(3) The Senate or Convocation of the University of London, or any other person or body directly affected by any such statute or regulation, may, within thirty days after the notification thereof in the *London Gazette*, petition Her Majesty in Council to withhold her approval of the whole or any part thereof.

(4) Her Majesty in Council may refer any such petition to a committee of the Privy Council, with a direction that the committee hear the petitioner personally or by counsel, and report specially to Her Majesty in Council on the matter of the petition.

(5) Thereupon it shall be lawful for Her Majesty by Order in Council either to declare her approval of the statute or regulation in whole or in part, or to signify her disapproval thereof in whole or in part. but any such disapproval shall be without prejudice to the making of a new statute or regulation.

(6) The costs of any petition under this section may be regulated by the committee to which the petition is referred.

V. *Power to amend statutes and regulations.*—After the expiration of the powers of the Commissioners the Senate of the University shall have power to make statutes and regulations for altering or supplementing any of the statutes or regulations made by the Commissioners. Provided as follows :—

(1) A statute made under this section shall be subject to the provisions of the last foregoing section, with the substitution only of the Senate for the Commissioners;

(2) A regulation made under this section shall be invalid so far as it is inconsistent with any statute made under this Act and for the time being in force.

VI. *Short title.*—This Act may be cited as the University of London Act, 1896.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

A DESPATCH (says the *Board of Trade Journal*) has been received at the Foreign Office from Mr. Martin Gosselin, Her Majesty's Chargé d'Affaires at Berlin, stating that a Government chemical dyeing school has recently been opened at Crefeld, which has cost about £20,000, exclusive of the machinery and fabrics, which have for the most part been presented by private manufacturers. The school contains laboratories for research and educational purposes, as well as a complete collection of dyeing machinery, and an exhibition showing the result of different processes.

THE following are among recent announcements :—Dr. Franz Boas to be lecturer on physical anthropology in Columbia University; Dr. Arthur Allen to be professor of psychology and pedagogy in the Ohio University; Dr. Bauer, professor of mineralogy at Marburg, to be Privy Councillor; Dr. H. Biltz to be extraordinary professor of chemistry at Greifswald; Dr. Linde, professor of physics in the Munich Technical High School, to be Ph.D. *honoris causa* of Göttingen University.

PLANS have been filed for the buildings of Barnard College in New York City. Three halls have been provided for. The central one is named Milbank Hall, in honour of the donor, Mrs. Anderson, *née* Milbank, and will cost 160,000 dols. Opposite the grounds of Columbia University will be Brinkerhoff Hall, costing 132,000 dols., the gift of Mrs. Brinkerhoff. The third hall for which the plan provides will correspond to Brinkerhoff Hall. Funds are not yet provided for it, nor a name assigned.

SCIENTIFIC SERIALS.

American Journal of Science, July.—Lecture experiment with liquid carbon dioxide, by C. Barus. The passage from the liquid into the gaseous state should be shown in full daylight, the tube containing the liquid being placed vertically in a wooden trough closed by plate-glass at both ends. This insures safety, and gives more light than a water-bath. The image of the tube is thrown upon a screen. Two different focal lines are obtained, one for the gas, the other for the liquid. Contrary to what might be expected, the one does not pass continuously into the other, that for the gas being always virtual, and that for the liquid real.—Percussion figures on cleavage plates of mica, by T. L. Walker. These figures, produced by a blow on the centre of a hexagonal plate with a blunt needle, have been described as being six-rayed stars with the rays at 60° to each other. Accurate measurements show that the angles may vary from 53° to over 63°, according to the kind of mica employed.—The seven-day weather period, by H. Helm Clayton. To extend the investigation of the seven-day weather period beyond the area of the United States, three stations were selected in the Arctic region, five in Europe, two in Asia, two in Oceania near the equator, three in middle South America, one in Mauritius, and one in Australia. The periods investigated were those of 7 days 6·43 hours, 6 days 3·95 hours, and 5 days 10·8 hours. Particular attention was given to a compilation of barometric minima at these stations during the last fifteen years. The results show that, on the average, twice in a period of 7 days 6·43 hours in America, and three times in Europe, waves of barometric minima, or storms, tend to begin near the poles, and sweep across the continents. There is a tendency at every station for the days of maximum frequency to remain on the same days of the period throughout the year.—The hydrology of the Mississippi, by J. L. Greenleaf. This is a valuable and interesting paper dealing with the drainage areas, rates of flow, and rainfall over the tributaries of the great American river. It is illustrated by diagrams representing the various factors in a concise and lucid manner. The largest drainage area is that of the Missouri. Then follows the Ohio, the Arkansas, and the Red River. Of these, the Missouri has the most striking peculiarities. Its drainage area has an average rainfall of 19·6 inches per annum. Although in flood it is a mighty torrent, its average volume is very poor considering its enormous drainage area of 527,700 square miles. Only 12 per cent. of the rainfall finds its way into the river. The rest is absorbed and evaporated by the extensive prairies. In the Ohio area the proportion is 30 per cent., and since the annual rainfall is 43 inches, it is not surprising that its discharge exceeds that of the Missouri. Near the Mexican Gulf we have the Yazoo and St. Francis Rivers, which carry off 70 per cent. of their rainfall, owing to its being quickly absorbed by the sandy soil, or stored in the swamps. There are other admirable diagrams showing the growing volume of water as each tributary enters, and giving the whole life-history of the river system in a very attractive shape.

