oxygen varies according to its state of combination. Therefore, the values of the molecular refractivity, as given in Table II, for each of these constitutions, differ noticeably; and the calculated value which agrees most closely with the actual value for thaumasite, as given in Table I, represents the most probable constitution. The mean index of refraction, as calculated from these values of the molecular refractivity and the specific gravity of thaumasite by means of the Lorentz-Lorenz formula, are given in the third column, and, for the sake of comparison, corresponding values for a molecule with fifteen waters and no hydroxyl are given.

TABLE II

Constitution	Calculated molecular refractivity	Calculated refractive index
$CaCO_3.CaSiO_3.CaSO_4.-2\ O+4\ OH.13H_2O$	96.59	1.492
$CaCO_3.CaSiO_3.CaSO_4.-1\ O+2\ OH.14H_2O$	97.25	1.496
$CaCO_3.CaSiO_3.CaSO_4.15H_2O$	97.91	1.500

The value of the refractive index calculated for the constitution with fourteen molecules of water agrees so closely with the observed mean value for thaumasite (1.496) as to strongly confirm Merwin's results, and incidentally also Wherry's interpretation of the mineral as a sulfate.

BOOK REVIEW

DETERMINATIVE MINERALOGY. CHARLES H. WARREN. 163 pages. McGraw-Hill Book Co., New York, 1921.

The purpose for which this book has been published, as stated in the preface, is a very good one, namely to supply the student with a relatively inexpensive determinative text. Whether the additional requirement of its being a satisfactory one has been met the reviewer is not so certain. The plan of the book is the usual one, comprising a description of the use of the blowpipe, a list of tests for the elements, tabulated lists of special tests and a series of tables in which groups of minerals are eliminated one after another until the one under investigation is located.

The first chapter, on the blowpipe, is thoro and should be helpful to the student. Some may not like the style in places, especially in such arrangements of terms as "Decomposition of insoluble (in acids) minerals" (p. 14); the use of inches on some pages and centimeters on others; the calling of the ame thing interchangeably and without explanation a gypsum, plaster, or plaster of Paris tablet, and so on. The English is not always correct, as for example, "All white oxide sublimates are volatile in the R. F. although some (tin) is difficultly so." (p. 12.)

In the second chapter the usual tests for the elements are given. Some objectionable features occur in the use of chemical terms. Thus "glucinium" is given on pages 28 and 41; Fl is used as the symbol for fluorine in places; and niobium is preferred to columbium in spite of the fact that every American chemist sees in the former name merely a German attempt to discredit American chemical research. Over half the atomic weights are stated inaccurately. Phosphoretted hydrogen (p. 53) is an obsolete term. There are also instances of obscure statement, as for instance "the solution filtered (this is yellow if chromium is present)" (p. 37), which should read, the filtrate is yellow; "without practically altering the state of oxidation" presumably meaning without seriously or essentially altering it; "minerals containing fluorine and hydroxyl water also give off acid water" (p. 74) from which the first water would better be omitted. There is a definite element of danger in the sequence of two sentences on page 55: "several rare earth minerals . . . are easily decomposed by strong sulphuric acid. A small excess of ammonium hydroxide is now added to the hot solution. . . ."

No mention is made of the easy test for cerium consisting in adding a pinch of red lead to the nitric acid solution, boiling and allowing to settle; cerium then yields an orange colored solution. Test 1 for tellurium is not, as stated, reliable; for manganese may give a purple color in sulfuric acid, a fact which has even led to loss of money in investments in companies floated to mine "tellurides" the existence of which had been inferred from this test, whereas the ores were really manganese oxides. Under manganese no mention is made of this coloration nor of the green flame color this element yields when its compounds are moistened with HCl.

The last chapter, on the determination of minerals, is of course the most important in deciding the satisfactory character of the book. The general plan seems to be adequate, altho a little more use might be made of colors as a means of division into groups. Since the finger nail scratches gypsum of hardness 2 readily, it might better be assigned the hardness of 2.5. On page 119 chalcanthite is indicated as becoming magnetic B.B.; on page 124 it is implied that a coating of ZnO can be obtained from zincite without the use of soda and carbon, whereas it is the reviewer's experience that students have a hard time getting any coating from this mineral even with the use of these; and it hardly seems correct to include wernerite (p. 134) in the list of those harder than glass.

