

Experiments were made with the object of testing whether the friction between the wall and the backing was of importance, and these showed that this friction did not affect the horizontal thrust.

The second paper, by Mr. Angus Robertson Fulton, gives an account of experiments made on the overturning moments on retaining walls. The method of direct measurement of the moment was employed; the filling was of three kinds: (1) clean river sand, (2) gravel, and (3) garden soil. The total height without surcharge was limited to 7 ft., and with surcharge it reached 9 ft. The experiments without surcharge show that results calculated from the Rankine theory are greatly in excess of the observed values, while those obtained from the wedge theory approximate fairly closely to experiment. For surcharged vertical walls with unlimited slope the wedge and Rankine formulæ give values too great by 20 and 50 per cent. respectively. In the whole series of experiments the greatest discrepancy occurred with the 7-ft. levels (no surcharge) when gravel-filling was used, and was worst with the wall inclined outward. Low experimental values were also obtained in the sand tests at the lower level under surcharge. Mr. Fulton concludes that the wedge theory gives good results with material uncompacted for walls in which the inclination of the inner face is not greater than usually obtains in practice.

Fellowship of the New Zealand Institute.

AT the annual meeting in 1919 of the Board of Governors of the New Zealand Institute it was decided to establish a fellowship of the institute, since—apart from Hutton and Hector memorial medals, which can be gained only by very few—there are no honours attainable in the Dominion for those engaged in scientific research, the number of whom has greatly increased in recent years, while more branches of science are pursued than formerly. This fellowship, which entitles the recipient to place the letters "F.N.Z.Inst." after his name, is limited to forty fellows, and not more than four are henceforth to be elected in any one year until the number is complete, after which only such vacancies as occur may be filled.

In order to make a commencement, and as there were many who well deserved recognition for their long and valuable services to science, it was resolved that, in the first place, twenty original fellows should be appointed, these to consist of the living past-presidents, together with Hutton and Hector medallists (ten in all), and of ten more members of the institute who were to be elected by the past-presidents and medallists from persons nominated by the various affiliated branches of the institute.

The fellowship is to be given only for research or distinction in science, and it is plain that the distinction even now is far from easy of attainment, and that, as time goes on, its value will greatly increase. The election and appointment of the original fellows took place at the close of 1919, and resulted as follows:—Mr. B. C. Aston, *†Prof. W. B. Benham, †Mr. Elsdon Best, *†Mr. T. F. Cheeseman, **†Prof. Chas. Chilton, *††Dr. L. Cockayne, †Prof. T. H. Easterfield, Prof. C. C. Farr, Mr. G. Hogben, Mr. G. V. Hudson, Prof. H. B. Kirk, ††Dr. P. Marshall, *Dr. D. Petrie, †Sir Ernest Rutherford, Prof. H. W. Segar, Mr. S. Percy Smith, Mr. R. Speight, Prof. A. P. W. Thomas, *the Hon. G. M. Thomson, and Dr. J. Allan Thomson. * signifies past-president; † Hector medallist; and †† Hutton medallist.

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The Proposed University of Reading.

LORD HALDANE'S conception of the division of the country into areas in each of which a "civic university" caps the provincial education scheme is coming to be recognised as not only wise and far-seeing, but also essential. In Georgian and Victorian days a university was looked upon as primarily an institution for the completion of the teaching work of public schools. The wider view is taken now of the university as a focus of the intellectual life of the community which it serves and as a centre for research.

When in 1902 it was proposed that the Victoria University should be split up into the Universities of Manchester and Liverpool, many regarded the multiplication of degree-giving bodies with apprehension. It was feared that it would lead to a competition downwards. The reverse of this has happened. Leeds, Sheffield, and Bristol have secured independent universities, and each of them fears, above all things, the imputation that its degrees are less desirable than those of any other.

Reading is now seeking a charter. This project is not new. In 1911 the college received great endowments from Mr. and Mrs. G. W. Palmer, Lady Wantage, and Mr. Alfred Palmer, given for the purpose of enabling it to qualify for a charter. The scheme was interrupted by the war, but has now been taken up again with the utmost vigour. Three or four only of our modern universities have so large a permanent source of income. Its students are now more numerous than were those of two chartered English universities before the war.

In the provision of residential accommodation Reading is unique. Its six hostels lodge upwards of four hundred students. The college has also certain definite claims to be regarded as a national institution. In addition to the faculties of letters and science and the departments of fine arts, music, and domestic subjects, its distinctive line of study is agriculture, horticulture, and dairying. In these subjects it is a most important centre of research. Students go to it, not only from the whole of the United Kingdom, but also from the Continent and the British Dominions overseas.

The desire for independence is most natural. As matters stand at present, its professors and lecturers have no voice in determining the conditions for degrees, in settling the syllabuses of teaching, in carrying out the examinations, or in marking their students' answer-papers.

University and Educational Intelligence.

CAMBRIDGE.—Prof. Horace Lamb, Sir Thomas L. Heath, Prof. W. H. Bragg, and Dr. Henry Head have been elected honorary fellows of Trinity College.

Mr. A. Amos, Downing College, has been appointed University lecturer in agriculture, and Mr. G. U. Yule, St. John's College, re-appointed University lecturer in statistics.

A Smith's prize has been awarded to S. Pollard, fellow of Trinity College, for an essay on "The Stieltjes Integral and its Generalisations."

The following grants have been made from the Gordon-Wigan fund:—50*l.* for plant-breeding experiments, 50*l.* for an experimental gas chamber in the physiological laboratory, 50*l.* to assist in the provision and display of entomological specimens, 30*l.* to help in the study of Pleistocene deposits round Cambridge, and 20*l.* towards a deficit on the working of the botanical department.