Wiedemann's Annalen der Physik und Chemie, No. 6.—Electrolysis of water, by A. P. Sokolow. Helmholtz applied his theorem of free energy in thermodynamics to electrolysis, and concluded that the E.M.F. necessary to electrolyse water depends upon the density of the hydrogen and oxygen at the electrodes, and that when the liquid is free from gas the necessary E.M.F. may closely approximate to zero. The author endeavoured to find a more rigorous experimental proof of this conclusion than has hitherto been obtained. This was done by constructing a voltameter with platinum electrodes in which separate platinum wires were fused in close to the electrodes. Any polarisation of the latter due to a current, if leading to the formation of gas, would be gradually transferred to the wires through the separating liquid. This was found to be the case, and dissociation was obtained with E.M.F.s of a few hundredths of a volt.—Loss of energy in magnetisation by oscillatory condenser discharges, by Ignatz Klemenčič. Hysteresis and other losses have so far only been investigated with about a hundred oscillations per second. The author experimented with condenser discharges up to 2000 per second in order to obtain an approximate idea of the action of Foucault currents and hysteresis in iron and nickel at higher frequencies. The method used was that of discharging a condenser and interrupting its discharge at a certain stage by a dropping weight. This made it possible to determine the damping of the oscillations in a simple coil and in a coil with an iron or nickel core respectively. The results showed that even in thin iron wires the loss of energy was chiefly determined by the Foucault currents. The losses due to hysteresis in soft iron were considerably greater than those calculated from the hysteresis curves at lower frequencies. For steel and nickel, however, the losses were about the same.—On magnetic irregularity and the annealing of iron and steel, by A. Ebeling and E. Schmidt. Annealing, if done uniformly, may be sometimes useful; but if not uniform, it may be detrimental to magnetic homogeneity. The most uniform material is obtained by careful fusion. Wrought iron is not made magnetically uniform by annealing.—Transparency of bodies for Röntgen rays, by O. Zoth. This was determined by comparing them with a tinfoil scale containing grades of various thicknesses. The transparency of alcohol compared with tin was 600, that of water 300, cork 2450, ebonite 150, plate-glass 29, magnesium 36, aluminium 25, lead 0·29, gold 0·28, and platinum 0·25. The author also found a slight difference between the transparency of solid substances and their powders, which shows that there is some reflection or refraction. Loose powder was even less transparent than pressed powder.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 21.—"Note on the Larva and Post-larval Development of *Leucosolenia variabilis* H. sp., with Remarks on the Development of other Asconidæ." By E. A. Minchin.

The larva of *Leucosolenia variabilis* is an amphiblastula of a primitive type, transitional in many respects between the larva of the lower Ascons and the amphiblastula of the Sycons. It has an anterior ciliated, and a posterior non-ciliated pole, but when first hatched the ciliated pole is relatively very large, and the non-ciliated cells are few in number. During the free-swimming larval period the non-ciliated cells increase through their numbers being recruited from the ciliated cells, of which those situated more posteriorly become modified into granular cells after passing through an intermediate stage. In addition to anterior ciliated cells, posterior granular cells, and the equatorial zone of intermediate cells, the larva has cells of a fourth kind, placed in the centre of the body, immediately behind the minute central cavity, which contains gelatinous matter and is surrounded laterally by a ring of pigment lodged in the inner ends of the ciliated and intermediate cells. The central cells, together with the pigment, appear to constitute a larval organ, perhaps sensitive to light, which is lost at the metamorphosis.

The larva swims for 36-48 hours and fixes by the anterior pole. The granular cells grow round the ciliated cells, and the former become the dermal layer, the latter the gastral layer. At first the dermal layer forms an epithelium of a single layer, which becomes two-layered by immigration of certain of its cells. The dermal cells which remain on the surface secrete each a single monaxon spicule; those which migrate inwards arrange themselves into groups, and secrete the tri- and quadri-radiate spicules. While these changes are taking place in the dermal layer, a central cavity has appeared, round which the gastral cells arrange themselves in a columnar epithelium and gradually assume the characters of collar cells. At one spot the cavity is not lined by gastral cells, but by dermal cells only; it is here that the osculum is formed about the sixth day of fixation.

