

Current Topics and Events.

THE ninety-first annual meeting of the British Association, which closed at Liverpool on Wednesday, September 19, was one of the most successful in the history of the Association, and all who have been concerned in the arrangements for it, whether local or sectional, are to be congratulated upon the gratifying result of their work. More than three thousand members attended the meeting, and the facilities afforded them for social amenities and scientific discussion were much appreciated by all. As nominated by the Council, Sir David Bruce was elected by the General Committee as president for the meeting to be held in Toronto on September 3-10 of next year. The Committee also cordially accepted the invitation from Southampton to meet there in 1925. On Monday, September 17, the honorary degree of doctor of science of the University of Liverpool was conferred upon the following distinguished men of science: Sir Ernest Rutherford; Prof. Niels Bohr, professor of physics in the University of Copenhagen; Dr. E. H. Griffiths; Prof. G. N. Lewis, professor of chemistry, University of California; Prof. G. Elliot Smith, professor of anatomy in University College, London; Dr. Johs. Schmidt, director of the Carlsberg Laboratory, Copenhagen; and Prof. J. C. McLennan, professor of physics in the University of Toronto.

CANON BARNES of Westminster preached the sermon on Sunday last in the Lady Chapel of Liverpool Cathedral on the occasion of the British Association's visit to that city. He dealt with "The Influence of Science on Christianity," and with characteristic courage attributed the waning influence of the churches to the obscurantism and static outlook of many exponents of religion. Christianity has gained much from progress external to itself; the pronounced ethical progress in the Roman Empire in the second century was a wide movement for which religion cannot claim the whole credit; thirteen centuries later the Renaissance had an invigorating effect, producing in the churches changes destined to be as permanent and valuable as they were extensive: the pity was that in the nineteenth century the churches did not take advantage of the changes produced in the outlook of educated men by the scientific movement, but, led by the tractarians, adopted rather an attitude of hostility which has resulted in the modern conflict of ideas among clerics themselves, and has prejudiced educated people against their teachings. "Faith is a necessity of existence. Zealots still contend that there is a moral value in blind faith. But the modern world, so far as it has fallen under the sway of the scientific method, demands that faith shall be reasonable and not blind." Inability to grasp new ideas, reluctance to discard or even to modify theories or beliefs, are qualities perhaps more rare among scientific workers than among theologians; but we are too accustomed to the conservatism of outlook among the former, particularly those whose life-work has been in the direction of elaboration of what are to them fundamental principles amounting to beliefs, to fail to

appreciate the magnitude and importance of the task of the best contemporary theologians in combating religious obscurantism.

If the first accounts exaggerated the number of lives lost, the latest figures reveal the completeness of the disaster caused in Japan by the earthquake of September 1. Although the exact number of deaths caused by earthquake and fire is still unknown, it is estimated that, approximately, 110,000 were killed in Tokyo, 30,000 in Yokohama, 10,000 in Kamakura, 10,000 in the Miura Peninsula, 700 in Odowara and Atami, and 5000 in the Boso Peninsula—a total of 165,700. In Yokohama, about 71,000 houses were destroyed and about 100 escaped damage; in Yokosuka, all but 150 out of 11,800 houses were destroyed; in Tokyo, 93 per cent. of the houses were burnt or crushed. Most of the high concrete buildings damaged in Tokyo show fissures in the third-floor facades, but above and below that floor there is little injury. The fire destroyed a great part of the Imperial University, including 700,000 volumes in the library. At first, the shock at Yokohama was not severe and differed little from those so often felt in Japan. Then, suddenly, there came a swirling motion (the vorticosity shock of the Italians), during which practically all houses collapsed instantaneously. Several early reports with regard to the effects of the shock prove to have been erroneous. There was no volcanic eruption in the island of Oshima and none of the islands off the Izu Peninsula disappeared. Dr. Nakamura has made a preliminary investigation of the central area. He finds that the earthquake originated in two separate foci, one between Oshima and Atami, in which the first and more violent movement seems to have originated, the other near the naval station of Yokosuka.

