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geographical periodicals into one publication; with a department for teachers. The plan of adding such a department to an existing journal was proposed to the editors of the *Journal of School Geography* and the offer declined because they believed:

1. That the cause of geographical education warranted a separate periodical.
2. That teachers would not and could not subscribe to so expensive a journal as a valuable scientific periodical must be.
3. That educators would many of them shun pedagogic assistance vended by a society whose aims were primarily scientific.
4. That the organ of no one society or combination of societies could be advertised so as to reach the greater number of teachers.
5. That a journal *for* teachers should be edited *by* teachers.

I believe that the new journal has a legitimate right in the educational world for all these reasons and many more. The knowledge of the world may be enlarged for the few by the geographical societies, through the promotion of exploration and research and the publication of the results thereof. It may be enlarged for the many by such a journal as the one in question, if the editors sift and select new and old facts and put them in a form and dress for the larger public, who are not in touch with modern geographic progress. The increasing of the geographic knowledge of the world at large by either of these methods is a proper aim for those interested, and one may be as useful and necessary a task as the other. It may be that success can better be attained by specialization than by a combination of efforts. The *Journal of School Geography* will continue to select facts from the great mass of geographic information, to try and express them in a simple and straightforward manner, and do what it can to help the geographic societies and publications in the wider dissemination of knowledge of the world. This work with the teachers and youth in this generation may bear fruit in the next generation in a larger demand for the consolidation and improvement of the publications of a scientific character.

I agree with Professor Russell that there is need of bettering all the scientific geographical

publications in this country. I disagree with him in his idea that there is no room for a journal whose aim is not the publication of new scientific results, but the broader dissemination of geographical knowledge, expressed not in childish, unscientific or pedagogic terms, but in simple English, with a knowledge, on the part of the editors, of the needs and tastes of the readers to whom they would appeal.

RICHARD E. DODGE.

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THE DRAINAGE OF THE SAGINAW VALLEY.

TO THE EDITOR OF SCIENCE: Professor Davis has asked me to add a few more instances apropos of his note on the drainage of the Saginaw Valley (p. 337, issue of Feb. 26, 1897). The peculiar circuitous drainage due to moraines of retreat, in which streams do not flow directly to the water of the bay near by, but fetch a compass and make backhanded branches, has numerous other examples in Michigan. Among the most striking are the Sturgeon, which heads in the Huron Mountains, Sec. 9, T. 49N., R. 32E., and flows clear around Keweenaw Bay to empty into Portage Lake, and the region of Grand Traverse Bay, where the Rapid River, Boardman River, Platte River and the Betsie River show a similar type of drainage, which we may call willowly. For in discussing a relation of branches it seems natural to use a term borrowed from botany. A comparison of a drainage map of the Saginaw Valley with the pendent branching of the willow will show the appropriateness of the comparison, and the term can easily be changed by those who prefer Latin terms into saliculous.

ALFRED C. LANE.

SCIENTIFIC LITERATURE.

A Dictionary of Birds. By ALFRED NEWTON, assisted by HANS GADOW, with contributions from RICHARD LYDEKKER, CHARLES S. ROY, etc. London, A. and C. Black. [The Macmillan Company, 66 Fifth Avenue, New York.] 1893-1896. 1 vol., 8vo, pp. *i-xiii* + *1-124*, *i-viii* + *1-1088*. Map and unnumbered figg. in text.

The ninth edition of the *Encyclopædia*

Britannica contains a long series of short articles on birds, which have seldom been approached and never equalled for pith and point in the literature of Ornithology. The same publication also contains two extensive articles, under the heads of *Aves* and of *Ornithology* respectively, in which the science itself and the history of the science are set forth in a masterly manner. It does not suffice to call these contributions able and authoritative; they are mainly from the most facile and forceful pen that has ever been bent in the service of the science of which Professor Newton is a foremost exponent and ornament. The whole of these articles have served as the foundation of the present Dictionary, for which purpose they have been modified into something like continuity, so far as an alphabetical arrangement will admit; and supplemented by the intercalation of a much greater number, be they short or long, to serve the same end. "Of these additions by far the most important have been furnished by my fellow-worker, Dr. Gadow, which bring the anatomical portion to a level hitherto unattained, I believe, in any book that has appeared" (Note, p. v). Less numerous though not less valuable articles have been contributed by Mr. Lydekker, and others of great merit by Professor Roy. The result may be correctly characterized as altogether the best book about birds that has ever been written in English or any other language.

