the area in question (as seen from different camera stations), they being studied in the same way as the plane-tabler studies the surrounding terrene to grasp its characteristic forms and represent the same on the map as a faithful translation.

Among the advantages of applying photography, in the manner suggested, to surveying are:

1. With the same material brought home from the field, large or small scale maps can be constructed, and the plotting can be made detailed or generalized by deducing a large or a small number of geodetic control points from the photographs.

2. The phototopographic map construction can be carried on at the home office while the observer remains in the field, sending in the data as soon as they may be acquired. This renders metrophotography especially well adapted for the use of scientific explorers.

3. The field season is reduced to a minimum, no instrumental observations being required beyond the triangulation which forms the basis for the map. Hence, this method is to be recommended for surveys in mountainous regions, in arid countries or where fogs and smoke prevail, in short, where it is desirable to gather much topographical information in a short time.

Since this method has been developed it has been used successfully by explorers, topographers, military engineers, geologists, hydrographers, etc.

It has been employed with marked success for topographical surveys of large areas in mountain regions in Italy (Mil. Geographical Inst., L. P. Paganini), Austria (Professor Steiner, Pollack, Hafferl, Hübl, Lechner, etc.); Canada (Capt. E. Deville, Surveyor General); France (Col. A. Laussedat; Commandants Javary, Moessard and Le Gros; Dr. Le Bon, Ed. Monet, etc.); and in Germany (Dr. Meydenbaur, Dr. Doergens, Dr. Hauck, Dr. Vogel, Professor Jordan, Dr. Koppe, Dr. Pietsch, etc.). Also for astronomical observations photography has been applied in a similar manner by M. G. Flammarion in France and by Dr. Stolze and C. Runge in Germany.

Phototopography is being practiced now in Greece, Spain, Portugal, Norway, Mexico, Chile, Peru, Brazil, Switzerland, England, and more recently still in the United States, although this art-science has been taught, both in theory and practice, at the Military Academy at West Point by Lieut. H. A. Reed for several years past.

The Coast and Geodetic Survey has, in the past and in the present season, used the phototopographic method in a modified form for the topographical reconnoissance of regions in southeastern Alaska; while phototopography has been used exclusively by the Dominion Land Surveyors for similar work along the boundary between Alaska and British Columbia under Dr. W. F. King, Commissioner to H. M. in 1893 and 1894.

J. A. Flemer.

Washington, D. C.

THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The committee appointed by the President and Council of the Royal Society to enquire into and report upon the feasibility of a catalogue of scientific literature through international coöperation presented their report on July 5th. It is as follows (we quote from *Nature*):

At the first meeting of this Committee (February 8, 1894), the Memorial to the President and Council (July, 1893) which led to the appointment of the Committee, and the Minute of Council of December 7, 1893, appointing the Committee, having been read, it was resolved to request the President and Council to authorize the Committee to enter directly into communication with societies, institutions, etc., in this country and abroad, with reference to the

preparation, by international coöperation, of complete subject and authors' catalogues of scientific literature.

Subsequently, a draft circular letter was prepared, which, on February 22, 1894, received the approval of the President and Council, who also authorized its issue.

This letter was sent to 207 societies and institutions selected from the exchange list of the Royal Society, and to a few others. It was also sent to the directors of a number of observatories and of government geological surveys, to the foreign members of the Royal Society, as well as to those of the following societies: Chemical, Geological, Physical, Royal Astronomical, Linnæan, Royal Microscopical, Entomological, Zoological, Physiological and Mineralogical, and of the Anthropological Institute. A special letter was addressed to the Smithsonian Institution.

More than a hundred replies to the letter have been received; several of these are reports of committees specially appointed to consider the suggestions put forward by the Royal Society. A list of answers received up to December, 1894, with brief excerpts from the more suggestive, was issued to members of the Committee early in this year. It should, however, be added that from some important institutions no answer has as yet been received.

It may be said at the outset that in no single case is any doubt expressed as to the extreme value of the work contemplated, and that only two or three correspondents question whether it be possible to carry out such a work. It is a great gratification to the Committee that the matter has been taken up in a most cordial manner by the Smithsonian Institution, the Secretary of which, in his reply, refers to the desirability of a catalogue of the kind suggested as being so obvious that the work commends itself at once. The importance of having complete subject catalogues, and not mere transcripts of titles, is also generally recognised.

Some bodies and individuals take the matter up very warmly and urge that steps be taken forthwith to put the scheme into action, this being especially true of the replies received from the United States; others, while giving a general approval, dwell upon the difficulties of carrying out the suggestions put forward; and others, again, ask for more details before committing themselves to any answer which may seem to entail future responsibility, especially of a financial character.

Incidentally it may be pointed out as very noteworthy that over and over again reference is made to the great value of the Royal Society's 'Catalogue of Scientific Papers.' There is abundant evidence that considerable use is made of this on the continent of Europe. And it is clear that a proposal to carry out a more comprehensive scheme initially under the direction of the Royal Society of London is likely to meet with general approval, owing to the fact that the Society is credited with having already carried out the most comprehensive work of the kind yet attempted. Indeed, the Academy of Natural Sciences of Philadelphia, U. S. A., directly advocates the establishment of a central bureau under the Royal Society; and several others more or less clearly imply that they would favor such a course.