THE Howard silver medal for 1923 of the Royal Meteorological Society has been awarded to Cadet J. C. Needham of H.M.S. *Worcester* for the best essay on "Tropical Storms." The medal was competed for by the cadets from H.M.S. *Worcester*, H.M.S. *Conway*, and the Nautical College, Pangbourne.

THE International Commission of Eugenics met at Lund in Sweden on September 1 and 3 under the chairmanship of Major Leonard Darwin. Various resolutions were passed, and the question where the next international congress should be held was discussed. Profs. Nilsson-Ehle and Johansson were appointed members of the Commission. The Commission was entertained at dinner by the Mendelian Society and visited the Swedish Institute of Genetics at Akarp near Lund, and the Swedish State institute for race biological investigation. These are the only institutions in the world for genetics or eugenics which are State-endowed.

"HEALTH WEEK" is to be celebrated on October 7-13. This movement was instituted in 1912 and the arrangements are made by a committee appointed by the Royal Sanitary Institute, 90 Buckingham Palace Road, S.W.1. The object of Health Week

is to focus public attention for one week in the year on matters of health, and to arouse that personal responsibility for health, without which all public work, whether by Government or by Local Authorities, must fall far short of its aims. It is suggested that the dominant idea should be "Self Help in Health," and the consideration of what every individual can do for himself and his neighbour in securing a healthy life. While there is this central Health Week Committee, local celebrations in each centre are organised and controlled by local committees, and a circular has been issued for the formation and guidance of the latter, containing suggestions for the programme of events and subjects for lectures. The Health Week Committee is working in cordial co-operation with the National Baby Week Council (already referred to in these columns), and it has been found convenient in several instances to combine the celebrations of Health Week and Baby Week.

AN Empire Mining and Metallurgical Congress is to be held at the British Empire Exhibition in London during the first week in June 1924. The Institution of Mining and Metallurgy, the Institution of Mining Engineers, the Institution of Petroleum Technologists, the Iron and Steel Institute and the Institute of Metals, representing the scientific and technical interests of the mineral and metal industries, with the Mining Association of Great Britain and the National Federation of Iron and Steel Manufacturers, are co-operating as conveners of the Congress. This is the first such Congress to be held, and it is anticipated that succeeding sessions will be held in the Dominions under the auspices of an Empire Council of Mining and Metallurgical Engineering Institutions, which it is hoped will be constituted as a result of the inaugural Congress. Viscount Long of Wraxall will deliver the Sir Julius Wernher Memorial Lecture of the Institution of Mining and Metallurgy at the opening session of the Congress, taking mineral resources and their relation to the prosperity and development of the Empire as his subject. The May Lecture of the Institute of Metals to be delivered by Dr. F. W. Aston, on "Atoms and Isotopes," will also form part of the programme of the Congress.

AN unusual insurance claim is recorded by the New York correspondent of the *Times* in a message dated September 13. The University of Indiana took out a policy at a cost of about 30*l.* to insure against possible failure of the party from the University sent to Ensenada, Mexico, to take good photographs of the total solar eclipse of September 10. The expedition was unsuccessful, and the insurance company duly paid out about 300*l.*, which is to go towards the cost of the expedition. A similar insurance policy, but for 2000*l.*, was taken out by the Swarthmore College party, which was also in Mexico. The compensation in this case was to be inversely as the success of the expedition in obtaining photographs. It is stated that good photographs of the solar corona were obtained.

Up to July 2, no less than 826 broadcasting stations had been licensed in the United States. For various

reasons, however, chiefly financial, 376 of them have ceased to operate. Nearly half the total number of working stations are run by radio and electrical companies. The rest are run by newspapers, stores, colleges, churches, etc. That the art of broadcasting has come to stay is proved by the fact that only a small percentage of the stations were discontinued because their service was unsatisfactory to the public. In a few cases stations were closed down because of the competition of neighbouring rival stations. In Great Britain there is only a single organisation for broadcasting, and so the public does not get the benefit of improved service owing to competition. On the other hand, however, it is imperative that the industry be in a sound financial position if it is to work satisfactorily.

