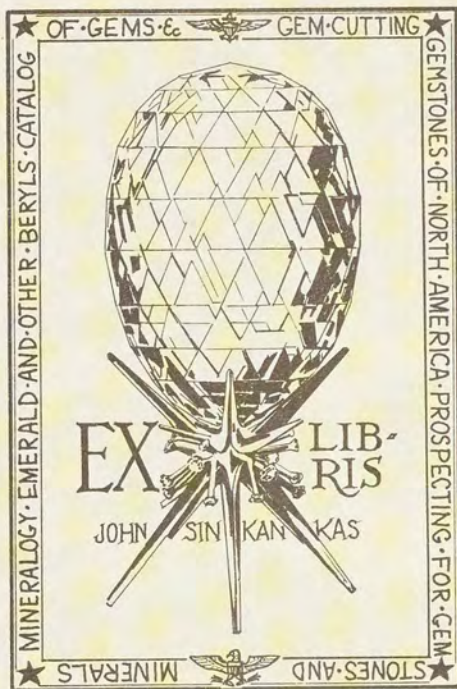


CHART
SHOWING
THE CHEMICAL RELATIONSHIPS
IN THE MINERAL KINGDOM

PALMER COSSLETT PUTNAM, M.S.



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BY

PALMER COSSLETT PUTNAM, M.S.

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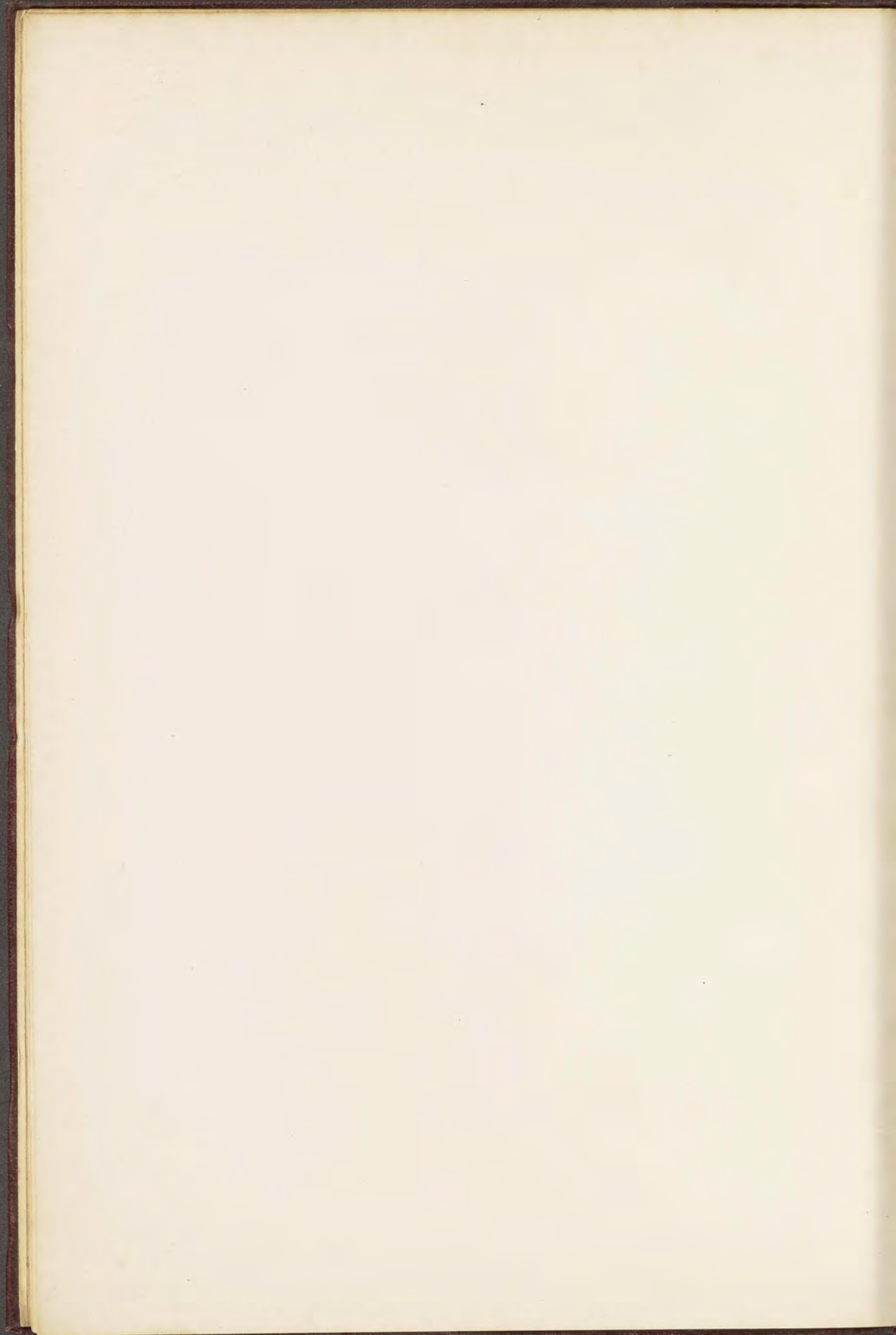
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A CHART SHOWING THE CHEMICAL RELATIONSHIPS IN THE MINERAL KINGDOM

THE PURPOSE OF THE CHART

The purpose of the chart is three-fold:

(A) To serve as a ready reference aid to the man who would know quickly, whether for an economic or a scientific purpose, the answer to such questions as: "How many and what are the minerals containing germanium, and what are their compositions?"; or, "Does silver occur with oxygen in any mineral?"; or, "Do phosphides or silicides occur as minerals?".

(B) To serve as an aid in Determinative Mineralogy, especially in the case of rare minerals, where either the small amount of the unknown substance, or the lack of laboratory facilities (as when in the field), precludes the possibility of making more than a few specific tests. It may also serve as a complement to microchemical methods in the laboratory, and as a reminder to verify the presence or absence of minute quantities of certain interesting replacing elements.^a

(C) To form a mechanical stimulus to speculation upon the chemistry of the earth, by affording upon one sheet a statistical survey of the affinities and the antipathies which hold sway in the mineral kingdom.

THE SCOPE OF THE CHART

(A) **The Elements**—The eighty-four major active elements are listed. The eight omitted include: three of the five inert noble gases, krypton, xenon and neon, known only in traces in the atmosphere; polonium and actinium, whose presence may be assumed whenever uranium is reported; the little known rare-earth, cerium; and two of the unknown elements, numbers 85 and 87, which quite possibly are mere transitional atomic configurations, whose stability is of a low order even in terms of actinium C. (Numbers 43 (eka-manganese), 61, and 75, elements as yet awaiting their discoverer, have been supplied with columns.)

The thirty or more known products of radio-active disintegration are not listed, but are assumed to be present whenever the respective parents of the three most important series are reported, and are included in the subscript "etc." to U, Th and Ra respectively. The latter, though but a stage in the U series, is so important as to justify its emphasis by specific mention.

^a See page 6, *et seq.*

The eight common inorganic radicals are listed.

The water molecule is listed.

Neodymium, (Nd), and praseodymium, (Pr), always occur together, and are inclusively symbolized by Di, the abbreviation for "didymium," their former joint name.

Save in the case of iron, no differentiation is made between the various valencies.

(B) **The Minerals.**—A mineral is here understood to be an aggregate of atoms whose physical state is the solid,^a whose crystallographic^b and optical constants vary within specific limits, whose chemical composition varies within specific limits, and which has been formed in nature under cosmic, atmospheric or telluric conditions of electro-chemical equilibrium.

All minerals described before July, 1924, in the literature mentioned under "References," are entered. This includes a number of sub-species, a number of doubtful species, many varieties based upon chemical composition, and the liquid, native mercury. Optical and crystallographic data, so far as possible, were the criteria of the individuality of a given mineral. The minerals are sixteen hundred and eleven in number.

THE MECHANICS OF THE CHART

(A) The Coördinates:

1. The right- and left-hand vertical margins; i.e., the termini of the horizontal columns.

Here is included:

- I. Each element, (and the ammonium radical), which occurs in nature as the *dominant electro-positive* constituent of a mineral. (Ca in calcite, CaCO_3).
- II. Each element which occurs uncombined, but in mineral form. (Pd in allopalladium, Pd.)

2. The top and bottom horizontal margins; i.e., the termini of the vertical columns:

Here are included:

- I. All the elements, (and the ammonium radical), occurring in nature in the *electro-positive* state, but as *minor* constituents of minerals. Since every active electro-positive element occurs in subordinate amount in at least one mineral, all are here entered.

