ters, microscopes, and a museum of old and new contrivances are now in the scrap heap. Until to-day, I felt I had the observatory I intended to put up in England completely furnished, and I was proud of the furniture.

One very cruel cut was the picking up of an insurance policy dated 1878, which fluttered out of the ruins. One reason that I have not insured for some years past is because day and night I always had for purposes of continuous photography open benzine lamps burning in my house, and I should have had to tell the agent about the little tricks they played when first I used them. It may sound odd, but I do not think a stranger to their ways can light one so that nothing shall happen during the next three days. Against eccentricities like these I insured myself by having above them a bunch of fluffy paper, which, if the lamp blazed up, was burned and burned its suspended string. This was followed by the falling of a lever, when an electric bell in my bedroom and one in the kitchen was set going.

Outside the door of the instrument room stood fire-extinguishers and a heap of rugs. From time to time I had 'fire drill,' going through the operation of turning up a lamp, burning the paper, ringing the bells, alarming everybody, and then putting out the conflagration—in fact, very much like what happens on ship-board, only I had real fire—which was easily extinguished.

But what happened was the unexpected; the fire broke out in the midst of a pile of wood in an outhouse, and this, with a nice wind blowing, on a Sunday morning, when there was no one near to help.

And now I have next to nothing—decorations, medals, diplomas, clothes, manuscripts, extending over twenty-five years, and everything else has gone up in smoke; still it is not altogether a misfortune.

I shall not have a sale, nor the worry of selecting amongst my accumulations; there will be no buying boxes and packing up, neither will there be any haggling with custom house officials, or trouble in collecting on an insurance policy. On the other hand, I shall have new clothes, and some time or other, I hope, new clocks and new instrumeuts, whilst what I have got is the knowledge that I have many sincere and kind friends. Their clothes don't fit, but the sympathy that they have expressed and the little things they have sent me tells me that I should never be homeless in Japan. Looked at in the right way; like an earthquake, a fire may, after all, be a blessing in disguise, but, of course, it is sometimes pretty well wrapped up.

Dies iræ, dies illa,
Solvet sæclum in favilla."

Professor Milne asks me to make public the loss of his address book and his desire to send to all to whom it may be due, copies of Vol. IV. of the 'Seismological Journal.' This, he says, is an unusually large number, and he hopes an unusually valuable contribution to Seismology—his 'expiring effort;' and he asks all to whom this volume should be sent to address him, care Japan Mail Office, Yokohama.

Out of the few hundred copies, more or less, of the Transactions of the Seismological Society of Japan, he will be able to make up some sets; and those desiring to obtain them should address him, care Geological Society, Burlington House, London. And finally, he earnestly desires to receive, in exchange or otherwise, copies of any papers on or relating to earthquakes, volcanoes, or earth movements in general.

I am sure that every one who can will respond to this last appeal and cheerfully do whatever is possible to assist Professor Milne to replace, as far as may be, the accumulations of a quarter of a century, converted into sunset-reddening dust in a few short moments. T. C. M.

CORRESPONDENCE.

THE IDEAL INDEX TO SCIENTIFIC LITERATURE.

TO THE EDITOR OF SCIENCE: Since you have been so kind as to ask me to contribute to SCIENCE my views as to how the plan of cataloguing scientific literature may best be accomplished, I venture to present the following considerations. It is probable that some of the ideas suggested are impracticable, and indeed that the plan is too extensive and unwieldly to be undertaken as a whole at the present time. The literature of science is so vast and the number of workers so great, the degree of specialization in modern work so intense and the participation in research so wide-spread over the world, that a really adequate and

serviceable index must, of necessity, be of great extent, and undertaken upon a scale of considerable magnificence.

It may be that the time has not yet come when the scientific men of all the world can coöperate together in such a task as this, but if coöperation is possible in any field of intellectual activity, surely it is in that of science. Such coöperation is not only essential to thorough work in indexing, but would also have a most important influence in promoting united efforts in other branches of scientific activity.

The considerations suggested are these:

1. The catalogue should be international in name and scope. This is essential in order to secure the unreserved support of all nations engaged in the production of scientific literature. It should, therefore, not bear the imprint of any society or organization, or derive its distinctive character from any one nation. Since the titles will, of necessity, be quoted exactly, it might be well that all annotations and comments should be in the same language as the title. To insist that only English or French should be used would be fatal to its general adoption by other countries. Titles in the Scandinavian, Slavonic and Oriental Languages and dialects and others would, however, need to be translated into French, German or English.

2. It should be exhaustive within its own limits, no latitude being given to the judgment and taste of its editors, in the matter of rejecting titles.

3. It should be printed in annual installments, each installment including every paper or work printed within a single year, and each installment should be published in not more than six (preferably not more than three) months after the close of the year.

4. The publication should be in the form of a bibliographical catalogue, with the titles arranged alphabetically by authors, the papers by each author to be numbered, beginning with number one. This would render it possible to identify any paper, either in an annual or a general index, by simple reference to author, year and number.

