an account is given of the methods of distribution in the Chrysler Building, 1047 ft. high, and the Empire State Building, 1300 ft. high. Experience with the Irving Trust Company Building had shown that a saving could be effected by installing transformers not only in the basements but also on more than one floor of buildings more than forty stories high. In the Chrysler Buildings the high-tension feeders, therefore, are carried direct to substations with transformers on the thirtieth, sixtieth, and seventy-fourth floors, while in the Empire State Building there are substations on the forty-first and eighty-fourth floors in addition to that in the sub-basement.

The Empire State Building covers an area 420 ft. by 200 ft., and its 86 floors can house some 40,000 persons, or as many as a fair-sized town. Illumination is provided on a liberal scale, and the estimated lighting load is 6000 kw., while for the lifts, fans, pumps, and other plant electric motors of a total of 9600 horse power are installed. The substations are fire-proof brick structures and each contains four or five 600 kw., 13,800/200-volt transformers. The main vertical cables are rated for a pressure of 15 kw. and are about 3 in. in diameter with an approximate weight of 6 lb. a foot, and in the article referred to is an interesting account of the methods adopted for placing them in position and securing them.

University and Educational Intelligence

BIRMINGHAM.—Under the will of the late Mr. James Gittins Chidlaw, of Edgbaston, a member of the Court of Governors, a sum of more than £10,000 will be put at the disposal of the Council of the University for the endowment of scholarships.

MR. E. J. W. BARRINGTON of Oriel College, Oxford, has been appointed lecturer in zoology, and Dr. F. C. Champion of St. John's College, Cambridge, assistant lecturer in physics, at University College, Nottingham.

THE Council of the Institution of Naval Architects has awarded the Martel scholarship in naval architecture (1932), valued at £130 per annum for three years at the University of Liverpool, to Mr. H. G. Herbert, of Sheerness Dockyard, and the Earl of Durham prize to Mr. N. H. Young, of Devonport Dockyard.

A SURVEY of industrial education in the United States of America has been published by the Office of Education, Washington, as *Bulletin* No. 30, 1931. Among recent developments is noted the more general recognition of the importance of maintaining close contact and co-operation between the school officials and industrial firms. Committees composed of representatives of employers and employees have been especially valuable in selecting the courses to be included in the training programme, in securing properly qualified teachers and adequate equipment, and in the organisation of instruction so as best to meet the needs of industry. There is yet lacking, however, a sufficiently high degree of correlation between the courses provided in the schools of a given locality and the needs of the dominant local industries. Increasingly the public schools accept responsibility for vocational guidance with the view of placing their pupils in suitable occupations, and increasing interest is manifest in occupational information courses. Progressive specialisation in industries has led to corresponding specialisation in the schools, and the number of separate courses has been further increased by the inclusion of training for a number of semi-skilled occupations for which a short period of school instruction is now held to be worth while. Evening school work has received more attention, because money spent on training persons already employed yields a more certain and immediate return than pre-employment training. The increasing use of electricity on the farm and in the home is stimulating the development, even in small schools, of courses in simple electric wiring, the operation and maintenance of electrical appliances, and other instruction in applied electricity. Similarly, a belief that aviation will constitute a principal method of transportation in the future is leading to the provision in secondary schools of courses in model aircraft building, etc.

Calendar of Geographical Exploration

Sept. 13, 1898.—Capt. M. S. Wellby's Explorations

Capt. M. S. Wellby left Berbera on the north coast of British Somaliland, penetrated to the Omo River, and thus entered Lake Rudolf. He then turned north-west and explored part of the course of the Sobat River. In 1896, Wellby and Lieut. Malcolm had carried out a journey in Tibet, crossing the country from Leh to Kuku Nor, afterwards following the Hwang-ho and reaching Peking. This journey filled in many previously blank spaces on the map of Tibet.