^a Exceptions to this are the elements Hg, He, and A. Mercury is the sole constituent of the metallic liquid, native mercury; helium is a gaseous product of radio-active disintegration, found in many minerals; and the gas argon, also possibly a disintegration product, is known in a few minerals.

^b With the obvious exception of thirty or forty hardened colloid gels.

- II. Those elements occurring in nature as the *electro-negative* constituents of minerals, whether *dominantly* or *subordinately* so. (Te, dominant, S, subordinate, in sulfurous tetradymite, Bi (Te, S)).
- III. The common electro-negative radicals.
- IV. The water molecule.
- V. Three of the unknown elements, entered by their atomic numbers.
- VI. A column designated "Nat. El.," for the native elements.

In effect, then we have the *dominant electro-positive* elements plotted against *all* the *electro-positive* elements and *all* the *electro-negative* elements, and against the *common radicals*.

(B) **The Data:**

1. Each number refers to a mineral. The numbers are chosen arbitrarily, and are listed numerically in Index II.
2. The minerals are entered in the chart according to their composition. A hydrous neutral ferrous sulfate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, (No. 536), is entered in the horizontal Fe'' column, in the SO_4 box and in the H_2O box. An aluminum silicate, Al_2SiO_5 , (No. 236), is entered, in the horizontal Al column, in the Si_xO_y box.
3. Complex minerals are entered as follows:

A mineral containing more than one electro-positive element, as a ferro-magnesian silicate, is entered in the horizontal column of the dominant electro-positive element; i.e., that one present in the greatest percentage weight. Should the analysis, (No. 1592), record 31% Fe'' and 32% Mg, the mineral would be entered in the horizontal Mg column, and would pick up Fe'' in the Fe'' box, and silica in the Si_xO_y box.
4. Certain oxygenated radicals, not specifically listed as coördinates, (the arsenates, antimonates, borates, tellurites, mellates, etc.), are indicated thus:

In the case of a ferric tellurite, Fe_2TeO_5 , (No. 1233), the mineral is entered in the horizontal Fe''' column, in the O box and in the Te box. In other words, if there is any oxygen in a mineral not accounted for in a specific radical, as the SO_4 or Si_xO_y radical, an entry is made in the O box of the appropriate horizontal column.
5. It will be noted that certain of the radicals are written with x and y as subscripts, in lieu of numerals. This is to indicate that

more than one acid is represented. Si_xO_y , for instance, indicates that SiO_2 is the salt of not merely H_2SiO_3 , but of one or more acids in addition.

THE ACCURACY OF THE CHART

The sources of error may be divided into three groups:

(A) Errors in original data.

1. Typographical.

2. Analytical.

I. Of omission.

II. Of commission.

(B) Errors in interpretation of original data.

(C) Mechanical errors in transcription of these data.

(A) Probable Errors in Original Data:

1. *Typographical.*

Although cross references were used, few typographical errors in analytical data were detected, and in most cases it could be determined which was the correct information.

2. *Analytical.*

These fall into two groups:

I. *Errors of Omission.*

The analyst either failed to weigh one or more oxides, as shown by the fact that his results fell short of 100 by an amount greater than his experimental error, or he unwittingly precipitated two or more oxides together, but weighed them as one, obtaining an apparently satisfactory analysis. Errors of the first type are not common, since the curiosity of the investigator usually did not permit the discrepancy to remain long a puzzle. Errors of the second type were fairly common prior to 1886, but after this date they were practically confined to two groups of elements, the radio-active and the rare-earth groups. It has been possible largely to correct for the errors of omission occurring in these two groups. The correction has been made as follows:

Radio-active Group: Whenever uranium was reported, the presence was assumed of radium and helium. The other fifteen or more products of disintegration were also

present, but are grouped under the subscripts "etc." Uranium lead was also undoubtedly present, but unless in quantity sufficient to be detected analytically, has not been reported, in order not to confuse the determinative work.

Whenever thorium was reported, the presence of the commercial mesothorium, along with the other ten or more products of this series, was assumed, and is indicated in the subscript "etc."

Rare-earth Group: Where the phrase " Ce_2O_3 etc." occurred in the analysis, it was assumed that all the elements of this group were present. Where the phrase " Yt_2O_3 etc." occurred, the same assumption was made for this group. Where oxides of one group only were reported, it was assumed that members of the other group were not present. This is not strictly so, since the two groups merge into one another through the medium of the Terbium group, and since scandium is known^a to occur, once at least, solely with the yttrium earths. Until more accurate analytical data are available, however, this assumption, in conjunction with the following classification^b of the elements, would appear to be the closest approximation to the truth:

<i>Cerium Group</i>		<i>Yttrium Group</i>	
Cerium	Ce	Celtium	Ct ^{e?}
Europium	Eu ^c	Dysprosium	Dy
Gadolinium	Gd ^c	Erbium	Er
Lanthanum	La	Holmium	Ho
Neodymium	Nd	Lutecium	Lu
Praseodymium	Pr	Terbium	Tb ^c
Samarium	Sm	Thulium	Th
Scandium	Sc	Ytterbium	Yb
		Yttrium	Yt

^a Thortveitite, No. 813.

^b The author is not a student of rare-earth chemistry, and borrowed this classification from Browning's "Introduction to the Rarer Elements." The original articles containing the analyses were not consulted in most instances, and, had this been done, more satisfactory data might have been obtained.

^c These are sometimes grouped together as the Terbium group.

^d These two elements, before differentiation, were considered to be one element, "didymium." Since they invariably occur together, and to save space, they are here grouped together under their former symbol, (Di).

^e The recent discovery of hafnium, atomic number 72, has made the position of celtium obscure. The latter is known only spectroscopically, while some zircons contain 14% Hf.

II. *Errors of Commission*

Especially in certain of the older analyses, when mechanical methods of separation were not highly developed, products of alteration and adventitious material probably were present in a regrettably large amount. This error is large, indeterminate, but nearly negligible so far as the virtue of this chart is concerned, and has been partially rectified, as indicated in the next paragraph.

(B) Probable Errors in the Interpretation of Data:

It is hoped that the author's interpretation of doubtful data minimized rather than augmented the indigenous errors. When the chart was first made, in 1920, only those elements occurring in a formula as given in the standard works were included, and only about 900 minerals were plotted. When the chart was expanded to include all minerals described up to July, 1924, many of the replacing elements were included. The criteria of the legitimacy of the rôle played by a minor constituent were developed as follows:

An arbitrary distinction was made between two types of element, which we may designate the "aluminum" type and the "indium" type, respectively. To the former type belong such common elements as Na, K, Mg, Ca, Al, O, Fe'', Fe''' and, to a certain extent, Si, Ti and Mn. To the latter type belong such mineralogically rare and interesting elements as A, N, Li, Rb, Cs, Cd, Sc, Ga, In, Tl, Ge, Zr, Sn, Cr, Co and Ni, the isotopes of Pb, and the significant He.

A great many analyses, especially of non-metallies, show the presence of one or more of the *first* type in amounts ranging from a trace to two or three per cent. In general these quantities have been assumed to be adventitious and have been *disregarded* unless:

1. There is evidence that the analysis was of exceptionally pure material.
Example: (Rare.)
2. That the occurrence was consistent in a number of analyses from different localities.
Example: Small quantities of Ni in serpentine.
3. That the element was an isomorphous replacement of one with which it is often associated.
Example: Small quantities of Na in orthoclase.

Many of the second type, however, are only to be detected spectroscopically and their relationship to their host is not certain. In the case of A and He, they are certainly uncombined and in the gaseous state, yet their occurrence in minerals is so rare, and their significance so great, that they have been duly entered where recorded in the literature.

As for such elements as In and Ga, we note their wide diffusion in nature, (few spectrographs of minerals lack the In lines, for instance), and we also note their great reluctance to concentrate themselves into palpable organizations. But the important and interesting phenomenon is, that they are not promiscuous in their associations, but *do* concentrate themselves slightly in certain favored hosts. So whatever the rôle of indium within the atomic aggregation which we are pleased to call sphalerite, for instance, it has been duly entered as a minor constituent and thus with other similar elements, though perhaps only present spectroscopically.

The differentiation between minor elements actually entering into the chemical structure of the mineral, those that are adsorbed, those that are occluded, those that are inert, and yet owe their existence to some radioactive parent in the mineral, and those that are merely mechanically adventitious, was assuredly not complete, and is therefore a source of error of indeterminate magnitude.

