

of the 7.4 day period about the times of the four principal phases, with amplitudes of 0.16 and 0.11. The ranges about the mean depth for the three periods are, respectively, 1.50, 1.50 and 1.84 km.

The 42-minute period affects both the frequency and the mean focal depth of the Tango after-shocks until the end of May. During March and April, the minima of the periods for both frequency and depth coincided approximately with the return movements from the antipodes of the focus, the amplitudes being 0.25 and 0.06 in March and 0.33 and 0.10 in April, while, in May, the maxima coincided closely with those returns, with amplitudes of 0.54 and 0.13. The ranges about the mean depth during the three months are, respectively, 0.97, 1.64 and 1.91 km.

*Ordinary Earthquakes felt in Tokyo.*—The lists of such earthquakes, with their estimated focal depths, are given from 1924 to 1933. In the results that follow, the earthquakes for the year 1924 are omitted on account of the unusually large number felt in January of that year. Of 564 shocks felt during the remaining nine years, the focal depths of 388 are determined. The variations in mean depth show periods of one year, one day, and 14.8 and 7.4 days.

The maximum epoch of the annual period in the frequency of the earthquakes occurs at about the end of March, the amplitude being 0.11. The mean focal depth of the earthquakes is 46.7 km., and the maximum epoch of the variations in monthly mean depth occurs in the middle of March, the amplitude being 0.08, that is, the range on either side of the mean is 3.7 km.

The diurnal period in the variation of mean focal depth is less pronounced. For the same earthquakes, the maximum epoch of the variation in frequency occurs at 2 a.m., the amplitude being 0.28. The maximum epoch for the mean focal depth occurs at about 11 p.m., the amplitude being 0.05, that is, the range of variations about the mean is 2.3 km.

For the lunar periods, the number of earthquakes of known focal depth from January 25, 1925, to December 17, 1933, is 372. For both frequency and depth, the maximum epochs of the 14.8 day period fall near the times of new and full moon, the amplitudes being 0.16 and 0.03, and the range on either side of the mean depth 1.4 km. The epochs of the 7.4 day period fall near the times of the four principal phases, the amplitudes being 0.14 and 0.04, and the range on either side of the mean depth 1.9 km.

### University and Educational Intelligence

CAMBRIDGE.—The Adam Smith Prize offered annually for an essay on some unsettled question in economic science or in some branch of economic history or statistics subsequent to the year 1800 selected by the candidate himself has been awarded to Mr. W. B. Reddaway, of Oundle and King's College, who was placed alone in Division I, Class I, in Part II of the Economics Tripos last June. The prize is valued at £40.

The governing body of Emmanuel College invites applications for a research studentship which will be awarded in July 1935. Preference will be given to candidates who have already completed one but not more than two years of research. The studentship has a maximum annual value of £150, and is awarded and normally held for two years. The studentship is not open to a woman or to a graduate of the University. Further

information can be obtained from the Master, Emmanuel College, Cambridge.

ST. ANDREWS.—R. A. Smith has been appointed Carnegie teaching fellow and assistant in applied mathematics in the United College, St. Andrews, in succession to Dr. D. E. Rutherford, who has been promoted to the post of lecturer in mathematics and applied mathematics.

PROF. F. E. WEISS, formerly Harrison professor of botany in the University of Manchester, has been appointed to take charge of the botanical department of the Egyptian University at Abbassia, Cairo, from February 1 until the end of May, in succession to Prof. F. W. Oliver, who is retiring from the professorship.

### Science News a Century Ago

#### Faraday's Eyesight

Faraday's "Diary" is strictly a laboratory record of experiments, and from end to end there are very few references in it to matters outside his experimental work. One of these personal entries occurs on January 15, 1835:

"Within the last week have observed twice that a slight obscurity of the sight of my left eye has happened. It occurred in reading the letters of a book, held about 14 inches from the eye, being obscured as by a fog over a space about half an inch in diameter. This space was a little to the right and below the axis of the eye. Looking for the effect now and other times, I cannot perceive it. I note this down that I may hereafter trace the progress of the effect if it increases or becomes more common."

It does not seem that the obscurity occurred at all frequently, for no further reference to it in the "Diary" has been traced. None of Faraday's biographers makes any reference to defective eyesight. The thick glass spectacles used by him, which are preserved at the Royal Institution, were worn only to protect his eyes from the effects of explosions during the experiments on the liquefaction of gases. Among the numerous portraits of him one photograph has been found, taken probably after 1860, in which he is holding a pair of spectacles in his hand; and it would appear that he used glasses for reading in his later years; but apart from this, it is evident that he retained his sight practically unimpaired to the end.

#### Geographical Exploration

On January 15, 1835, *The Times* said: "A lecture interesting both to the friends of science and the friends of commerce was last night delivered at the London University by Captain Maconochie. The lecturer commenced by saying two expeditions of discovery were now being sent out by the efforts of the Royal Geographical Society. One of these expeditions was to explore the interior of Southern Africa and the other to explore the regions to the south and south-west of British Guiana. The Geographical Society had done much to further discovery and their exertions had been most beneficial to the promotion of geographical science." Referring to the expedition to Africa, Capt. Maconochie said: "The continent of Africa had already been penetrated 1,400 miles from the Cape of Good Hope. The countries further north were found to be the furthest advanced in the arts of civilised life. At the distance

of 1,400 miles from the Cape the arts of smelting iron and copper, and of carving in ivory were known. Commerce had penetrated in that direction nearly 1,400 miles, and a trade to the amount of 1,600£ had been carried on in one expedition. Captain Alexander had volunteered to explore these regions. He had sailed from England in September last." As regards the expedition in British Guiana: "The French nation had sent out two gentlemen for the purpose of making discoveries, and from the funds of the Geographical Society 500£ had been given towards sending out from this country a gentleman for the same purpose. The Government of the country had contributed 1,000£ to forward his exertions in so laudable an enterprise."