Of writings on Ornithology there is no end. As Professor Newton says (p. 22), "the desponding mind may fear the possibility of its favorite study expiring through being smothered by its own literature." So huge has the accumulation become that the most expert bibliographer could no more than guess vaguely the total of titles a complete catalogue would contain; no such catalogue exists, nor is likely to ever be produced. The total number of species now known may be somewhere about eleven thousand only; but they will average several synonyms apiece, in Latin binomial form. Generic names in current usage are several thousand, and their synonyms are still more numerous. Non-technical names of birds in English use are derived from almost every language that has been reduced to writing, and a

vast number of purely English 'phrase-names' (consisting of more than one word) are employed. We must add to this rough tally all the biological terms which are peculiar to Ornithology, or which this science shares in common with other branches of zoology. A bare list of words which might serve as entries for a Dictionary of Birds would make a bulky volume, without a line of text to define them; and any treatment of such a mass of verbiage in its entirety would be practically impossible, even were it desirable. A majority of such candidates for lexicography make a rubbish heap not worth overhauling. No one knows this better than Professor Newton, who has made no attempt in this work "to include in it all the names under which Birds, even the commonest, are known" (p. v). He characterizes his selection of names to be entered as 'quite arbitrary;' but we may be permitted to testify that his arbitration is that of a tactful expert who understands the beauty of utility, and has governed himself accordingly. How many entries there may actually be we have hardly any idea; the alphabet runs for more than a thousand pages; the articles range from a line or two to several pages, presumably according to the author's estimate of the relative interest or importance of their respective subjects. Regarding the form as distinguished from the substance of the work we cannot do better than here repeat its eminent author's significant words (p. vii):

"I would say that the alphabetical order has been deliberately adopted in preference to the taxonomic because I entertain grave doubt of the validity of any systematic arrangement as yet put forth, some of the later attempts being, in my opinion, among the most fallacious, and a good deal worse than those they are intended to supersede. That in a few directions an approach to improvement has been made is not to be denied; but how far that approach goes is uncertain. I only see that mistakes are easily made, and I have no wish to mislead others by an assertion of knowledge which I know no one to possess; yet with all these drawbacks and shortcomings I trust that this Dictionary will aid a few who wish to study Ornithology in a scientific spirit, as well as many who merely regard

its pursuit as a pastime, while I even dare indulge the hope that persons indifferent to the pleasures of Natural History, except when highly-coloured pictures are presented to them by popular writers, may find in it some corrective to the erroneous impressions commonly conveyed by socialists posing as instructors."

The 'drawbacks' and 'shortcomings' to which the modesty of a master of the art of exposition and a past master of birdcraft may permit him to allude in speaking of his own performance appear to the present reviewer to be a drawing back from profitless penwork and a coming short of adding anything to the rubbish heap above specified. The plan of the work is not open to any criticism, except it be captious, and its execution is such as makes mere praise seem impertinent.

A respect for precision of statement which verges on scrupulosity is a prime quality of this author's mental furnishing, and his ability to reflect that quality clearly is conspicuous in his literary composition. An ornithologist who should be asked, 'What is a Wagell?' would probably reply, 'A young Black-backed Gull.' This would be right, but not exactly right. We will give what Professor Newton says about this name as a single sample of one of his short 'definitions,' as distinguished from any of the extended articles in this book:

"WAGELL,* the Cornish name of a bird of which Ray and Willughby were told, 30th June, 1662, on Godreve Island near St. Ives in Cornwall (*Memorials of Ray*, ed. Lankester, p. 188, and Ray, *Collection of Words*, p. 93). From what is said of it the Arctic Gull (SKUA, p. 870 [small caps for cross-reference]), seems to have been meant, but they took it to be the young of what we now know as *Larus marinus*, and so the name has been attached to that species by subsequent writers.†"

The Dictionary has appeared in four parts,

"* The derivation and pronunciation of this word are unknown to me. It is spelt indifferently by Ray with one *l* or two. I preserve the latter form as possibly indicating a stress to be laid on the last syllable."

"† See *Additions to Borlase's Natural History* (reprinted from *Journ. R. Inst. Cornwall*, Oct. 1865), Truro: 1865, p. 46."