A source of error of a different sort is the differentiation between O, H, OH, and H₂O. The significance of H and OH is, except in certain obvious cases, purely academic. A complex formula is often written as an algebraic expression, with no indication of molecular structure. When the term "basic" is then applied to such a formula, it is not clear whether it is the oxygen ratio in the acid from which the given salt was derived which is referred to, or the actual presence of the OH radical. The term "acid" leads to the same confusion. And in many cases (*cf.* the zeolites), the structure is still a matter for discussion. In general, entries have been made in the H₂O column when water is lost below a red heat, and in the O and OH columns when lost only above a red heat. Entries have been made in the H column when the water given off, (below a red heat), is acid and in the OH column when basic, in addition to the entry in the H₂O column.

(C) Probable Mechanical Errors in Transcription of Data:

Errors from this source are largely due to astigmatism; to the entry of a number in a box immediately contiguous to the proper box. The chart was checked back to original sources in part six times, in part four times and, in part, only twice. Each one of these checkings revealed errors, progressively fewer. It is believed that the error due to this source is not greater than about 0.1%,

and probably less. This amounts to not more than ten individual entries. Further, it is an error usually quite obvious.

Recapitulation.

It is believed that the chart fairly faithfully represents the author's interpretation of the data in the literature; that errors of omission in a few of the older analyses are fairly common; that these latter have in part been corrected in the chart; that errors of commission were somewhat more common in certain of the older analyses; that the corrections of this type of error were probably not so effective as of the former type; that the greatest source of error, therefore, lies in this type of analysis and in the author's interpretation of it. The total percentage error is undoubtedly greater than it will be after a revision, but it is thought that its present accuracy is such that the chart may begin to function.

THE USES OF THE CHART

These are indicated on p. 1, and are largely self-explanatory, yet a few examples might not be amiss.

(A) The chart serves the first purpose as follows:

Example 1.—It is desired to know the occurrence of germanium, and its associations. Inspection of the right-hand margin reveals that Ge is not known to occur as a *dominant electro-positive* constituent of a mineral, and therefore occurs always as an accessory. Turning, then, to the vertical column headed by Ge, one thumbs down the chart and notes that the following minerals *always* or *usually* contain Ge:

In the Ag^a box, numbers 55, 146;
 In the Cu box, number 1291;
 In the Fe'' box, numbers 208, 795;
 In the Pb box, number 1116;
 In the Sn box, number 157;
 In the Yt box, numbers 297, 306, 327, 717;
 In the Zn box, number 764.

Turning to the numerical index, these numbers are found to refer respectively to:

Argyrodite, (55)	Cassiterite, (157)
Canfieldite (146)	Euxenite, (297)
Germanite, (1291)	Fergusonite, (306)
Columbite, (208)	Gadolinite, (327)
Tantalite, (795)	Samarskite, (717)
Ultrabasite, (1116)	Sphalerite, (764)

^a A line under a chemical symbol indicates that it is the horizontal column of that element which is referred to, and not its vertical column, in which case there is no underline.

To find the complete composition of each of these, including other rare constituents not usually recorded in mineralogical texts, inspect to the right and left of each number for further entries. This is facilitated by the arrangement of all the numbers of a given box in numerical order. Thus 55, for instance, is found to appear only in the S box, in addition to its entry in the Ge box. Since these entries are in the Ag horizontal column, it follows that argyrodite is a silver germanium sulphide, the silver dominating the germanium in percentage weight.

Example 2.—What minerals, if any, contain thallium as a major constituent? Inspection of the right-hand margin shows that Tl *does* form the dominant electro-positive constituent of some minerals, and running along this horizontal column we find:

In the Ag box, number 912;
 In the As box, numbers 508, 866, 912;
 In the Pb box, number 912;
 In the S box, numbers 508, 866, 912;
 In the Sb box, number 866.

In the numerical index, these numbers refer to:

Lorandite, (508)
 Vrbaité, (866)
 Hutchinsonite, (912).

If information is desired concerning the occurrence of Tl as an accessory constituent, one proceeds as with Ge and finds that:

In the Al box, numbers 26, 487;
 In the Au box, number 787;
 In the Cu box, numbers 98, 175, 226;
 In the Fe'' box, numbers 523, 672;
 In the Fe''' box, number 388;
 In the K box, number 149;
 In the Mn box, number 125;
 In the Zn box, number 764;

have been reported to carry traces or more of Tl.

In the numerical index, these numbers refer to:

Alunite, (26)	Marcasite, (523)
Lepidolite, (487)	Pyrite, (672)
Sylvanite, (787)	Hematite, (388)
Berzelianite, (98)	Carnallite, (149)
Chalcopyrite, (175)	Braunite, (125)
Crookesite, (226)	Sphalerite, (764)

(B) The use of the chart as an aid to Determinative Mineralogy is illustrated by the following two examples:

Example 1.—A minute quantity of a yellow, earthy incrustation on barite was to be tested. A fine closed-tube test was run. Vapours of iodine, and possibly of other halogens, were given off. Inspection showed:

<u>Ag</u> box	431 Iodobromite
	432 Iodyrite
	555 Miersite
<u>Ca</u> box	258 Dietzite
	1393 Lautarite
<u>Cu</u> box	1437 Marshite
<u>Pb</u> box	732 Schwartzembergite

to be the iodides occurring in nature. A reference to a descriptive text often will give physical data which may aid in eliminating some of these minerals, and thus further reducing the number of microchemical or blow-pipe tests required to determine the mineral or to suggest that it is a mixture or a new species. In the case under discussion, the physical data were inconclusive. In order to prove the unknown to be one of these iodides, tests had to be run for Ag, Cu, Ca and Pb. The tip of the C. T. was pulverized and introduced into a three-inch test-tube. Warmed with a few drops of $6N \cdot HNO_3$, the assay went completely into solution with no effervescence. Addition of NH_4OH produced no ppt. nor the formation of a distinctive colour. The NH_4OH was gently expelled and some $(NH_4)_2C_2O_4$ added. No CaC_2O_4 was formed. A few drops of HCl were added, and no ppt. formed immediately, suggesting the absence of Ag. After six hours' standing, a fine white ppt. formed. Upon heating, it went back into solution, ruling out $AgCl$, but, in the cold, it recrystallized. Under the glass the crystals were seen to be fine prismatic needles, with adamantine luster, and were presumably $PbCl_2$. Thus schwartzembergite was indicated qualitatively, and later checked optically.

Example 2.—During the course of a preliminary geological survey of Uganda¹⁴, Wayland and his assistants had occasion to determine a mineral occurring in and on fossilized wood from the Mount Elgon (Pliocene?), volcanic series. Their laboratory facilities being scanty, they were able to make only limited qualitative tests.

“ . . . , but the behaviour of the acicular mineral associated with the wood seems to indicate that it must be a true mineral substance and not a mixture.

"Some of the patches of acicular crystals are pure white but mostly they are a dirty yellowish colour. They occur in tufts thickly covering the cavities and rest on a massive incrustation of the same composition. . . . In cold dilute HCl they are only slightly acted upon, but on warming, they are soluble with effervescence of CO₂. On putting aside after five or six hours the whole solution sets to a jelly. . . . On heating in the closed tube the crystals become opaque, transparent ones becoming white and the yellowish ones becoming black. Water is evolved and this water vapour when it condenses on the tube gives an alkaline reaction with litmus paper. Heated in a tube with lime, ammonia is evolved and a good alkaline reaction is obtained. In the blowpipe the crystals are fusible at the ends to an enamel. With fusion mixture (*sic*) on charcoal and then cobalt nitrate a strong blue aluminum colour^a is given. A flame test for calcium could not be obtained. The tests above given show the presence of Aluminum,^a Ammonium, a Carbonate and Silicate, with hydroxyl, and the mineral species to which such a compound can be referred is doubtful. . . . It is not clear that a hydrous silicate can enter into combination with a carbonate."

These data applied to the chart, yield the following results in two or three minutes:

1. There are six hydrous silicates known to contain carbonate:

<u>Al</u>	1037	Cancrinite
	1038	Sulfatic cancrinite
	1214	Davyne
<u>Ca</u>	806	Thaumasite
	1539	Plazolite
<u>Yt</u>	164	Cenosite

2. Though these hydrous silicates contain carbonate, no one of them contains ammonium.

3. Ammonium occurs with water, but not in the presence of hydroxyl, carbonate, or silicate.

4. Ammonium occurs with carbonate, but not in the presence of silica, water, or hydroxyl.

Thus, were the "acicular mineral," (as tested), truly homogeneous, it would be a new mineral; but it would not only be a new mineral; it would represent a new chemical type; and not only one new type, but three new types! The probability that the material tested was a mixture is thus strongly emphasized.

^aMost fusible or fluxed silicates and many other fusible minerals give a good blue colour when heated with Co(NO₃)₂, in addition to those infusible minerals whose blue colour is a specific test for aluminum compounds or the zinc silicates.

