

gations among the native troops of the Egyptian Army, to which was added some observations on nasal and cephalic indices in Egypt by Dr. C. S. Myers; that of the committee to conduct anthropometric observations in the British Isles, which issued in its report a series of photographs and diagrams of the living figure with the points, between which dimensions are to be measured, marked; and that of the committee to collect anthropological photographs, which issued a first list of photographs registered.

#### M. LIPPMANN'S METHOD OF PHOTOGRAPHY IN COLOUR.

THE original method of photography in colour proposed by M. G. Lippmann was based on the production of interference fringes in the photographic plate, and had the disadvantages of requiring very delicate adjustments and a long exposure. In the *Comptes rendus* for July 30 M. Lippmann gives an account of a method in which long exposures are not required. Consider a photographic spectroscope consisting of a slit, a prism, a lens, and a sensitised plate. The light falling on the slit is analysed by the prism, and the rays produce a corresponding number of dark lines on the negative, each of which is a conjugate image of the slit. If a positive is taken from this negative, and the former placed in the exact position originally occupied by the latter, the system is reversible. If the plate is now illuminated by white light, the light passing through the transparent portion of the plate formed by any particular line will produce at the slit only that ray which originally imprinted the negative. On the whole spectrum, the net result will be to reconstitute at the slit the original colour. In order to apply this principle to photography in colours, the following apparatus has been arranged. The single slit of the spectroscope is replaced by a series of slits very close together, consisting of fine transparent lines ruled five to the millimetre. This grating is fixed at one end of a solidly built box, the other end carrying the photographic plate, and between these is a converging lens, in front of which is a prism of very small angle. The object to be reproduced is projected on the grating, illuminated with white light. The light passing through the prism and lens falls on the sensitive plate producing a negative in black and white, which under the lens appears lined, each line being divided into small zones, which are parts of an elementary spectrum. If the negative be now replaced in its original position and illuminated by white light, the eye being placed at the distance of distinct vision from the grating, the image of the object photographed is seen in colours, these colours being complementary to those of the object; the latter appears in its own proper colours when the negative is replaced by a positive. The spectrum of the electric light has been produced with this apparatus by the aid of a positive in its natural colours. It is necessary that the angle of the prism used should be so small that the length of each spectrum produced by it should be less than the length between each line, otherwise the spectra interfere with each other. Ordinary sensitive orthochromatic plates can be used, and the exposure required is very much less than with the interference method. The chief drawback at present is the necessity of using the identical apparatus in which the exposure is made to view the colours, but M. Lippmann suggests a method by which this difficulty may possibly be overcome.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The Frank Smart studentship in botany has been awarded to Mr. D. Thoday, of Trinity College. The studentship is held at Gonville and Caius College.

ENGINEER F. R. EICHHOFF has been appointed professor of iron metallurgy in the Berlin Mining School.

A MOVEMENT is on foot for the foundation in the Glasgow Agricultural College of a bursary, to be known as "the Biggar Bursary," in memory of the late Mr. James Biggar.

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THE metallurgical laboratory of the Technical High School, Charlottenburg, is to be divided into two sections, the one, especially for iron and steel, to be under Prof. Mathesius, and the other, for the metallurgy of other metals, under Prof. Doeltz. Near the technical chemistry institute of the same high school a chemical museum has been provided and placed in the charge of Prof. O. N. Witt.

PROF. EDUARD SUSS, president of the Vienna Academy of Sciences, celebrated his seventy-fifth birthday on August 20, and also the fiftieth anniversary of his appointment as extraordinary professor of palæontology in the University of Vienna. Prof. E. Ludwig, the holder of the chair of medical chemistry in the same university, has been elected an ordinary member, and Prof. J. Herzig, professor of chemistry, a corresponding member, of the Vienna Academy of Sciences.

