

Incidentally, we remark that it may well be questioned whether the theory of protuberant mountains, so beautifully illustrated in the Sundance Hills, is not unduly stretched in attempting to make it cover the Front Range of the Rockies in Colorado and Wyoming. Finding the essential condition of eruption in liquefaction by means of relief of pressure, Professor Russell makes the rôle of steam merely incidental. The action of steam is conspicuous enough in volcanic eruptions of the explosive type, but it cannot account for the phenomena of great fissure eruptions; and the two extreme types of eruption are so connected by fine gradations that the general cause must be identical throughout the whole series. In criticising the special form of the steam theory proposed by Shaler, the author justly protests against the enormous thickness of sediments postulated by that theory. Professor Russell holds the steam contained in lavas to be exclusively of superficial origin. This is undoubtedly true of a part of it, and probably of much the larger part. But the fluid cavities of plutonic rocks are proof of the existence of water vapor in magmas at great depth, and it appears probable that somewhat of this vapor may have been occluded in the originally molten mass of the globe. Professor Russell holds that volcanic activity increased through geologic time until the Tertiary, and that it is now declining. This conclusion seems to us not supported by adequate evidence. According to modern views of the mode of solidification of the globe, the reaction of its heated interior upon its surface could not have been very different in Cambrian time from what it is now. The apparent rarity and insignificance of volcanic phenomena in the earlier geological periods may well be explained as due to the destruction of the evidence by erosion and metamorphism, or its concealment beneath masses of superincumbent strata.

The closing chapter, on the life history of a volcanic mountain, is an exquisite piece of scientific description, in which picturesque imagination gives vividness without detracting from scientific accuracy. One incidental point, however, we should be disposed to criticise. We would not, indeed, contradict the statement that it is *possible* that the aborigines, so

artistically introduced to add a human interest to the pictures of natural scenery, were living in Tertiary time; but we do, nevertheless, consider such a supposition extremely improbable.

The book, so delightful and instructive, would have been made still better by more careful proof-reading. Several proper names are misspelled. We read *Atria del Cavallo*, instead of *Atrio*; *Mazana*, instead of *Mazama*; *Roichthofer*, instead of *Richthofen*; *Johnson-Lewis*, instead of *Johnston-Lavis*. In the note on page 74, in which the last name is thus misspelled, the reference to the *American Journal of Science* should be to Vol. 36. Typographical errors have rendered a few sentences ungrammatical or nearly unintelligible. The printers have also metamorphosed the young insects of Lake Mono into *lavæ*. The book is thoroughly attractive in its mechanical execution. Many of the pictures (mostly reproductions of photographs) are very beautiful.

WM. NORTH RICE.

SOCIETIES AND ACADEMIES.

NEW YORK ACADEMY OF SCIENCES—SECTION OF GEOLOGY, DECEMBER 20, 1897.

THE first paper of the evening was by Mr. Arthur Hollick, entitled 'Recent Explorations for Prehistoric Implements in the Trenton Gravels, Trenton, N. J.' Dr. Hollick gave in his paper a summary of the present understanding of the artifacts found in the Trenton gravels, a more complete statement of which has already been published in *SCIENCE* for November 5, 1897. The second paper of the evening was by Professor J. F. Kemp, entitled 'Some Eruptive Rocks from the Black Hills.' Professor Kemp summarized the geological features and history of the Black Hills, and gave a bibliography of the works concerning these deposits. He then mentioned the occurrence of some Leucite-bearing rocks, in the northern part of the hills, similar in character to those which occur in but few other places in this country, as in Wyoming, Montana, Lower California and New Jersey, near the Franklin Furnace.

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Secretary.