Sept. 14, 1927.—The *Norvegia* Expeditions to the Antarctic

The *Norvegia*, a vessel fitted out by Consul Christensen, left Sandefjord harbour to begin that series of antarctic researches which has added so much to scientific and especially oceanographical knowledge of the region. Various scientific workers and aeronauts have taken part in the *Norvegia's* work, and, under the leadership of H. Rüser-Larsen, Queen Maud Land, Ragnhild Land, and Princess Martha Land were discovered. Early in 1931 the *Norvegia* completed the circumnavigation of the antarctic continent. The Russian explorer, Bellingshausen, in 1819-21, had previously made the circumnavigation of the continent in high latitudes, while Cook and Biscoe had made similar journeys in somewhat less high latitudes.

Sept. 15, 1587.—Davis Strait

John Davis arrived at Dartmouth after his third arctic voyage, during which he had pushed through the strait named after him into Baffin's Bay and coasted the west of Greenland to 73° N. On his first voyage, in 1585, Davis had sighted southern Greenland, which he called the Land of Desolation, had crossed Davis Strait, explored part of the Canadian archipelago, and had penetrated some distance into Cumberland Sound. On his second voyage, in 1586, he again reached the north-east coast of America. His voyages pointed the way to the true north-west passage, though it was not given him to reach it. He added much to the knowledge of the coasts of Greenland and north-east America. In 1591 he accompanied Cavendish on his voyage with the object of "searching that north-west discovery upon the back parts of America". After the rest of Cavendish's party had turned back, Davis continued the journey and discovered the Falkland Islands. He was killed by Japanese pirates when off Sumatra in 1605. Davis is also entitled to fame as an inventor; his back staff and double quadrant held the field long after Hadley's reflecting quadrant had been introduced.

Sept. 17, 1776.—Basin of the Colorado River

Father Garcés, a Franciscan missionary, reached Bac. He had set out in 1775 from the Yuma country, travelled from the mouth of the Colorado to Mojave,

and opened a new route across to San Gabriel. Thence he made a trip northward to the Tulare valley, returned to Mojave, and proceeded eastward to the Moqui country. Garcés had made many previous journeys of exploration, including a descent of the Rio Gila to the Colorado in 1771. Garcés was murdered by the Yuma Indians in a subsequent attempt to found a mission amongst them.

Sept. 17, 1822.—Weddell in the Antarctic

James Weddell in the *Jane*, accompanied by the *Beaufoy*, left on a voyage which combined whaling with discovery. Weddell had previously, in the *Jane*, visited the South Shetlands, discovered in 1819 by William Smith, and had carried out some surveys there. On this voyage he proved that the Aurora Islands, which were supposed to lie between the Falklands and South Georgia, did not exist. Weddell explored the sea which now bears his name, and reached 74° 15′ S. He brought back with him a sea leopard (*Hydrurga leptonyx*); Weddell's seal (*Leptonychotes Weddelli*) is named after its discoverer.

