INTERNATIONAL GEOLOGICAL CONGRESS

AT the late meeting of the American Association for the Advancement of Science at Nashville, Tenn., Dr. T. Sterry Hunt presented a report on the above subject, of which at the time we gave a brief note. The following extracts, which have been sent us, will no doubt be more satisfactory to geologists:—

"The committee to arrange for an International Geological Exhibition and Congress, to be held in Paris in 1878, was appointed by this Association at Buffalo in August, 1876, and consisted of Messrs. W. B. Rogers, James Hall, J. W. Dawson, J. S. Newberry, T. Sterry Hunt, R. Pumpelly, and C. H. Hitchcock, together with T. H. Huxley for England, O. Torrel for Sweden, and E. H. von Baumhauer for Holland. At a meeting of the committee at Buffalo on August 25, 1876, James Hall was chosen chairman, and T. Sterry Hunt secretary. It was then agreed to prepare a circular setting forth the plan of an International Geological Exhibition, which should form a part of the general exhibition to be held at Paris in 1878, and indicating a scheme for the organisation of the geological collections to be sent thereto by the nations taking a part in that exhibition, and moreover, proposing an International Geological Congress to be held at Paris.

"The circular in accordance with this plan was duly prepared, and printed in English, French, and German, and before the end of the year had been sent by the secretary to the principal scientific societies and academies, as well as to the workers in geology throughout the world. The response to this invitation has been most gratifying. The Geological Society of France has formally recognised the great importance of the objects proposed, and promised its hearty co-operation, while private letters from its president to the secretary of the committee, and from Prof. Hébert to Prof. Hall, give cordial assurances of the same kind. Spanish and Italian geologists have translated and published the circular in their respective languages, and have communicated to the secretary their hearty approval of the plan. Prof. Capellini has, in this connection, published an interesting correspondence, calling attention to the fact that in 1874 he had laid the project of a similar International Geological Congress, to be held in Italy, before the Italian Minister of Agriculture, Industry, and Commerce.

"The Geological Society of London and the Geological Survey of Great Britain have also formally signified their approval of our objects, and the co-operation of Norway, Sweden, Russia, and Austro-Hungary, is promised. It is to be regretted that Germany has declined to take a part in the International Exhibition of 1878, but we trust that this will not prevent her geologists from joining in the proposed Congress. The director of the Geological Survey of Japan promises to aid in our work, and we have the same assurance from Brazil, where the circular has been translated into Portuguese. Chili and Mexico have also responded, and promise an ample representation of their geology at Paris next year; while Canada, both through her Geological Survey and in the person of Dr. Dawson, will probably be represented there.

"The Government of the United States has as yet failed to accept the invitation of France to take a part in the Exhibition of 1878, so that American geologists are not certain that they will be able to participate in the International Geological Exhibition of 1878. We are, however, assured that the Government is very desirous to have our country duly represented at Paris; and it is to be hoped that at the approaching extra session of the United States Congress, measures will be taken for accepting the French invitation, and appointing a commission, so that our people may secure a representation in Paris. I am assured, on all sides, that our geologists desire to contribute largely to the International Geological Exhibition, and even at this late day it will be possible to do much.

In any event it is probable that several members of our committee will be present at the proposed Geological Congress. The precise date of this has not yet been fixed, though your secretary is now in correspondence with the Secretary of the Geological Society of France upon this point, and believes that with the co-operation of that body a time convenient to all will be agreed upon.

"It is recommended by the Standing Committee of the Association that, in addition to the names of Prof. J. P. Lesley, of Philadelphia, and Prof. A. C. Ramsay, director of the Geological Survey of Great Britain, already added to the International Committee, the presidents for the time being of the Geological Societies of France, London, Edinburgh, and Dublin, of Berlin, of Belgium, Italy, Spain, Portugal, and the Imperial Geological Institute of Vienna, be invited to form part of our Commission.

T. STERRY HUNT

"Secretary of the International Committee."

Shortly after the presentation of the above report, the secretary received official notice that the Geological Society of France had, in co-operation with the above plan, appointed at Paris a local committee of organisation for the proposed Congress, constituted as follows:—Hébert, President; Tournouer and Albert Gaudry, Vice-Presidents; Bioche, Treasurer; Jannetaz, Secretary-General; Delaire, Sauvage, Brocchi, and Vélain, Secretaries; with the following: Belgrand Bureau, de Chancourtois, G. Cotteau, Damour, Daubrée, Delafosse, Delesse, Descloizeaux, Desnoyers, Fougué, V. Gervais, Gruner, De Lapparent, Mallard, Milne-Edwards, Pellat, Marquis de Roys and L. Vaillant, Members of the Committee.