In recommending that the catalogue shall be published in book form, I am by no means unmindful of the merits of the card-catalogue system in work of this kind. I use card-catalogues freely in my own work, and in the National Museum there are hundreds of thousands of cards by means of which the vast collections of specimens and papers are kept under control. The card-index has its limitations, however, and these are nowhere more evident than in connection with such a scheme as a universal scientific catalogue.

The very bulk and unwieldiness of the card system is an objection, which may be partly appreciated if one can imagine the contents of the ten volumes of the Royal Society's Catalogue transformed into card form and arranged in drawers.*

In the volumes as they now stand, the eye can sweep rapidly over page after page in search of a given title, and thirty or forty impressions pass to the mind at a glance, instead of one, while the strain upon the attention caused by turning over the pages is much less than where each title card is scrutinized singly.

For finding a book or reference when the name of the author or its title is known, the card system is without rival. It is less useful, however, when, as often happens, one is 'looking up' a subject in a general way. A card-catalogue, after it has attained to great bulk, requires much labor

* Dr. Carrington Bolton prepared the copy for his 'Select Bibliography of Chemistry' on slips of standard sizes, and it filled 7 standard trays or a length of nearly 9 feet. The slips were on thin paper —if they had been of card the lengths would have been nearly 20 feet. When printed the 12,000 titles were presented in a light convenient octavo volume of about 1,200 pages.

in consultation and a vast amount of painstaking care to insert new cards and keep it in order. Then, too, one of its features which makes it particularly advantageous in the hands of an individual scholar, is that the cards may be continually sorted and rearranged. This would be practically impossible with a great card index intended for the use of many in a public institution. Volumes like those of the Royal Society index may be carried to the desk of the student. A card-catalogue he must consult in its place of deposit, probably in a crowded and noisy library. Then, too, after a period of years the card index will represent the investment of hundreds and soon of thousands of dollars, on the part of each possessor, and the tendency will be to place constantly narrowing restrictions upon its use.

The needs of library workers might be met in part by printing a special edition of the catalogue on one side of the page, so that the titles might be cut and pasted upon cards.* Indeed, if there were a sufficient demand, a special edition of the catalogue might be printed on cards. Whatever may be said of the advantages of the card system, it is certain that it would not be accepted in Europe.

Every one remembers the plan of Jewett, who, in the early days of the Smithsonian Institution, proposed a universal bibliography. His plan was to electrotype each title upon a separate block, and to supply these blocks, either for printing cards, or to be made up into catalogues in any system of arrangement desired. His project almost succeeded fifty years ago, when there was much less demand, much less money, and much more in the way of mechanical obstacles, than at present. The modern type-setting machine, which casts each line of type in a single bar, would lend itself admirably to such co-operative work.

5. A subject-index of the most exhaustive character should be issued in connection with each annual publication, but since this index cannot so conveniently be made until the catalogue itself has been set in type, it might be well not to delay the distribution of the catalogue itself until the index is ready, but cause the latter to follow as soon as practicable.

6. The adoption of this index as a part of the plan would render it practicable to issue the entire record of the year's work in one single alphabetical series, if this were deemed desirable. It might be, however, that it would be more convenient, and less expensive to subscribers interested in special branches of science, if the titles were arranged in more than one series. To divide it into two—one for the physical and one for the natural sciences—would be quite practicable; perhaps philology, history, economics and mechanical science might each have a volume of its own. Whether further subdivision would answer, is a question for careful discussion.

7. The catalogue should embrace within its determined scope all publications in the following categories:

(a). Publications of scientific academies and societies.

(b). Scientific publications of universities, colleges, and technical schools.

(c). Publications of scientific expeditions.

(d). Scientific publications of national, municipal and other governments.

* In order to facilitate this, the name of the author might well be printed in bold-faced type, and *repeated at the beginning of each title.* This increases the cost but little, and adds much to the usefulness of the bibliography, if it is to be cut up and rearranged, either for a catalogue, as I have suggested, or as 'copy' for other bibliographies. The width of the title as printed should not exceed 4½ inches, whether the publication is in octavo form or larger. It will then come within the limits of the standard cards.

(e) Independently published scientific books of reputable character.

(f) All articles in journals and magazines devoted exclusively to the sciences.*

(g) Articles of scientific importance in the general periodical literature of the day, and in the cyclopædias and works of reference, at the discretion of the editorial committees.

(h) All bibliographical publications, relating wholly or in part to scientific literature, including important library catalogues, etc.†

(i) All authors-separates or offprints with independent titles and paging. (Including even scientific addresses and special papers in ephemeral journals, when practicable.)

(k) *Festschriften:* Memorial works and others, coöperative volumes, these to be analyzed and indexed as periodicals.

(l) Scientific biography, the history of science and scientific institutions, etc.