A MEMORANDUM on the rainfall in India during June and July and the probable amount during August and September has recently been issued by the Indian Meteorological Department. The monsoon was late in arriving on the shores of India, and was weak throughout the month of June. There was a general strengthening of the monsoon currents in the early part of July, and during the month well-distributed rain fell over most of India. For the two months of June and July the rainfall over the plains of India was about 6 per cent. above normal. The excess was large in Lower Burma and in the North-West Frontier Province and Rajputana West. The amount was short of the normal by more than 20 per cent. in most of the Madras Presidency, Orissa, the East Central Provinces, Berar, the West United Provinces, and mostly along the western frontier. The forecast issued in the early part of August states that there is no reason to expect any large departure from the normal in the rainfall of India generally in August and September. Reports received from India by the India Office show for the mid-week in September that there was an excess of rain in west Central India, north Hyderabad, and south-east Madras; normal amounts in Lower Burma, Orissa, west Central Provinces, and north Madras; elsewhere rains were scanty.

PROF. A. R. FORSYTH recently delivered a lecture on the life and work of Sir Isaac Newton, under the auspices of the London County Council, and it is published as an article in the *Empire Review* for September. This is an opportune moment to refresh the public memory on Newton's life and achievement, when so much interest is being taken in Einstein's modification of the Newtonian law of gravitation. In addition to a biographical sketch, the article gives a summary of the state of mathematics and astronomy when Newton was at Cambridge, and the preparatory work done by Copernicus, Tycho Brahé, Kepler, and Galileo in leading up to the *Principia*. It is explained that the geometrical methods of the *Principia* were adopted, because the validity of the infinitesimal method, which Newton had himself employed, was still a matter of controversy. Comment is made on the curious fact that Newton took a degree of the earth's circumference as 60 miles in his first abortive

test of his law; the correct value had been published in England thirty years earlier by Richard Norwood. The fact that international jealousy delayed the universal acceptance of the law of gravitation seems strange to us now; there is, however, a slight echo of it in the antipathy shown to Einstein in some quarters, because of his nationality. The article shows the important part that Voltaire played in persuading the French of the truth of Newton's law. Thus we find that before the return of Halley's comet in 1759, Clairaut and Lalande calculated its perturbations by gravitational methods. Prof. Forsyth makes the practical suggestion that the bicentenary of Newton's death in 1927 should be marked by a new edition of his collected works. There has been none

since Horsley's edition in 1785, and many additional manuscripts have been discovered since that date.

THE Almanac for the year 1923 published by the Egyptian Government contains, in addition to the usual statistical information, a good deal of matter of scientific interest. There are chapters on the geographical features, and special attention is given to the Nile. Agriculture and antiquities receive considerable attention, and there is a long section on irrigation. It is noted that the almanac is intended to be explanatory and descriptive rather than statistical, and in this respect is intended to supplement the "Annuaire Statistique." The book is a valuable volume of reference on Egypt.

Our Astronomical Column.

A LARGE FIREBALL.—Mr. W. F. Denning writes: "On September 7, at 7.45 P.M., G.M.T., a large fireball was observed from many places in the south-west of England. As viewed from Par, Cornwall, it appeared as large as the full moon, and passed from the west over north-west, and finally disappeared in north-north-west. It left a brilliant trail of light, and this remained conspicuously obvious to the unaided eye during five minutes. The trail exhibited some singular changes of shape and position while it continued in sight. It first assumed a vertical direction, after which the extremities curved to the left and formed a semi-circle.

"A number of other observers in Cornwall have reported observations of the phenomenon, and among other places it appears to have been well observed at Fowey, Liskeard, and Polruan. The object was also seen from Southampton, from which place the enduring streak was situated due west at an altitude of 16° ."

