other crystals and massive specimens found, but either very small or insignificant in regard to quality or quantity.

I expect this place to be to the mineralogist what its near neighbor, Bergen Hill, world-famed, was fifteen years ago.

E. W. PERRY.

Color-Changes in Toads.

IN Mr. Poulton's "Colors of Animals" he mentions (p. 83) that "the common frog can change its tints to a considerable extent." This recalls some experiments made in 1876 on common toads. Toads kept on dark grounds or in dark pen became dark, and on light grounds or in light pen became very much lighter in color. The arrangement of colors was not changed, but the whole seemed to grow lighter or darker. Red, blue, or other colors seemed to have no effect except as to their value as light-absorbers. Owing to the detailed notes being mislaid at this writing, it is impossible to give details of time; but my remembrance is that the change of shade took much longer than Mr. Poulton quotes for the frog. The experiment is an easy and interesting one to try. In fact, there is an immense field for young investigators in the question of color, because of the ease with which apparatus can be arranged and the number of species which as yet have not been tested. It is partly for this reason I record the above on toads.

FREDERIC GARDNER, Jun.

Trinity College, Hartford, Conn., Dec. 17.

The Cause of Rain.

IN your issue of March 7, I refer, on p. 161, in a letter with the above title, to certain experiments which to my mind show conclusively that condensation takes place in saturated air by compression, and not by expansion.

As far as I am able to ascertain, the rain theories which my letter brings me in opposition to are based upon the supposition that the results of compressing and expanding saturated vapor or steam, as mentioned in the mechanical theory of heat, may be directly applied to saturated air.

That these two so entirely different substances — the one a pure gas, and the other a compound or mixture of various gases, and both containing the same quantity of aqueous vapor for equal temperatures, pressures, and volumes — should act in the same way under compression and expansion seems to me hardly credible, and it may therefore be of interest to inquire whether any of your readers can quote the results of experiments on saturated air which are contrary to those I have arrived at.

FRANZ A. VELSCHOW, C.E.

Brooklyn, N.Y., Dec. 20.

BOOK-REVIEWS.

A Treatise on Electro-Metallurgy. By WALTER G. MCMILLAN. London Charles Griffin & Co.; Philadelphia, J. B. Lippincott Company. 12°. $3.50.

THIS volume treats of the application of electrolysis to the plating, depositing, smelting, and refining of metals and to the reproduction of printing surfaces and art work, etc. That the author was well equipped for his work is evident to all who, with some understanding of the subject, glance through even a single chapter of the book. He believes evidently that in writing upon such subjects a technological rather than a technical treatment is required, for the matter is so lucidly set before the reader, that, even though he be a novice, he will have no difficulty in comprehending; and this result is achieved without the use of technicalities, which, though useful in their proper place, are sometimes confusing to the general reader, and unnecessary for the expert. Still, in cases where the success or failure of a process is largely governed by strict attention to minute details, the author has not hesitated to introduce such instructions as may be needful to guide the worker in the right direction In other words, the treatise is just such a combination of theory and practice as might be expected from one who, in addition to a knowledge of both sides of the subject, possessed the happy faculty of imparting that knowledge to others, as far as may be done through the medium of a book.

The first chapter is mainly historical, briefly sketching the progress of the art, from the rude beginnings of its chemical side, when it was discovered by the ancients that "certain metals became superficially coated with other metals when plunged into suitable solutions," down to its latest developments, not omitting the much-discussed Elmore process of producing seamless copper tubes. In this chapter the scope of the art of electro metallurgy is stated to be, (1) to obtain a coherent and removable deposit on a mould the form of which it is desired to reproduce with accuracy,—electrotyping; (2) to obtain a thin but perfect and adhesive film of metal upon a metal of different character, in order to impart to it properties in which it is naturally deficient, — electroplating; (3) to obtain the whole of a given metal from a substance containing it, either as a substitute for extraction by smelting, or for analytical or refining purposes; and (4) to dissolve metals, — either to remove an existing coat of one metal from the surface of another, or to effect the complete or partial solution of a homogeneous body superficially, as in electro-etching. This statement will give a good idea of the scope of the treatise.

As a fair knowledge of chemistry and electricity is necessary to those who would understand the subject, the author introduces a chapter dealing in an elementary fashion with those sciences; not intended, of course, to take the place of text-book and laboratory study, but rather to lead up to it The book is fully illustrated, and, in addition to a good index, has a glossary of substances commonly employed in electro-metallurgy, and many useful tables.

Outings at Odd Times. By CHARLES C. ABBOTT, M.D. New York, Appleton. 16°. $1.50.

To those acquainted with Dr. Abbott's previous works, this little volume needs no introduction. In spirit, if not in book-making sequence, it is one of a series of which, we trust, the end is not yet. To the nature-loving naturalist, not the perfunctory one, the reading of it will necessarily be a pleasure and an assistance; to the city dweller, with an occasional "day off," at any season of the year, it will prove an incentive to recreation-seeking in the best direction; to the average dweller in the country it will act as an "eye-opener" to much that is going on about him; while to any reader of ordinary intelligence the perusal of it cannot fail to be beneficial. It is the record of what a true lover of nature, in all its phases, has seen, heard, felt, and thought about on occasional outings at odd times, in odd places, and under what may be called odd circumstances. Beginning with a winter sunrise, and the midwinter minstrelsy of the birds that may be heard along the Delaware even when the snow covers the ground, he carries the reader around the cycle of the seasons, dwelling upon the pleasures that may be indulged in out of doors at almost any time, and even in the most unpromising of places. Moreover, there is much sound though unobtrusive philosophy in the book.

Dust and its Dangers. By MITCHELL PRUDDEN, M.D. New York, Putnam. 16°. 75 cents.

DR. PRUDDEN'S interesting little volume, "The Story of the Bacteria," is followed by another of equal interest and value. It has been written "with the purpose of informing people, in simple language, what the real danger is of acquiring serious disease — especially consumption — by means of dust-laden air, and how this danger may be avoided." The plan is well carried out, and the book will open the eyes of the people without needlessly alarming them. Chief attention is given to the consideration of the organic — bacterial and mould — constituents of dust-laden air. The "plate method" of biological analysis of air — i.e., five minutes' exposure to the air of a film of nutrient gelatine, and subsequent growth of colonies from the germs deposited — is simple and reasonably accurate, and yields interesting results. The relative numbers of bacteria in the air of the library of a private house, of a large retail dry-goods store, and of a cross-street in process of being cleaned, were 34, 199, and 3,810. Under ordinary conditions, a New Yorker takes into his body with every twenty breaths 11 to 376 bacteria and moulds; and, when the dust is being stirred up, the number is excessive. The most of these are not disease-germs, but some may be so. Thanks to the ciliated cells of the air-passages, the phagocytes, the lymph-glands, and the digestive processes, the organic and inorganic dust-particles are