress upon our readers the sense of our obligations to its author. Were it necessary or proper to say any thing at this time in regard to the part played by Professor Gray in the development of botanical science in this country, it would only be necessary to point to the fact, that, of the North-American Compositae as enumerated in this volume, more than 600 species and 30 genera have been characterized and enrolled by him since the publication of his previous study of the order. Twenty-eight species are first described in this volume.

The present volume, like its predecessor, will be found a model of comprehensive arrangement, and neat, concise, and clear expression. Unlike its predecessor, it bears upon the titlepage, in addition to the names of Professor Gray's New-York, London, and Leipzig publishers, "Published by the Smithsonian institution, Washington," where copies, no doubt, can be obtained, as well as from the author at Cambridge.

THE LANGUAGES OF AFRICA.

A sketch of the modern languages of Africa; accompanied by a language-map. By ROBERT NEEDHAM CUST. London, *Trübner*, 1883. 2 vols. 16+566 p. 8°.

THE Caucasus is styled in the east, from the variety of idioms spoken by the many tribes that are harbored in its recesses, the 'Mountain of languages.' This variety, remarkable as it is, becomes insignificant when compared with that which exists in Africa, which might well be called the 'Continent of languages.' In these volumes of Mr. Cust, we read of no less than five hundred and ninety-one distinct idioms, of which four hundred and thirty-eight are classed as languages, and a hundred and fifty-three as dialects. And even this does not complete the list; for there are several unexplored regions, of whose tribes and languages nothing certain is known.

A closer scrutiny, however, lessens the mar-

vel materially. Of the idioms enumerated, no less than two hundred and forty-eight belong to that portion of the continent which lies south of the equator. All these idioms, as is well known, compose only two linguistic stocks,—the great Bantu family, which occupies the whole of the wide territory explored by Livingstone and Stanley; and the Hottentot-Bushman family, comprising the tribes of dwarfish people who seem to have been the aboriginal inhabitants of South Africa. The Bantu nations now speak, according to Mr. Cust, two hundred and twenty-three languages and dialects. But as philologists have no doubt that all the idioms of the Indo-European stock are the offspring of a primitive mother-tongue, which was at one time spoken by a single tribe, and earlier still by a single household, so we may feel assured that all the languages of the Bantu family have their origin in the speech of a single clan.

There was reason to hope that in Mr. Cust's elaborate work we should find this process of reduction continued, and the vast variety of African tongues brought into the manageable compass of a comparatively few linguistic stocks. This expectation, unfortunately, is not fulfilled. Mr. Cust has chosen to adopt the classification of the eminent ethnologist, Prof. F. Müller, who arranges the languages (or, more properly speaking, the tribes) of Africa in six main divisions,—Semitic, Hamitic, Nuba-Fulah, Negro, Bantu, and Hottentot-Bushman. This arrangement, however, was proposed by the distinguished Viennese professor, not for linguistic, but mainly for ethnological, or rather anthropological, reasons. Only three of these divisions—the Semitic, the Bantu, and the Hottentot-Bushman—are true families. The other three divisions are styled by Mr. Cust, 'groups,'—a word which in comparative philology has, at least as here employed, no scientific meaning whatever. The connection of the tribes composing these groups is not even geographical: it depends merely upon some physical resemblances; and these, it may be affirmed, are not nearly so strong as those which exist between the Hungarians, the Germans, and the Basques, whom no philologist would think of classing together. In fact, the word 'group' in this case is simply, as Mr. Cust frankly admits, a confession of ignorance.

The ignorance which is thus confessed is, on the author's part, to a large extent voluntary. With the immense mass of linguistic materials which he has collected, and which far surpasses all that earlier inquirers have been able to accumulate, nothing would have been more easy

than by a simple collation of vocabularies — aided, where practicable, by grammatical comparisons — to ascertain the relationship of the various idioms, and to reduce them into the families to which they belong. It is probable enough that some isolated languages would be found, like the Basque in Europe and the Khasi in farther India, whose kinship could not at present be determined; and, of course, the 'language-map' would show many vacancies: but these are imperfections which belong to the earlier stages of all investigations. In spite of such drawbacks, a scientific classification could have been made, which would have gone far to bring this linguistic chaos into order, and would have thrown a flood of light upon African ethnology.

But while regretting these deficiencies in Mr. Cust's work, we must be thankful for what we have gained from him, which is not a little. In these two volumes we have a clear and readable account of the present state of African philology, and a complete list of the tribes and languages of the continent, so far as they are now known, with interesting details concerning many of them. The names of all the authors who have written on the subject, and the titles of their productions, are given with commendable fullness and precision. The work displays great industry and conscientious accuracy. The extensive 'language-map,' which has evidently been prepared with much care, aids materially in illustrating the text, and is in itself a most valuable contribution to philological science. In spite of the defects which have been indicated, Mr. Cust's treatise must be pronounced to be by far the best work which we possess on the subject to which it is devoted. Scholars who pursue this important branch of linguistic study will find in these attractive volumes a highly useful, and indeed almost indispensable, guide. H. H.

MINOR BOOK NOTICES.

The development theory: a brief statement for general readers. By JOSEPH Y. BERGEN, jun., and FANNY D. BERGEN. Boston, Lee & Shepard, 1884. 7+240 p. 24°.

No better evidence of the present general interest in biology could be wanted than is afforded by the growing demand for popular books on evolution. The latest of these is a little treatise of two hundred and forty pages, by Mr. and Mrs. Bergen, in which, to be sure, not much is original, except the form in which the facts are presented, and a few of the examples cited, as the authors confess; but a read-

ing of their book shows that they have given a good deal of thought to the presentation of the chief arguments upon which the modern development theory rests, with so few technicalities as to render it comprehensible to even young readers. With so many books of a similar character already in circulation, only the test of time can show whether this latest one meets, as the authors intended, a real need. So far as one not wholly unfamiliar with the subject can judge, the story is well and simply told.

Calcul des temps de pose et tables photométriques. Par LÉON VIDAL. Paris, Gauthier-Villars, 1884. 114 p. 16°.

THIS little book is made up very largely of tables, whose object is to enable the photographer, when supplied with a particular form of photometer, to give the correct exposure to his plate under all circumstances. The book is apparently written largely for amateurs in landscape-photography; but whether they will in general be willing to trouble themselves to procure such a photometer, and carry round the tables with them to consult whenever they wish to take a picture, in preference to relying on their judgment, is perhaps questionable. The photometer employed is similar to that used by carbon-printers, depending on the exposure of sensitized silver-paper, and the noting of the tint obtained after a definite time. The author refers to the application of the instrument to the case of enlargement, where it would seem to be more useful than when taking the original negative. There is one serious objection to its employment for the latter purpose, however, which our author seems to have overlooked. This is, that the exposure for a given landscape does not depend wholly on the total amount of light coming from it. If the background is the important portion, a certain definite exposure will be given. If, on the other hand, it is the foreground that is of interest, the same view may require two or even three times the exposure under the same conditions.

Leidraad bij het onderwijzen en aanleeren der dierkunde. Door Dr. JULIUS MACLEOD. Algemeene dierkunde. Met eene titelplaat en 61 door den schrijver gegraaverde figuren. Gent, 1883. 151 p. 12°.

THE author of this little school-book has written it in the Dutch language, in the patriotic belief that *dierkunde*, or zoölogy, may be taught in that tongue, which can supply all the necessary terms. The volume is really a