STELLAR MASSES.—Accumulating statistics on binary systems, combined with the great increase in the number of fairly trustworthy parallaxes, have made it possible to deduce mean values of the stellar masses for each spectral type. Messrs. Russell, Adams, and Joy investigate the matter in a joint paper in *Pub. Ast. Soc. Pacific* for August, using about 400 stars. They assign to type O masses of 6 to 9, to type B mass 6, to giants of types A to G masses 2 to 4, and to the dwarfs of all classes masses $\frac{1}{2}$ to $2\frac{1}{2}$; in each case the unit is the sun's mass.

On plotting mass against absolute magnitude, they obtain a graph that is practically a straight line, though with a slight upward bend for type B. This result seems to lead to a fairly obvious corollary, which is not, however, given by the authors. It is that the duration of the stellar universe in the past is of the same order as that of the luminous period of individual stars. If it were much greater than this, then even the most massive stars would have had time to distribute themselves among all the ranks of absolute magnitude. The same conclusion is obtained by dynamical studies of the stellar motions, which do not indicate any great preponderance of non-luminous stars.

The recently published report of the Cape Observatory states that the stellar masses are also being investigated there. The results suggest that the masses group themselves about certain standard values, $11\frac{1}{2}$, $5\frac{1}{2}$, $2\frac{3}{4}$, $1\frac{1}{4}$ of the sun, each being about double the following. If this law should be established, it would indicate that the large masses were

determined by some physical cause, and that they were liable to successive subdivision into equal parts.

HEAT RADIATIONS OF PLANETS.—Allusion has already been made in these notes to the investigation by Messrs. Edison Pettit and Seth Nicholson on the dark heat-waves emitted by the planets. These are isolated by the use of a cover-glass transmitting between 0.3μ and 5.5μ (with a weak extension to 7.5μ), and a water-cell transmitting between 0.3μ and 1.3μ . The curve of atmospheric transmission at Mt. Wilson is a very complicated one, with eight minima between 0 and 8μ , and two maxima between 8μ and 14μ . The dark planetary radiations are chiefly in the latter region. The deflexion from the planet Mercury has been compared with that from the moon, the ratio of radiation per unit area being $264/206$, a smaller ratio than would be expected in view of Mercury's proximity to the sun. The authors make the suggestion that it may indicate a rapid rotation of Mercury; they note in corroboration of this that they obtain a sensible deflexion even from the dark portion of Mercury's disc.

Their former measures indicated practically no dark heat from Jupiter, but the present series gives 78.1 per cent. of its radiation between 0.3μ and 1.3μ , 15.3 per cent. between 1.3μ and 5.5μ , and 6.6 per cent. between 8μ and 14μ .

A SMALL STELLAR MASS.—*Astr. Nachr.*, No. 5246, contains an investigation of the orbit of the binary O. Struve 400, by P. Meier. The position for 1900 is R.A. $20^h 6^m 54^s$, N. Decl. $43^\circ 39'$, magnitude 7.7, spectral type G 3; trigonometrical parallax $0.043''$ (Sproul Observatory), spectroscopic parallax $0.030''$ (Mt. Wilson). The elements obtained are: period 84.4 years, periastron 1885.1, $e 0.48$, $\omega 19.4^\circ$, $\Omega 143.9^\circ$, $i 62.5^\circ$, $a 0.428''$. The observations used extend from 1843 to 1922, so that practically a revolution has been completed. Using the Sproul parallax, the sum of the masses is 0.138 of the sun. (By a slip this is printed in *Astr. Nachr.* as 0.014 of the sun.)

The smallest stellar mass hitherto measured is that of the faint component of Krüger 60, which is about one-seventh of the sun; but if the present result is trustworthy, the joint mass of the pair is equal to that of this star.

A comparison of observed and computed positions is given. The agreement is fair, considering the closeness of the pair. The star is one that should be kept under observation. The components are furthest apart, $0.62''$, in 1932; the separation is more than $0.50''$ till 1948.