(C) The mechanical presentation upon one sheet of the affinities and antipathies which hold sway in the mineral kingdom is instructive, and aids in emphasizing many interesting inter-relationships which it might prove difficult to grasp in another way.

The array of numbers in the $\text{Al Si}_x\text{O}_y$ box, for instance, emphasizes visually the importance of such minerals in the scheme of things. The great affinity of Ca for Al in the presence of Si_xO_y is brought out, as also the even greater (statistical) affinity of Na for Al under the same conditions.

Many other suggestive relationships among less common elements are indicated. There is no need of enumerating them here.

These relationships are only crudely quantitative, since the entries were made by percentage weight, and not by molecular proportions, and since the individual minerals have not been weighted according to their occurrence in the earth's crust.

Further, this method of presentation serves to emphasize in a clearcut manner the distinction between elements of the "indium" type, which, above a certain low saturation point, prefer the company of others to that of themselves, and those of the "aluminum" type, which show greater development of the herd instinct, for, when present at all, they are usually present in large quantities.

NOTICE OF A DETERMINATIVE SCHEME

It is obvious that a *determinative scheme*, embracing the mineral kingdom, and developed on the plan of successively testing for specific elements, by blowpipe and wet chemical methods, would be the logical complement to this chart. Such a scheme was indeed developed during the winter and spring of 1920, for use by the author in the elementary course of mineralogy given by Dr. Warren at the Massachusetts Institute of Technology. It included about 350 of the common minerals. In the summer of 1920, it was made to include about 900 minerals, and in 1923 was submitted as partial fulfilment of the requirements for the degree of Bachelor of Science. It has since been in use by the author, in the laboratories of the Department of Geology at the Institute, and in 1924 was tested out under the supervision of Dr. Lindgren. It is now being further revised, and expanded so as to include all minerals. Some refinements in the specific tests for elements are being tried out, and it is hoped to bring the entire scheme to completion within a year.

BINGHAM CANYON,
Aug. 23, 1924.

REFERENCES

1. "A System of Mineralogy." Dana. 1892.
2. "Appendices I, II, and III" to "A System of Mineralogy." Thru 1915.
3. "Microscopic Determination of the Non-opaque Minerals." Larsen. 1921.
4. "Dana's Textbook of Mineralogy." Ford. 1922.
5. "The Mineralogy of the Rarer Elements." Cahen and Wootten. 1916.
6. "Introduction to the Rarer Elements." Browning. 1919.
7. "Interpretation of Radium." Soddy. 1920.
8. "The Chemistry of the Rarer Elements." Hopkins. 1924.
9. "A Treatise on Inorganic Chemistry." Mellor. 1924.
10. "The American Mineralogist." 1920-July, 1924.
11. "The Mineralogical Magazine." 1920-July, 1924.
12. "Chemical Abstracts." Jan.-July, 1924.
13. "The American Journal of Science." August, 1924.
14. Wayland, E. J. "Annual Rept. Geol. Dept. Uganda Protectorate." Pp. 51-52.
1921. Printed by Govt. at Entebbe, 1921.

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| 373. Hancockite | 441. Jarosite | 509. Lorenzenite |
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| 375. Hardystonite | 443. Jeremejevite (eremeyevite) | 511. Ludlamite |
| 376. Harmotome | 444. Ježekite | 512. Ludwigite |
| 377. Hatchettolite | 445. Johnstrupite | 513. Luenebergite |
| 378. Hauchecornite | 446. Jordanite | 514. Pyromorphite, arseniferous |
| 379. Hauerite | 447. Kainite | 515. Magnesioferrite |
| 380. Hausmannite | 448. Olivine | 516. Magnesite |
| 381. Hautfeullite | 449. Kaliophilite | 517. Magnetite |
| 382. Häuynite | 450. Kaolin (ite) | 518. Malachite |
| 383. Hedenbergite | 451. Keilhauite | 519. Mallardite |
| 384. Heintzite | 452. Kentrolite | 520. Manandonite |
| 385. Hellandite | 453. Kermesite | 521. Manganite |
| 386. Helvite | 454. Serpentine, common | 522. Manganosite |
| 387. Hemafibrite | 455. Kierserite | 523. Marcasite |
| 388. Hematite | 456. Muromonite | 524. Margarite |
| 389. Salmite | 457. Klaprotholite | 525. Marialite |
| 390. Hematolite | 458. Klemite | 526. Martinite |
| 391. Hercynite | 459. Knebelite | 527. Mascagnite |
| 392. Herderite | 460. Knoxvillite | 528. Massicotite |
| 393. Herregrundite | 461. Kobellite | 529. Matildite |
| 394. Hessite | 462. Köchlinite | 530. Matlockite |
| 395. Heulandite | 463. Koninckite | 531. Maucherite |
| 396. Hewettite | 464. Kornerupine | 532. Meionite |
| 397. Hexahydrite | 465. Koettigite | 533. Melanocerite |
| 398. Hibschite | 466. Krennerite | 534. |
| 399. Hillebrandite | 467. Kroehnkite | 535. Melanotekite |
| 400. Hinsdalit | 468. Langbanite | 536. Melanterite |
| 401. Hiortdahlite | 469. Langbeinite | 537. Mellite |
| 402. Hisingerite | 470. Labradorite | 538. Meliphanite |
| 403. Hodgekinsonite | 471. Lacroixite | 539. Melite |
| 404. Salmonsite | 472. Lanarkite | 540. Melonite |
| 405. Hollandite | 473. Langite | 541. Mendipite |
| 406. Hopeite | 474. Lansfordite | 542. Mendozite |
| 407. Hornblende, common | 475. Lanthanite | 543. Meneghinite |
| 408. Hortonolite | 476. Laumontite | 544. Mercury |
| 409. Howlite | 477. Laurionite | 545. Mesolite |
| 410. Huebnerite | 478. Laurite | 546. Metabrushite |
| 411. Humite | 479. Lautite | 547. Metacinnabarite |
| 412. Hureaulite | 480. Lawsonite | 548. Mefahewettite |
| 413. Sphalerite, mercurial | 481. Lazulite | 549. Iron, meteoric |
| 414. Hyalophane | 482. Lazurite | 550. Meyerhofferite |
| 415. Hyalotekite | 483. Lead | 551. Miargyrite |
| 416. Hydroboracite | 484. Leadhillite | 552. Microcline |
| 417. Hydrocerusite | 485. Lecontite | 553. Microlite |
| 418. Hydrocyanite | 486. Lehrbachite | 554. Microsommite |
| 419. Hydrogiobertite | 487. Lepidolite | 555. Miersite |
| 420. Hydromagnesite | 488. Lepidomelane | 556. Milarite |
| 421. Hydronephelite | 489. Leucite | 557. Millerite |
| 422. Hydrotalcite | 490. Leucochalcite | 558. Mimetite |
| 423. Hydrozincite | 491. Leucophanite | 559. Minasragrite |
| 424. Hypersthene | 492. Leucophoenicite | 560. Minguetite |
| 425. Schoepite | 493. Leucopyrite | 561. Minium |
| 426. Ilesite | 494. Leucosphenite | 562. Mirabilite |
| 427. Ilmenite | 495. Levynite | 563. Mixite |
| 428. Ilvaite | 496. Liebigite | 564. Mizzonite |
| 429. Inesite | 497. Lillianite | |

