

we learn that the number of earthquakes was 169 as against 190 noted in 1899 and 209 noted in 1898. To obtain these records the empire has been divided into sixteen districts, each district having its referee. Dalmatia, for example, has 423 observers, who send their observations—unfortunately for the editor—in at least three different languages, to Prof. A. Belar in Laibach.

There are five horizontal pendulum stations, four of which receive from the Government a yearly subvention of 1000 to 1100 K. A sixth station is to be installed at Pribram, one instrument to be on the surface and another at a depth of 1100 m. in the Adalbert-Schacht.

In part i. Dr. W. Láška gives a catalogue of records obtained between June 1899 and December 1900 from a three-component seismograph installed at Lemberg. From the introduction to this work it is clear that Dr. Láška has met with troubles, some of which might certainly have been avoided had he been acquainted with the experiences of his predecessors. On the second page we learn that the clock employed to drive the record-receiving photographic film has also been employed to give time marks on the same. To expect a time-piece to unroll a heavy band of paper or to turn a drum and at the same time to keep a chronometer-like rate is a false economy in which those who construct seismographs for the first time frequently indulge. Whatever inaccuracies may, in consequence of this apparent simplicity of arrangement, have crept into Dr. Láška's time determinations it was evidently his intention that what could be measured should be measured with unimpeachable exactitude. The writer has in his possession a globe which, as it could not be made in England, was purchased from abroad. Its scale is stated to be 1/25,823,716.814. Although Dr. Láška does not aim at such exactitude, he tells us that the mirror of his N.W. pendulum is 3.7757 m. distant from the recording drum, whilst the period of the pendulum when hung vertically is 0.31515, to which, however, he adds that there is no certainty about the accuracy of the fourth decimal. Tables which inform us that 0.1 minute = 6 seconds, 0.2 minute = 12 seconds, &c., also convey an idea of unnecessary redundancy.

In the working of the instrument, which is installed in a cellar, a well-known bogie has been encountered. There is hardly a seismologist who has not met it, and volumes sufficiently numerous to form a moderate library have been published describing its behaviour. It is a something which causes pendulums to move fitfully, and many observers cling to the belief that it is an actual motion of the ground and either trace the same to the beating of waves on a distant shore or to some other cause. The photographs showing these movements which Dr. Láška reproduces are strikingly like those obtained from observatories all over the world. Forasmuch as a copious ventilation or the burning of a gas jet in the room thus haunted frequently results in expelling the intruders, my own opinion is that the majority of them have their origin in the movements of the atmosphere in the room rather than the movement of the ground.

To show that there may be a relationship between seismic disturbances and the movements of magnetic needles which is not mechanical, our attention is once more drawn to the ancient story of the magnet at Parc St. Maur which at the time of an earthquake was caused to move whilst a similarly formed and similarly suspended copper bar remained at rest. Our attention, however, is not drawn to the possibility that these two systems had very different natural periods of vibration.

In a supplement, suggestions are made respecting the determination of the distance of an earthquake origin from a given station from the interval which elapses at that station between the arrival of the preliminary tremors and the large waves. In recent reports issued by the British Association, especially that for 1900, it will be seen that not only have these suggestions already assumed a practical form, but also that other subjects referred to by Dr. Láška have received greater or less consideration.

Part iii. is a detailed account of earthquakes noted in German Bohemia by Dr. V. Uhlir.

In part iv. Prof. P. Franz Schwab gives the records obtained from an "Ehlert" pendulum installed at Kremsmünster. From an analysis of the records it appears that the frequency of earthquakes was much less between Apogee and Perigee than between Perigee and Apogee. In the cooler months, especially from the middle of September to the beginning of March, the pendulums were frequently unsteady. The greatest disturb-

ances, however, accompanied marked barometric depressions. These movements probably eclipsed movements due to earthquakes.

The next number, by Dr. E. Mazelle, is a register of 146 records obtained from a Reubeur-Ehlert pendulum at Trieste.

One excellent suggestion made by Dr. Mazelle is that seismologists should have a uniform system in chronicling their observations.

The periods of his pendulums are taken monthly and are recorded to within 1/100 of a second of time, whilst a table is given to compute possible tiltings of the pendulum to within 1/1000 of a second of arc.

At the end of this paper we find certain analyses of the registers, relating, for example, to the monthly frequency and the frequency of disturbances of different amplitudes, those with amplitudes between 1 and 2 mm. forming 35 per cent. of the total observations.

The sixth part of these publications, by J. N. Woldrich, refers to the earthquake which on January 10, 1901, shook north-east Bohemia. Here and there we find reference to unusual phenomena like the swaying of forests as if moved by a strong wind, the increase or decrease of water in springs, and the effect of the movements upon men and the lower animals. The latter, excepting the story of a man who by the shaking was caused to walk in his sleep, are of the usual type.

Most of these papers are accompanied by maps or diagrams.

J. M.

SCIENTIFIC SERIAL.

THE February number of the *Journal of Botany* contains three articles dealing with mosses. The first and most interesting paper records the finding of an Arctic species, *Tetraplodon Wormskoldii*—practically a *Splachnum*—on Widdy Bank Fell, by Messrs. E. C. Horrell and D. A. Jones. Its usual habitat is about 70° N., and further north.—Mr. Duncan discusses the occurrence of *Octodiceras Julianum* along with *Fontinalis* in the River Severn.—There is the first part of a joint paper by Messrs. D. Prain and E. Baker on *Indigofera* species, in which it is proposed to deal with the numerous synonyms.—Mr. C. B. Clarke writes an appreciative article on Colonel Sir Henry Collett, who combined botany with various important administrative posts in India.

IN the number for March, Messrs. S. Schönland and E. G. Baker conclude a series of articles on South African species of *Cotyledon*.—Two sets of "Notes" deal with the distribution of plants. The first, by C. E. Salmon, enumerates floral localities in Norfolk, thereby furnishing an appendix to Trimmer's "Norfolk Flora" and the supplement thereto.—The second article, written by William Whitwell, relates to East Sussex. He alludes to the "Notes" given by Salmon in the last December number of this journal, which were more copious and referred to the whole county. These two papers, with Arnold's well-known book, should bring the Sussex flora up to date, more especially since Mr. Salmon benefited by help from Mr. Botting Hemsley and by records due to Mr. Roper.—In the supplement, Mr. Batters once again essays a catalogue of British marine Algae, which will be very cordially welcomed. The "revised list" was published in the *Annals of Botany*, 1890, by the same writer in conjunction with Mr. Holmes. As regards localities a change will be noticed; instead of the arbitrary sections of the coast given in the revised list, specific towns, &c., are now mentioned. Practically the whole of this part deals with the Myxophyceae, or, as they are generally termed, the Cyanophyceae.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, March 14.—Mr. S. Lupton, vice-president, in the chair.—A paper on the thermal expansion of porcelain was read by Mr. A. E. Tutton. The paper gives an account of experiments made to determine the expansion of Bayeux porcelain between 0° and 120° C. The material employed was a portion of the tube used by Bedford in his experiments on the expansion of porcelain between 0° and 830° C. Another piece of the same tube has also been used by Chappuis in a series of determinations by the Fizeau method between 0° and 83° C. The author has worked with an interference dilatometer, which possesses advantages over the Abbe