

the chair. The position of geography as the bridge subject between the humanistic and the purely scientific studies was well brought out in the papers and discussions. Mr. H. J. Mackinder, M.P., in opening a discussion on the resolutions drawn up by the Five Associations, quoted a statement issued by the council of the Geographical Association with regard to the teaching of geography. In this document the object of teaching geography in schools is said to be to train future citizens to imagine accurately the interaction of human activities and their topographical conditions. It is pointed out that as these conditions have been established partly by natural forces and partly by human effort, any discussion of the correlation of the various conditions must be both scientific and humanistic. The case is summed up thus:—"The unity of geography, for school purposes at any rate, is essentially humanistic, and on one side related closely to history, but the assembling of the physical data is a very important part of geographical teaching and cannot be left to the teacher of other subjects."

Two other papers brought out the relationships of geography, and at the same time curiously emphasised the fact that geography is a subject in itself. Prof. Fleure read a paper on "Regions in Human Geography," which was saturated with humanism, and was marked by a strong historical flavour, and yet was in no sense history. "Correlation of various conditions" within a region is essentially geography, whatever is or is not. "Though essentially humanistic" and "related to history," geography has a unity of its own. Prof. Nunn read a paper to a joint meeting of the association and the Mathematical Association on "Map Projections." The relationship of geography to science was taken for granted in the meeting, just as the joint meeting last year with the Historical Association took the humanistic relation for granted. What was perhaps more striking with regard to the paper was the different point of view of the geographer from that of the mathematician, even a most sympathetic mathematician, in regard to this almost purely mathematical subject. It was quite evident that while both geography and mathematics gain immensely by correlation, yet there is very distinct work for each. The danger of leaving projections for geographical work entirely to the mathematical teacher, or, indeed, for mathematical training to be left to the geographical teacher, was unmistakable. Again, to quote the statement, "the assembling of the physical data . . . cannot be left to the teachers of other subjects." The last sentence of the statement stands true: "Experience has shown that the art of geographical correlation depends on specially trained habits of thought."

The Mathematical Association held its annual meeting on January 5, under the presidency of Prof. Whitehead. After the business meeting—at which Prof. T. P. Nunn was elected president for 1917-18—Prof. Nunn read an important paper on "The School Course in Geometry," illustrated by many interesting models and practical devices. He urged that geometry should be closely connected with the facts of life and that the pupils should approach it through practical work of various kinds; that many topics which have hitherto been postponed to a late stage or omitted altogether—*e.g.* certain facts of solid geometry and the simpler properties of the conic sections—should be introduced at a comparatively early stage; and that the reasoning, while of a nature suitable to the stage reached, should throughout be careful and rigid. In this connection he distinguished three stages: the first that of simple intuitional reasoning in connection with direct experience; the second that of deductions based upon the assumption of certain fundamental truths; and the third that of constructing a system of geo-

metrical truths on the smallest possible basis of assumptions.

The afternoon session opened with an inspiring address from Prof. Whitehead on "Technical Education." His main thesis was that a liberal education should in all cases be in close touch with the activities of life; and it should include in varying proportions the literary, scientific, and technical elements. These should be closely connected; technical education needs the enlightenment of science, intellectual education lacking some relation to handwork is barren, while the literary element supplies that wider contact with other life and thought which is essential to healthy mental life. Only so can we reach the ideal in which "work is play and play is life," and nothing but harm can come of the assumption that the practical world is one in which high ideals can have no place.

Later in the afternoon Mr. P. Abbott opened a discussion on "The Place of Mathematics in Educational Reconstruction," dealing chiefly with the mathematics suitable for continuation schools. Other speakers dealt with other aspects of the subject.

The twenty-fifth annual general meeting of the Incorporated Association of Headmasters was held at the Guildhall, London, on January 8. The Rev. J. R. Wynne-Edwards (Leeds Grammar School), in his presidential address, said that in science teaching in schools two chief objects are in view—first, the acquisition of facts that "every educated man ought to know," the laws of Nature, the constitution of our planet and its atmosphere, the chief properties of light, heat, and electricity, and their bearing on daily life; and secondly, the investigator's respect for truth, his determination to observe phenomena irrespective of preconceived ideas, and to reason on observed facts without being hampered by preconceived theories. Of these two objects the second is by far the more important. It is agreed that the time has come to improve our system of science teaching and to bring science to bear more fully on the problems of our daily life; but difficulties present themselves the solution of which will tax all the ingenuity of the nation. At present there is not an adequate supply of teachers, and it is absolutely essential that a solution of this difficulty should be found. Another difficulty is to adapt science teaching to the need of industry without taking away its power as an intellectual stimulus, and to persuade the manufacturers of the country that it is to their interest to have the very best advice that science can give them and to pay for it accordingly. One still hears of graduates serving in Government munition works as science experts at 2*l.* a week, which they are prepared to accept in their anxiety "to do their bit" for their country, while workmen in the same works may be earning their 5*l.* or 6*l.* per week. There are, however, signs of a change, and the great demand and very limited supply of expert science men is giving rise to abnormal conditions.

