shape of (1) an undertaking that the Government Departments concerned in motor transport and the air services would undertake to make use only of British magnetos made (so far as practicable) only of British parts—such undertaking to be for a term of years after the conclusion of the war; and (2) the extension to all magnetos of the import duty of 33⅓ per cent. imposed upon magnetos imported as parts of motor-cars. We reported to the President of the Board of Trade that, in view of the importance of the manufacture of magnetos for military and naval purposes, its position as a "key industry," the efforts which the manufacturers have made, and the undoubtedly severe competition from the powerful Bosch interests which they will have to encounter after the war, we were unanimously of opinion that Government assistance might be given in the two forms desired by the industry.

Apart from proposals for the imposition of import duties on foreign goods, other suggestions put before us for the protection of British manufactures in other ways included the restriction of British Government contracts to British goods, or a preference to such goods in respect of price. The reasonableness of this claim was strongly urged upon us by representatives of the new magneto industry, and also in the case of table glassware. In this connection we were informed that at the instance of the British Science Guild a large number of educational institutions and authorities have already undertaken not to purchase any chemical glassware of foreign manufacture for a period of three years after the war, provided that an adequate supply of British manufacture is forthcoming.

RECOMMENDATIONS.

Scientific Industrial Research and Training.—(*a*) Larger funds should be placed at the disposal of the new Committee of the Privy Council, and also of the Board of Education, for the promotion of scientific and industrial research and training.

(*b*) The universities should be encouraged to maintain and extend research work devoted to the needs of the main industry or industries located in their respective districts; and the manufacturers engaged in those industries should be encouraged to co-operate with the universities in such work, either through their existing trade associations or through associations specially formed for the purpose. Such associations should bring to the knowledge of the universities the difficulties and needs of the industries, and give financial and other assistance in addition to that afforded by the State.

In the case of non-localised industries, trade associations should be advised to seek, in respect of centres for research, the guidance of the Advisory Council of the Committee of Privy Council for Scientific and Industrial Research.

(*c*) An authoritative record of consultant men of science, chemists, and engineers, and of persons engaged in industrial research, should be established and maintained by some suitable Government Department, for the use of manufacturers only.

Copyright.—The United Kingdom copyright law should be brought into line with that of the United States.

Patents.—(*a*) The efforts which have been made to secure uniformity of Patent Law throughout the Empire should be continued. (*b*) The provisions of the law as to the compulsory working of patents in the United Kingdom should be more rigorously enforced, and inspectors should be appointed to secure that such working is complete and not (as has frequently been the case) only partial. (*c*) The fullest possible information as to enemy patents should be given to British firms during the war, and every practicable assistance for their use.

Trade Marks.—All German and Austrian goods imported into the United Kingdom should be required to be marked with an indelible mark, "Made in Germany" or "Made in Austria-Hungary," and goods imported from other foreign countries should be similarly marked either with the country of origin or with the words "Foreign Made" or "Not British." Such marking should be in all cases on the actual goods and not merely on the package.

Transport.—A definite policy for the improvement and extension of the canal system of the United Kingdom should be formulated, with a view to its being carried out so soon as the national finances shall permit.

Financial Assistance.—(*a*) The joint stock banks should be invited by his Majesty's Government, so soon as opportunity offers, to consider the possibility of affording a greater measure of assistance to British industrial enterprise. (*b*) All Government Departments, local authorities, and statutory bodies entrusted with the control of moneys raised by taxes or rates, should be under legal obligation to purchase, so far as possible, only goods produced within the British Empire.

Trade Exhibitions.—The following broad principles should be adopted in respect of future trade exhibitions:—(*a*) Trade exhibitions should be held under the control of the Board of Trade; (*b*) exhibitions should be exhibitions of manufacturers' wares for traders, and should not be organised with the view of attracting the general public; (*c*) exhibitions should not be too general in scope, but should be for a limited number of branches of industry at a time, according to the importance and dimensions of each particular industry in this country; (*d*) at least one year's notice of the intention to hold any particular exhibition should be given to manufacturers.

Establishment of a Ministry of Commerce.—His Majesty's Government should be urged to consider anew the advisability of establishing a separate Ministry charged solely with the safeguarding and extension of British industry and trade, and freed from the regulative duties in respect of railways, shipping, and harbours, and the duties in respect of labour, which at present devolve upon the Board of Trade.

