

ing, and is fully illustrated. Formulæ for reagents, stains, &c., then follow, after which certain types are selected and full directions given for demonstrating root, stem, floral, cell, and other structures. This section is illustrated with twenty-three coloured plates of the specimens, beautifully executed and with ample descriptions. The author is to be congratulated on the success which he has attained in the production of this work.

R. T. HEWLETT.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The San Francisco Earthquake of April 18.

THIS disastrous earthquake was remarkable for its long duration and the rotatory character of the movement. As observed at Mare Island the first sign was a very faint, gentle rustling, the waves being the merest tremors; but after about a minute's duration they had grown to such proportions as to be felt by everyone. The violent phase lasted about forty seconds, and then the shocks died out, the last feeble tremors vanishing about three and a half minutes from the time of the first perception. The writer was favourably situated for noting the slightest disturbance, and had been awake some time before the first tremors were felt, and he could see the clock face at the beginning and end of the disturbance, which read about 5h. 11m. and 5h. 14m. 30s. Two of the four astronomical clocks at the Mare Island Observatory were stopped by having their pendulums thrown upon the ledge which carries the scale for measuring the amplitude of the swing. The time of the violent oscillation thus automatically recorded was 5h. 12m. 37s., Pacific Standard Time, eight hours slow of Greenwich. The waves were mainly from the south and south-south-west, and they seemed to turn to the west, giving the movement an elliptical, clockwise rotation. The pendulums of the two clocks which kept moving had their points rubbed against the swing index of the ledge so violently that the metal of the index was brightened by the friction of the pendulum points, and the time thereby deranged more than twenty seconds. Except for the disturbance of objects on the ground, the earthquake seemed to be essentially noiseless. Other slight shocks have continued at irregular intervals for the past five days.

T. J. J. SEE.

U.S. Naval Observatory, Mare Island, California,
April 23.

Interpretation of Meteorological Records.

I REGRET that, owing to absence from home, I have only now seen Mr. Lander's letter in NATURE of April 19; I have to apologise for my inexcusable carelessness in writing of the storm as being accompanied by rain in place of snow and hail. However, accepting Mr. Lander's correction, it does not appear that the change will produce any alteration in the interpretation of the records, as it does not matter whether the water fell in the liquid or the solid state; its presence in either form would check any rise of temperature due to compression in the downward moving air. Any difference in the effect of snow compared with rain in producing a downward movement of the air would be to make the current stronger, because the air offers greater resistance to the fall of snow than to rain.

It is very interesting to know that at the place where Mr. Lander made his observations the barometer began to rise before the first hail arrived. But if the interpretation offered of the records be correct, this would only seem to indicate that his place of observation was not directly under the area where the storm began, and that the compression produced by the falling hail and snow travelled outwards and caused a rise in his barometer before the storm cloud brought the hail to him.

Baveno, Italy, May 7.

JOHN AITKEN.

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RECENT PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.¹

WE welcome the long-looked-for monograph on the Hako ceremony of the Pawnee by Miss Alice C. Fletcher, the Thaw Fellow of Harvard University, as upon her, so to speak, has fallen the mantle of Cushing. Not only has she a long and intimate acquaintance with certain tribes of the Plains Indians, but her affection for and sympathy with the Indians is so marked that the old and prominent natives have confided to her their sacred lore; and she was even able to induce Tahirussawichi to come to Washington, he being the keeper of the old and sacred objects, whose life has been devoted to the acquisition and maintenance of certain sacred rites. In 1898 he was taken to the Capitol and the Library of Congress. While the vastness and beauty of these structures gave him pleasure, they did not appeal to him, for such buildings, he said, were unfitted to contain sacred symbols of the religion of his ancestors, in the service of which he had spent his long life. He admired at a distance the Washington Monument, and when he visited it he measured the base by pacing, but he would not go up, saying, "I will not go up. The white man likes to pile up stones, and he may go to the top of them; I will not. I have ascended the mountains made by Tira'wa."

The purpose of the ceremony was twofold: (1) to benefit particular individuals by bringing to them the promise of children, long life, and plenty; (2) to establish a bond of friendship and peace between two distinct groups of people. It is intertribal, and not only serves as a means for the interchange of ideas through contact and through gifts, but represents one of the many powerful agencies which, by spreading tolerance and friendly feeling, tend to weld scattered warlike bands of men into great, peaceful nations. A desire for offspring was probably the original idea. The ceremony is very old, and has been modified in the process of time to adapt it to changed conditions of environment. For example, the substitution of the buffalo for the deer, and the transference of songs; thus one formerly sung while on a journey to the mesa is now sung within the lodge.

"Each ritual contains one general thought, which is elaborated by songs and attendant acts. These songs and acts are so closely related to the central thought that one helps to keep the other in mind, and they all form a sequence that, in the mind of the Pawnee, can not logically be broken. The compact structure of the Hako ceremony bears testimony to the mental grasp of the people who formulated it. As we note the balancing of the various parts, and the steady progression from the opening song of the first ritual to the closing prayer in the twentieth, and recall the fact that the ceremony was constructed without the steadying force of the written record, we

¹ "Hopi Katchinas." Drawn by Native Artists. By Jesse Walter Fewkes.

"Iroquoian Cosmology." First Part. By J. N. B. Hewitt. Twenty-first Annual Report of the Bureau of American Ethnology. 1899-1900. (Washington, 1902.)

"Two Summers' Work in Pueblo Ruins." By Jesse Walter Fewkes.

"Mayan Calendar Systems, II." By Cyrus Thomas. Twenty-second Annual Report. Part I., 1900-1901 (1904).

"The Hako: a Pawnee Ceremony." By Alice C. Fletcher, assisted by James R. Murie. Music transcribed by E. S. Tracy. *Ibid.* Part II. (1904).

"The Zuñi Indians; their Mythology, Esoteric Fraternities, and Ceremonies." By Matilda Coxe Stevenson. Twenty-third Annual Report, 1901-1902 (1904).

"Mexican and Central American Antiquities, Calendar Systems, and History." Twenty-four Papers. By E. Seler, E. Förstmann, P. Schellhas, C. Sapper, and E. P. Dieseldorff. Translated from the German under the supervision of C. P. Bowditch. Smithsonian Institution, Bureau of American Ethnology. Bulletin 23 (pp. 682). (Washington: Government Printing Office, 1904.)

"Haida Texts and Myths; Skidegate Dialect." Recorded by John R. Swanton. *Ibid.* Bulletin 29, 1905.