The following resolution was carried by 70 votes to 15:—"That it is of the highest importance to the welfare of this country that the decimal system of weights and measures be adopted, and that this association approves of the policy and aims of the Decimal Association, and invites its members to support the proposals."

PRIZE AWARDS OF THE PARIS ACADEMY OF SCIENCES FOR 1916.

MATHEMATICS.—The Grand Prize of the mathematical sciences. No memoir was received dealing with the question proposed, but a prize of 2000 francs was awarded to N. E. Nörlund, professor at the University of Lund, for his work on the linear equations

in finite differences. The Bordin prize, Georges Darrois and Bertrand Gambier each an honourable mention (1000 francs); the Poncelet prize to Charles de la Vallée Poussin, for the whole of his contributions to mathematics; the Francoeur prize to (the late) René Eugène Gateaux, for his work on the functional calculus.

Mechanics.—The Montyon prize to E. Mérieux, for his work on the theory of ventilators and centrifugal pumps and on internal-combustion motors. No memoir was received on the subject proposed for the Fourneyron prize. The H. de Parville prize to Leonardo Torres y Quevedo, for his researches on calculating machines and other mechanical inventions.

Astronomy.—The Lalonde prize (increased to 1000 francs) to Jérôme Eugène Coggia, for his astronomical work as a whole; the Valz prize to Giovanni Boccardi, for his researches on the variation of latitude; the Janssen prize to MM. Ch. Fabry, Henri Buisson, and Henry Bourget, for their researches on the determination of the temperature, and evaluation of the atomic weights of the unknown gases in the nebula of Orion; the Pierre Guzman prize was not awarded.

Geography.—The Delalande-Guérineau prize to Sir Ernest Shackleton, for his explorations in the Antarctic continent; the Gay prize to Henri Vallot, for his topographical studies in the French Alps; the Tchi-hatchef prize was not awarded; the Binoux prize to Eugène Prévot, for his work in geodesy and topography.

Navigation.—The prize of 6000 francs between M. Marbec (3000 francs), for his rapid adaptation of the vessel *Gharb* as a water-carrier to Gallipoli, P. Dumanois (2000 francs), for his work relating to the installation of Diesel motors on submarines, and M. Le Matelot (1000 francs), for his practical method of determination of position near the coast; the Plumey prize (2000 francs) to Louis Barbillion, for his researches on governing motors used in connection with dynamos.

Physics.—The La Caze prize is not awarded; the Kastner-Boursault prize to (the late) Eric Gerard; the Hébert prize to Jules Lemoine, for his work on the optical effects of electricity; the Hughes prize to (the late) L. Chaumont, for his memoir on Kerr's phenomenon.

Chemistry.—The Montyon prize (unhealthy trades) to (the late) Alexandre Hébert, for his researches relating to the hygiene of workshops; honourable mentions (1500 francs each) to Charles Samuel Banzet, for his work on respiratory masks for use against noxious gases either at the front or in works, and to Paul Langlais, for his apparatus designed to protect work-people against fumes at shell works; the Jecker prize to (the late) Paul Lemoult, for the whole of his chemical work; the La Caze prize is not awarded; the Cohours foundation: the arrears to (the late) Jacques Bongrand; the Houzeau prize to (the late) Edouard Bauer.

Mineralogy and Geology.—The Victor Raulin prize to J. de Lapparent, for his work on eruptive rocks.

Botany.—The Desmazières prize to F. Renault and J. Cardot, for their work on the mosses of Madagascar; the de Coincy prize to R. Souèges, for his researches on the embryogeny of the Ranunculaceæ and Cruciferæ; the Montagne and de la Fons Mélicocq prizes are not awarded.

Anatomy and Zoology.—The Cuvier prize to Edouard Chevreux, for his work on the Amphipods; the Savigny prize to Ed. Lamy, for his malacological studies; the Thore prize is not awarded.

