botanical, zoological, or anthropological science—were engaged in teaching and research. The medical faculty will always be associated with the names of Dietl, Teichmann, Cybulski, Browicz, Jordan, Pieniazek, Korczvnski, Jaworski, Mikulicz, Rvdygier, Wicherkiewicz, and others.

The Jagellonian University always consisted, and now consists, of four faculties. The faculty of theology has nine professors; the faculty of jurisprudence has sixteen professors and four lecturers; while the faculty of medicine includes twenty-six professorial chairs and thirteen lectureships. The philosophical faculty embraces literature and philology, history and philosophy, mathematical, physical, and natural science; in connection with this faculty there is a college of agriculture, a department of pharmacy, and a teachers' training school. No less than sixty-eight professors and twenty-two lecturers are engaged in the work of this faculty. The total number of matriculated students during the session 1921–22 is 4631.

Space will permit only of a reference to the library of the university (Biblioteka Jagiellonska), renowned for the precious MSS. it contains.

L. N.

Current Topics and Events.

THE national manifestation of rejoicing on the occasion of the marriage of H.R.H. Princess Mary to Viscount Lascelles on Tuesday, February 28, is a sign of the secure place which the Royal Family occupies in the hearts of the British people and also, we hope and believe, a token of national unity. In common with all classes of the community, workers in scientific fields marked the occasion with affectionate interest and shared with much satisfaction in the chorus of good wishes by which the nation expressed itself in perfect harmony with a happy event.

THE following fifteen candidates have been selected by the Council of the Royal Society to be recommended for election into the Society:—Prof. T. H. Bryce, Mr. C. G. Darwin, Dr. C. G. Douglas, Dr. S. R. Douglas, Prof. A. J. Ewart, Dr. A. Hutchinson, Dr. F. W. Lanchester, Mr. J. Mercer, Prof. S. R. Milner, Prof. M. S. Pembrey, Prof. F. Lee Pyman, Prof. G. A. Schott, Dr. N. V. Sidgwick, Mr. D. M. S. Watson, Sir Alfred Yarrow, Bart.

THE Report of the Aeronautical Research Committee on the causes which led to the loss of the airship R. 38 was issued by the Air Ministry on February 23. The Committee has come to a number of clear findings and has summarised them at the end of its report; it has concluded, from an examination of the evidence available, that the airship broke in two as a result of defects in design, but that the loss of life was to be attributed largely to a subsequent fire. It appears that the only calculations made by the designers were of the type used in general engineering and had little special reference to airships. In addition, no account was taken of the aerodynamic forces which an airship might reasonably experience in normal usage. Information as to the importance of the air forces is said to have existed from experiments on models of airships in the wind tunnels, but the warning was not acted upon even to the extent of referring the problem to the Aeronautical Research Committee. Shortly expressed, the result of the enquiry shows the marked deficiency of rule-of-thumb as compared with scientific methods as an instrument of progress. The accounts of the accident in America to the semi-rigid airship, *Roma*, further point the moral. The obvious fundamental fact in engineering design is that the details of a structure should depend on the forces it has to withstand. In an airship the bending arises in part from the distributed weights and in part on aerodynamic loading, the former being independent of the speed of flight and the latter to its square. Hence an airship moving at 30 knots may have the stresses due to weight and buoyancy twice those due to aerodynamic causes, whilst at a speed of 60 knots the proportions are exactly reversed. The accident to R. 38 appears to have occurred when the air loading was at least five times that provided for by the designers on the basis of weight alone. There is great difficulty in introducing improvements into aircraft with the present official organisation, and it is to be hoped that the report will receive due consideration from the point of view that it is desirable to provide for scientific progress rather than for a process of trial and error on a large scale and at great expense in life and money.

THE third and final Report of the Committee on National Expenditure (Cmd. 1589, price 4s.), issued on February 24, deals, among other services, with the British Museum, National Gallery, National Portrait Gallery, Wallace Collection, London Museum, Imperial War Museum, Geological Museum, and National Galleries (Scotland). The Estimates for 1921–22 and the Provisional Estimates for 1922–23 are respectively £506,771 and £405,864. Over 80 per cent. of the Estimate is in respect of the cost of personnel. The Committee thinks that further economies might be produced by a close investigation into the size of the warding staff, especially in the case of the British Museum and the Natural History Museum. It recommends that there should be four paying days a week for all National Museums and Art Galleries without distinction. The Committee is of opinion that the net sum of £405,864, which is asked for in the Provisional Estimates for 1922–23, should be reduced to £392,264, a saving of £13,600. With regard to the grants for scientific investigation, amounting in all to £200,423, it is recommended that the grant to the Medical Research Council—£130,000—should be as proposed by the Treasury. As regards the smaller grants, the Committee says: "We are averse from an arbitrary and uniform reduction on a percentage basis on the ground that the saving to the Exchequer would be small compared with the detriment which would be caused to the activities of the learned and scientific world and the discouragement which would be given to private subscriptions and donations if the Exchequer grants were reduced. We therefore recom-

mend that the Provisional Estimate, as framed by the Treasury, should be accepted, with the qualification that it may be possible, under the terms of the Irish Settlement, to omit £2200 proposed for the four Academies and Societies in Ireland. The Department of Scientific and Industrial Research was instructed, in May last, to effect at least a 20 per cent. reduction on expenditure. The Department succeeded in effecting this, and presented a Provisional Net Estimate of £330,287. Since arriving at that figure the Department and the Treasury have agreed on an additional cut of £17,700, and, as the result of a further review, the Department have intimated that a still further reduction can be made, which will bring their Net Estimate down to £298,071. We are unable to recommend any further reduction beyond the saving of £32,216 already effected."