565. Barytocelestite
 566. Molengraaffite
 567. Molybdenite
 568. Molybdite
 569. Molybdophyllite
 570. Monazite
 571. Monetite
 572. Monimolite
 573. Montanite
 574. Monticellite
 575. Celestobarite
 576. Montroydite
 577. Moravite
 578. Mordenite
 579. Morenosite
 580. Mosesite
 581. Rubber-sulphur
 582. Muthmannite
 583. Muscovite
 584. Nadorite
 585. Nagyagite
 586. Nantokite
 587. Nasonite
 588. Natrochalcite
 589. Natrolite
 590. Natron
 591. Natrophilite
 592. Naumannite
 593. Nephelite
 594. Daiton-sulphur
 595. Nepouite
 596. Neptunite
 597. Nesquehonite
 598. Newtonite
 599. Niccolite
 600. Niter
 601. Nordenskiöldine
 602. Northupite
 603. Noselite
 604. Tourmaline, alkali
 605. Krugite
 606. Okenite
 607. Oldhamite
 608. Oligoclase
 609. Olivenite
 610. Onofrite
 611. Smithsonite, cupriferous
 612. Opa
 613. Orpiment
 614. Orthoclase
 615. Pachnolite
 616. Palaite
 617. Paraffin
 618. Paragonite
 619. Parahopeite
 620. Mimetite, calciferous
 621. Fluor-meionite
 622. Partchinite
 623. Pascoite
 624. Pearceite
 625. Pectolite
 626. Peganite
 627. Penfieldite
 628. Penninite
 629. Pentlandite
 630. Percyite
 631. Periclase
 632. Perovskite
 633. Petalite
 634. Petzite
 635. Pharmacolite
 636. Pharmacosiderite
 637. Phenacite
 638. Phillipsite
 639. Phlogopite
 640. Phenicochroite
 641. Phosgenite
 642. Phosphosiderite
 643. Phosphuranylite
 644. Piedmontite
 645. Pinakiolite
 646. Pinnoite
 647. Pirssonite
 648. Pitticite
 649. Plagionite
 650. Platinum
 651. Plattnerite
 652. Plumbogummite
 653. Polianite
 654. Pollucite
 655. Polyargyrite
 656. Polybasite
 657. Polycrase
 658. Polydymite
 659. Polyhalite
 660. Polymignite
 661. Powellite
 662. Prehnite
 663. Prochlorite
 664. Prosopite
 665. Proustite
 666. Pseudobrookite
 667. Psilomelane
 668. Schneebergite
 669. Ptilolite
 670. Purpurite
 671. Pyrargyrite
 672. Pyrite
 673. Pyrochlore
 674. Pyrochroite
 675. Pyrolusite
 676. Pyromorphite
 677. Pyrope
 678. Pyrophyllite
 679. Pyrosmalite
 680. Pyrostilpnite
 681. Pyroxmangite
 682. Pyrrhotite
 683. Quartz, alpha
 684. Freirinite
 685. Ralstonite
 686. Rammelsbergite
 687. Raspite
 688. Realgar
 689. Reddingite
 690. Reinite
 691. Remingtonite
 692. Retzian
 693. Rezbanyite
 694. Rhabdophanite
 695. Rhagite
 696. Rhodizite
 697. Rhodochrosite
 698. Rhodonite
 699. Richterite
 700. Rickardite
 701. Riebeckite
 702. Rinkite
 703. Rinneite
 704. Foresite
 705. Risörite
 706. Frigidite
 707. Roebbingite
 708. Roepperite
 709. Roemerite
 710. Roscoelite
 711. Roselite
 712. Rosiéresite
 713. Spinel (normal "ruby")
 714. Rutile
 715. Safflorite
 716. Sal-ammonia (salammo-
 nite)
 717. Samarskite
 718. Samirésite
 719. Samsonite
 720. Saponite
 721. Sapphirine
 722. Sarcolite
 723. Sarkinite
 724. Sartorite
 725. Sassolite
 726. Schaphbachite
 727. Scheelite
 728. Schefferite
 729. Schirmerite
 730. Schorlomite
 731. Schroetterite
 732. Schwartzembergite
 733. Schwatzite
 734. Scolecite
 735. Scrodite
 736. Searlesite
 737. Selenium
 738. Selen-tellurium
 739. Sellaite
 740. Semseyite
 741. Senarmontite
 742. Sepiolite
 743. Zinc-copper-melanterite
 744. Seybertite
 745. Sicklerite
 746. Siderite
 747. Sideronatrite
 748. Sillimanite
 749. Silver
 750. Sipylyte
 751. Skemmatite
 752. Skutterudite
 753. Smaltite
 754. Smithsonite
 755. Soda niter
 756. Sodalite
 757. Soumansite
 758. Spadaite
 759. Spangolite
 760. Sperryite
 761. Spessartite
 762. Spherite
 763. Spherochalcite
 764. Sphalerite
 765. Zinc-copper-chalcanthite
 766. Spodumene
 767. Spurrite

768. Stannite
 769. Staurolite
 770. Stephanite
 771. Stercorite
 772. Sternbergite
 773. Stibiconite
 774. Stibiotantalite
 775. Stibnite
 776. Stilbite
 777. Stilpnomeane
 778. Stolzite
 779. Strengite
 780. Strontianite
 781. Struvite
 782. Styloptypite
 783. Sulfoborite
 784. Sulfohalite
 785. Sulfurite
 786. Sussexite
 787. Sylvanite
 788. Sylvite
 789. Symplectite
 790. Synadelphite
 791. Sapphire
 792. Syngenite
 793. Szmikite
 794. Talc
 795. Tantalite
 796. Tantalum
 797. Gold, cupriferous
 798. Tellurium
 799. Duftite
 800. Tennantite
 801. Tephroite
 802. Terlinguaite
 803. Teschemacherite
 804. Tetradymite
 805. Tetrahedrite
 806. Thaumassite
 807. Thernardite
 808. Thermonatrite
 809. Thomsenolite
 810. Thomsonite
 811. Thorianite
 812. Thorite
 813. Thortveitite
 814. Thuringite
 815. Tiemannite
 816. Tilasite
 817. Tin
 818. Titanite
 819. Topaz
 820. Tourmaline, chromic
 821. Tremolite
 822. Trichalcite
 823. Tridymite
 824. Trimerite
 825. Triphylite
 826. Triplite
 827. Triploidite
 828. Tritomite
 829. Troegerite
 830. Troilite
 831. Trona
 832. Tscheffkinite (chevnikite)
 833. Tsumebite
 834. Tungstite
 835. Turyite
 836. Turquoise
 837. Tychite
 838. Tyrolite
 839. Tysonite
 840. Ulexite
 841. Ullmannite
 842. Uraninite
 843. Uranocircite
 844. Uranophane
 845. Uranopilite
 846. Uranospinite
 847. Uranothallite
 848. Urbanite
 849. Ussingite
 850. Hoelite
 851. Uvanite
 852. Uvarovite
 853. Valentinite
 854. Vanadinite
 855. Variscite
 856. Vashegyite
 857. Vauquelinite
 858. Vermiculite
 859. Vesuvianite
 860. Veszelyite
 861. Vivianite
 862. Voglite
 863. Vollborthite
 864. Voltaite
 865. Voltzite
 866. Vrbaite
 867. Picrochromite
 868. Xanthochroite
 869. Wagnerite
 870. Walpurgite
 871. Wapplerite
 872. Wardite
 873. Weinschenkite
 874. Warwickite
 875. Wavellite
 876. Wellsite
 877. Wernerite
 878. Whitneyite
 879. Wiikite
 880. Wilkeite
 881. Willemite
 882. Wilyamite
 883. Witherite
 884. Wittichenite
 885. Woehlerite
 886. Wolfachite
 887. Wolframite
 888. Wollastonite
 889. Wulfenite
 890. Wurtzite
 891. Xanthoconite
 892. Xanthophyllite
 893. Rhodonite, ferriferous
 894. Xenotime
 895. Yttrocerite
 896. Yttrotantalite
 897. Yukonite
 898. Zarate
 899. Zepharovichite
 900. Zeunerite
 901. Lorettoite
 902. Zincaluminite
 903. Zincite
 904. Zimkenite
 905. Zinnwaldite
 906. Zircon
 907. Zirkelite
 908. Zoisite
 909. Zorgite
 910. Zunyite
 911. Yttergranat
 912. Hutchinsonite
 913. Josëite
 914. Lengenbrachite
 915. Lithargite
 916. Nitrocalcite
 917. Nitroglauberite
 918. Nitromagnesite
 919. Whewellite
 920. Misenite
 921. Merrillite
 922. Plumbionibite
 923. Platinite
 924. Seligmannite
 925. Tripkeite
 926. Uranospherite
 927. Bayldonite
 928. Barthite
 929. Oliveiraite
 930. Tarbuttite
 931. Tavistockite
 932. Taylorite
 933. Teallite
 934. Pisanite
 935. Zeyringite
 936. Yttrogummite
 937. Yttrofluorite
 938. Siderite, manganiferous
 939. Yttrialite
 940. Adularia
 941. Aegirite-augite
 942. Aegirite, vanadiferous
 943. Akermannite
 944. Weibullite
 945. Akrochordite
 946. Alalite
 947. Tantaie ochre
 948. Albertite
 949. Rhodocrosite, ferriferous
 950. Allactite
 951. Allemontite
 952. Allopalladium
 953. Almeriite
 954. Aloisite
 955. Iron pyrochroite
 956. Alshedite
 957. Alurgite
 958.
 959. Amesite
 960. Ammiolite
 961. Basobismutite
 962. Anatase
 963. Bavenite
 964. Anemousite
 965. Angaralite
 966. Tennantite, bismuthiferous
 967. Margarosanite
 968. Anthracite
 969. Antigorite
 970. Antlerite

