

workshops. His ingenious devices are worth an article in themselves. We were greatly impressed by his method of doing Kundt's experiment, using a brass tube with two thick circular plates of brass soldered at nodes a quarter of the length of the tube from each end; these plates fit between two blocks of wood on a rigid stand. The cork at one end of the brass tube is stuck on by resin, so as not to constrain the vibration of the tube, and the resonance tube of glass contains no visible lycopodium until the note is obtained, when the nodes are evident as very fine lines, the position of which can be read to 0.02 cm. by a travelling microscope. Mr. Meier said that a few

degrees difference in temperature, such as results from turning out a gas fire in the room, produces a measurable displacement of the nodes.

The retiring chairman of the Association, Mr. W. H. Barrett, of Harrow School, handled the annual business meeting with skill. A resolution was passed assuring the president that the Association would support him in any steps he may take to initiate a reform of our educational system on the lines laid down in the course of his presidential address.

The next meeting of the Association is to be held at the University of Bristol, on Jan. 3-5, 1933, and the new president will be Prof. A. M. Tyndall. E. N.

Form and Height of Clouds.

THE Central Meteorological Observatory at Tokyo has recently published an illustrated account of a thorough photometric study of clouds made at the Meteorological Observatory at Mera. Mera lies at the southern extremity of the Bôsô peninsula, in the south-east of Japan proper, at no great distance from Tokyo. The observations cover the period of two years ending on Mar. 31, 1929, and were made by three members of the staff of the Mera Observatory.

Although the work does not appear to have been undertaken with the solution of any particular problem in view, and might be adversely criticised on the ground that we have already too many such bulky statistical compilations relating to the weather of temperate latitudes, such criticism should be qualified in view of the fact that the information about the heights of various forms of cloud in this work is rarely based on measurements of single points in the cloud, but on so many points that an idea is given of the vertical extent of the cloud as well as of its height above the ground. For example, a photograph numbered 217 in the section devoted to strato-cumulus clouds, portrays a group of these clouds and alongside a key diagram with numbered points. In a table underneath, the measured heights of these points are shown. One of the larger fragments of cloud contains five such points, and the table shows that the lowest height was 1489 metres and the highest 1587 metres, whence we deduce a minimum of 89 metres for the vertical extent of this particular cloud. The table further informs us that the mean height of the whole group was 1534 metres and the range 117 metres.

The heights were obtained by two photo-theodolites of German manufacture set up at the ends of a base line 1161 metres in length—a length that should ensure a fair degree of accuracy even in the measurement of cirrus clouds, which normally occur at heights equal to about seven times the length of the base line.

There is another aspect of the work which calls for favourable criticism, and that is that the quality of the photographs and the complete range of form illustrated justifies the authors in describing section viii. as a "Cloud Atlas". It is an atlas in which the full information about the heights of the clouds just described is supplemented by figures giving the mean amount of cloud on each occasion, its speed and direction of movement, and the speed and direction of the wind near the ground. When telephotographic representations of cloud are given and no terrestrial object appears in the field of view, the reader is likely to have a difficulty in imagining the true appearance of the clouds, unless some device is adopted for giving the scale of the photograph. In this event, a circular line might with advantage have been added in one corner of each photograph, the diameter of the circle being equivalent to about half a degree, that is, to about the diameter of the sun or moon, so that the clouds could be compared with either of these luminaries.

It should be noted that in addition to the section described as a cloud atlas, there are numerous tables relating to the heights of the different clouds, and the seasonal variations of these are shown by graphs, as well as being given in tabular form.

E. V. N.

Photocells: the Valves which operate by Light.*

ONCE the potentialities of devices in which the action of light produces or changes the magnitude of an electric current are properly appreciated, they are likely to become very widely employed. At least four types of these are now available: the selenium cell and its congeners, the alkali metal cell—operating on the external photoelectric effect, and often called a photoelectric cell to the exclusion of the others—the electrolytic cell, and the dry plate rectifier cell. Of these, the electrolytic cell, in which the electromotive force is changed when the electrodes are exposed to light, is as yet little understood, although it is likely to be of value for some purposes. More attention is being paid to the rectifier cell, which is the development of a crystal rectifier which has been found recently to be sensitive to light and is going to be very important. Selenium cells employ a half

conductor of a similar type to the crystal, but work simply by its change in resistance when illuminated, Ohm's law being obeyed, which is not true of rectifiers.

Choice of cell for any particular purpose depends upon exactly what is required of it, but the answer that an engineer wants in most of the less complicated industrial applications can be illustrated by performing an experiment, in which the current through an incandescent lamp is altered until it produces a current of a few microamperes in the circuits of various cells exposed to its light. Selenium cells are found in this way to be the most sensitive, then electrolytic cells, gas-filled alkali cells, and rectifier cells, and the vacuum alkali cells come last. On the other hand, vacuum alkali cells give a response proportional to the intensity of the light, provided its colour is not altered, and have the great advantage of having an effectively instantaneous response, whereas the response of the selenium cells bears a less simple relation to the intensity of the light and may not reach a

* Substance of a lecture-demonstration given by Mr. C. C. Paterson on Jan. 5 at the Physical and Optical Societies' Annual Exhibition of Scientific Instruments and Apparatus at the Imperial College of Science, South Kensington.