running 1893-'96, the last part having been issued in November or December of 1896. Besides finishing the alphabet (*Sheathbill-Zygodactyl*) and furnishing the permanent title, preface and indexes, it brings us the cream of the whole performance in its Introduction (pp. 1-124). Upon the Britannica basis already indicated Professor Newton has erected an imperishable monument. The task he set himself was nothing short of a critical review of ornithology and of ornithologists in few more than one hundred pages. The result is something to which no other writer who has ever lived has attained. It may possibly add somewhat to the luster of a name already renowned; it will, if any thing can; but certainly it illuminates the whole history of the subject. Professor Newton is unequalled, if not unapproached, by any person now living, in his grasp of ornithological literature, and all the resources of his erudition have been brought to bear upon this summation of his subject, with rare tact and skill, with still rarer sense of historical perspective. It is a masterpiece of composition, in perfect focus and adjustment, without a blurred line from start to finish. Professor Newton is nothing if not accurate in statement of facts, nothing if not cautious and conservative in expressions of opinions, nothing if not scholarly in his modes of locution; these are qualities which all his writings display conspicuously, and we have a right to hold him to them, requiring him never to fall short of a standard of excellence he has taught us to expect to find in his work. But we admire not less, in this instance, what we may call the temper of this piece of writing—so eminently wise, just, kindly, courteous, dignified, and without of fine academic flavor without a trace of pedantry. In its impersonal aspects, as merely a matter of erudition, it was no easy thing to do; it became one of increased difficulty and great delicacy, in its personal bearings. Professor Newton has relaxed nothing of rigid censorship, maintaining his judicial character throughout, and passing severe sentences in more than one case; but few there will be, we imagine, to dispute the fairness with which he has rendered his even-handed decisions. It was an invidious task, to bring so many of his contemporaries to the bar, to answer for their performances; but it

has been executed with scrupulous fidelity. Some offenders will writhe at the point of his pen, as they feel the keen discernment of his criticisms, and others may thank their own insignificance for the charitable mantle of his silence. Meanwhile, this Introduction takes its rightful place as the most valuable and most interesting contribution ever made to the subject of which it treats.

Lacking space for any adequate analysis of this portion of the Dictionary, we prefer to say no more.

ELLIOTT COUES.

Recent Geological Bibliographies. (Bibliography and Index of North American Geology, Paleontology, Petrology and Mineralogy for 1895; F. B. WEEKS; Bul. U. S. Geol. Survey, No. 146, 130 pp.; Washington, 1896. Bibliography of Missouri Geology; C. R. KEYES; Mo. Geol. Surv., Vol. X., pp. 221-523; Jefferson City, 1896.)

Perhaps there are no publications more welcome or more serviceable to the worker in any branch of science than bibliographies. When accurately and conveniently arranged they save the specialist much time, energy and money. One who is not a specialist is even more dependent on them. This is particularly true in our country, where so many who are interested in scientific subjects are necessarily located where library facilities are poor. The worker in some small town, miles, perhaps, from any really good library, learns to carefully treasure all bibliographic matter. Bibliographies render distant libraries more or less accessible, and enable book purchases to be made by mail with the same certainty of satisfactory selection which comes from personal examination. A glance over the list of periodicals examined by Mr. Weeks shows that it is quite complete. Indeed the U. S. Survey library is one of the most complete geological libraries in America. The acquisitions for 1895, as listed here, include 575 titles. In Mr. Weeks' paper there is, under each title, a brief abstract of the contents of the paper noted. This in a certain sense brings the library to each worker, while a visit to the library would be impossible to many geologists, except at great expense.

The survey has from the first recognized the responsibility which comes with the possession of an excellent library, and has issued many helpful bibliographies.* Two of these were compiled by Mr. Weeks, and their wide use has shown that they were carefully planned and conscientiously executed. In the present, as in the preceding papers, the references are full and clear, the abstracts concise and the arrangement convenient. Limits have necessarily been drawn. The proper limits to such a work are a matter of opinion. It would seem, for instance, that signed editorials in standard journals might properly be included, since they often contain much which is germane to current geologic discussion. In this they seem on a par with signed reviews which have been included. While certain trade journals, such as *Engineering and Mining Journal*, have been included, others, which often contain original papers of merit, for example the *Colliery Engineer*, have been excluded. Since so large a portion of the work of the modern geologist has to do with economic subjects, an extension of the scope of the work to include a larger portion of the economic literature would be welcome. Certain of the discussions in such a book as 'The Mineral Industry,'† would probably be as helpful to the working geologist as some of the strictly paleontologic literature noted. This is a criticism, not of the bibliography itself, but upon its possibly too restricted scope.

The paper by Dr. Keyes is on a somewhat different plan. The attempt has been made to bring together all the literature bearing upon the geology of a single State. The result is that a considerable number of titles have been added to the list published by Sampson.‡ There is the same lack, however, of references to important economic literature that is shown by Mr. Weeks' paper. Numerous papers upon the zinc and lead deposits of Missouri have been published in the *Engineering and Mining Journal*, and any one studying the deposits would need to be familiar with these papers, yet none have

* See Bulletins 7, 13, 44, 63, 69, 71, 75, 91, 99, 100, 102, 121, 127, 130, 135.

† Scientific Pub. Co., New York.

‡ Geol. Surv. Mo., Bul. 2, 158 pp. Jefferson City, 1890.