

advancing wave excited simultaneous luminosity in a swarm of, say, *Noctiluca miliaris*.

The coasts of Sanriku contain many V-shaped indentations facing the Tuscaroora Deep, and they have suffered so often from the sea-waves from the northern slope of the Deep, especially in 869, 1611 and 1896, that the Imperial Earthquake Investigation Council has issued a volume of notes on the prevention of damage from *tunami*. The main suggestion is the removal of coast villages to elevated ground, but, if this should be impossible, the construction of defence works, such as sea-walls and breakwaters, or groves of trees, and the provision of avenues of escape and *tunami* warnings. C. D.

University and Educational Intelligence

LONDON.—A special committee has been appointed to report fully as a matter of University policy on the amount and nature of technological study at present carried on in the University, and as to the desirability of instituting a new Faculty of Applied Science or Technology.

It is announced that Miss Ethel Strudwick has been appointed a trustee of the London Museum. Miss Strudwick is high mistress of St. Paul's Girls' School, and her appointment is intended to associate schools with the museum.

A COURSE of nine lectures on cathode ray oscillographs will be given at East London College, Mile End Road, London, E.1, on Mondays at 5.30, commencing on January 22. The first lecture, entitled "Cathode Rays and their Use in Electrical Engineering", will be delivered by Prof. J. T. MacGregor-Morris; lectures 2-5, entitled "Low Voltage Oscillographs", by Mr. L. H. Bedford; and lectures 6-9, entitled "High Voltage Oscillographs", by Prof. G. I. Finch. Admission will be free, without ticket.

On the place of biology in education hangs the efficiency of efforts to popularise appreciation of the laws of health. In this belief, the British Social Hygiene Council organised a year ago a conference on the subject, and set up in March last, as an outcome of the conference, an Educational Advisory Board. In a leaflet recently issued, the objects of the Board, its composition and committees and the services it offers are set forth in detail. It aims at promoting the teaching of biological sciences in all kinds of educational institutions, at securing adequate recognition for biology as a general and as a specialist subject by examining bodies, and at giving guidance in the production of textbooks and teaching material. Its chairman is Dr. W. W. Vaughan, formerly headmaster of Rugby, and among its members are representatives of the Board of Education and the Scottish Education Department, of most of the universities of Great Britain, of several examination boards, of many associations of members of the teaching profession and of local education authorities. One of the standing committees concerns itself with the teaching of biology in outlying parts of the British Empire, especially colonies and protectorates and mandated territories under British rule. The Board offers a variety of services including recommendation of books, advice regarding syllabuses and information about current research in methods of teaching.

Science News a Century Ago

Death of M. Hachette

On January 16, 1834, the eminent French mathematician and engineer, Jean-Nicolas-Pierre Hachette, died in Paris at the age of sixty-four years. Born in Mézières on May 6, 1769, he was the son of a bookseller and was educated at Charleville and Rheims. At the age of nineteen he became a draughtsman in the military engineering school at Mézières, and four years later was made a professor of hydrography at Collioure. His mathematical writings having brought him to the notice of Monge, who then held the post of Minister of Marine in the Revolutionary Government, Hachette in 1793 was made a deputy-professor at Mézières, and the following year at the battle of Fleurus on June 26, 1794, he assisted Guyton de Morveau in the experiment of using a balloon for military observations. A few months later, after the fall of Robespierre, he assisted Monge and Guyton de Morveau in founding the *École des Travaux Publics*, renamed in 1795 the *École Polytechnique*, and was given the chair of descriptive geometry. In 1798 with Berthollet, Monge, Fourier, Jomard and other savants he accompanied Napoleon to Egypt. Once again in France, he resumed his lectures at the *École Polytechnique*, having among his students Arago, Poisson and Fresnel. At the restoration in 1816, like Monge he was deprived of his chair and twice the Government refused to allow his election to the Academy of Sciences, which he did not enter until the Revolution of 1830. His writings comprise an admirable series of works on descriptive geometry, many reports on mathematical and physical subjects and memoirs on machines. Though his name is connected with no great discovery, his services were of great importance to constructors of machinery, and as a man he was respected for his amiability and uprightness.

Sir John Herschel at the Cape

After his father's death in 1822, Sir John Herschel lived at Slough with his mother, continuing the survey of the northern heavens with the 20 ft. telescope he had made under his father's directions. His 'sweeps' resulted in a catalogue of 2,307 nebulae of which 525 were new discoveries, presented to the Royal Society in 1833. "Strongly invited," as he himself said, "by the peculiar interest of the subject, and the wonderful nature of the objects which presented themselves," he resolved to attempt the completion of the survey of the southern hemisphere, and on November 13, 1833, embarked with his wife and family in the *Mount Stewart Elphinstone*, and after a prosperous voyage landed at the Cape on January 16, 1834, about ten days after Maclear, the successor of Henderson as H.M. Astronomer. "Choosing as the scene of his observations a rural spot under the shelter of Table Mountain, he began regular 'sweeping' on the 5th of March. The site of his great reflector is now marked by an obelisk, and the name of Feldhausen has become memorable in the history of science; for the four years' work done there may truly be said to open the chapters of our knowledge as regards the southern skies" (Clerke).