A circular issued by this committee bearing date July 31, invites all those interested in geological, mineralogical, and palæontological studies to take part in the approaching congress, and to subscribe the sum of *twelve francs* each, which will give a card of admission to the Congress, and right to all the publications thereof. All those who intend to be present are at the same time invited to send, as soon as possible, a list of the questions which seem to them worthy of general discussion, as well as of the communications which they propose to make touching these questions. They are also invited to indicate the date which appears to them most convenient for the meeting of the Congress.

As regards an International Geological Exhibition, the Paris Committee of Organisation state that the difficulty of finding a suitable locality seems to them an obstacle in the way of realising this part of the programme. They hope, however, that there will be many special collections sent, and beg the exhibitors of such to give the committee due notice of these, in order that a special catalogue of them may be prepared.

The secretary of the International Committee desires, in this connection, to call attention to the fact that his circular did not contemplate the holding of an International Geological Exhibition apart from the universal exhibition, but, in the language of that circular, *the making as complete as possible the geological department of the universal exhibition*. It is certain that, as at all previous similar exhibitions, the different nations will contribute more or less of geological material, and it was conceived that such collections, extended and systematised in accordance with the plan set forth in the circular, would, while forming a part of the universal exhibition, without farther cost meet all the requirements of an International Geological Exhibition. To the accomplishment of this end it will only be necessary for the exhibitors of all nations to send a list of their geological contributions to the Local Committee of Organisation at Paris.

All correspondence relating to the Congress should be

addressed to Dr. Jannetaz, *Sécrétaire-général*, rue des Grands Augustins, 7, Paris, France; and all moneys sent to Dr. Bioche, at the same address.

THE MODERN TELESCOPE

THE gain to astronomy from the discovery of the telescope has been twofold. We have first, the gain to physical astronomy from the magnification of objects, and secondly, the gain to astronomy of position from the magnification, so to speak, of *space*, which enables minute portions of it to be most accurately quantified.

Looking back, nothing is more curious in the history of astronomy than the rooted objection which Hevel and others showed to apply the telescope to the pointers and pinnules of the instruments used in their day; but doubtless we must look for the explanation of this not only in

the accuracy to which observers had attained by the old method, but in the rude nature of the telescope itself in the early times, before the introduction of the micrometer; the modern accuracy has been arrived at step by step.

FIG. 1.—A portion of the constellation Gemini seen with the naked eye.

Let us see what the telescope does for us in the domain of that grand physical astronomy which deals with the number and appearances of the various bodies which people space.

FIG. 2.—The same region, as seen through a large telescope.

Let us, to begin with, try to see how the telescope helps us in the matter of observations of the sun. The sun is about 90,000,000 of miles away; suppose, therefore, by means of a telescope reflecting or refracting, whichever we like, we use an eyepiece which will magnify say 900 times, we obviously bring the sun within 100,000 miles of us; that is to say, by means of this telescope, we can observe the sun with the naked eye as if it were within 100,000 miles of us. One may say, this is something, but not too much; it is only about half as far as the moon is from us. But when we recollect the enormous size of the sun, and that if the centre of the sun occupied the centre of our earth the circumference of the sun would extend considerably beyond the orbit of the moon, then one must acknowledge we have done something [to bring the sun within half the distance of the moon. Suppose for looking at the moon we use on a telescope a power of 1,000, that is a power which magnifies 1,000 times, we shall bring the moon within 240 miles of us, and we shall be able to see

the moon with a telescope of that magnifying power pretty much as if the moon were situated somewhere in Lancashire—Lancaster being about 240 miles from London.

It might appear at first sight possible in the case of all bodies to magnify the image formed by the object-glass to an unlimited extent by using a sufficiently powerful eyepiece. This, however, is not the case, for as an object is magnified it is spread over a larger portion of the retina than before; the brightness, therefore, becomes diminished as the area increases, and this takes place at a rate equal to the square of the increase in diameter. If, therefore, we require an object to be largely magnified we must produce an image sufficiently bright to bear such magnification; this means that we must use an object-glass or speculum of large diameter. Again, in observing a very faint object, such as a nebula or comet, we cannot, by decreasing the power of the eye-piece, increase the brightness to an unlimited extent, for as the power decreases,