Societies and Academies

PARIS

Academy of Sciences, July 25 (vol. 195, pp. 293-344). —**Robert Bourgeois**: Obituary notice of Antonio Luiz de Teffé, *correspondant* for the Section of Geography and Navigation.—**Émile Guyénot** and **A. Naville**: Reduction of chromosomes in the female *Drosophila* and the theory of crossing over.—**M. Syptak**: The hypercircumferences and hyperhelixes in Euclidian spaces of p dimensions.—**Maurice Roy**: The definition and laws of the sudden variation of section in gaseous jets.—**Edmond Brun** and **Pierre Vernotte**: The measurement of the coefficient of thermal exchange between a solid wall and a current of gas.—**Henri Chaumat** and **Edouard Lefrand**: An electric motor utilising the kinetic energy of gaseous ions. A description of the construction and working of an 'ionic turbine'.—**René Audubert**: The calculation of the average radius of the granules of a dispersed system. If, at high dilutions, the electrokinetic potential be considered as obeying the Debye-Hückel theory, then the average radius of the granules of a dispersed system can be calculated by means of relations deduced from this theory.—**Radu Titeica**: The vibration spectra of some polyatomic molecules. The results of measurements of the infra-red absorption bands of formaldehyde and of acetone are given.—**Ny Tsi-Ze** and **Choong Shin-Piaw**: The absorption of light by ozone between 3050 A. and 3400 A. (the region of the Huggins bands).—**M. Bourguel**: Double conjugated linkages.—**Mlle. B. Grédy**: The application of Raman spectrography to the study of the rhodinol-citronnellol isomerism. These experiments do not confirm the formula of citronnellol suggested by Verley (α form): rhodinol contains three isomeric alcohols.—**D. Skobelzyn**: The mechanism of the phenomena of the ultra-penetrating radiation (cosmic rays).—**S. Rosenblum**: The fine structure of the magnetic spectrum of the α-rays of radium.—**H. Muraour** and **G. Aunis**: Study of the velocity of combustion, at a low temperature, of colloidal powders.—**Victor Lombard** and **Charles Eichner**: Researches on the conditions of optimum diffusion of hydrogen through palladium.—**A. Cochet** and **J. Houdin**.—The phosphates of urea and of guanylurea.—**Henri Fournier**: The results furnished by stamping tests and their relation with extension tests.—**Ch. Bedel**: The density of ferrosilicons. Thirteen alloys were prepared, ranging from 0 to 100 per cent iron. Indication of density variations were observed when the composition of the alloys corresponded to Fe_2Si and FeSi.—**Ed. Chauvenet** and **Avrard**: The determination of barium in iron ores. The iron is removed as ferric chloride by heating to 900°-930° C. in the vapour of carbon tetrachloride.—**P. Bugnon** and **A. Parrot**: The morphological value of the cotyledon in monocotyledonous umbellifers.—**Mme. Liou** (Tchang-Tcheng-Houa): Various peculiarities of the development of the egg of *Bombyx mori* under the influence of bivoltinising agents.—**Ch. Dhéré**: The fluorescence of phyllærythrin and the structure of its fluorescence spectra.—**J.-E. Abelous** and **R. Argaud**: The formation of adrenaline in the suprarenal gland. The results of the experiments described are inconsistent with the view that the medullary substance is exclusively concerned with the production of adrenaline. —**Mme. Andrée Roche** and **Jean Roche**: The participation of the hexosephosphoric acid in the glycolysis of the blood.—**Aynaud**, **Peyron**, and **Falchetti**: Cancer of the lung in sheep and its etiological connexion with parasitic and infectious lesions.

CAPE TOWN

Royal Society of South Africa, March 16.—**W. A. Jolly**: The living organism (Presidential Address). If we are ever to attain to self-knowledge, to explain ourselves, and to determine our place in Nature and our relation to the world around, it is to advance in biology that we must trust. All that we know of the universe is due to physiological changes of some kind. In the living organism, regarded as a whole, we have a phenomenon the unity and fundamental nature of which are as essential as any of the concepts of physics. Psychology, studied by subjective methods, working in collaboration with physiology, has an important part to play in our final achievement of self-knowledge. The address concluded with an account of the methods and difficulties of modern physiological research, with special reference to electro-physiology and the time-relations of the simple reflex.—**F. Kirchheimer**: On pollen from the Upper Cretaceous dysodil of Banke, Namaqualand. These pollen forms, probably of Upper Cretaceous age, do not in the least agree with the present-day flora of the area. This serves to show, in conjunction with the character of the megascopic plant remains, that the ecological character of the area at the time of formation of the deposits was widely different from that of to-day.—**E. Reuning**: The composition of the deeper sediments of the pipe at Banke, Namaqualand, and their relation to kimberlite. The various rocks known found in the neighbourhood—granite, dolerite, and Karroo sediments—can have contributed but little to the composition of the dysodil, which is apparently the product of the infilling of the pipe by finest mud obtained from the weathering of ejected kimberlite material lying on the granite in the neighbourhood of the pipe.—**S. H. Haughton**: On some South African fossil Proboscidea. New proboscidean remains attributed to the genera *Archidiskodon* and *Pilgrimia*. There is evidence of considerable dental variability within the confines of a single living race of African elephant. The geology of the various gravels of the Vaal River area is critically examined; the possibility that the gravels of the so-called 'Middle Terrace' and the 'River-bed Gravels' may be contemporaneous is discussed.

GENEVA

Society of Physics and Natural History, May 19.—**R. Cherbuliez** and **A. Rilliet**: On methylcodeine. The methylation of the hydroxyl group of codeine is made difficult by the presence of the basic tertiary function,