

för Matematik on the theorems of Poisson and Lexis.

ACCORDING to an article reprinted from the Proceedings of the Academy of Science of Amsterdam, Prof. Zeeman, in the course of some experiments on the double refraction produced in liquid air by an electric field, has found that liquid air will stand an electric field of 90,000 volts per centimetre. In his double refraction measurements a difference of potential of 17,000 volts was maintained between the plates of a condenser 4.5 centimetres long, 1.0 centimetre wide, and 0.3 centimetre apart immersed in liquid air, and a beam of plane polarised homogeneous light traversed the liquid air between the plates. The phase difference introduced by the double refraction due to the electric field was estimated at  $1/300$  wavelength, so that the Kerr constant for liquid air is about  $1/20$  of that of carbon bisulphide.

THE therapeutic action of certain mineral springs has been recently attributed, at least in part, to the presence of the radium emanation in the water. Experimental evidence in support of this view is given by P. Mesernitsky in the current number of the *Comptes rendus* of the Paris Academy of Sciences. It was found that the radium emanation decomposes sodium urate, some ammonium salts being formed. The exact nature of the decomposition (which was shown to be due to the action of the  $\alpha$  rays, the penetrating rays being without effect) has not been completely made out, but there is a marked increase of solubility of the urate. It is suggested by the author that this action of the  $\alpha$  rays upon sodium monourate may furnish an explanation of the therapeutic effects of the emanation in gouty cases.

A PAPER by Mr. Andrea Naccari in vol. xlvii. of the *Atti* of the Academy of Sciences of Turin (December, 1911) takes as its starting point an old memoir by Samuel Hunter Christie in the *Phil. Trans.* for 1826, entitled "On Magnetic Influence in the Solar Rays." Christie found the amplitude of oscillation of a magnet to decrease more rapidly than usual when sunlight fell on the magnet. The phenomenon had since been studied by Baumgartner, who found that it was not confined to magnets, and concluded that the real cause was air currents set up by the heating. Naccari confirms the view that magnetism has nothing to do with the phenomenon, but he differs from Baumgartner as to the cause. He ascribes it to the effect of radiation on the air which is carried by the oscillating body and that immediately surrounding it. Under certain conditions, the effect of thermal radiation on the damping seems very large, and further study of the phenomenon from the point of view of the kinetic theory of gases might not unlikely prove profitable.

IN a paper read at the Concrete Institute on March 14, Mr. Reginald Ryves treated the question of high dams of great length, and proposed a form of thrust buttress dam of arches, in which the whole of the water load is taken by masonry in direct compression, and neither the weight of the buttress nor the weight of the arch is taken into account as re-

gards stability, except for resistance to sliding bodily when the ground is comparatively soft. Under normal conditions, the best slope for the water face is  $45^\circ$ . The dam consists of inclined arches of increasing thickness as the depth increases, and sloping at  $45^\circ$ . The abutments rest against the up-stream faces of the buttresses, which are built of layers all inclined at  $45^\circ$ . Every part of such a dam is subject to the same stress, except that the top layer of the buttress and the upper part of the arch ring may have the minimum in each case for the materials used. The author claims that this type is suitable for heights up to 200 ft. with a stress of 10 tons per square foot, and up to 300 ft. for 16 tons per square foot.

MR. EDWARD STANFORD has published an excellent, well-coloured geological map of central Europe which will prove of great service to students of geology, and less directly to teachers of geography. The map is  $16\frac{3}{4}$  in. by  $10\frac{1}{2}$  in., and costs 5s.

M. J. DANNE asks us to say that his laboratory at Gif for experiments on radio-active substances is about 26 kilometres from Paris, and not 206 kilometres, as stated in last week's NATURE (p. 69).