The Secretary of the Royal Commission on Oxford and Cambridge Universities gives notice that all members of the University who desire to submit representations on matters falling within the terms of reference of the Commission should forward written memoranda in triplicate to him at 22 Carlisle Place, S.W.1, if possible by the middle of April.

Fresh regulations for the diplomas in agriculture and forestry have been drafted. It is proposed to establish a diploma in horticulture, and, further, to include horticulture in the subjects to be examined upon for the degree of B.A. in agriculture, estate management, and forestry.

THE Senate of the University of Dublin has decided to grant the following honorary degrees:—*D.Litt.*: Dr. William Crooke. *LL.D.*: Lord Bryce and Sir Donald MacAlister. *M.D.*: Sir Archibald E. Garrod, Regius professor of medicine in the University of Oxford. *D.Sc.*: Prof. W. H. Bragg, Quain professor of physics in the University of London, and Prof. R. A. Millikan, professor of physics in the University of Chicago.

A ROYAL COMMISSION has been appointed to inquire into the financial resources and working of the University of Dublin and of Trinity College, Dublin, and to consider the application which has been made by the University for State financial help. The members of the Commission are:—Sir Archibald Geikie, Sir John Ross, Dr. A. E. Shipley, Prof. J. S. E. Townsend, and Prof. J. Joly. Prof. G. Waterhouse is to be the secretary to the Commission.

THE governing body of the Imperial College of Science and Technology has made arrangements for the provision, partly from its own funds and partly from the gifts of donors for this special purpose, of six post-graduate scholarships for advanced work and research to be held in the coming year at American universities. It is hoped that arrangements may be made for interchange by the reception at the Imperial College of a corresponding number of university students from America. Lord Crewe, chairman of the governing body, has received the following letter from Viscount Grey:—"It is most desirable that young men of the rising generation, who will do much of the public work here and in America in the coming years, should get to know each other's universities. It will help both countries to realise how much the British and American peoples have in common, not merely in language, but in thought and in political views and aspirations. I am sure the interchange of students between British and American universities is most valuable both to individual students themselves and generally in promoting friendship based upon true understanding."

A WELL-ATTENDED meeting of teachers of the Incorporated Colleges and Schools of the University of London was held at King's College on Friday, March 12, under the chairmanship of Prof. W. A. Bone, of the Imperial College of Science and Technology, to consider the position of university teachers in relation to the Teachers (Superannuation) Act. The chairman pointed out that, as the Act is framed, university teachers are expressly excluded from its benefits. This exclusion will inevitably set up a barrier between the schools and the universities, and prevent the free transition of teachers from the one to the other, especially as the salaries of university lecturers compare most unfavourably with those in the better secondary schools. Financially, the benefits under the Teachers Act are much greater in almost all respects than under the existing contributory scheme for university teachers, which

makes no provision in respect of the years of service of a teacher prior to his joining the scheme, whereas the Act is retrospective and takes account of all years of recognised service. As the scheme was only instituted in 1913 this is a matter of serious concern to the older university teachers, for whom the provision on retirement is totally inadequate. The new scales of salaries and the Teachers Superannuation Act have made the school-teaching profession much more attractive than in the past, and unless the universities are placed in a position to offer salaries and retiring allowances at least comparable with those offered to teachers in secondary schools, they cannot maintain their efficiency and attract the abler graduates to their service. After discussion the following resolution was passed with only five dissentients:—"That this meeting of whole-time teachers in the Incorporated Colleges and Schools of the University of London hereby requests the Government to extend to university teachers and administrative officers all the benefits of the School Teachers (Superannuation) Act, 1918." A committee was appointed to take further action in conjunction with the Association of University Teachers.

Societies and Academies.

LONDON.

Royal Society, March 4.—Sir J. J. Thomson, president, in the chair.—Dr. F. F. Blackman: The protoplasmic factor in photo-synthesis. The centre of interest in problems of the photo-reduction of CO₂ in green photo-synthesising cells is shifting from the chlorophyll to the protoplasm. The quantitative control of photo-synthesis in the normal green cell is determined protoplasmically. This is illustrated by the temperature relations, which are not those of a photo-chemical reaction, but of a dark reaction. The photo-synthetic activities of leaves of different varieties (green *v.* golden leaves) and at different stages of development show no relation to the amount of chlorophyll that they contain, as is brought out by the "assimilation numbers" of Willstätter. The relation between chlorophyll development and photo-synthesis development, described in the next communication, furnishes another instance of the dominance of factors other than the pigment. In many lower organisms we find the power of reducing CO₂ to form organic matter by chemical energy in the absence of pigment or light. This chemo-synthesis may be the sole or only an alternative source of the carbon for the living cell. The process involves, of course, no cosmic gain of energy. In these cases the efficiency of energy transference from the oxidation of various substances to the reduction of CO₂ seems to be as great as or greater than in the utilisation of light energy for photo-reduction of CO₂.—G. E. Briggs: The beginning of photo-synthesis in the green leaf. In young leaves development of the power of photo-synthesis is found to lag behind development of chlorophyll, so that a green leaf when young may exhibit very slight or zero photo-synthetic power. This means that photo-synthetic activity demands development of some other internal factor than chlorophyll. The potentiality of this other factor rapidly increases with age day by day, even when the leaf is kept in darkness continuously. By keeping a leaf in a very low partial pressure of oxygen, further development of chlorophyll can be completely arrested, even in continuous light. Here also, starting with a leaf of feeble green tint, there is similar day-by-day increase in photo-synthetic power in spite of there being no further greening. Experiments were carried out by