

skulls differed markedly from those of the Long Barrow men. On the other hand, in every respect these London skulls corresponded more closely with those of Anglo-Saxons than with those of Long Barrow men. Occasionally a Londoner might reproduce the Long Barrow type, as in the case of the notorious thief Jonathan Wild, but these cases were so rare as not to affect the average contour.

Further, the Londoner of to-day had changed his head shape from that of the seventeenth-century Londoner, but it was in the direction of the short-headed mid-European race, and farther away still from the Mediterranean type, of which the Long Barrow men were such good examples.

When the average contours of the modern London skulls were superimposed upon those of the Long Barrow men, it was at once evident that there were two sets of differences, which Prof. Parsons provisionally described as "masticatory" and "respiratory." The former consisted of increased length of skull in front of the auditory meatus, of a tilting forward of the malar bone and outer margin of the orbit, of a greater splay of the zygomatic arch, of an increased width of the ramus of the jaw, and of a flattening of the side of the head. All these changes were just as evident in an average contour of Eskimo skulls as in that of Long Barrow men, and they were all explicable by assuming an increased development of the great masticatory muscles.

The second set of changes between the Long Barrow and London skulls was the deep face and deep orbital openings of the latter, as in all Nordic skulls. The face of the English child at birth closely agrees with that of the Long Barrow man, and at three and five months the orbits and nose have markedly increased in depth from above downward. This is to be attributed to the narrowing and deepening of the nose to adapt the individual to a cold climate, ensuring that the air shall be more perfectly warmed by contact with the turbinated bones which act as radiators. As the nasion moves up the tops of the orbits have to keep pace with it, and so the characteristic depth of the Nordic orbits is accounted for.

It is interesting to note that though the Eskimo agree with the Long Barrow folk in the first set of masticatory characteristics, they differ from them and agree with the Nordic people in the second set of respiratory changes.

Pendulum Operations in India and Burma.¹

THE paper referred to below, recently published by the Survey of India, is an opportune contribution to geodetic knowledge. It gives the results of pendulum observations at 108 stations distributed over mountains, plateaux, plains, and coasts. Col. (now Sir) G. P. Lenox Conyngham, Major Cowie, and Capt. Couchman were the observers. The work extended over six years, 1908-13, and it is evident that unremitting care was bestowed upon it throughout.

This is the first attempt made outside the United States of America to apply to pendulum observations the correction for isostasy, first introduced by Mr. Hayford in 1909 when he was reducing the pendulum observations of America. The deduction of the correction for isostasy for any particular pendulum station involves considerable labour; the whole earth has to be divided into circular concentric zones, with the station as their centre; the mean heights of the several zones, above or below sea-level, have then to be determined from maps. This course has to be pursued *de novo* for each successive station. The

¹ Survey of India. Professional Paper No. 15: "The Pendulum Operations in India and Burma." By Capt. Couchman. (1915.)

application of Hayford's system to the pendulum stations of India is thus a most interesting feature of Capt. Couchman's work, and students of modern geodesy will find his explanations helpful and clear. The final results obtained by Couchman furnish strong evidence in support of Hayford's contention that isostatic compensation is complete at a depth of about 113 km.

Geodesy is a science demanding world-wide co-operation; the results obtained in one continent require to be tested in others. The theory of isostasy initiated in America has now been shown by Capt. Couchman to explain anomalies in Asia. But this is not sufficient; geodetic results and theories should be submitted to an international association for scrutiny. The old International Geodetic Association, which had been endeavouring for fifty years to co-ordinate the surveys of all countries, came to an end in 1914, when the war broke out. If geodesy is to progress, a new international association will have to be formed.

The old association, always sympathetic and anxious to help, had an uphill task; it had to contend with jealousies, and to accept results, whether good or bad, without being able to discriminate or criticise. Its authority rested largely on the personal reputation of the late Prof. Helmert, whose right to the position of director was universally recognised, and whose death during the war was lamented in many countries.

In 1914, when the old association came to an end, two questions were awaiting an international decision, namely, the introduction of a new spheroid of reference and the treatment of isostasy. Obsolete spheroids of reference are still employed by various surveys, and their continuance is due, not to any local belief in their correctness, but to an unwillingness to face the laborious complications of a change until a new spheroid has received international approval.

The problem of isostasy is also awaiting international consideration. In America Hayford and Bowie have worked out a complete system of computations, and in India Crosthwait and Couchman have followed Hayford's lead.² Will the system be accepted in Europe? When this question comes to be considered by the future international association Capt. Couchman's work on the pendulum operations in India will be found a useful and weighty contribution.

University and Educational Intelligence.

NOTICE is given by the University of London that applications for grants from the Dixon Fund for assisting scientific investigations must be made to the Academic Registrar of the University, South Kensington, S.W.7, before May 15 next.

Two further lectures under the scheme for the exchange of lecturers between Holland and England are announced. Both will be given at the rooms of the Royal Society of Medicine, 1 Wimpole Street; the first, by Prof. W. Einthoven, of Leyden, entitled "The Relation of Mechanical and Electrical Phenomena of Muscular Contraction, with Special Reference to the Cardiac Muscle," will be delivered on May 2 at 5 p.m.; and the second, by Prof. Bolk, of Amsterdam, entitled "The Somatic Changes in Affections of the Endocrine Glands and their Significance in the Evolution of Man," on May 12 at 5 p.m. The lectures, which will be delivered in

² In Professional Paper No. 13 (1912) Crosthwait applied Hayford's method to the observations of the plumb-line in India.