In the other Ascons investigated—*L. cerebrum*, *L. coriacea*, and *L. reticulum*—the larvæ are oval ciliated blastulæ in which an inner mass of cells is formed by modification and subsequent immigration of certain of the ciliated cells. In *cerebrum* and *coriacea* the immigration appears to be multipolar; in *reticulum* it takes place from the posterior pole, and thus affords a transition to the above-described larva of *variabilis*. If the cavity of the larva of *reticulum* be imagined reduced to the extent to which this has occurred in *variabilis*, then the modified cells at the hinder pole, instead of migrating inwards, must remain where they are, and as more ciliated cells become modified around them, a type of larva is obtained with ciliated cells anteriorly, intermediate cells laterally, and non-ciliated cells posteriorly, as in *variabilis*. This homology is further borne out by the fact that in all these larvæ the inner mass becomes the dermal layer, and the ciliated cells become the gastral layer, as the result of changes in position which take place at the metamorphosis. The post-larval development of the layers is similar to that described for *variabilis*.

When the development of *L. variabilis* is compared with that of Sycon as described by Schulze and Metschnikoff, it is seen that the only difference between them lies in the periods at which the events take place. In Sycon the larva, while still in the maternal tissues, undergoes changes which in *variabilis* take place during the free-swimming period, and the dermal cells surround the gastral cells before fixation in Sycon, instead of after fixation, as in *variabilis*.

The primitive larva of Calcarea was probably a ciliated blastula, in which an inner mass, the future dermal layer, was formed by modification and immigration of certain of the cells.

The immigration of cells from the dermal layer to form the triradiate spicules is precisely similar to what occurs in the adult whenever new spicules arise. Hence this process is not to be regarded as one of blastogenetic, but of histogenetic significance. In other words, sponges are to be regarded as two-layered animals, and not as possessing a mesoderm.

June 18.—"On Fertilisation, and the Segmentation of the Spore, in *Fucus*. By Prof. J. Bretland Farmer and Mr. J. Ll. Williams.

An account was given of an investigation into the mode of formation of the oospheres, of their fertilisation by the antherozoids, and of the germination of the resulting spores in various members of the Fucaceæ, special attention being paid to the protoplasmic structures therein concerned. The chief points were illustrated by lantern-slides from photomicrographs.

In order to study the fertilisation and germination stages, diœcious species were selected, and the male and female plants were kept in separate dishes, covered over so as to prevent drying up. This method gave far better results than those more usually advocated. On the appearance of the extruded sexual products, the female receptacles were placed in sea water, and after the complete liberation of the oospheres, a few male branches with ripe antherozoids were first placed in a capsule of sea water until it became turbid owing to their number. If on examination the antherozoids proved to be active, small quantities were added to the vessels containing the oospheres. The latter were then fixed at intervals of five minutes during the first hour, and then at intervals of fifteen minutes, up to six hours after the addition of the antherozoids. After that, samples were killed at longer intervals up to three days, and this was continued till we had material fixed at all stages for the first fortnight. At first sea water was used in which to keep the embryos growing, but a proper solution of Tidman's sea salt was found to answer quite as well. A large number of fixing reagents were tried, but Flemming's solution diluted with sea water gave the best results. Many reagents in common use proved utterly worthless. In embedding the tissues and spores in paraffin, previous to cutting them, it is important not to allow the temperature to rise above 50° C.

When an oogonial nucleus is about to divide, it first becomes slightly, then very much, elongated so as to resemble an ellipse. Fine radiations are seen to extend from the two ends into the surrounding cytoplasm. The latter is at first tolerably uniformly granular, but as the radiations around the polar areas increase, these regions become cleared altogether of the granules which then become massed outside them. The nucleus rapidly becomes more spindle-shaped, and its chromatic elements are chiefly grouped near each pole, leaving a clear space about the equator in which the nucleolus is situated.

The polar radiations continue to increase and the nucleus to lengthen, until the entire structure recalls the figure of a dumb-bell, in which the nucleus answers to the handle, and the radiation areas to the knobs. If the radii be traced outwardly, they are seen to terminate either in the frothy protoplasm, on the angles where the foam walls meet, or on the large granules which surround the cleared areas and are embedded in the foam. No structures were seen which could *certainly* be identified as centrosomes, although bodies suggestive of them were often observed; but these proved to be so variable in size and position, as well as in number, that it appeared impossible to attach any special significance to them.

The achromatic spindle is remarkable, inasmuch as it is intranuclear. The chromosomes were too minute to admit of their development being satisfactorily studied, but in all the *oogonial* spindles the number was estimated as *ten* when seen in profile. After the delimitation of the oospheres, some of them were observed to contain more than one nucleus. This is an abnormal feature, and the non-recognition of this fact has led to mistaken views in the past. When the oospheres are extruded, and come to lie free in the water, they swell somewhat, and are turbid with granules, which are very abundant in the cytoplasm. About five minutes after the mixing of the sexual cells, the antherozoids are found to have slipped into many of the oospheres. The act of penetration was not observed, but, in a number of cases, the antherozoid could be recognised within the oosphere, before its final fusion with the nucleus of the latter. It is a roundish, densely staining body, and, unlike the majority of animal sperm cells as yet described, no system of radiations are associated with it when in the egg. Judging from the short period of time elapsing between its penetration of the surface of the oosphere and its arrival at the exterior of the female nucleus, it must pass through the intervening cytoplasm with great rapidity. It then becomes closely appressed to the nucleus,