#### The Eastern Counties Railway

By 1835, plans for railways to connect London with the north, south, west and east of England were being prepared, and on January 17, 1835, the *Mechanics' Magazine* said that the "Eastern Counties Railway which is to run from London to Yarmouth, by way of Chelmsford, Colchester, Ipswich and Norwich will be one of the most level, for its length, yet laid down in the whole kingdom. According to the report of the engineers, there will be nowhere a greater rise than 1 in 400; no embankment of more than 28 feet high; and not a single tunnel throughout its whole length. The average cost per mile will, in consequence of these singularly favourable circumstances, be less than any other railway constructed, or in progress of construction, in Great Britain. The estimates of revenue are also extremely encouraging. From there being no canal communication between the metropolis and the counties of Essex, Suffolk and Norfolk, there is a greater waggon traffic on this line than on any other in the kingdom. The passenger traffic is also so considerable, that it would of itself suffice to pay all the expenses of the railway, and leave a handsome profit to the proprietary."

#### Volcanoes of South America

On January 18, 1835, for the second time, H.M.S. *Beagle* anchored in the bay of San Carlos in Chiloe. "On the night of the 19th," wrote Darwin, "the volcano of Osorno was in action. At midnight the sentry observed something like a large star, which gradually increased in size till about three o'clock, when it presented a very magnificent spectacle. . . . I was surprised at hearing afterwards that Aconcagua in Chile, 480 miles northwards, was in action on this same night; and still more surprised to hear that the great eruption of Coseguina (2,700 miles north of Aconcagua), accompanied by an earthquake felt over a 1,000 miles, also occurred within six hours of this same time. This coincidence is the more remarkable, as Coseguina had been dormant for twenty-six years; and Aconcagua most rarely shows any signs of action. It is difficult even to conjecture, whether this coincidence was accidental, or shows some subterranean connection. If Vesuvius, Etna, and Hecla in Iceland (all three relatively nearer each other than the corresponding points in South America) suddenly burst forth in eruption on the same night, the coincidence would be thought remarkable; but it is far more remarkable in this case, where the three vents fall on the same great mountain-chain, and where the vast plains along the entire eastern coast, and the upraised recent shells along more than 2,000 miles on the western coast, show in how equable and connected a manner the elevatory forces have acted."

## Societies and Academies

### DUBLIN

Royal Dublin Society, November 27. E. J. SHEEHY: A crate for the collection of fæces and urine adjustable for metabolism experiments (solid and liquid) with pigs, sheep and cattle of various sizes. J. HARDIMAN, J. KEANE and T. J. NOLAN: The chemical constituents of lichens found in Ireland. *Lecanora gangaleoides* (1). This lichen contains, besides chlor-atranorin, a chlorinated depsidone of constitution  $C_{14}H_8O_5Cl_2(OCH_3)_2$  closely allied in structure to diploicin,  $C_{15}H_7O_4Cl_4(OCH_3)_3$ , previously found in the lichen *Buellia canescens*. H. H. POOLE and W. R. G. ATKINS: The measurement of the current generated by rectifier photo-cells. A modification of the method recently described by Campbell and Freeth has proved very suitable for photometric measurements over a very wide range of illumination, and is especially adaptable to marine work (see NATURE, Nov. 24, p. 810). THOMAS DILLON and TADHG O'TUAMA: The cellulose of marine algæ. Cellulose was obtained from species of *Laminaria* (1) by successive extraction with ammonia and with caustic soda and (2) by a process of retting followed by extraction with soda. The methyl and acetyl derivatives and the thiocarbonate of this cellulose resembled in properties the corresponding derivatives of the cellulose obtained from land plants. When the cellulose was hydrolysed with sulphuric acid, glucose was obtained, which was identified by the osazone. Failure to obtain glucose from algic cellulose reported by other authors may have been due to the impurity of the cellulose, which in the plant appears to be closely associated with a substance corresponding to the lignin of land plants. VINCENT BARRY and THOMAS DILLON: Preparation and properties of alginic acid and the extraction of marine algæ with various solvents. High viscosity has always been regarded as the most characteristic property of solutions of the alkali alginates. It has now been found that, if the fronds of *Laminaria digitata* are extracted with boiling water and then with ammonia, the ammoniacal solution which contains the alginic acid is not highly viscous, and filters easily. Extraction with a series of solvents in the order mentioned gave approximately the following extracts expressed in percentages of the dry plant: water 40, industrial alcohol 10, industrial alcohol containing a little hydrochloric acid 2, ammonia 20, boiling caustic soda 20, residue of cellulose 8.

### PARIS

Academy of Sciences, December 10 (*C.R.*, 199, 1345-1463). The president announced the death of Adrien de Gerlache de Gomery, *Correspondant* for the Section of Geography and Navigation. MARCEL BRILLOUIN: The Planck quanta and the field of atomic force. A development of the hypothesis that Planck's constant should appear as a fundamental constant of the atomic field which governs the motions of the electrons and the mutual actions of the atoms. CHARLES NICOLLE and MME. HÉLÈNE SPARROW: Some experiments on the virus of the river fever of Japan (*Tsutsugamushi*). This belongs to the class of exanthematic fevers and is distinct from typhus. It is propagated by animal parasites, ticks. The rat acts as a carrier for the disease. In this animal there is no fever, and the disease is