THE Minister of Health announced last week that the Rockefeller Foundation had offered a sum of two million dollars (approximately £454,000 at the present rate of exchange) for the provision of an institute of State Medicine in London—site, building and equipment—on the understanding that the British Government accepted the responsibility for staffing and maintenance. At present public health teaching is given at some seven or eight institutions in London, which instruct about 120 students per annum for the examinations for the Diploma of Public Health; for toxicology and medical jurisprudence practically no advanced course is available. The need for an Institute of State Medicine has long been recognised, and some years before the war the Board of Hygiene of the University of London formulated a scheme for the provision of such an institute, but funds for its establishment were never forthcoming, and in 1921 the Committee for post-graduate medical education in London made a similar recommendation. The offer of the Rockefeller Trustees has been gratefully accepted by the Minister of Health, and the Government proposes, we believe, to allocate a sum of £25,000 annually for the maintenance of the Institute, the work of which will be devoted both to education and to research in all branches of State Medicine.

ON Wednesday, March 1, there was opened at the British Museum a special exhibition of Greek and Latin papyri presented at various dates by the Egypt Exploration Society. This body (formerly the Egypt Exploration Fund) is celebrating the twenty-fifth anniversary of the foundation of its Graeco-Roman Branch, the excavations of which at Behnesa (Oxyrhynchus) and elsewhere have made so many additions to our stock of Greek literature and to our knowledge of the political, economic, and social history of Graeco-Roman Egypt; and it is in honour of the anniversary that the Museum is arranging its exhibition. A guide-book to the exhibition, with introduction, detailed descriptions of the papyri shown, a preface by Sir Frederic Kenyon, and one photographic facsimile, is being published by the Society, and will be on sale at the Museum, price 1s. The exhibition, which will be found in the MSS. Saloon, Case A, includes many interesting papyri of various kinds, selected to illustrate the wide range of papyrological discovery. There are examples of famous additions to Greek literature, like the Paeans of Pindar, the poems of Cercidas, and the Oxyrhynchus historian; theology is represented by the Sayings of Jesus; and the economic and social life of Egypt finds illustration in many non-literary documents, several of them rich in human interest.

THE Referee, under section 1 (5) of the Safeguarding of Industries Act, has given judgment against the complaint of the British Cellulose and Chemical Manufacturing Company, Limited, that calcium carbide had been improperly excluded by the Board of Trade from the lists published by them of articles chargeable with duty under Part I. of the Act. The effect of the award is that calcium carbide is not to be subject to import duty.

THE ambitious project for opening up a navigable channel of sufficient width and depth to enable ocean-going vessels to reach the group of inland ports fringing the shores of the Great Lakes of North America, and there to ship and discharge their cargoes direct without any intermediate handling, is steadily being urged in influential quarters, and, despite strong and determined opposition, appears to be gaining ground. The report of the International Commission, which has been holding an inquiry into the feasibility, necessity, and cost of the scheme, has just been presented to the respective Governments at Washington and Ottawa. The position may be briefly summarised as follows:—At the present time vessels loaded with grain at the great depôts of Port Arthur, Fort William, Duluth, and Superior, on Lake Superior, and of Chicago and Milwaukee, on Lake Michigan, are unable, on account of the rapids on the St. Lawrence, to proceed further than Buffalo, at the lower end of Lake Erie, where the grain has to be transferred either into barges to proceed along the Erie Canal to New York for reshipment or into small ships capable of traversing the Welland Canal as far as Montreal, where again reshipment is required for the ocean journey. This repeated handling of the cargoes means increased cost of carriage, delay, and dearer bread for the countries to which the grain is consigned. The necessity for transhipment can be avoided only by the formation of a waterway of sufficient capacity for ocean-going vessels, and, as contemplated in the proposed scheme, this means the enlargement and deepening of the Welland Canal from a depth of 25 ft., to which it is at present being increased, to a depth of 30 ft., and the construction of four lateral canals and impounding dams at the rapids on the St. Lawrence River, together with the deepening of the river-bed itself. There is an additional advantage attaching to the scheme in that by the construction of the dams a very considerable amount of hydro-electric power could be developed, and it is claimed that on this ground alone the project should prove a sound and profitable enterprise.