971. Aphrosiderite
 972. Arakawaite
 973. Arcanite
 974. Arduinite
 975. Argentojarosite
 976. Armangite
 977. Arquerite
 978. Arsenobismite
 979. Asbolite
 980. Ascharite
 981. Dolomite, manganiferous
 982. Astrolite
 983. Attacolite
 984. Auerlite
 985. Augelite
 986. Bäckströmite
 987. Cyprine
 988. Barbierite
 989. Baricalcite
 990. Barkevikite
 991. Barsowite
 992. Barobismutite
 993. Barylite
 994. Barysilite
 995. Ferrierite
 996. Bassanite
 997. Basselite
 998. Bastite
 999. Batchelorite
 1000. Bathvillite
 1001. Bacquerelite
 1002. Beldongrite
 1003. Berlinite
 1004. Berthonite
 1005. Berzeliite
 1006. Quartz, beta
 1007. Beyrichite
 1008. Bilmite
 1009. Bisbeeite
 1010. Bischoffite
 1011. Bismuth, gold
 1012. Bismutoplagonite
 1013. Bismutosmaltite
 1014. Dolomite, ferriferous
 1015. Bituminous coal
 1016. Bityite
 1017. Brostenite
 1018. Blomstrandine
 1019. Bolivarite
 1020. Bort
 1021. Bowlingite
 1022. Brannerite
 1023. Bravoite
 1024. Bromcarnallite
 1025. Breunnerite
 1026. Britholite
 1027. Brugnatelite
 1028. Brunsvigite
 1029. Bushmanite
 1030. Bustamite
 1031. Bytownite
 1032. Calciobiotite
 1033. Cadmium oxide
 1034. Calcium lazulite
 1035. Campylite
 1036. Camsellite
 1037. Cancrinite
 1038. Sulfatic cancrinite
 1039. Manganandalusite
 1040. Cappelinite
 1041.
 1042. Carbonado
 1043. Xanthoxenite
 1044. Anapaite
 1045. Rhodium gold
 1046. Platinum, magnetic
 1047. Celsian
 1048. Ceruleite
 1049. Coeruleofibrite
 1050. Cesarolite
 1051. Parsettensite
 1052. Racewinite
 1053. Chalcolamprite
 1054. Chalcomenite
 1055.
 1056. Chathamite
 1057. Chiasolite
 1058. Chilenite
 1059. Chillagite
 1060. Chlormanganokalite
 1061. Chlor-apatite
 1062. Chloralluminite
 1063. Chloromagnesite
 1064. Chloromelanite
 1065. Christobolite
 1066. Chrome-clinochlore
 1067. Chrome-diopside
 1068. Cleavelandite
 1069. Chromite
 1070. Chromohereynite
 1071. Chrysocolla
 1072. Chrysotile
 1073. Cleveite
 1074. Cliftonite
 1075. Clinoenstatite
 1076. Dolomite, cobaltiferous
 1077. Cobalt chalcantite
 1078. Cobaltoadamite
 1079. Cobaltocalcite
 1080. Cobaltomenite
 1081. Cobaltiferous lampadite
 1082. Coeinerite
 1083. Coeruleolactite
 1084. Cohenite
 1085. Colerainite
 1086. Collophanite
 1087. Columbium
 1088.
 1089. Connarite
 1090. Copalite
 1091. Cordierite
 1092. Cornuite
 1093. Coronadite
 1094. Covellite
 1095. Crandallite
 1096. Creedite
 1097. Crestmorite
 1098. Crossite
 1099. Cryptohalite
 1100. Vredenburgite
 1101. Topaz, oriental
 1102. Vonsenite
 1103. Voglianite
 1104. Voelckerite
 1105. Viridine
 1106. Villiamite
 1107. Cobaltiferous gahnite
 1108. Vilateite
 1109. Vernadskite
 1110. Velardeñite
 1111. Vegasite
 1112. Vanthoffite
 1113. Uranospathite
 1114. Uraconite
 1115. Umangite
 1116. Ultrabasite
 1117. Uhlignite
 1118. Tyuyamunite
 1119. Torbernite
 1120. Torendrikite
 1121. Törnebohmitite
 1122. Tourmaline, iron
 1123. Mackensite
 1124. Trechmanite
 1125. Trigonite
 1126. Tripuhyite
 1127. Trolleite
 1128. Troostite
 1129. Tschermigite
 1130. Tungstenite
 1131. Turanite
 1132. Thorogummite
 1133. Thulite
 1134. Titanhydroclinohumite
 1135. Tachyhydrite
 1136. Taeniolite
 1137. Taenite
 1138. Tagilite
 1139. Taletriplite
 1140. Tallingite
 1141. Tapiolite
 1142. Taramellite
 1143. Tarnowitzite
 1144. Tartarkaite
 1145. Tasmanite
 1146. Tawmawite
 1147. Tellurite
 1148. Tellurobismutite
 1149. Tenorite
 1150. Termierite
 1151. Tetradymite-sulfurous
 1152. Thalenite
 1153. Sulvanite
 1154. Svbabite
 1155. Svanbergite
 1156. Sychnodymite
 1157. Stewartite
 1158. Stibiocolumbite
 1159. Stichtite
 1160. Stoffertite
 1161. Stokesite
 1162. Strigovite
 1163. Stromeyrite
 1164. Strontianocalcite
 1165. Strüverite
 1166. Stutzite
 1167. Succinite (amber)
 1168. Sobralite
 1169. Soda-glaucanite
 1170. Soddite
 1171. Spencerite
 1172. Arsenopyrite, nickeliferous
 1173. Spodiophyllite

1174. Spodiosite
 1175. Stasite
 1176. Staszicite
 1177. Steenstrupine
 1178. Stellerite
 1179. Senaite
 1180. Serendibite
 1181. Serpierite
 1182. Shanyavskite
 1183. Shattuckite
 1184. Selensulfur
 1185. Sheridanite
 1186. Siegenite
 1187. Silicomagnesiofluorite
 1188. Schreibersite
 1189. Simonellite
 1190. Sincosite
 1191. Sphenomanganite
 1192. Mārcasite, arsenical
 1193. Sitaparite
 1194. Smaragdite
 1195. Schafarzikite
 1196. Scheererite
 1197. Schertelite
 1198. Schizolite
 1199. Tetrahedrite, cobaltiferous
 1200. Cumengite
 1201. Cuprite
 1202. Cuproadamite
 1203. Cuprogoslarite
 1204. Cupromagnesite
 1205. Cuproplumbite
 1206. Cuproscheelite
 1207. Cuprozincite
 1208. Curite
 1209. Rubidium-microcline
 1210. Dahllite
 1211. Danaite
 1212. Dannemorite
 1213. Daviesite
 1214. Davyne
 1215. Dechenite
 1216. Delessite
 1217. Delorenzite
 1218. Delvauxite
 1219. Dewindtite
 1220. Diabantite
 1221. Diallage
 1222. Dietrichite
 1223. Dihydrate
 1224. Diopside-jadeite
 1225. Dioptase
 1226. Dixenite
 1227. Dolomite, zinciferous
 1228. Doughtyite
 1229. Douglasite
 1230. Tinzenite
 1231. Dravite
 1232. Dundasite
 1233. Durdenite
 1234. Dysanalite
 1235. Dysluite
 1236. Dysodile
 1237.
 1238. Echellite
 1239. Ectropite
 1240. Elaterite
 1241. Elpidite
 1242. Webyite
 1243. Elbaite
 1244. Emmonsite
 1245. Endeiolite
 1246. Endlichite
 1247. Scacchite
 1248. Epidesmīne
 1249. Epistolite
 1250. Eguéite
 1251. Erikite
 1252. Erythrosiderite
 1253. Sanguinite
 1254.
 1255. Eucolite
 1256. Eucolite-titanite
 1257. Eucryptite
 1258. Eudidymite
 1259. Ferberite
 1260. Ferganite
 1261. Fermorite
 1262. Ferrazite
 1263. Ferronatrite
 1264. Ferroanthophyllite
 1265.
 1266. Ferrocaldite
 1267. Ferrocobaltite
 1268. Ferrogoslarite
 1269. Ferrocolumbite
 1270. Fichelite
 1271. Fiedlerit.
 1272. Finnemanite
 1272. Finnemanite
 1273.
 1274. Flagstaffite
 1275. Flajolotite
 1276. Clinoptilolite
 1277. Siderite, magnesian
 1278. Fowlerite
 1279. Francolite
 1280. Fluormanganapatite
 1281. Fredricite
 1282. Friesite
 1283. Fuchsite
 1284. Fuggerite
 1285. Furnacite
 1286. Garnierite
 1287. Belonesite
 1288. Gedrite
 1289. Geocerite
 1290. Georgeixite
 1291. Germanite
 1292. Georgiadesite
 1293. Gerhardtite
 1294. Geyerite
 1295. Holmquistite
 1296. Gilesite
 1297. Orvillite
 1298. Gilpinite
 1299. Gilsonite
 1300. Glaucocroite
 1301. Glauconite
 1302. Globosite
 1303. Gonnardite
 1304. Grahamite
 1305. Grandidierite
 1306. Greenalite
 1307. Greenovite
 1308. Griffithite
 1309. Griphite
 1310. Grothite
 1311. Grünerite
 1312. Guadaleazarite
 1313. Gummite
 1314. Gyrolite
 1315. Hackmanite
 1316. Hannayite
 1317. Harstigitite
 1318. Hartite
 1319. Hatchettite
 1320. Hastingsite
 1321. Zinc
 1322. Hematostibiite
 1323. Henwoodite
 1324. Hessonite
 1325. Hetaerolite
 1326. Heteromorphite
 1327. Szaibelyite
 1328. Hjelmite
 1329. Hieratite
 1330. Higginsite
 1331. Sandbergite
 1332. Heterosite
 1333. Histrixite
 1334. Catoptrite
 1335. Högbonnite
 1336. Hörnesite
 1337. Illsemannite
 1338. Homilite
 1339. Horsfordite
 1340. Huanatajayite
 1341. Hügelite
 1342. Humboltine
 1343. Hulsite
 1344. Huntelite
 1345. Hydroclinochumite
 1346. Kischelimitite
 1347. Chloroxiphite
 1348. Hydrophilite
 1349. Hydrothomsonite
 1350.
 1351. Ice
 1352. Iddingsite
 1353. Idrialite
 1354. Ilmenorutile
 1355. Impsonite
 1356. Ambatoarinite
 1357. Irvingite
 1358. Ishikawite
 1359. Ivaarite
 1360. Jalpaite
 1361. Jefferisite
 1362. Jeffersonite
 1363. Jet
 1364. Johannite
 1365. Josephinite
 1366. Jurupaite
 1367. Kaersutite
 1368. Kalicinite
 1369. Diabolite
 1370. Kamarezite
 1371. Kämmererite
 1372. Kamacite
 1373. Kasolite
 1374. Kayserite
 1375. Keelyite