English, are addressed to advanced students and others interested in the subject, and admission is free, without ticket.

THE Registrar of the University of Calcutta has submitted an application to the Secretary to the Government of Bengal Education Department (*Pioneer Mail*, March 18) for substantial financial aid for teaching and post-graduate study in accordance with the recommendations of the Calcutta University Commission. For the salaries of the post-graduate staff during the session 1921-22 a sum of 1½ lakhs of rupees (8333l.) is asked. Large grants are also asked for the extension of technological studies in the University College of Science and Technology. It is suggested that part at least of these grants should be recurrent, but for the present year a capital grant of 10 lakhs of rupees (66,666l.) would enable the college to carry on its work. The library of the college is also in need of many standard works of reference, and for this purpose a grant of 1¼ lakhs of rupees (8333l.) is considered to be necessary.

THE subject proposed for the Adams prize for the period 1921-22 is "The Theory of the Tides." Applications of mathematical and dynamical theory to the observations already available, the rate of dissipation of tidal energy, the characteristics of tides in shallow seas and estuaries, and the general problem of tidal motion as affected by the earth's rotation are among the suggestions which the adjudicators make for the guidance of candidates. The prize is open to any person who has been at any time a graduate of the University of Cambridge, and is worth about 220l. Each essay must be accompanied by an abstract indicating which portions are considered to be original, and it may be printed, typewritten, or written by someone other than the author. A motto must be affixed to each essay, and a sealed envelope bearing the same motto and containing the candidate's name, degree, and address should be forwarded with the essay. Essays must reach the Registry of Cambridge University on or before December 31, 1922.

AN interesting event of the present month is the International Conference of Students which has just been held at Prague, an account of which has appeared in the *Westminster Gazette*. Prior to the war a society known as the "Corda Fratres," or International Students' Union, was already in existence. It was dissolved in later years, but is now being restored. In November, 1919, when Strasbourg University was celebrating its newly acquired freedom, La Confédération Internationale des Etudiants was formed by France, Belgium, and Czecho-Slovakia, and most of the other chief countries of Europe have since become affiliated. Apparently a necessary preliminary to admission is the existence of a national students' union in the country concerned. This formerly rendered Great Britain, the United States, and other countries ineligible, but it is stated that steps in the desired direction are already being taken. It is hoped that this country will play a part in the movement—one of great benefit to students and to the future of science, which, it is commonly said, knows no national boundaries. One of the unfortunate results of the war has been the accentuation of barriers to free scientific intercourse and exchange of knowledge, scientific men in Russia, Austria, and other countries being exceptionally unfortunate in this respect. This desire for fraternisation between students in the chief countries of Europe is a hopeful sign for the future of civilisation.

THE Royal Commission on University Finances, appointed in October last to inquire into and report

upon a basis for determining the financial obligations of the State of Ontario towards its universities, has presented a report to the Lieutenant-Governor of the State. There are at present five institutions of university standing in Ontario, and the report before us deals with three of them, Toronto, Queen's, and Western Universities. Toronto University is a State institution controlled on its administrative side entirely by the State Government; Queen's and Western Universities are independent, though they have been in receipt of annual grants from the Government which have been determined from year to year. The Commission recognises that higher education can no longer be supported by private individuals, and a definite scheme of State grants for the three universities is recommended. For buildings which are urgently needed it is considered that sums of 1,500,000 dollars, 340,000 dollars, and 800,000 dollars should be given to Toronto, Queen's, and Western Universities respectively. As regards maintenance, it is recommended that for the State University a yearly sum equal to 50 per cent. of the average yearly succession duties should be granted, while for the two independent institutions annual grants, to be adjusted every five years by a Court of Reference, should be made out of consolidated revenue. Should these grants be found insufficient, a direct tax for general educational purposes of one mill per dollar on the value of rateable property of the province is recommended. The question of the control of education in the universities was also discussed, and the Commission concludes that "the State, which gives financial support, has the right (a) to determine how this education may be most effectively and economically carried on, and (b) to exercise supervision over projected developments involving financial outlay."

WE are glad to see that the Library Association is issuing its Subject-Index to Periodicals for the years 1917-19, in continuation of the Class Lists for 1915 and 1916, and to learn that the association proposes to resume the annual publication of these indexes. It has just published in 87 quarto pages "Section F: Education and Child Welfare." As in former lists, the entries are arranged under subject headings, under each of which papers are placed in chronological order of dates of publication. The difficulty in framing a thoroughly satisfactory classification for papers which discuss education from many different points of view has been met by introducing frequent cross-references. Among the subject headings we find sections for education in general, education in each country taken separately; higher education, education of children, education of women, secondary education, and teachers. There are also sections for technical education, agricultural education; chemistry teaching; the study of engineering, and the study and teaching of science. We notice also sections on universities and colleges and on many universities taken singly. Among sections coming under the head of child welfare we find child study, abnormal and backward children, care and hygiene of children, employment of children, exceptionally gifted children, and milk. The lists of papers on citizenship, rehabilitation of the disabled, and educational aspects of the European war are well worth examining at the present time. There are altogether in this index 2154 titles of papers taken from 242 English and foreign periodicals published during the three years 1917-19. The total number of periodicals examined by the compilers of the Subject-Index to Periodicals for all the subjects catalogued is now nearly six hundred. We hope that the circulation of these useful class-lists will be sufficient to ensure the continuance of their publication.