Herschel's work at the Cape led to an extraordinary hoax which had a remarkable sequel. On the staff

of the newly-founded New York *Sun* was the reporter Richard Adams Locke. Locke contributed to the *Sun* a series of articles stated to be based on Herschel's discoveries with a giant telescope which enabled him "to study even the entymology of the moon in case she contained insects upon her surface". The fake, of course, was later on exposed, but was regarded with amusement. It had helped to establish the *Sun*, which achieved the largest circulation of any daily in the world, 19,360 copies as against the 17,000 of the London *Times*, and led to the birth of cheap newspapers. "We are indebted," said Edgar Allan Poe, "to the genius of Mr. Locke for one of the most important steps ever taken in the pathway of human progress" (see *British Weekly*, Jan. 16, 1918).

Examination of Mummies

A mummy was opened at the College of Surgeons on January 16 by T. J. Pettigrew, F.R.S., in the theatre of the College, before a very crowded audience, consisting not only of members of the College, but also scientific men generally who had been invited by advertisements. It was stated that the mummy was the property of the College, and had been in its museum since 1820, brought from Thebes by Henderson. Mr. Pettigrew said that a mummy opened at the Leeds Philosophical Society was covered an inch thick with an aromatic powder. In concluding his discourse, Mr. Pettigrew expressed his pleasure that this antiquity had proved to be a male subject, as he had predicted, and did not therefore bring into question his reading of the inscriptions.

Quantity of Electricity to Decompose a Grain of Water

Faraday's experiments on the decomposition of compound bodies by electrolysis, described in the Seventh Series of the "Experimental Researches in Electricity", led him to speculate as to the "quantity of electricity associated with the particles or atoms of matter", and his wonder was excited by the "enormous electric power of each particle or atom" which his measurements showed. "What an enormous quantity of electricity therefore", he says, "is required for the decomposition of a single grain of water". He compares the quantity of "voltaic" electricity required for the purpose, measured electro-chemically, with that of "common" electricity from the frictional machine, and finds that "the proportion is so high that I am almost afraid to mention it". This experiment was recorded on January 17, 1834, in the Diary ("Faraday's Diary". Vol. 2, p. 214). The "battery" was a little voltaic arrangement of zinc and platinum wires dipping into sulphuric acid:

"Now in this form of battery 1 gr. of water require solution of 3.6 grains of zinc—and as 6.8 gr. dissolved in 7 days, 3.6 would require 3.7 days; but if a wire 5 inches long required 3.7 days to loose 3.6 grs., one only $\frac{1}{2}$ of an inch in length but of the same diameter would require 29.6 days for solution of same weight, if constant action could be sustained. Now the comparative battery required 0.0533 of a minute to equal one charge of Leyden battery, but 29.6 days divided by 0.0533 of a minute gives very nearly 800,000. So that from this calculation the electricity required to decompose a single grain of water is about equal to that of 800,000 charges of the Leyden battery, any one of which would kill a cat or dog."

Societies and Academies

LONDON

Physical Society, Dec. 15. G. I. FINCH and A. G. QUARRELL: Crystal-structure and orientation in zinc oxide films. A new type of electron-diffraction camera is described incorporating means for greatly increasing the accuracy hitherto obtainable in electron-diffraction analysis. Partially and completely oxidised zinc films have been examined by transmission. The normal type of zinc oxide is formed by the oxidation of zinc via a zinc oxide which is basally pseudomorphic with the zinc. The corrosion-resisting properties of zinc appear to be due, in the main, to a protective coating of such pseudomorphic zinc oxide. A. O. RANKINE: Note on the behaviour of the Eötvös gravity balance in fluctuating gravitational fields. Attention is directed to the semi-diurnal variation of gravity at a point on the earth's surface, due to lunar attraction and recently measured by Loomis. This temporal variation of g is much larger than the spatial differences measured by the Eötvös gravity balance, but it produces no effect on the balance. This constitutes an experimental proof of the power of the Eötvös instrument to discriminate between space and time changes of terrestrial gravitation. ALLAN FERGUSON and J. T. MILLER: The temperature variation of the orthobaric density of unassociated liquids. A formula connecting the orthobaric density of a liquid and its temperature is developed in the form $\rho = 2\rho_c[A(1-m)^{0.3} + (1-\frac{1}{2}m)]$, where m is reduced temperature and A is a constant which varies slightly from liquid to liquid, and may be taken to have a mean value 0.911. The formula is a long-range one, and has been tested for thirty pure organic substances. It has been applied to the evaluation of expansion coefficients and to show the manner in which free and total molecular surface energy vary with temperature. L. C. MARTIN: The theory of the microscope (2). A discussion of the effects in dark-ground illumination when the image of the source of light is projected into the object plane by an illuminator of the symmetrical type. The treatment is two-dimensional. The conditions necessary for the formation of genuine and spurious images are investigated, and it is shown that the Abbe principle is theoretically valid in the cases considered. A short practical investigation with Grayson's rulings supports the theoretical conclusions, but indicates the desirability of closer examination of the causes of misleading interference phenomena. G. GRIME: Measurement of impact stresses in concrete. A quartz piezo-electric gauge, using a cathode-ray oscillograph for recording, has been developed to measure impact stresses in concrete. It is being employed to study the stresses in driven reinforced-concrete piles.

PARIS

Academy of Sciences, November 27 (*C.R.*, 197, 1257-1368). EMILE BOREL: Studies on the probability of series of rainy days or of fine weather. The analysis of 50 years' data, taken at Paris between October 1 and January 31, shows that given a run of either fine or wet days, there is a tendency towards persistence of the run (see also *NATURE* 132, 864, Dec. 2, 1933.) GEORGES CLAUDE: New progress in lighting by luminescence. The light emitted by neon-mercury lamps is known to be deficient in the