1376. Kehoite
 1377. Kertschenite
 1378. Könenite
 1379. Kongsbergite
 1380. Tilkerodite
 1381. Koppite
 1382. Kotschubeite
 1383. Kreittonite
 1384. Kremersite
 1385. Knopite
 1386. Kreuzbergite
 1387. Magnetite, magnesian
 1388. Kurskite
 1389. Lagonite
 1390. Lampadite
 1391. Lambertite
 1392. Laubanite
 1393. Lautarite
 1394. Laavenite
 1395. Lavrovite
 1396. Lawrencite
 1397. Leifite
 1398.
 1399. Leuchtenbergite
 1400. Leucopetrite
 1401. Leverrierite
 1402. Lewisite
 1403. Liebethenite
 1404. Lignite
 1405. Liskeardite
 1406. Lucinite
 1407. Luckite
 1408. Lubeckite
 1409. Hacklite
 1410. Larderellite
 1411. Mackintoshite
 1412. Lassallite
 1413. Kochite
 1414. Magnesioludwigite
 1415. Malacon
 1416. Siderite, calciferous
 1417. Malinowskite
 1418. Pyrrhotite, nickeliferous
 1419. Manganapatite
 1420. Manganbrucite
 1421. Manganese-chalcanthite
 1422. Manganchlorite
 1423. Manganfayalite
 1424. Manganhedenbergite
 1425. Manganmagnetite
 1426. Manganocalcite
 1427. Manganocolumbite
 1428. Manganophyllite
 1429. Kempite
 1430. Vanadic ochre
 1431. Manganostibite
 1432. Manganotantalite
 1433. Manganpectolite
 1434. Mangan-vesuvianite
 1435. Mansjöite
 1436. Marmatite
 1437. Marshite
 1438. Marsjatskite
 1439. Martite
 1440. Maskelynite
 1441. Mauzelite
 1442. Mazapilite
 1443. Melanovanadite
 1444. Mellite
 1445. Melnikovite
 1446. Mendelyeevite
 1447. Merwinite
 1448. Mesitite
 1449. Messelite
 1450. Metastibnite
 1451. Metavoltaite
 1452. Millosevichite
 1453. Milosechite
 1454. Minasite
 1455. Galena, argentiferous
 1456. Moissanite
 1457. Molybdomenite
 1458. Molybdosodalite
 1459. Molybite
 1460.
 1461. Montebrasite
 1462. Morencite
 1463. Morinite
 1464. Mosandrite
 1465. Mossite
 1466. Mottramite
 1467. Müllerite
 1468. Mullanite
 1469. Naegite
 1470. Napalite
 1471.
 1472. Narsasukite
 1473. Natroalunite
 1474. Natrodavynite
 1475. Natrojarosite
 1476. Nematite
 1477. Neotantalite
 1478. Neotocite
 1479. Motlocite
 1480. Newberyite
 1481. Nicholsonite
 1482. Nickel-skutterudite
 1483. Prolectite
 1484. Nitrobarite
 1485. Nocerite
 1486. Lechatelierite
 1487. Nordmarkite
 1488. Offrérite
 1489. Siderotil
 1490. Ramsayite
 1491. Orientite
 1492. Oruetite
 1493. Osmiridium
 1494. Otavite
 1495. Oxammite
 1496. Ozocerite
 1497. Owyheelite
 1498. Pageite
 1499. Palladium
 1500. Palmerite
 1501. Palmierite
 1502. Tourmaline, magnesian
 1503. Paracoquimbite
 1504. Paraurichalcite
 1505. Paralaurionite
 1506. Paraluminite
 1507. Paramelaconite
 1508. Parasepiolite
 1509. Paravivianite
 1510. Paravauxite
 1511. Paredrite
 1512. Pargasite
 1513. Paternoite
 1514. Patronite
 1515. Parsonsite
 1516. Peckhamite
 1517. Phillipite
 1518. Rubidium-orthoclase
 1519. Pholidolite
 1520. Phosphoferrite
 1521. Phosphophyllite
 1522.
 1523. Picite
 1524. Piekeringite
 1525. Picotite
 1526. Picroepidote
 1527. Pieromerite
 1528. Pieropharmacolite
 1529. Picrotitanite
 1530. Pigeonite
 1531. Pintadoite
 1532. Pistomesite
 1533. Pilbarite
 1534. Natroncatapleite
 1535. Planchéite
 1536. Planerite
 1537. Planoferrite
 1538. Avaite
 1539. Plazolite
 1540. Plessite
 1541. Plumbocalcite
 1542. Plumbojarosite
 1543. Plumosite
 1544. Pöchite
 1545. Podolite
 1546. Polysphaerite
 1547. Cerium sulfate
 1548. Porpezite
 1549. Posepnyte
 1550. Prizbramite
 1551. Priceite
 1552. Priorite
 1553. Rutherfordine
 1554. Silver, cupriferous
 1555. Ellsworthite
 1556. Rumpfitte
 1557. Chinkolobwite
 1558. Pucherite
 1559. Pyroaurite
 1560. Pyrobelonite
 1561. Pyrophanite
 1562. Errite
 1563. Pyrrharsenite
 1564.
 1565. Picrotrophite
 1566. Pseudowavellite
 1567.
 1568. Quisqueite
 1569. Rathite
 1570. Redingtonite
 1571. Rhodolite
 1572. Rhomboclase
 1573. Rhönite
 1574. Richellite
 1575. Brandisite
 1576. Riversideite
 1577. Romeite
 1578. Rosasite
 1579. Roschélite

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|----------------------------------------|-----------------------------------|---------------------------------|
| 1580. Rosenbuschite | 1598. Mariposite | 1615. Rhodocrosite, calciferous |
| 1581. Rothoffite | 1599. | 1616. cobaltiferous |
| 1582. Rowlandite | 1600. Yttrocrasite | 1617. Sarcopsidite |
| 1583. | 1601. Heterogenite | 1618. Magnesiochromite |
| 1584. Tengerite | 1602. Wattedevillite | 1619. Schorlomite |
| 1585. Joaquinite | 1603. Volchonskoite | 1620. Schroeckingerite |
| 1586. Corkite | 1604. Uranochalcite | 1621. Rhodocrosite, magnesian |
| 1587. Parisite | 1605. Pleonaste | 1622. Stevensite |
| 1588. Ruby, oriental | 1606. Iron - copper - chalcantite | 1623. Monimolite, calciferous |
| 1589. Emerald, oriental | 1607. Heubachite | 1624. Tarapacaite |
| 1590. Amethyst, oriental | 1608. Wodanite | 1625. Tamarugite |
| 1591. Chlorospinel | 1609. Barytbiotite | 1626. Titanolivine |
| 1592. Hyalosiderite | 1610. Löllingite, cobaltiferous | 1627. Silver, auriferous |
| 1593. Pseudomesolite | 1611. Trerorite | 1628. Hydrotroilite |
| 1594. Soda-sarcosite, an hypothet. mol | 1612. Plumboferrite | 1629. Gel-cerargyrite |
| 1595. Zebedassite | 1613. Vauxite | 1630. Hydrocuprite |
| 1596. Xonotlite | 1614. Cornetite | 1631. Gel-variscite |
| 1597. Destinezite | | 1632. Spheromangite |

BLANK NUMBERS

The following numbers had been assigned to minerals which were later, for one reason or another, stricken from the chart. They *do not now* appear upon the chart, and appear in the Numerical Index followed by a blank.