Extension of the System of Trade Commissioners.—The appointment of Trade Commissioners, responsible, and reporting directly, to the Board of Trade, should be extended to the principal foreign countries.

The Consular Service.—The organisation of the Consular Service should be dealt with so soon as possible after the completion of the report of the Royal Commission on the Civil Service, with a view to the increase of its commercial utility.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

ABERDEEN.—At the recent meeting of the University Court, intimation was received of a munificent benefaction to the University by Sir Alexander McRobert, Cawnpore, India, and of Douneside Lodge, Tarland, Aberdeenshire. Ten years ago Sir Alexander instituted a research fellowship in the University for the purpose of encouraging the investigation of the cause, prevention, and treatment of cancer. An annual sum was placed at the disposal of the University to meet the salary of the fellow and necessary working expenses. The fellowship has been held in succession by Drs. Bertie R. G. Russell, Alex. Greig Anderson, and Harold A. Haig, and some important investigations

have been carried out by them on the nature of cancerous growths. Sir Alexander McRobert has now placed the foundation on a permanent footing by handing over securities to the University which will yield an annual return of about 750*l.* It has been arranged that the foundation shall take the form of a lectureship, attached to the department of pathology. The lecturer will conduct research with a view to the elucidation of the problems of cancerous and other malignant diseases, and will also give instruction on subjects connected with his investigations.

SHEFFIELD.—The council, at its meeting on February 7, appointed Dr. A. J. Hall (senior physician, Sheffield Royal Hospital) to the professorship of medicine, in succession to Dr. D. Burgess.

A NOTE in the *Sunday Times* records that on February 4 Lord Hardinge, the Viceroy of India, laid the foundation-stone of the new Hindu University buildings to be erected at Benares. The estimated cost will amount to about 2,000,000*l.*

THE following appointments have been made in connection with the Royal College of Physicians of London:—Sir Thomas Barlow to be the Harveian orator for the present year, Dr. H. W. G. Mackenzie the Bradshaw lecturer, and Dr. W. J. Howarth to be the Milroy lecturer for 1917.

IT was stated in the manifesto issued last week on the position of science (see p. 640) that communications to the Reorganisation Committee should be addressed to 107 Piccadilly, London, which is the address of the Savile Club. The secretary of the Reorganisation Committee now asks that such communications should be addressed to him at 11 Airlie Gardens, London, W.

THE Government of Madras has inaugurated a scheme of lectures for the education of villagers in sanitary principles. Model lectures on various subjects affecting the daily life of the villagers have been prepared by the Sanitary Commissioner, and the idea is, we learn from the *Pioneer Mail*, to translate these lectures into the principal vernaculars of the Presidency in language easily understood by the people, and to get them delivered to villagers through the agency of the sanitary and educational staff, surgeons, and other competent persons, who may have sufficient interest in the movement.

IN addition to the war work being done in the departments of physics and arts and crafts of the Reading University College, to which reference was made in our recent note on the December issue of the *Reading University College Review*, we learn that the chemical department of the college is active in a similar direction. The work consists in the preparation of synthetic drugs for the Admiralty, and in connection with the Royal Society's Sectional Chemical Committee. Several old students have obtained temporary posts as chemists in explosive works, and a number are on the waiting list of the National Physical Laboratory for assisting in physical and engineering experiments upon war problems.

THE following gifts to higher education in the United States are announced in the issues of *Science* for December 31 and January 7 last:—A gift of 15,000*l.* to the Harvard Medical School; this is the balance of the bequest of Morrill Wyman, who established the Morrill Wyman Medical Research Fund, the income of which is to be applied in promoting investigation concerning the origin, results, prevention, and treatment of disease. Dr. Rudolph A. Witthaus, known for his work in chemistry and toxicology, who died on December 19 last, left most of his estate of more than 30,000*l.* to the New York Academy of Medicine. Dr. Witthaus left to the Academy of Medicine all his books and the estate for the benefit of the library. Grinnell College has received 10,000*l.* from an anonymous donor. The college is conducting a campaign for new endowment and buildings. Recently a parcel of land in Kansas City, valued at 30,000*l.*, was turned over to the college. The alumni of the college are raising funds for new buildings, the construction of which will be commenced next spring, which will cost about 50,000*l.* It is now said that the estate left by the late Mr. Amos R. Eno is likely to amount to 3,000,000*l.* Provided the will filed for probate last October stands, in the face of the contest being made by Mr. Eno's next of kin, Columbia University's share of the estate will be about 1,400,000*l.*