THE issue of *Science* for August 17 gives particulars as to the degrees of Doctor of Philosophy and Doctor of Science conferred during the past year by American universities. The number of students receiving one or other of the degrees in 1906 was the same as in 1905, viz. 325, while the total number of doctorates (in philosophy or science) conferred in nine years was 2387. The names of those on whom the degrees were conferred, the subjects of their theses, and the names of the institutions conferring the degrees are given in the number.

IN connection with the meeting in Canada of the British Medical Association, the honorary degree of LL.D. has been conferred by the University of Toronto upon the following medical men:—Prof. T. Clifford Allbutt, F.R.S., Dr. A. H. Freeland Barbour, Sir Thomas Barlow, Bart., Sir James Barr, Sir William Broadbent, Bart., F.R.S., Prof. G. Cooper Franklin, Prof. W. D. Halliburton, F.R.S., Sir Victor Horsley, F.R.S., Dr. Donald MacAlister, Dr. W. Julius Mickle, Dr. Louis Lapicque, Paris, Dr. Ludwig Aachoff, Marburg, and Dr. W. J. Mayo, president of the American Medical Association. The degree was also conferred *in absentia* upon Dr. H. W. Langley Browne, chairman of the British Medical Council. The same degree is also to be conferred *in absentia* on Sir Thomas Barlow, Bart., Sir William Broadbent, Bart., F.R.S., Prof. T. Clifford Allbutt, F.R.S., and Sir Victor Horsley, F.R.S., by the McGill University, Montreal.

IN the last of six lectures on British institutions, delivered to students attending the University Extension summer meeting at Cambridge, Prof. Masterman dealt with education. He said we are just at the beginning of a systematisation of our secondary education as an attempt to complete the ladder for brilliant pupils from the elementary school to the university. There is a danger, he said, that the majority of children unable to climb such a ladder may be neglected. Prof. Masterman thinks that the next two towns to obtain a university charter will be Bristol and Newcastle. The new universities are largely dependent on the subsidies of municipal authorities. In this the lecturer sees the danger, and he does not speak without knowledge, that the universities will be hampered from the higher education point of view by the entirely inadmissible conditions of the municipal authorities. The men who provide the money may claim to control the expenditure of it and disregard the opinions of experts. That can only be averted by a large subsidy paid from the central authority. He urged that universities ought to receive greater assistance from the State.

#### SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 10.—"The Action of Anæsthetics on Living Tissues. Part II.—The Frog's Skin." By N. H. Alcock.

This paper is a continuation of researches made on isolated nerve (Proc. Roy. Soc., B, vol. lxxvii., p. 267), and the phenomena here described are to be considered in connection with them.

The experiments may be summarised as follows:—

(1)  $\text{CHCl}_3$  vapour locally applied to the outer surface of the frog's skin abolishes the normal ingoing resting current.

(2)  $\text{CHCl}_3$  to the inner surface leaves the current unaffected.

(3)  $\text{CHCl}_3$  to a combination of (outer-inner) surfaces, connected with another spot on the outer surface, diminishes the current.

(4) The electrical resistance of the skin is diminished by about 24 per cent. of its value by  $\text{CHCl}_3$ .

Certain conclusions can be deduced from these observations:—

(a) The apparatus furnishing the current is located at the outer surface.

(b) A diagram of an electrical apparatus which would give similar results to those observed on the skin shows that the latter must consist of structures resembling galvanic cells, the positive elements of which lie towards the outer surface, and are insulated from each other, the negative elements towards the inner surface, and connected together. If it is assumed that the current in the skin is due to the movement of ions, it appears from the present experiments (and also from those in part i.) that there must be some semi-permeable apparatus in both skin and nerve, and that chloroform renders this apparatus completely permeable, so making the whole tissue iso-electric. The diminution of resistance can be accounted for by this action, which is equivalent to a diminution of viscosity.

If this interpretation of the results is correct, it furnishes an actual demonstration of the existence of some form of semi-permeable apparatus in the tissues, and suggests that a similar mechanism may play a larger part in vital phenomena than had previously been supposed.

