of tomato soils, and the cultivation treatment of barley. Discussing the extensive work on the mineral content of pastures, he said that the data so far recorded promise to have a very marked effect on the agricultural practice of the future, and emphasised the importance of supplementary fodder production for stock. Studies of stock ailments such as bush-sickness and xanthin (urinary) calculi of sheep have also yielded conclusive evidence indicating the means of controlling them. The first, due to nutritional deficiency of iron, has been shown to be due to lack of soluble forms of iron in the soil rather than in the pasture; stock appear to derive much of the iron they need by ingestion of the soil itself. It has also been shown that xanthin calculi can be avoided by the encouragement of English grasses and clovers, by suitable top-dressing, and by the supply of supplementary feeds.

Among other examples of the practical value of the work of the Institute, Prof. Easterfield referred to the economic importance of the investigations carried out on the reclamation of the extensive pakihi lands occurring chiefly in the more populated mining districts. Field plot studies have shown that it is possible to bring the land, supporting only fern and rush in its natural state, into a condition suitable for dairy farming at a cost as low as £6 per acre.

The Japanese Seismic Sea-waves of March 3, 1933

THOUGH we may have to wait some time for the complete reports on the great Japanese earthquake of March 3, 1933, some valuable papers have recently been published*, of which an abstract is here given. The earthquake occurred at about 2.32 a.m., Jap. Stand. Time, on March 3 (5.32 p.m. on March 2, G.M.T.). From the records at stations connected with the Earthquake Research Institute, Prof. Ishimoto finds the epicentre to be in lat. 38·2° N., long. 144·0° E.; while the observations at Tokyo, according to Prof. Imamura, place it in lat. 38·5° N., long. 143·3° E. The latter point is represented by the more southerly of the two crosses in the accompanying map (Fig. 1), the other being the epicentre of the great earthquake of June 15, 1896. The dotted lines on the map are isobaths in thousands of metres, and the two points, which are about fifty miles apart, both lie near the isobath of 4000 metres or about 2½ miles, on the northern slope of the Tuscaroora Deep, the depth of which exceeds five miles.

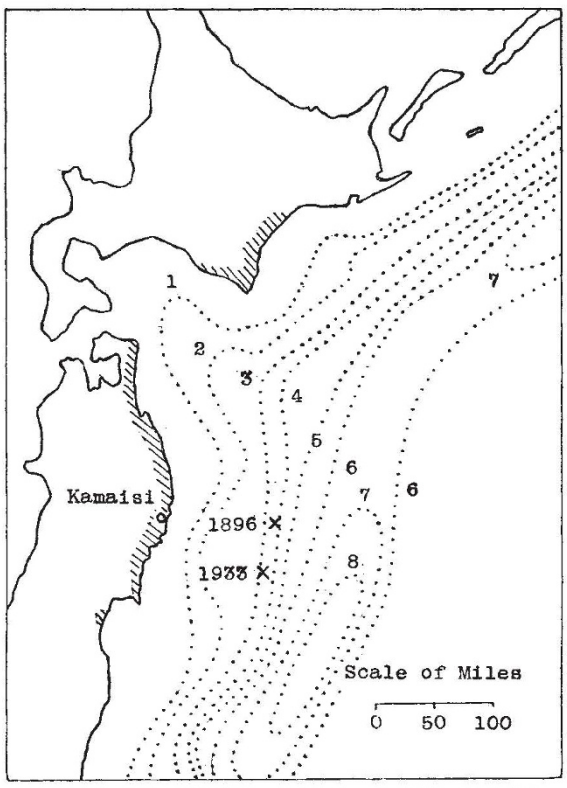

FIG. 1. Isobaths of the Japanese earthquake of March 3, 1933.

The point given above is that below which the movement of the crust-block began. It differs slightly, however, from the origin of the great sea-waves. Assuming the velocity of the waves to be $\sqrt{(gh)}$ ft. per sec., where h is the depth in feet, Mr. R. Takahasi has determined the position of the wave-centre from the times of arrival of the sea-waves at Miyako, Tyôsi and Tukihama, namely, lat. 38·3° N., long. 143·6° E.

Both points, however, being about a hundred miles from the coast, the shock, though widely felt on land, caused only slight damage along and near the coast. After an interval, ranging from 25 to 40 minutes, the great sea-waves swept over the shores shaded on the map, and drowned 3,022 persons, washed away 6,889 houses, besides destroying more than 8,000 boats and other vessels. In 1896, the earthquake was less severe than in 1933, but the waves were in most parts higher, and the destruction was far greater, 27,122 lives being lost and 10,617 houses washed away. In Hokkaido, the greatest height of the waves as shown by marks left on trees, posts, slopes, etc., was 15 ft. In the Main Island, it was 15 ft. at Kamaisi, the place that suffered most in 1896, but somewhat farther to the south, it rose to 62 ft. along the coast at Ryôri Sirahama (and 93 ft. inland) and 75 ft. at Hirota Atumari. The waves swept in with such velocity that a motor-boat from Kamaisi, with a speed of 12 miles an hour, could make no headway against them. Across the Pacific, they were recorded by mareographs at Honolulu, San Francisco and Santa Monica.

Mr. K. Musya has made an exhaustive study of the luminous phenomena seen as the waves came in. Among them is reported a strong flash of light that seemed to be emitted from the surface of the sea near the mouth of Kamaisi Bay. Prof. Terada shows that the most probable explanation of the flash is that the turbulence of the water in front of the

* M. Ishimoto. Preliminary notes on the *tunami* of March 2, 1933 (G.M.T.), and an outline of the investigations now being made concerning it at the Earthquake Research Institute. *Japan. J. Astron. Geophys.*, 11, 1–9; 1933.
T. Matuzawa, K. Kanbara and T. Minakami. Horizontal movement of water in the *tunami* of March 3, 1933, *ibid.*, pp. 11–16.
A. Imamura and Z. Kawase. The Sanriku *tunami* of 1933, *ibid.*, pp. 17–35.
T. Terada. Luminous phenomena accompanying destructive sea-waves (*tunami*). *Proc. Imp. Acad., Tokyo*, 9, 367–369; 1933.
Notes on the prevention of damage from *tunami*. Issued by the Imperial Earthquake Council, 1933.

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 Publiques, 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 nebulæ 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