The indexes of scientific books are usually open to criticism for being incomplete; but in this case the reverse seems to be the case, for a considerable number of mineral names are given, often tho not always as synonyms, which do not appear in the text at all, as for instance anatase, desmine, magnetic pyrite (s), molybdate (mineral), pennine, etc. There are however, also omissions, as magnesium oxide (p. 149), molybdite (p. 124), and tin sulfides (pages 108 and 110).

The formulas given for minerals, thruout the book, are in some cases not up to date, in others quite erroneous. As examples may be cited jamesonite, given as $2PbS.Sb_2S_3$; sylvanite, $(AuAg)Te_4$; polydymite, Ni_4S_5; fayalite, $FeSiO_4$, molybdite, MeO_3; etc. There is also a curious lack of consistency in the use of chemical terms; thus Sb_2O_3 is variously described as oxide of antimony, antimony trioxide and antimonous oxide; As_2O_3 with the additional variation to arsenious oxide; SeO_2 as selenium, selenous, and selenious oxide; and others. The prize in this respect seems to belong to tourmaline, which is mentioned about five times with a different statement of its composition each time, including a borosilicate of Al, etc., complex silicate of Al and other bases with boron, and boro-aluminium silicate. Phosphorus has added o but once in the book, but aluminium appears both with and without the second i.

A feature likely to be particularly confusing to the student is the indiscriminate use of periods, commas, + signs, and no sign at all to set off the various parts of formulas. Thus on a single page (119), water of crystallization is shown in four different ways, $CuSO_45H_2O$, $MgCl_2.KCl.6H_2O$, $MgSO_4,KCl,3H_2O$ and $Al_2(SO_4)_2[3]+18\ H_2O$. Isomorphous replacement (called on page 94 isomorphoric) is indicated by commas in some places, as $(Fe, Mn)WO_4$, but by lack of them elsewhere, as $(ZnMn)_2\ SiO_4$ and then unfortunately both plans are also used to show non-isomorphism as in $K(Fe,2OH)_3(SO_4)_2$ and $BiO(Bi2OH)CO_3$.

Some cases of peculiar spellings may be intentional, as asbestose for asbestos, duodecahedral (also appearing as doudecahedron) for dodecahedral (also used once), blend for blende, etc. But minerology (p. 95), melelite (p. 140 twice) and pargonite (p. 145) are not. The last belong to the almost incredible number of compositors' errors present. The reviewer has counted over 200 of these (more than one per page) and sees more every time he looks at the book. There are numerous instances of the subscript numerals in formulas being wrong; of capital initial letters where lower case would have been preferable; and of omitting, transposing, and inserting letters. There has evidently been some misunderstanding with respect to correcting proof. The composition must have been done by operators unaccustomed to chemical work; that the publishers did not go over the proof is indicated by the fact that every time one of their own books is mentioned, there is an error either in its title or its author's name; but apparently the author assumed that proof reading had been done. It is to be hoped that the book will soon be reprinted after all of these errors have been corrected. W.

PROCEEDINGS OF SOCIETIES

PHILADELPHIA MINERALOGICAL SOCIETY

Academy of Natural Sciences of Philadelphia, Nov. 10, 1921.

A meeting of the Society was held on the above date, President H. W. Trudell presiding. Nineteen members and sixteen visitors were present. Thru the courtesy of the Bureau of Mines at Pittsburgh, six reels of moving picture films were exhibited. The subjects illustrated were: "The Story of Sulphur" and "Zinc Mining, Milling and Smelting;" both of which proved very interesting and instructive.

Mr. Hoadley reported upon the following trips: rutile was found at 274th St., New York; tremolite and brown tourmaline were secured at the old dump at the Harlem River canal; while a visit to the locality of Ossining yielded specimens of azurite, serpentine, pyrite, malachite, and mountain leather. Prehnite, pseudomorphous after stilbite was also reported from Paterson.

At a new Perkiomenville quarry, Mr. Hilbiber found calcite crystals covered with pyrite. He also exhibited specimens of epidesmine from the Kibblehouse quarry.

Mr. Knabe reported having taken a trip to the DeKalb St. quarry where calcite crystals were found. These crystals were in the form of short hexagonal