Over and over again, it is stated that the production, by international coöperation, of a catalogue such as is contemplated is not only desirable but practicable. The Americans, who, as already stated, are the most enthusiastic supporters of the scheme, especially dwell on the importance of early action being taken. Professor Bowditch, of Harvard University, in particular, points out that if the Royal Society of London wish to guide the enterprise it ought to announce its views and put forward a compre-

hensive scheme with the least possible delay. It may be added here that he also urges that in determining the scope of the catalogue a very wide interpretation should be given to the word 'Science.'

No very precise information as to the best mode of putting the scheme into operation is to be gathered from the replies as a whole.

It is generally agreed that the enterprise should be an international one. Many think that international financial support should and would be accorded to it, but no method of securing this is indicated; others express the view that the cost may be met by subscriptions from societies, libraries, booksellers and individuals without government aid, and this is, perhaps, on the whole, the prevailing feeling among those who have discussed the matter from a financial point of view. But in no case is any attempt made to form any exact estimate of the cost.

A number of scientific bodies and institutions express themselves prepared to work in such a cause. The Secretary of the Smithsonian Institution suggests that, as the Institution receives all the serials and independent works published in America, a branch office might be established there, and that it is not impossible that a sum of money might be given yearly in aid. The Royal Danish Academy is willing to render as much assistance as possible. It would charge an official of one of the Danish chief libraries in receipt of all Danish publications with the task of editing slips, and would defray the cost of this work. The Société des Sciences of Helsingfors would furnish the central office with information as to the scientific work done in Finland. The Kongl. Vetenskaps Akademie of Stockholm would organize a Committee for Sweden.

As regards language, there appears to be more unanimity than could have been expected. Over and over again the opinion is expressed that English should be the language of the subject catalogue. Frequent reference is made to the importance of quoting titles in the original language, although some suggest that this should be done only in the case of those published in English, French or German, and perhaps Italian.

Some form of card catalogue appears to be generally favored, especially in America, as the basis of the scheme; the Committee of Harvard University, whose reply is very full, in particular discuss this point in detail.

In an interview with the Committee in March last, Professor Agassiz spoke very warmly in favor of the scheme, and of the support which it would meet with in the United States, especially from libraries. As others have done, he urged that the cooperation of booksellers and authors should be secured. Professor Agassiz also expressed the view that the regular issue, to libraries and scientific workers, from the central office, of cards or slips which would afford the material for the construction of card catalogues would form an important source of income, at all events in his country.

From various sides it is urged that an International Congress should be held to discuss plans. This is advocated as a first step in a reply received from the Königl. Gesellschaft der Wissenschaften in Göttingen, a reply to which, not only as regards this point, but also in respect to the whole matter, the Committee attach very great weight, since it embodies in an official form views arrived at by the Academies of Vienna and Munich, and by the scientific societies of Leipzig and Göttingen, who have considered the matter in common. Professor Agassiz strongly urged the calling of a conference, and among others who share this view, Dr. Gill, of the Cape Observatory, in his letter particularly dwells on

the great value of such meetings as the means of securing unanimity of action.

Such being the tenor of the correspondence, your Committee are convinced that initial steps of a definite nature in furtherance of the scheme ought now to be taken.

They accordingly request the President and Counsel to take measures with the view of calling together, in July of next year (1896), an International Conference, at which representatives of the several nations engaged in scientific work should be invited to attend, with the view of discussing and settling a detailed scheme for the production, by international coöperation, of complete authors' and subject catalogues of scientific literature.

London will probably be found the best place in which to hold such a conference. It may be desirable to summon the representatives of the different countries through their respective governments, and it will obviously be necessary that a detailed scheme be prepared, to serve as a basis for discussion at the conference. These and other points will require much consideration before any action at all can be taken; meanwhile it is desirable that a beginning should be made during the autumn, before the winter session of the Society. The Committee therefore recommend that the President and Council should give the Committee (which includes the President and officers) executive powers in order that they may take, in the name of the Society, such steps as they may think desirable, with the view of calling together the above-mentioned conference.

NOTES FROM LONDON.

A DAY with Mr. Maxim and his wonderful gun and more marvelous flying-machine has proved one of the most interesting of our tour to date. The flying-machine is completely repaired, and in as good working order as before its famous flight and unlucky accident. Mr. Maxim's lease has nearly expired, however, and little more can be done until he is reëstablished in new quarters. He has, at Bexley, only about 1800 feet range, and for further operations desires at least a mile. It may be difficult to find precisely the location suitable for the work. It would be fortunate for the inventor, for science and for the country, could the new location be found in the United States, with ample funds for the experiment. Mechanically, the machine is a success; but much experience is likely to be required to give its operation certainty and safety. The reduction to practice of the art of flying may probably prove a more serious matter than the solution of the purely mechanical problems involved.

THE Maxim gun is perhaps the most extraordinary implement of war ever devised. The pressing of a button is all that is required of the gunner, the gun loading itself and firing automatically, at the rate of 600 to 800 shots a minute, until the finger is removed or until the ammunition is exhausted. All the needed energy in working the mechanism is supplied by the recoil of the barrel of the gun. Hundreds of these guns have been supplied European and Oriental nations, and they have already done much effective work. It seems hardly creditable to the ordnance authorities of the United States that they should have permitted foreign nations to lead in utilizing so great an American invention. Mr. Maxim has not imbibed much respect for our officials, or our methods of treatment of inventors in this department of applied science, from his personal experience at home.

THE Henley races have come and gone, and the most interesting feature, to Americans, proved disappointing. In the races for the Grand Challenge Cup, Cornell won from Leander by an error on the part of the umpire, and was beaten by Trinity Hall. The result is claimed by advocates of the long