FURTHER gifts to higher education in the United States are recorded in the issue of *Science* for January 21. Mr. George T. Baker has made a further gift of 10,000*l.* to Cornell University; Barnard College, Columbia University, has received 20,000*l.* from Mr. James Talcott; a new chair at the University of Pennsylvania, to be known as the Dr. Isaac Ott chair in physiology, has been endowed through the legacy received from the estate of the late Dr. Isaac Ott; and the sum of 50,000*l.* has been given by Mrs. Russell Sage to the Emma Willard School in Troy to found a department of domestic and industrial art. The new department will occupy the buildings recently vacated by the school on the completion of new buildings made possible by a gift of 200,000*l.* from Mrs. Sage in 1907.

THE Department of Agriculture and Technical Instruction for Ireland has issued a circular (Form S. 125) giving particulars of the technical school examinations it will hold during the present year. The Department's scheme of examinations is designed to follow courses of instruction extending over four years in commerce, building trades' work, applied chemistry, electrical engineering, mechanical engineering, domestic economy, and art. Examinations in all subjects of the courses will be held this year in May. Certificates will not be issued by the Department in respect of the first and second years' examinations of any course, but pass lists will be issued to the local school authorities. It is intended that the courses of instruction of which these examinations will provide a test should include not only theoretical, but also practical and laboratory work.

NOTICE has been given that the fourth election to Beit fellowships for scientific research will take place on or about July 15 next. Not more than three fellowships will be awarded. Applications must be received on or before April 15. Forms of application and all information may be obtained, by letter only, addressed to the Rector, Imperial College, South Kensington, London, S.W. The annual value of every fellowship is 150*l.*, and its tenure is for one year, which may be extended by the trustees for a further period not exceeding one year. So long as the fellow is a graduate of a British University, or holds some approved diploma, he may be of any nationality provided he is of European descent by both parents. Every candidate must be under the age of twenty-five years on the date of election. Fellows are attached to a department of the Imperial College of Science and Technology, and work under the supervision of a professor in accordance with the arrangements made by the head of the department.

THE returns of the registration of students for November, 1915, of thirty of the universities in the United States are tabulated and analysed in an article by Mr. J. C. Burg, of Northwestern University, in the issue of *Science* for January 21. The largest gains in

