Both agreed with Mr. Pennington that the "illusion," once accepted, was useful. The one vital problem was to maintain his balance and hold the track, and the more simply and familiarly he could interpret his bodily feelings the easier that was, however topsy-turvy it might seem to make the world beyond. All of which may leave one wondering: When is an illusion not an illusion?

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SOCIETIES AND ACADEMIES

NOTES ON THE REPORT FOR ASTRONOMY AT THE CLEVELAND MEETING

IN the reports of the fourth Cleveland meeting of the American Association (SCIENCE for February 6, 1931) the paragraph devoted to Section D (Astronomy) on page 152, for which the present general secretary of the association was responsible, is regrettably inadequate in a number of ways. That paragraph was based on an excellent report received from the section secretary, which was itself too long to be included in the special issue of SCIENCE that carried the story of the meeting. The amount of space actually allotted to any section or society in such an issue can not be ascertained definitely until all manuscripts for that issue have been assembled, after which much deletion is generally necessary. In this instance notes on some important papers were finally omitted and some inaccuracies were introduced. The secretary of Section D has very kindly prepared the following amendations to the report on the Cleveland sessions of that section.

B. E. L.

In the note on the paper by Seares, Sitterly and Joyner, the kernel was omitted with the deletion of mention of "Eros." The investigation was on the magnitudes and color indices of the comparison stars for Eros, and it was in these that they found discrepancies among various observers.

There was but one paper on the Leonids, and that by Morgan and Calvert, who on the morning of the 17th of November, 1930, observed many meteors from the Leonid radiant, at the maximum 187 per hour. The statement of 20,000 meteorites which reach the earth's surface annually was a general estimate by C. C. Wylie and in no way concerned the Leonids.

In the field of spectroscopy, Miss Cecilia Payne presented a study of the Scorpio-Centaurus cluster, in which she emphasized the need of interpretation of the discordances in the character of lines of the spectra, which occur even in stars of the same type. Pressure and stellar rotation were discussed as causes. The important paper by Struve and Elvey on stellar rotation came as an apt sequel to that of Miss Payne. From the contour of the lines they deduce stellar rotation periods and find that equatorial velocities of 250 km/sec are not exceptional. The method was checked by observing the eclipsing variable Algol by the method first used by Schlesinger. Results were in substantial agreement.

Miss Losh finds that the velocity of the center of mass of Zeta Tauri is variable with a period of 24.6 years and a range of 43 km. The possibility of detecting such long-period variations increases as series of observation are extended.

An interesting variation of usual practice in the computation of spectroscopic orbits of eclipsing binaries was suggested by Carpenter, who proposes the introduction of the time of minimum as determined by photometric observation into the computation. A test case of u Herculis yielded gratifying results.

Bobrovnikoff identifies certain nuclear bands in the spectra of comets with the Raffety bands of the presumably CH molecule. The agreement is not complete. Frequency formulae gave fairly good representation for the remainder of the bands with the CN molecule suggested as the carrier. Berman's studies on the nebular lines at wavelengths 3869 and 3967 indicate their intensity ratio approximately constant in various planetary nebulae. Certain considerations lead to the rejection of C++ as the source, and the author inquires if P++ or Si++ are possibly available.

The remaining papers were brief. Alter presented a study by the method of correlation periodograms of the planetary tidal hypothesis and variation of sun-spot activity. Extension into the future will test the validity of the conclusions, which seem decidedly interesting. Joseph Johnson gave a preliminary report on the solar eclipse of 21 October 1930 as observed at Niuafou. His attention was especially directed to determination of the intensity of various parts of the corona. MacMillan showed some ingenious stereoscopic pictures of star clusters. Mees discussed the characteristics of some new high-speed panchromatic plates developed by Eastman Kodak Company, adaptable to visual refractors. Mehlin gave the result of the test of the objective of the Drake Municipal Observatory, and Dustheimer reviewed the astronomical radio program of WTAM. This station has broadcast 62 astronomical talks in the last six years.

It is expected that the paper on the "Life of Sir Isaac Newton, a Character Sketch," by Louis T.

More, presented at the joint session with Section L and the History of Science Society, will be published in full by the History of Science Society. Failure to mention this carefully prepared paper is the last serious omission.

P. F.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A METHOD OF MAKING TOPOGRAPHIC MODELS

RELIEF models have recognized advantages over other devices for representing topography. Teachers of physical geography, physiography or geography have found them especially valuable. Models of this type can be readily understood by children as well as by adults; hence their usefulness extends through the entire range of age groups.

One serious limitation in the use of such models is the difficulty of achieving detail and accuracy without spending an undue amount of time in their construction. To overcome these difficulties in part, a device was developed by the writer at Syracuse University when it was desired to prepare a model of the local area for the Natural Science Museum. With the aid of this device, nearly four thousand five hundred square miles of topography, representing central New York, have been completed. Both the accuracy and the amount of detail have proved satisfactory. Since the work was done during spare time, no accurate records were kept of the number of hours required. A fair estimate is that twenty-five square miles of topography of average difficulty may be completed in one hour, after a little experience.

The method consists in making the relief first in molding sand, using a contour map as a guide. Plaster of Paris is then poured over the sand model, and the resulting plate used as a mold from which the permanent model, also of plaster, is cast.

The central unit of the device for making the sand model consists of a box slightly longer and wider than the map, and about two inches deeper than is required for the maximum relief in the area to be represented. This box carries an attached platform at the left hand side on which the map is placed. A sliding carriage is mounted in grooves on the right hand side, free to move forward or backward as far as the limits of the box, but fitting closely in the grooves. This carriage supports a sliding bar which may be moved from side to side. The bar carries a molding tool near its center and a pointer at the left hand end by means of which map locations are transferred to the sand box. The vertical scale is marked on the molding tool. To facilitate the removal of the plaster plate from the sand box, the latter is provided with a false bottom which is lifted out by means of wires attached near each corner.

Much of the effectiveness of a relief model depends on a proper vertical scale. The vertical exaggeration employed on the Syracuse model is approximately 4 1/3. That is, with a horizontal scale from the map of 1/62500, the vertical scale is twelve hundred feet to the inch. This is enough to accentuate the low relief of the Ontario Plain north of Syracuse, and yet not too much for the dissected plateau country to the south.

Procedure: Fill the box nearly full of fine moist molding sand, tamped down firmly. Adjust the map so that when the pointer is moved around the map margin the molding tool will follow around the inside margin of the box. Secure the map in position with thumb tacks.

It has been found best to begin with that portion of the map nearest the operator. Place the pointer successively at each prominent hill top and set the tool each time at the corresponding level. Hold the tool and bar with the left hand, and grasp the carriage with the right. By moving the bar from side to side, and the carriage forward and backward, the excess sand is loosened and may be removed. A teaspoon and a soft brush have been found satisfactory for this purpose. Then select a contour line about a