8. The catalogue should embrace the following divisions:

A. General Science.
B. Mathematics.
C. Astronomy.
D. Meteorology.
E. Physics (including Astrophysics).
F. Chemistry.
G. Mineralogy.
H. Geology and Physiography.
I. Biology (including Morphology, Physiology, Systematic Botany and Zöology, Geographical Distribution of Life, Pathology, Psychophysics, etc.).
K. Anthropology (including Prehistoric Archæology, Ethnography, Comparative Technology, Folk-Lore, *Culturgeschichte*, etc.
L. Economic Science and Statistics (under determined limitations).
M. Mechanical Science and Engineering (under determined limitations).
N. Philology.
O. History, at least to the extent of including Archæology and the History of Institutions.
P. Geography (including all serious works of travel and works of reference geographically arranged).

In connection with this annual bibliography, an effort might be made to induce all persons and societies engaged in bibliographical work to adopt the same system, so that every title prepared and printed might be available for use in the universal catalogue of scientific literature, beginning with the birth of science, which, it is hoped, may in time be printed. In this connection there might be committees to advise with bibliographical workers, and whose function it would be in part to discourage duplication of work. A central office or a bulletin might be established, in which should be recorded all manuscript and published bibliographies in existence, and means provided by which persons proposing to do bibliography-work may ascertain whether the field which they intend to work in has already been covered.

No system for organizing this work has been suggested, but it is evident that if all the energy and all the money yearly expended upon the printing of partial bibliographies could be concentrated, there would be no lack of means for accomplishing very much more than has been here proposed. To secure such coöperation the proposed catalogue must meet, as fully as possible, the necessities of librarians, readers in libra-

* Book reviews and important book notices should probably be included, but whether they should be cited under the names of their authors, or parenthetically under the titles of the publications to which they relate, is a question. The latter is probably better, especially if cross references should be made under the name of the author of each review.

† It is suggested that even bibliographical appendices of importance, published in connection with books or articles, should be separately indexed, and that the annotations should indicate with precision their exact scope and character.

ries, investigators and writers, booksellers and book buyers.

It is evident, however, that existing agencies which are now engaged in bibliographical and index work should all be conciliated and enlisted in the work.

The Royal Society, the Smithsonian Institution, the special societies, such as the Zoölogical Society of London, the American Chemical Society, all groups of bibliographers engaged in the preparation of such works as the *Zeitschrift für Orientalische Bibliographie*, and the great individual bibliographers, like Professor Carus, should be brought in.

The sale of the work would undoubtedly cover the expense of printing and publishing, and it is not impossible that a considerable part of the expense of compiling might also thus be covered.

Considerable money subsidies would however be essential if the thing is to be done well.

The editorial work should doubtless be done without regard to geographical considerations, under the direction of specialized societies or institutions which should also be depositories of special information in regard to the bibliography to which they are devoted. It would be well, however, that in every country there should be a central office or depot where all the publications of that country should be systematically gathered.

It would seem also that some suitable plan should be devised for giving individual credit to the persons by whom the work is done, for there is an immense deal of self-sacrificing and conscientious work put into bibliography, and the pride of the bibliographer in having produced a thorough and workmanlike contribution in his chosen field is perhaps scarcely less than that of literary authorship.

G. BROWN GOODE.

U. S. NATIONAL MUSEUM.

SCIENTIFIC LITERATURE.

A Handbook of the Birds of Eastern North America. By FRANK M. CHAPMAN. New York, D. Appleton & Co. 1895. 12°, pp. 420. Library edition, heavy paper, broad margins. Pocket edition, thin paper, no margins, $3.00.

We live in a period of unusual productiveness in ornithological literature. We have technical works of scientific merit, popular works of literary merit, and local lists almost without end. But ornithologists and amateurs alike have long felt the need of a compact handbook small enough to be carried in the pocket, and full enough to afford means of ready identification. Another desideratum was that it should be written in language not too technical for the beginner. The older ornithologists, while recognizing the demand for such a book, have been too busy with special studies, and it has remained for one of the younger men to bring out.

Mr. Frank M. Chapman, the author of the present *Handbook*, has sought to fill the gap. He has written a book so free from technicalities as to be intelligible to a fourteen-year old boy, and so convenient and full of original information as to be indispensable to the working ornithologist. His plan is unique; his descriptions are from actual specimens (not compiled); they are written in plain English, so that no glossary is necessary, and are accompanied by numerous figures of heads, feet and tails as aids to identification. The description of each species is followed by paragraphs giving the geographic range (and the breeding range is commonly discriminated from the migratory and winter ranges); the time of presence at Washington, Long Id. [water birds], Sing Sing and Cambridge;* descriptions of the nest and eggs, and a brief popular ac-

*The data for these 4 stations are contributed respectively by Chas. W. Richmond, Wm. Dutcher, Dr. A. K. Fisher and William Brewster.