#### OUR ASTRONOMICAL COLUMN.

##### ASTRONOMICAL OCCURRENCES FOR APRIL:

- April 1. oh. om. Neptune stationary.  
 1. 1h. om. Jupiter stationary.  
 1. 10h. 14m. Moon eclipsed. Visible at Greenwich.  
 6. 8h. 32m. Jupiter in conjunction with the Moon. (Jupiter  $5^\circ 8' N.$ ).  
 10. 4h. 54m. Uranus in conjunction with the Moon. (Uranus  $4^\circ 46' N.$ ).  
 10. 19h. om. Neptune at quadrature to the Sun.  
 15. oh. om. Mercury in inferior conjunction with the Sun.  
 15. 5h. 17m. Venus in conjunction with the Moon. (Venus  $0^\circ 5' N.$ ).  
 16. 22h. 51m. Sun eclipsed, partially visible at Greenwich, ends at 1.31 p.m. on April 17.  
 18. 18h. 31m. Saturn in conjunction with the Moon. (Saturn  $4^\circ 47' S.$ ).  
 20-22. Lyrid meteors at maximum.  
 22. 3h. 22m. Mars in conjunction with the Moon. (Mars  $3^\circ 25' S.$ ).  
 22. 21h. 53m. Neptune in conjunction with the Moon. (Neptune  $5^\circ 53' S.$ ).  
 23. 10h. om. Uranus at quadrature to the Sun.  
 27. 11h. 53m. Mercury in conjunction with Venus. (Mercury  $0^\circ 10' N.$ ).

THE ECLIPSE OF APRIL 17.—In the *Revue générale des Sciences*, the Abbé Moreux publishes an interesting summary concerning the chances of a total eclipse of the sun being observed on April 17 next. He points out that M. Landerer's very slight modifications of the data produced considerable changes in the figures showing the size and path of the shadow cone, but even then the maximum breadth of the latter was only 200 metres (about one-eighth mile).

Adopting the new figures given by Dr. Crommelin, the Abbé Moreux finds that totality will last 1.6s. just before reaching the Portuguese coast, 1.5s. between Penafiel, about twenty miles east from Oporto, and Cavez, and about 1s. as the shadow leaves the northern shore of the Peninsula. He calculates that at St. Germain and Namur the height of the apex of



the shadow cone above sea-level will be 30 km. (19 miles) and 52 km. (32½ miles) respectively.

Further, he makes the suggestion that although totality may not yet occur, the corona may be seen, for at previous eclipses it has been seen well before and after totality, and in 1900 was photographed by Mr. Willis eight minutes after.

Finally, he presents the peculiar possibility of there being neither an annular nor a total eclipse; this would occur if the mean apparent diameter of the moon were just insufficient to produce totality, because of the depressions at the limb, yet was so great that the mountains at the moon's limb projected far enough to break up the continuity of the solar limb.

In No. 4562 of the *Astronomische Nachrichten* Dr. Graff also discusses the position of the lunar mountains, and also the possible observations of the lowest levels of the chromosphere. He suggests, finally, that suitably arranged astrophysical observations may not prove so unprofitable as it has been generally supposed they must be in the circumstances of the coming eclipse.

NOVA GEMINORUM NO. 2.—A number of messages concerning observations of Herr Enebo's new star have been received by the Kiel Centralstelle, and are published in No. 4562 of the *Astronomische Nachrichten*.

At Christiania, early on March 13, Prof. Schroeter estimated the magnitude as 4.0, while Dr. Hartwig at Bamberg on March 13, at 10h. 23.9m. (Bamberg M.T.), found it to be 4.3; he gives the colour as reddish, and the position, for 1912.0, as 6h. 49m. 11.87s., +32° 15' 6".

On March 14 Prof. Pickering reported that the spectrum of the nova was of the  $F_2$  type, but on March 15 he reported a change to a bright-line spectrum. In the Harvard classification the type  $F_2G$  represents spectra similar to that of Procyon, the Procyonian type in the South Kensington classification, which is the next earlier type to the solar stars.

According to Dr. Hartwig, the nova corresponds very closely with a thirteenth-magnitude star on the Palisa-Wolf charts. An observation made at 11.45 p.m. on March 20 showed the magnitude of the nova to be about 5.4.

ANALYSES OF STONE METEORITES.—A valuable contribution to the study of meteorites appears in Publication 151 of the Field Museum of Natural History, where Mr. O. C. Farrington publishes a list of analyses of 125 stone meteorites, and a scheme of classification. An "average" composition, derived from the whole, gives the following substances, and their percentages, as the principal constituents:— $SiO_2$  (39.12),  $Al_2O_3$  (2.62),  $FeO$  (16.13),  $MgO$  (22.42),  $CaO$  (2.31),  $Na_2O$  (0.81),  $Fe$  (11.46),  $Ni$  (1.15),  $S$  (1.98); there are thirteen other constituents.

