

and degraded savage. He had advanced many stages beyond this when we first came into contact with him, and his life, though simple and rude, was on the whole well ordered and happy; and if his wants and aspirations were few, so were also his cares and worries."

The illustrations are numerous and very good; we are told on p. 139 that hammers are commonly regarded by the uninformed as pestles, "but this is an error," yet in the description of the accompanying plate they are described as "pestles" and "hammers." It is greatly to be regretted that the utility of this book is restricted by the extremely inadequate "bibliography" (*sic*). The author's valuable papers in the Reports of the British Association, especially for the years 1899, 1900, and 1902, are not mentioned, neither does he give an exact reference to his own papers in the Journal of the Anthropological Institute. No clue is given where can be found, to take only two examples, Farrand's excellent paper on the basketry designs of the Salish Indians or the printed MS. of Mr. B. R. Ross. The single allusion to Prof. F. Boas is to his work on skull-deformation (reference again omitted), and the series of British Association Reports ending in 1898 is not even mentioned, although the twelfth and final report, with a good index, is of exceptional value. The important summary of Canadian ethnology in the Annual Archæological Report for 1905 (Toronto, 1906) contains papers by the author on the coastal Salish, and by Father Morrice on the Dénés, besides other valuable contributions by various authors, and as references are given to the literature the report serves as an admirable text-book on the anthropology of Canada. It is strange that no allusion is made to this publication; at all events, we recommend students who read Mr. Hill-Tout's book to consult the report in order to supplement his deficiencies.

THE LEICESTER MEETING OF THE BRITISH ASSOCIATION.

THE British Association is assured of a hearty welcome to Leicester for its seventy-seventh annual meeting to be held there from July 31 to August 7, under the presidency of Sir David Gill, K.C.B., F.R.S. Leicester is a place of great antiquity, few towns in England having a longer history of uninterrupted activity. Its Roman remains include the "Jewry Wall, a remarkable example of brickwork, and some mosaic pavement *in situ*. The geological features of the district are comprehensive, the Charnwood Forest, with its rocks providing many a geological puzzle, being within a few miles of the town. Botanists, too, have a happy hunting-ground there. The local committees and sub-committees are working hard to ensure the success of their efforts, and great interest is being shown on all sides in the visit of the association to Leicester. A guarantee fund of more than 3300*l.* has been raised towards the necessary expenses of the welcome, and this without any public appeal being made. No less than eleven amounts of 100*l.* and upwards are included in this sum.

A call has been made on all the principal halls and public buildings throughout the town for general and sectional use, and it is believed that the arrangements when completed will be most satisfactory in every way. The greatest difficulty the executive have had to meet has been the fact that Leicester possesses no town hall or public building large enough for the purposes of the holding of the usual *conversazione* and general reception of the large number of

members and guests anticipated. An ingenious suggestion, however, on the part of the chairman of the executive committee (Mr. Alfred Colson), which has met with the full approval of all concerned, promises to overcome all obstacles, and even to make the proposed *conversazione* additionally attractive on account of the unique way in which it will be housed. The intention is to utilise the whole of the present museum buildings, including the art gallery and mayoral reception rooms, for the use of which permission has been granted, and to erect on the four sides of the grass square adjoining a loggia or corridor constructed entirely of timber, 25 feet in width, forming a covered promenade about 500 feet in length. The four outer sides will be closed, but the inner sides, overlooking the grass plot, will be open, and so constructed as to be easily beautified with floral decorations. Internally the loggia will be draped with incombustible material and fitted with electric light and suitable furniture. Besides answering for the reception to be given by the Leicester Literary and Philosophical Society, the structure and grounds, with a military band in attendance, will make a convenient general rendezvous throughout the week.

A further edition of a very interesting work, "Glimpses of Ancient Leicester," by a local author, Mrs. Fielding Johnson, is being issued in connection with this meeting, and a handbook by another Leicester lady, Mrs. Nuttall, will be provided. The latter book will contain chapters on subjects of scientific interest prepared by various experts specially for the use of visitors.

Excursions are being arranged to many points of interest in the district, and the Mayor, Alderman Sir Edward Wood, J.P., will issue invitations to an evening *fête* in the Abbey Park. Sir Samuel Faire, J.P., will give a garden-party, and it may be taken for granted that the social side of the meeting will be well provided for. The comfort and enjoyment of all attending the meeting will not be overlooked, while the objects of the existence and visit of the association will throughout the week have the first consideration and thought.

AN AËRONAUTICAL EXHIBITION.

THE well-arranged collection of balloon appliances and models of *aéroplane* systems organised by the *Aéro Club* in connection with the Motor-car Exhibition in London presented a striking contrast to the want of organisation in the *aéronautical* section of the Milan exhibition of last year. The large, almost empty room at Milan, with no attempt at systematic display except in connection with the exhibits of the Prussian Government Meteorological Station, has no counterpart in the present exhibition. Here everything was well displayed, and there was no lack of exhibitors and assistants ready to give information to any inquirer.

In studying the exhibits, I paid special attention to the *aéroplane* models, with the object of ascertaining how far they were likely to furnish material that would further the systematic study of the problem of stability, and in particular of longitudinal stability, which is the more difficult of study. It appears, both from theory and experiment, that a very slight change in the form or dimensions, or even in the velocity of propulsion, of a model may change its motion from stable to unstable, and that if one machine travels safely through the air, another very closely resembling it may overturn at once. The general character of the exhibits does not seem to indicate that the constructors of flying models have

really grasped the all-important stability problem, or that the necessity of carefully studying the small oscillations of gliders, both stable and unstable, has been appreciated. It seems probable that a great many constructors of would-be flying machines do not even know what is meant by a moment of inertia, yet both theory and experiment tend to show that the stability of a machine depends partly on its moment of inertia being neither too large nor too small.