WE learn from *Science* that Capt. Roald Amundsen has made arrangements for co-operative work in

terrestrial magnetism and atmospheric electricity with the Department of Terrestrial Magnetism of the Carnegie Institution of Washington throughout his forthcoming expedition to the Arctic regions. During the North-East Passage, 1918–21, the Amundsen Expedition made a series of highly valuable magnetic observations at rather more than fifty different points, and Capt. Amundsen's chief scientific assistant, Dr. H. U. Sverdrup, has been associated with the Department of Terrestrial Magnetism since last October in order to complete the reduction and publication of the magnetic observations thus far obtained by the expedition. He will rejoin the *Maud*, Capt. Amundsen's vessel, early in March at Seattle. It is expected that Capt. Amundsen will resume his Arctic expedition, the chief object of which is to obtain scientific data relating to geography, oceanography, meteorology, gravity, terrestrial magnetism, and atmospheric electricity, about June 1.

H.R.H. The Duke of York will open the Research Laboratories of the British Cotton Industries Research Association, Shirley Institute, Didsbury, Manchester, on Tuesday, March 28. The opening ceremony will take place at 3.30 P.M.

THE Société Genevoise d'Instruments de Physique informs us that it has not at the London address, 95 Queen Victoria Street, E.C.4, a specimen of the printing chronograph referred to in Our Astronomical Column on February 16, p. 217.

THE trustees of the Percy Sladen Memorial Fund have given a substantial grant towards the expenses of the expedition to S.W. China by Prof. J. W. and Mr. C. J. Gregory, who are leaving for Rangoon at the end of March. The expedition will therefore be conducted as one of the Sladen Trust Expeditions.

PROFESSOR NILS BOHR, of the University of Copenhagen, will give a course of five lectures on the "Quantum Theory of Radiation and the Structure of the Atom" in the Cavendish Laboratory, Cambridge, on March 6, 7, 10, 13, and 14, at 4·45 P.M. The last two lectures, of a more advanced character, will deal with "Selected Problems in the Theory of Atomic Constitution."

THE members of the Geologists' Association of London are about to entertain at dinner their retiring President, Mr. William Whitaker, F.R.S. Mr. Whitaker, who is in his 86th year, joined the Geological Survey in 1857 and the Geologists' Association in 1875. He has frequently served as a member of the Council and has conducted innumerable excursions. He was President from 1900 to 1902, and has recently completed a second term of office. The dinner will be held on Saturday, March 25, at Stewart's Restaurant, 50 Old Bond Street, W., at 7 o'clock. A large attendance is expected.

AT a joint meeting of the Faraday Society and the Oil and Colour Chemists' Association, to be held on Thursday, March 9, at 8 P.M., in the rooms of the Chemical Society, Burlington House, W.1, a group of papers will be presented dealing with the properties of powders considered from various aspects. Prof. T. Martin Lowry and Mr. L. C. McHatton will deal with the grading of powders by elutriation, Prof. P. G. H. Boswell will contribute a paper on elutriation from the point of view of the geologist, and Dr. J. W. French will speak on grinding and polishing powders. Dr. R. S. Morrell, Mr. C. A. Klein, and Mr. W. J. Palmer will discuss the subject from the point of view of the oil and colour chemist, and Mr. R. W. Whymper will deal with certain applications to cocoa and chocolate. The subject will then be thrown open for general discussion.

Our Astronomical Column.

RELATION OF SPECTRAL TYPE TO MAGNITUDE.—The Henry Draper Catalogue of the Spectra of Stars, which is now completed but not yet fully published, contains as many as 225,000 stars. The classification is based on the Harvard system, wherein more than 99 per cent. of all the stars fall into the six main groups designated by the arbitrary letters B, A, F, G, K, and M. It is now known, from the work of Lockyer and Russell, that the actual sequences of changes in a star's spectrum are from M to B as the star increases in temperature (giants), and from B to M as the star cools (dwarfs). Thus for each letter mentioned above there are two distinct kinds of stars, and the nearer the letter is to M the greater this distinction becomes. It is necessary, therefore, to bear this fact in mind when reading the Harvard College Observatory Circular (No. 226) on the relation of spectral type to magnitude by Dr. Harlow Shapley and Miss Annie J. Cannon. Of the numerous tables given in the paper the following abstract of one of them exhibits some of the main results of the investigation.

The second column may be considered as representing the distribution of naked-eye stars among the various spectral classes. It will here be seen that the hot A stars exceed in number those of any other type, the cooler K class running it a close second. This state of things is reversed in the three following columns, which show a drop in magnitude for each

Spectral division	Visual magnitudes brighter than 6·25	7·25	8·25	9·25
B	719	1,286	2,061	3,026
A	2,018	5,904	15,884	39,342
F	680	2,160	6,536	15,224
G	656	2,456	8,776	27,160
K	1,984	6,144	20,760	51,008
M	538	1,453	4,491	10,657

column. In all columns, however, the A and K type stars are prominent features. In discussing the frequency of spectral divisions for successive fainter magnitude intervals, the B type stars rapidly fall off as fainter stars are considered. The A stars fall off to about the 8th magnitude, but then rapidly rise again. The F and M types maintain their frequency nearly throughout to magnitude 8·5, but fall slightly afterwards. The frequency of the G type increases very rapidly throughout the whole series up to magnitude 9·5, while the K class increases up to the 8th magnitude and then falls off. A plate accompanying the paper shows graphically many of the features of the tables.