It is worth noting that this list does not truly represent the relative spectroscopic importance of the various substances in meteorites. In the "Spectroscopic Comparison of Metals present in Certain Terrestrial and Celestial Light Sources," published from the Solar Physics Observatory in 1907, the chief metals were arranged in order of the prominence of their strongest lines in the spectra of the eight or nine stony meteorites examined. The order was as follows:—Cr, Na, Al, Mg, Mn, Si, Ca, Fe, Ti, V, K, Sr, Ni, and Ba.

In the spectra of all the certain meteorites, chromium is very well marked, yet in the chemical analysis given by Mr. Farrington it is only represented by 0.41 per cent. of  $Cr_2O_3$ .

OBSERVATIONS OF NOVÆ.—Observations of the magnitude of Nova Lacertæ are published by Prof.

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Nijland in No. 4562 of the *Astronomische Nachrichten*. Between January 1 and December 15, 1911, the magnitude sank from 7.50 to 11.40, and the plotted values show practically no oscillations of the brightness.

Observations of the suspected Nova 87-1911 Persei, discovered by Mr. D'Esterre, are reported by that observer in the same journal. The later photographs, showing fourteenth-magnitude stars, show, in the position of the nova, a nebulous patch in which appear to be involved three condensations or very faint nebulous stars.

#### LIFE IN THE OCEAN.<sup>1</sup>

MORE than twenty years have passed away since the veteran physiologist of Kiel—Victor Hensen—initiated a new era in plankton research characterised by the application of biometrical methods. His inventions and investigations culminated in the equipment of an oceanic expedition which was to be an experiment on a large scale. It was one of the first German scientific expeditions, and certainly the first oceanic expedition to be devoted entirely to the study of the floating organisms.

Hensen's pioneer work, with its enormous labour and brilliant negotiation of abstruse problems, was carried out in the face of much unfair criticism—the famous polemic of Haeckel, "Plankton Studien," will long be remembered by the Kiel school.

During the years that have elapsed since, the same kind of destructive criticism has been at times proclaimed, and almost always by those who seem to have taken no trouble to study the work they would demolish.

The material collected by this "plankton" expedition has been examined by specialists, and now, after twenty-two years, Hensen has taken up the pen and written what should be the final volume (1), the last word, were it not that two or three reports still remain unfinished.

The greater part of the volume deals with the quantitative geographical distribution of pelagic organisms in the North Atlantic. Numerous tables are appended, and these, with the reports, complete what must be considered the first scientific attempt to determine the distribution of the plankton of the high seas. The work as a record is of great value. It must be remembered, however, that the studies of recent years have emphasised the remarkable seasonal variations occurring in the plankton of both lakes and seas; hence, the observations of the Humboldt-Stiftung expedition, which lasted but three and a half months, must be regarded as only presenting a phase in the distribution of life in the ocean.

Perhaps the most interesting part of the volume is Hensen's *résumé*, which deals with contemporary plankton work and other problems which have been much discussed during the past few years, such as Putter's theory and the theories of de Vries.

The great aim of the plankton expedition was the determination of the actual number of the different organisms in the waters of the high seas. Within certain limits this has been carried out, but on the whole the figures looked at in this light are of little importance. It is the methodical manner in which quantitative nets are used, and the elimination of

<sup>1</sup> (1) "Das Leben im Ozean nach Zählungen seiner Bewohner: Uebersicht und Resultate der quantitativen Untersuchungen." By Prof. V. Hensen. (Ergebnisse der Plankton-Expedition der Humboldt-Stiftung. Bd. v. O.) Pp. v+406+Tabellen (pp. 8+xxviii tables+map.) (Kiel and Leipzig: Lipsius and Fischer, 1911.)

(2) "Ueber das Nannoplankton und die Zentrifugierung kleinster Wasserproben zur Gewinnung desselben in lebenden Zustände." By H. Lohmann. Pp. 38+5 plates. (Leipzig: Dr. Werner Klinkhardt, 1911.)

(3) "Leitfaden der Planktonkunde." By Prof. A. Steuer. Pp. iv+382. (Leipzig and Berlin: B. G. Teubner, 1911.) Price 7 marks.