The models exhibited are of various sizes, and adapted for propulsion through the air by means of twisted elastics, like the familiar toys; they are, however, of various dimensions, say from about 3 feet to 6 feet. The trials which were made at the Alexandra Palace on Monday thus involved none of the dangers attendant on experiments with man-carrying machines. It is to be hoped that some means were taken to record the actual motions of the models while in the air. Such a record, if made in a way that would enable the positions and the velocities of the models to be plotted at every instant of the motion, could be made to furnish material the study of which will greatly advance our knowledge of the flight problem. From what I learnt at the exhibition, it appeared that this matter had not received much, if any, attention, but I was given to understand that two kinematographs would be employed to obtain the necessary records. The necessity for two is obvious, and I can only hope that the requisite measurements of base line and angles were also attended to.

In the following remarks I shall assume the result that a machine supported on aeroplanes has two kinds of longitudinal oscillations of different period, either of which may give rise to instability. This is not generally known, but it is desirable to analyse the models even in the light of ideas which are to some extent anticipatory. The rough notes taken are far from exhaustive, but they summarise a few points regarding some of the more conspicuous exhibits.

Ezio Tani shows a most elegant and beautifully constructed mechanism in connection with the *motor*; the arrangement of wings does not look very practicable.

Balston and Cochrane both exhibit propellers, &c., of corrugated aluminium.

The *avroplane* looks a fairly practicable model. The arrangement of two sets of planes tandem fashion appears suited for stability, at any rate so far as the short oscillation is concerned, but a great deal depends on whether the planes are parallel or inclined at a slight angle. On the other hand, the increased moment of inertia caused by the projecting framework and the considerable distance between the front and hind surfaces may give trouble with the long-period oscillation.

The Drexler model seems to go to the other extreme, and suggests that the shortness of base may lead to trouble with the quick-period oscillation. Here the planes are superposed, not arranged tandem.

Weiss's *albatross* is really a model of a bird with curved wings. How far this imitation of the shape of bird's wings conduces to stability cannot be completely studied without further experimental data than are at our disposal. The model looks as if it would glide well for a short distance, but without a very careful system of recording, short flights teach us but little.

Montford Kay shows a model of great length with propeller placed in the middle of a number of long parallel aeroplanes. The arrangement seems ill-calculated for obtaining much lifting force from the air.

Piffard shows a reasonable form of model with two pairs of superposed aërocurves, one behind the

other. As arranged at the exhibition, the combination looked as if it would be unstable for moderate velocities, but a slight change in the inclination of the aërocurves might make all the difference.

T. W. K. Clark shows the most genuine attempt to cope with the problem of stability, he having followed the lines laid down by Chanute in the matter of flexible framework. From what I could gather, however, the necessary movements for balancing were not arranged to take effect automatically, but the machine was a small-sized model of a type intended to be balanced and controlled by the dexterity of an aeronaut.

It would be impossible from these rough observations to draw any very definite conclusions about the probable results of the competition, but it may be apposite to remark in conclusion that failures may teach quite as much as successes if only they are properly studied.

G. H. BRYAN.

THE STUDY OF EARTHQUAKES.

THE Imperial Earthquake Investigation Committee of Japan has supplemented its well-known Publications by a bulletin, issued with the object of securing a quick publication of short notes and preliminary reports on seismological subjects. The series opens with a very interesting number; there are papers on the determination of the time of origin of a distant earthquake, on the methods of calculating the velocities of earthquake propagation, on the Tokyo records of the Calabrian earthquake, and, most interesting of all, a discussion of the cause of the San Francisco earthquake, by Prof. Omori, who describes the great fault-fissure, referred to in NATURE of June 21, 1906 (vol. lxxiv.), and notices that near Pt. Arena and at some other places it did not show at the surface as a simple fault-fissure, but as a zone of distortion crossed by parallel shear-cracks, from the direction of which he concludes that, besides the relative displacement of the two sides of the fault zone, there was a general compression of the country from north to south. This displacement was no mere surface phenomenon, as it appeared in the tunnel near Wright station, some forty miles S.S.E. of San Francisco, at a depth of some 700 feet from the surface. From the direction of overthrow of objects, Prof. Omori concludes that the whole of the country along the fault has been displaced towards the N.N.W., but the west side more than the east.

In Austria the collection of earthquake statistics has been taken over from a committee of the Imperial Academy of Sciences by a newly extended Government Institute of Meteorology and Geodynamics. The first of the seismological publications of this institute is a catalogue of the earthquakes of the Austrian Empire in 1904, which are detailed province by province, with the addition of a general summary. A catalogue of this sort is as important and useful as a collection of meteorological tables; it is little more interesting to read, but, if not pleasant reading in itself, this little pamphlet suggests some interesting if not very comforting considerations. The science of seismology is essentially an English one; it is to Englishmen, and practically to two of them, that most of its fundamental concepts owe their origin; the ideas, which give vitality, and the terms which are in universal use, have almost all been born in this country, yet England remains without any permanent or official organisation for the collection of earthquake information, while one country after another is establishing a special service for this purpose. Nor can the neglect be excused by