the cuneiform inscriptions of western Asia. This contains a great deal of linguistic and historical material; e.g., a list of four hundred and eighty Assyrian verbs so arranged as to show an aquaintance with an *alphabet* on the part of the writer. We find, first, a series of groups of verbs whose first and second consonants are the same; and, secondly, within these groups, they are arranged according to their final consonant. This is the first inscription showing alphabetic order, and the alphabet is substantially the same as the Hebrew. Unfortunately the tablet is not dated. There is also an historical tablet of Nabunaid or Nabonetus, who was king when Cyrus took Babylon. Nabunaid tells how he restored the temple of the sun-god, and states that in renewing the foundations he discovered an old inscribed tablet that had been placed there by Naram-Sin, thirty-two hundred years before his own day, i.e., about 3750 B.C. The interest in archeology, therefore, is itself something very ancient.

TAIT'S LIGHT.

Light. By P. G. TAIT. Edinburgh, *Adam and Charles Black*, 1884. 8+276 p. 8°.

THIS book, uniform with 'Heat' by the same author, possesses in an eminent degree the qualities which render all books from Professor Tait eagerly welcomed by students of physical science. Although written primarily for the use of university students, it contains much which would interest and instruct one who has never pursued a definite course of study in physics, while there is not a little which will demand close attention from even a well-equipped student.

The first chapter gives a brief but perspicuous historical sketch of the discoveries in the science of light, down to the work of Alhazen. This is followed by chapters on the sources of light, and an admirable treatment of the consequences of the rectilinear propagation of light-waves. Chapter vi. treats of the speed of light. Chapters vii. to x. inclusive are devoted to the phenomena of reflection and refraction. Of notable excellence in the last of these, is the discussion of the rainbow and halos.

The eleventh chapter, doubtless, contains most that is novel to the general reader; for in it is an explanation of refractions in a non-homogeneous medium, including as special cases the phenomena of mirage. For the solution of the most interesting problems presented by these frequently recurring phenomena, we are indebted to Professor Tait more than to any other investigator; and probably no other writer could give in such a simple form so clear a presentation of the subject. The last section of this chapter the author devotes to a eulogy on his master, Sir W. R. Hamilton, and an emphatic assertion of the necessity of extended mathematical study for the student of physics. This concluding paragraph is as important as it is characteristic in style, and may well be quoted. It reads as follows: —

> "We have thought it absolutely necessary to point out, even in an elementary work like this, that such a perfectly general method [Hamilton's principle of varying action] has been developed; but the few fragmentary illustrations of it, which alone can be given without the use of higher mathematics, are so inadequate to the proper exhibition of its power, that we do not give them here. We have said enough to show that any one who wishes really to know the science as it now stands must previously prepare himself by properly extended mathematical study. When he is possessed of this indispensable instrument, he may boldly attack the precious stores of knowledge already accumulated. There is, as yet, no admission to any but those possessed of this master-key."

Fluorescence and absorption, with the attendant phenomenon of anomalous dispersion, form the subject-matter of chapter xii., which contains a highly interesting extract from a recent letter by Professor Stokes on the subject of fluorescence. The next chapter introduces the undulatory theory of light; the remainder of the book being a development of its consequences, including, in the final chapter (xvi.), radiation and spectrum analysis. An appendix contains, 1°, Hamilton on theories of light; 2°, Huygens on rays; and, 3°, the well-known and astonishing letter of Laplace to Young, on the undulatory theory. An index closes the volume.

Though the book is, perhaps, the most important acquisition to the literature of its class for a number of years, there is one particular in which we could have looked for something better. The theory of lenses given is the old one, which has hardly been improved since the time of Kepler, and which is repeated in all English elementary works on physics. By it the approximations are so very imperfect that they are next to useless in practice; while, by employing Gauss's improvements in the theory, formulas no more complicated in form, and hardly more difficult in derivation, could be given, which are of the greatest utility. It has long been the practice in German works, written for students no more advanced than those who will be the readers of this work, to give the Gaussian theory; and it is not easy to see why English writers should have been so slow in adopting it.