#### PARIS.

**Academy of Sciences, August 13.**—M. Bouquet de la Grye in the chair.—Irrigation and the permeability of soils: A. Müntz and L. Faure. The authors discuss the value of the application of irrigation to parts of France, and argue that irrigation works must prove unremunerative in private hands, and should be undertaken by the State. Proper attention does not appear to have been paid in the past to the different requirements of different classes of soil for water. The nature of the soil is not a sufficient guide in this matter, apparently similar soils having been found to require very different amounts of water. A description is given of a simple instrument for making this determination.—The two specific heats of a slightly deformed elastic medium; the fundamental formulæ: P. Duhem.—The preparation of pure barium starting from its suboxide: M. Guntz. Equivalent portions of magnesium and baryta, heated in a vacuous porcelain tube containing a water-cooled steel tube, gave a deposit on the cold tube of one-half the magnesium employed, together with traces of barium. The residue in the boat possessed properties corresponding to an oxide  $\text{Ba}_2\text{O}$ . If the magnesium is replaced in this reaction by aluminium, crystallised barium deposits on the cold tube. This was found to contain 98.8 per cent. of barium, and on a second distillation in a vacuum gave pure barium. Strontium can be obtained in the same way.—The aromatic azocyanamides: P. Pierron.—A property of diastase: J. Duclaux. The application of recent studies on colloids to diastase. The author holds that the quantity of active material in diastase, by reason of which it exerts its diastatic functions, need, in a set of experiments, bear no constant and necessary relation to the quantity of crude diastase taken, and that different experiments, even simply made at different dilutions, are not comparable among themselves.—The copper-steel alloys: Pierre Breuil. Copper increases the tenacity and reduces the ductility of steels, but the results obtained with a given alloy depend very largely upon the treatment the metal has received.—The cultivation of micro-organisms in chemically defined media: J. Galimard, L. Lacomme, and A. Morel.

August 20.—M. Bouquet de la Grye in the chair.—The progress of a fruit-attacking insect, *Ceratitis capitata*, in the neighbourhood of Paris: Alfred Giard. Six years ago the author pointed out the presence of this destructive exotic in the neighbourhood of Paris. At that time there were only a few apricot trees attacked, and it should have been easy to prevent its acclimatisation. The author's suggestions made at that time were, however, disregarded, and at the present time damage is being done to peach

trees in various localities round Paris, damage which may, given a few dry seasons, become as disastrous as at the Cape of Good Hope, unless prompt measures are taken.—The Valparaiso earthquake (August 16, 1906), registered at Paris: G. Bigourdan.—Observations of the Finlay comet made with the large equatorial of the Bordeaux Observatory: E. Esclangon.—Definitive orbit of the comet 1905a: M. Giacobini.—The boiling points of some secondary and tertiary alcohols: G. D. Hinrichs. Referring to a recent note by M. Louis Henry on this subject, the author points out that the relationships between the boiling points of the secondary and tertiary alcohols need not be regarded as unusual, since they can be deduced, at least qualitatively, from a consideration of the moments of inertia of the molecules.—Researches on the relations between functional groupings in distant positions. Decamethylene-imine: E. E. Blaise and L. Houillon.—The influence of some mineral compounds on the liquefaction of starch: J. Wolff and A. Fernbach.—Cultures of Protozoa and variations of living material: J. Kunstler and Ch. Gineste.

#### NEW SOUTH WALES.

**Royal Society, July 4.**—Prof. T. P. Anderson Stuart, president, in the chair.—The testing of building materials on abrasion by the sand-blast apparatus: H. Burchartz. The paper described a method of testing building material by means of a sand-blast apparatus. The sand-blast apparatus is used on cubes of the material, exposing an area of 4.34 square inches for two minutes, and the loss of weight, and the appearance of the area eroded by the sand, give accurate data in regard to the durability of the material. The author compared the results of testing a great variety of materials by means of the sand blast with those subjected to the grinding process proposed by Bauschwiges, and showed the superiority of the sand blast over all other tests for abrasion.

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