Medicine and Surgery.—Montyon prizes to Octave Laurent (2500 francs), for the whole of his work in surgery; Edmond Sergent and Henri Foley (2500

francs), for their works on recurring fever; Maurice Letulle (2500 francs), for his book on pleuro-pulmonary tuberculosis; mentions to Jules Glover (1500 francs), R. J. Weissenbach (1500 francs), and Henri Stassano (1500 francs); the Barbier prize to G. Moussu, for his researches on the local reactions to tuberculin in domestic animals; the Bréant prize (arrears of interest) to J. Havet (2000 francs), for his work on the nervous system of invertebrates; Mme. Marie Phisalix (2000 francs), for her researches on the poison apparatus and poisons of lizards and snakes; Frédéric Bordas and S. Bruère (1000 francs), for their work on the accelerating action of farm manure on the rapid destruction of dead bodies; the Godard and Mège prizes are not awarded; the Bellion prize to (the late) Richard Millant, for his work on opium poisoning; the Baron Larrey prize to Dr. Lasnet, for his essay on the organisation and working of the medical service in Colonial expeditions, A. Tournade receiving a very honourable mention for his work entitled "The Organisation and Working of No. 13 Temporary Hospital of Verdun."

Physiology.—The Montyon prize to M. Couvreur, for the whole of his work in experimental physiology; the Lallemand prize, divided equally between Aldo Massaglia, for his researches on glycostria, and L. Launoy, for his work on the thyroid, parathyroid, and thymus glands; the La Caze prize is not awarded; the Pourat prize to MM. Mayer and Schaeffer, for their contributions to the physico-chemical properties of the cell and its tissues; the Martin-Damourette prize is not awarded; the Philipeaux prize to Antoine Magnan, for the whole of his work relating to the influences of the medium, movement, and feeding on organisms.

Statistics.—The Montyon prize to Charles Perrier, for his memoir on the criminal skull.

History and Philosophy of Science.—The Binoux prize between Joaquim Bensaude (1000 francs), for his book on nautical astronomy in Portugal at the period of the great discoveries, and (the late) Louis Couturat (1000 francs); a mention (500 francs) to E. Doublet, for his works relating to the history of astronomy and meteorology.

Medals.—The Berthelot medal to Paul Lemoult, Alexandre Hébert, and Edouard Bauer.

General Prizes.—The Bordin prize is not awarded; the Jean Reynaud prize to the late Henri Amagat, for the whole of his work; the Baron de Joest prize to Ernest Esclançon, for his researches on the sound phenomena produced by cannon and projectiles; the Houlléville prize to Edmond Bordage, for his studies on the fauna and flora of Réunion; the Saintour prize is not awarded; the Henri de Parville prize to Auguste Barbey (1000 francs), Louis Raveneau (500 francs), Daniel Bellet (500 francs), and E. Montoriol (500 francs); the Lonchamp prize to Mlle. Thérèse Robert (2500 francs), for her researches on the function of calcium salts on the growth of plants, and H. Busquet (1500 francs), for his physiological and pharmacodynamical researches; the Wilde prize to M. Mansuy (2000 francs) and F. Garrigou (2000 francs), for the whole of their work; the Caméré prize to M. Freysinnet, for his novel applications of reinforced concrete; the Gustave Roux prize to (the late) Michel Longchambon (2000 francs), for his geological and petrographical work; the Thorlet prize to Adolphe Richard; the Lannelongue foundation between Mmes. Cusco and Rück; the Laplace and Rivot prize is not awarded; the Trémont foundation (1000 francs) to Charles Frément, for his work on the deformations of metals submitted to stresses; the Gegner foundation to A. Claude (2000 francs) and Mlle. I. Iotevko (2000 francs); the Jérôme Ponti foundation to MM. Battandier and Trabut, for their botanical work in northern Africa; the Henri Becquerel foundation is not awarded.

BONAPARTE FOUNDATION.

The committee has had to examine thirteen requests for grants from the Bonaparte Fund. The following grants are recommended:—(1) Charles Alluard (4000 francs), for continuing the publication, in conjunction with R. Jeannel, of the scientific results of three expeditions in eastern Africa (1903 to 1912).

(2) M. Bondroit (2000 francs), for collecting the material in France necessary for the constitution of a fauna of French ants.

(3) Pierre Lesage (2500 francs), for the continuation of his experiments on the plants of the coast zone, and in particular his researches on the transmissibility of the characters acquired by plants watered with salt water.

(4) The Touring Club de France (3000 francs), to contribute to the establishment of the new botanic garden at Lautarel (Hautes-Alpes).

(5) Camille Sauvageau (3000 francs), for extending to the species of *Laminaria* of the Mediterranean and the Channel the remarkable discoveries of the author on the development of a single species which grows in the Bay of Biscay.

(6) Em. Vigouroux (2000 francs), to contribute to the purchase of apparatus useful for the continuation of his interesting researches on the state of silicon dissolved in metals.

(7) Raoul Bayeux (2000 francs), to aid him in continuing his researches on the physiological effects and the therapeutics of hypodermic injections of gaseous oxygen. The author proposes to study experimentally the action of hypodermic oxygenation on the defensive reactions of the organism against asphyxia and against infections.

