living cell he finds the cause of this in the katalytic power of the protoplasm, which power is due to the oscillating motion of the labile atoms of the proteid constituents. It is by means of the energy imparted by these labile atoms that the oxidations occurring in respiration take place and thus this appears as the source of the energy of living protoplasm.

Whatever views the reader may hold respecting this theory and the evidence on which it rests he cannot fail to find much food for thought in the multitude of facts brought together in this volume. The book abounds in references so that a practically complete bibliography of the subject is given, a fact which alone gives the work much value.

THOMAS B. OSBORNE.

TABLES FOR THE DETERMINATION OF MINERALS BY PHYSICAL PROPERTIES, BASED ON THE SYSTEM OF DR. A. WEISBACH. BY PERSIFOR FRAZER. Fourth Edition. pp. 163. Philadelphia: J. B. Lippincott Co. 1897. Price $1.50.

These tables are well printed, the arrangement clear, the various physical properties succinctly, yet accurately, enumerated, and the remarks on blowpipe reactions and associated minerals very well written. There is an unfortunate confusion in the use of the term "*sectile*," which as defined by Dana and used by accurate mineralogists, means that the substance can be sliced into shavings with a knife, but goes to pieces on hammering. Dr. Frazer uses *sectile* in place of Weisbach's *weich*, which is very clearly used as meaning simply *soft*; and again uses the same word in place of the German *mild*, which as used by Weisbach means that the substance is not brittle, but cuts like white china clay or stibnite. The result of this confusion is that the tables sometimes classify a mineral as sectile in one sense, but not sectile in another sense; while the same mineral is not sectile at all according to the definition of Dana!

It would have been far better to have used *soft* in the first case and *mild* in the second, explaining the meaning that word has when applied to minerals, while *sectile* could be reserved for its exact use according to definition.

Aside from these commendations and criticisms, and while acknowledging the tables the best of their kind, the reviewer must record his opinion that "*the kind*" is not the best one. Mineral

tables based on "physical properties" are radically wrong in principle. Dr. Frazer himself emphasizes in italics the truth that "*Every true mineral is a definite chemical compound or element*," and it thence follows that every true scheme of determining minerals should start and be based on their *chemical composition*, bringing in physical tests *afterwards* to verify the chemical determination, or to distinguish between the few minerals which contain the same ingredients or respond to the same tests. The Weisbach method starts at the wrong end, and while it may and does give to beginners a superficial acquaintance which enables them to identify the *usual* forms of the *common* minerals, yet it is totally unfit to guide in the accurate determination of minerals in general. JOSEPH W. RICHARDS.

PHYSICAL LABORATORY MANUAL FOR SECONDARY SCHOOLS. BY CHARLES F. ADAMS, A.M., Teacher of Physics in Detroit Central High School. 12 mo. pp. 184. 1896. New York and Chicago: Werner School Book Company. Price, 75 cents.

While the number of elementary manuals for physical laboratory instruction continues to increase, it is rare to observe among them any decided advance either in methods or plan. In the book before us the author has sought to eliminate qualitative exercises "or illustrative experiments," as he calls them, and to confine the pupil's attention to comparatively few exercises, the greater part of them being quantitative in character. It would seem, however, that, especially in elementary instruction, there is a proper place for qualitative physics as there certainly is for qualitative chemistry. Indeed, in certain parts of the subject, as, for instance, in physical optics and in electrostatics, qualitative experiments are an almost necessary preparation for quantitative ones. A judicious combination of the facts of physics, ascertained by qualitative experiments, with the laws of physics, proved and verified quantitatively, would seem to constitute the best basis for an elementary laboratory text-book. While there is not much that is novel in Mr. Adams' text-book it is well arranged, the experiments are for the most part well chosen, and the descriptions are clear and concise. The emphasis with which care in entering the results in the note-book is insisted on, is particularly to be commended. G. F. BARKER.