the number of students, including the summer attendance, were registered by the following universities (the number in brackets giving the increase in the number of students):—California (2375), Pennsylvania (900), Minnesota (892), Chicago (837). The University of California, with a total of 10,555 students, was the only institution with a gain of more than 1000 students. Omitting summer students, the largest gains for 1915 are those of Pennsylvania and Minnesota. Four universities enrolled more than 7000 students, viz., Columbia (11,888), California (10,555), Chicago (7968), and Pennsylvania (7404). The article also provides some interesting statistics as to the number of students taking different branches of study. In engineering Michigan now leads with 1498 students, followed by Cornell with 1347. The largest medical school is at New York University, where 509 students are now enrolled. The school of commerce of New York University has 2639 students, and Pennsylvania comes next with 1889. The school of education at Columbia numbers 1972 students, as compared with 897 at Pittsburgh. These figures as to subjects are exclusive of summer students. The largest summer session in 1915 was at Columbia, where 5961 students were enrolled. At California a remarkable increase last summer of 2012 brought the number of summer students to 5364.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 3.—Sir J. J. Thomson, president, in the chair.—Prof. W. **Bateson** and C. **Pellew**: Note on an orderly dissimilarity in inheritance from different parts of a plant. In a recent paper the authors gave evidence as to the genetics of the wild-looking "rogues" which appear as the offspring of high-class types of peas. Among other peculiarities, it was shown that F_1 plants resulting from crosses between rogues and types were in their juvenile condition intermediate, showing influence of the type parent, but on maturing they become rogues and have exclusively rogue offspring. The authors interpreted this to mean that the type-elements are left behind in the basal parts of the plant. In the variety Gradus certain intermediates (offspring of types) were observed to give mixtures of types and rogues. In such intermediate plants the characters often change with age, the lower parts being more type-like, the upper more rogue-like. Preliminary sowings of seed from these intermediates indicate that when their offspring consists of types and rogues, *the types come predominantly from the lower pods and the rogues from the upper pods.* The three sets of facts are therefore consistent in indicating that there is an orderly segregation in the body of the plant, the type-elements being predominantly in the lower parts.—H. M. **Woodcock**: Observations on Coprozoic flagellates, together with a suggestion as to the significance of the kineto-nucleus in the Binucleata. The paper deals with the first results of a comprehensive study of the *coprozoic* flagellates of goats and sheep. The coprozoic fauna comprises those forms which pass through the alimentary tract in a resting, encysted state, and undergo all the active phases of their life-cycle in the (moist) dung.—S. B. **Schryver**: Investigations dealing with the phenomena of clot formations. Part III.—Further investigations of the cholate gel. It is shown that there is a marked similarity between certain vital activities of cells and the behaviour of cholate gel. (1) The erosive action of certain organic substances on the cholate gel runs parallel with their narcotic and cytolytic actions. (2) Gel formation by calcium chloride is inhibited by sodium, magnesium, and other chlorides. The same substances can also cause gel erosion, but the erosive action can be antagonised by the addition of relatively small amounts of calcium salts. (3) To explain the parallelism between certain biological actions of organic substances and the antagonistic action of inorganic salts, on one hand, and the action of these substances on the cholate gel, on the other, it is suggested that the cell membrane or cytoplasm is constituted by a heterogeneous system of lipoids, proteins, etc., held together in a magma containing a gel-forming substance with physical properties similar to those of the cholates. On such a hypothesis, the biological action of certain substances can be explained in a manner more satisfactory than is possible by the assumption of the "lipoid" theory of Hans Meyer and Overton.—J. M. **O'Connor**: The mechanism of chemical temperature regulation. Anæsthetised cats or rabbits, when not shivering, consume oxygen in proportion to their body temperature. When shivering, more oxygen is consumed than would otherwise be consumed at that body temperature. The onset of shivering is dependent on the brain temperature being below a point more or less fixed in a given animal. The amount of "extra oxygen" consumed during shivering is proportional to the extent to which the average skin temperature is below this point. This point towards which the animals regulate chemically varies in different animals between 30° and 39° C.

Mathematical Society, January 13.—Sir Joseph Larmor, president, and later Prof. A. E. H. Love, vice-president, in the chair.—Sir J. **Larmor**: The transition from vapour to liquid when the range of the molecular attraction is sensible. In the theory of capillarity, and of change of state, the hydrostatic pressure p is defined, in physical illustration, as the difference between two much larger quantities, the repulsion ϖ due to molecular motion, and the mutual attraction P of the molecules. Its graph, in the Andrews-Thomson diagram, determines the critical point and the conditions for change of state. It is a definite quantity only where the density is unform; thus it loses its meaning inside interfacial layers of rapid transition, though under fluid conditions it is transmitted across such layers. The instability in homogeneous fluid, and consequent separation of phases, which ensues when dp/dv becomes positive, is essentially a matter of the internal constitution of the fluid, and ought to be so deducible. It is found, however, that the homogeneous medium is unstable for variation of density when $d(p-\mathrm{P})/dv$ is positive: whereas instability from external stress, when the density is not disturbed, occurs within the narrower limits for which dp/dv is positive. When the range of attractions is sensible there will thus be arcs of internal instability along the isothermals above the critical point, for which, however, separation into two phases, vapour and liquid, cannot occur. It might be imagined as relieved by gradual falling away of the medium to modified states of molecular aggregation; and, in fact, the question arises, why this type of change should be regarded as excluded in the usual theory, notwithstanding the aptness of the van der Waals equation. An S-shaped convolution of the isothermal is still the condition for abrupt transition of state. Other conditions restricting the form of such law of attraction as is compatible with the existence of a homogeneous phase are noticed.—T. W. **Chaundy**: (1) A note on the uniform convergence of the series $\Sigma a_n \sin n\theta$. (2) A condition for the validity of Taylor's expansion.—G. H. **Hardy**: The average order of the arithmetical functions $\mathrm{P}\Delta(x)$.—(x) and C. E. **Weatherburn**: Green's dyadics in the theory of elasticity.—G. N. **Watson**: A problem in "Analysis Situs."