(8) Joseph Laïs, as a contribution to the expense of photogravures relating to the photographic chart of the heavens, the copper-plates to become the property of the Paris Observatory.

The committee has in reserve, after payment of these grants, 55,000 francs.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE fifth election to Beit Fellowships for Scientific Research will take place on or about July 15. Not more than three fellowships will be awarded. Applications must be received on or before April 16. Forms of application and all information may be obtained, by letter only, addressed to the Rector, Imperial College, South Kensington, London, S.W.

DR. W. H. HADWY, Principal of Armstrong College, Newcastle, and Vice-Chancellor of Durham University, has been appointed a member of the committee to consider and report on the scheme of examination for Class I. of the Home Civil Service in lieu of Mr. H. A. L. Fisher, who has found it necessary to resign membership of the committee on assuming the duties of the President of the Board of Education.

"EDUCATION in the Universities after the War" is the subject of a lecture to be delivered by the Master of Balliol next Tuesday evening, at 5 o'clock, at the meeting-room of the Society of Antiquaries, Burlington House, Piccadilly. Mr. Fisher, Minister of Education, will preside. The lecture will be one of a series on "Reconstruction," to be given every Tuesday during January and February. Applications for reserved seats may be made to the hon. secretary, United Workers, 175 Piccadilly, W.

ON December 15 last the degree of Doctor of Medicine *honoris causa* was conferred by Malta University on Col. Ch. A. Ballance, C.B., M.V.O., Col. Wm. Thorburn, C.B., Col. Arch. E. Garrod, C.M.G., F.R.S.,

and Col. Howard H. Tooth, C.M.G. Lord Methuen, the Governor of Malta, presided, and a Latin address was delivered by Prof. A. Bartoli, and a speech made by the rector, Prof. E. Magro. In his concluding remarks Lord Methuen said Col. Ballance had been in Malta from the time the hospitals were started, Col. Thorburn arrived shortly after, and, together with Col. Garrod and Col. Tooth, they had rendered services to the patients that could not be over-estimated.

THE shortage of colour sensitizers for photographic plates, and the difficulties thereby incurred in the colour-printing trade, are affording another example of the fact that when the requisite stimulus is applied the chemical resources of the country are quite able to meet industrial needs. The Leeds Education Committee, through its Technical School, having become aware of the situation in the colour-printing trade, approached the Leeds University, and the work of supplying the necessary sensitizers has been taken in hand under a joint scheme of research. A preliminary report gives a full description of the preparation of two dyes, formocyanine and tolucyanine, which are stated to be identical in their sensitising powers with those of the German products hitherto used. The work is being continued.

THE School of Oriental Studies at the London Institution is, we learn from the *Times*, to be formally opened by the King near the end of next month, but classes will begin on January 18. A preliminary announcement which has been circulated states that at the outset teaching will be provided in seven groups of languages, comprising twenty different tongues; but it is hoped at an early date to extend the scope of the school. Courses on the history, religion, and customs of Oriental and African countries will form a special feature in the teaching of the school. The Senate of the University of London has assented to the transfer to the school of the teachers in the Oriental departments at University and King's Colleges, excluding certain subjects, such as Egyptology, Assyriology, and Hebrew. The Oriental staffs have accordingly been transferred to the school, but since the teaching at the colleges has been on a restricted scale numerous additional appointments have been made. The school is intended to provide London with a centre for Oriental teaching adequate to the needs of the metropolis and of the Empire, and one that will remove the reproach that London has hitherto been without an Oriental School comparable with those of Paris, Petrograd, and Berlin.

UNDER the will of the late Miss A. F. Yule, the daughter of the late Sir Henry Yule, the house and grounds of Tarradale, or Taradale, in the county of Ross and Cromarty, where Sir Roderick Murchison was born in 1792, are left in trust "to be preserved for ever to the use and enjoyment of my countrymen under the style and title of the Murchison of Taradale Memorial." The executors are left a wide discretion in interpreting the objects of the testatrix, but the idea expressed is that the house, with all its contents, including a library extending to more than 20,000 volumes, should form "a place of rest and refreshment for poor scholars or other students, preferentially, but not exclusively, those no longer young," and preferably also of Scottish birth or descent. If funds do not permit otherwise, the house may only be kept open for three or four months in the year. The desire is also expressed that the grounds of Tarradale House should form a sanctuary or reserve for the preservation of the wild life of the Highlands, more especially for wild birds, and the trustees are given power to lend the house and grounds to any one or more of the Scottish universities, for a limited period, for purposes of scientific research, exclusive of experiments