271, 309, 433, 534, 958, 1041, 1055, 1088, 1237, 1254, 1265, 1273, 1350, 1398, 1460, 1471, 1522, 1564, 1567, 1583, 1599.

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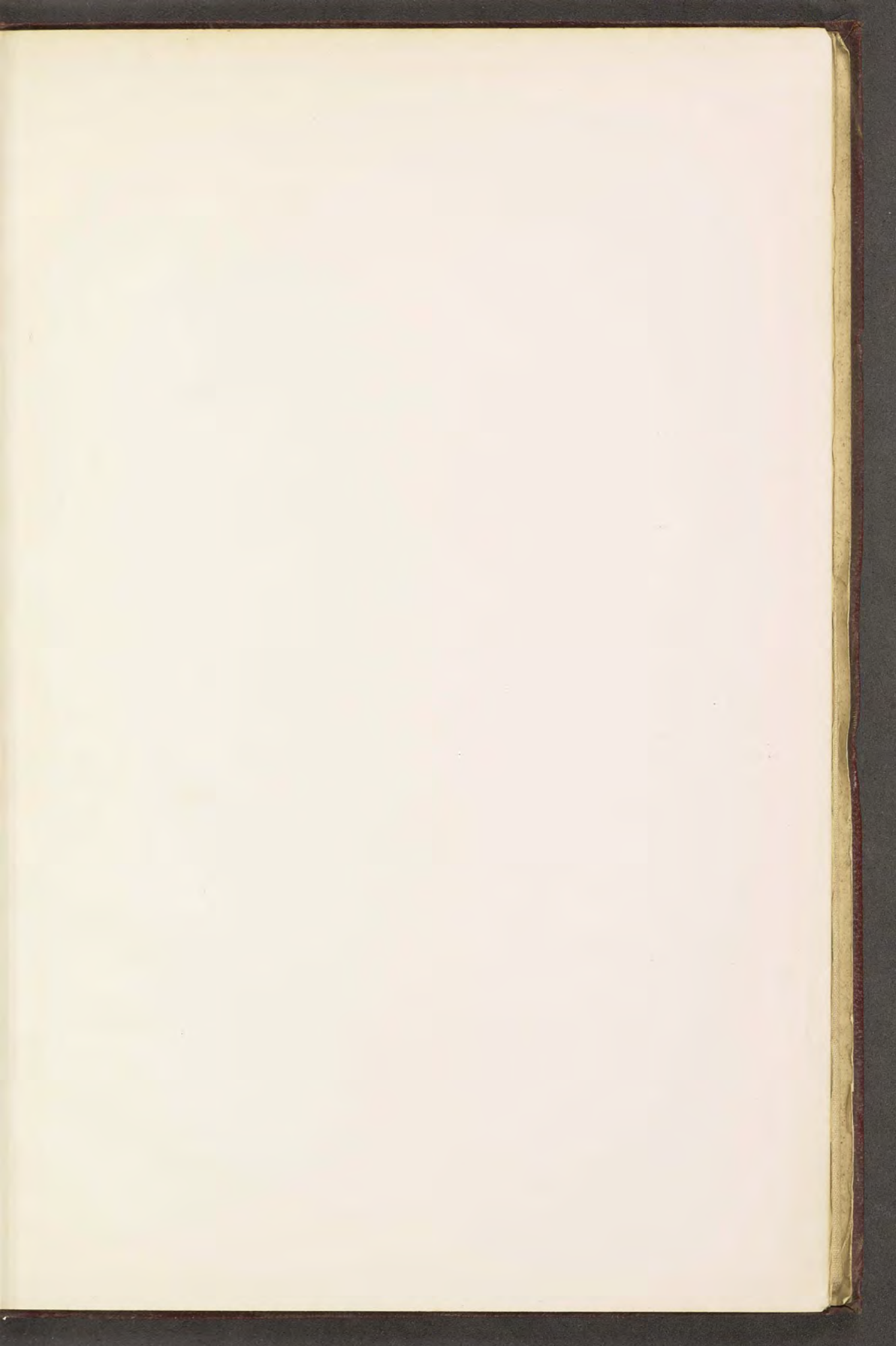
36

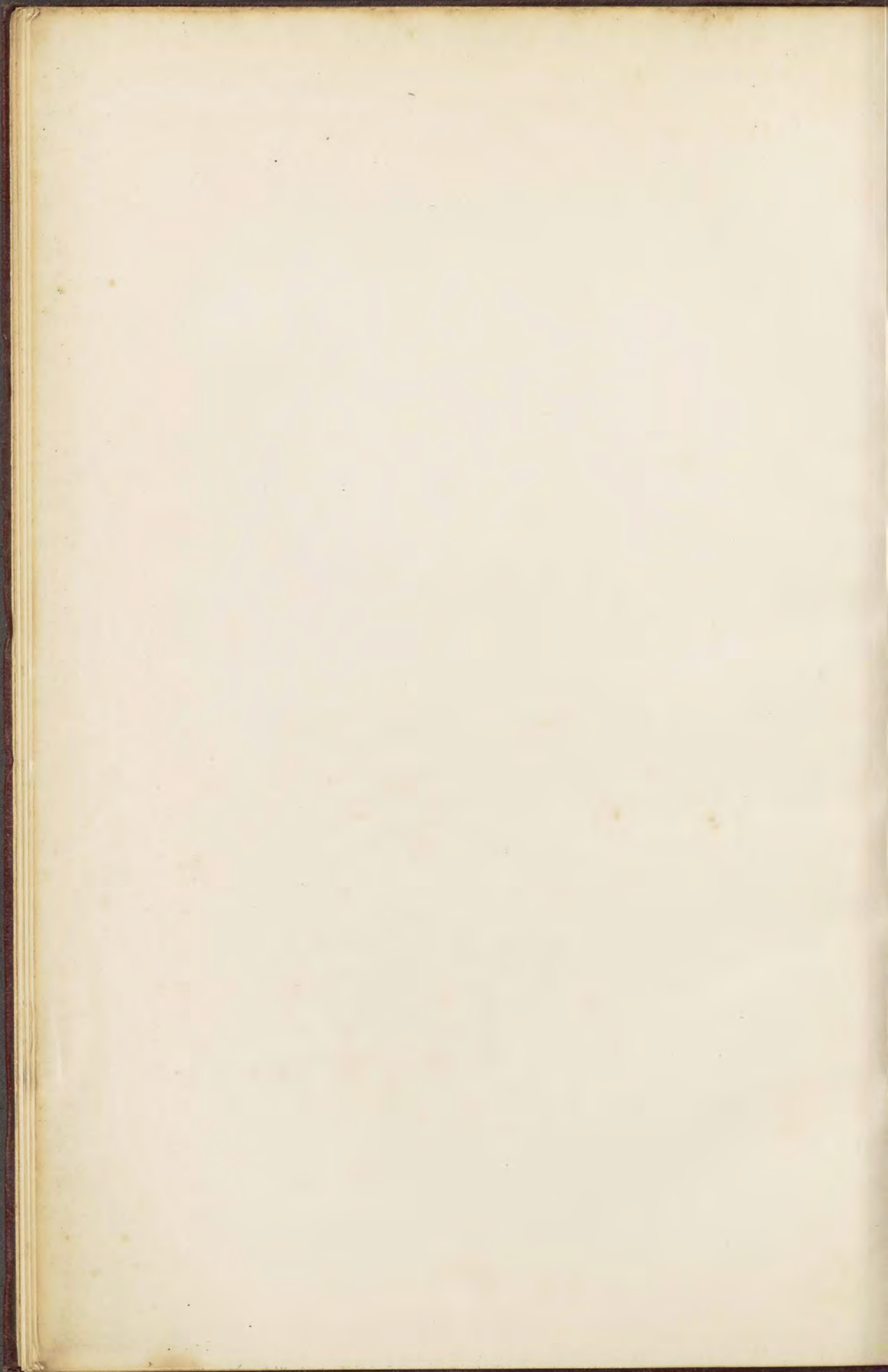
37

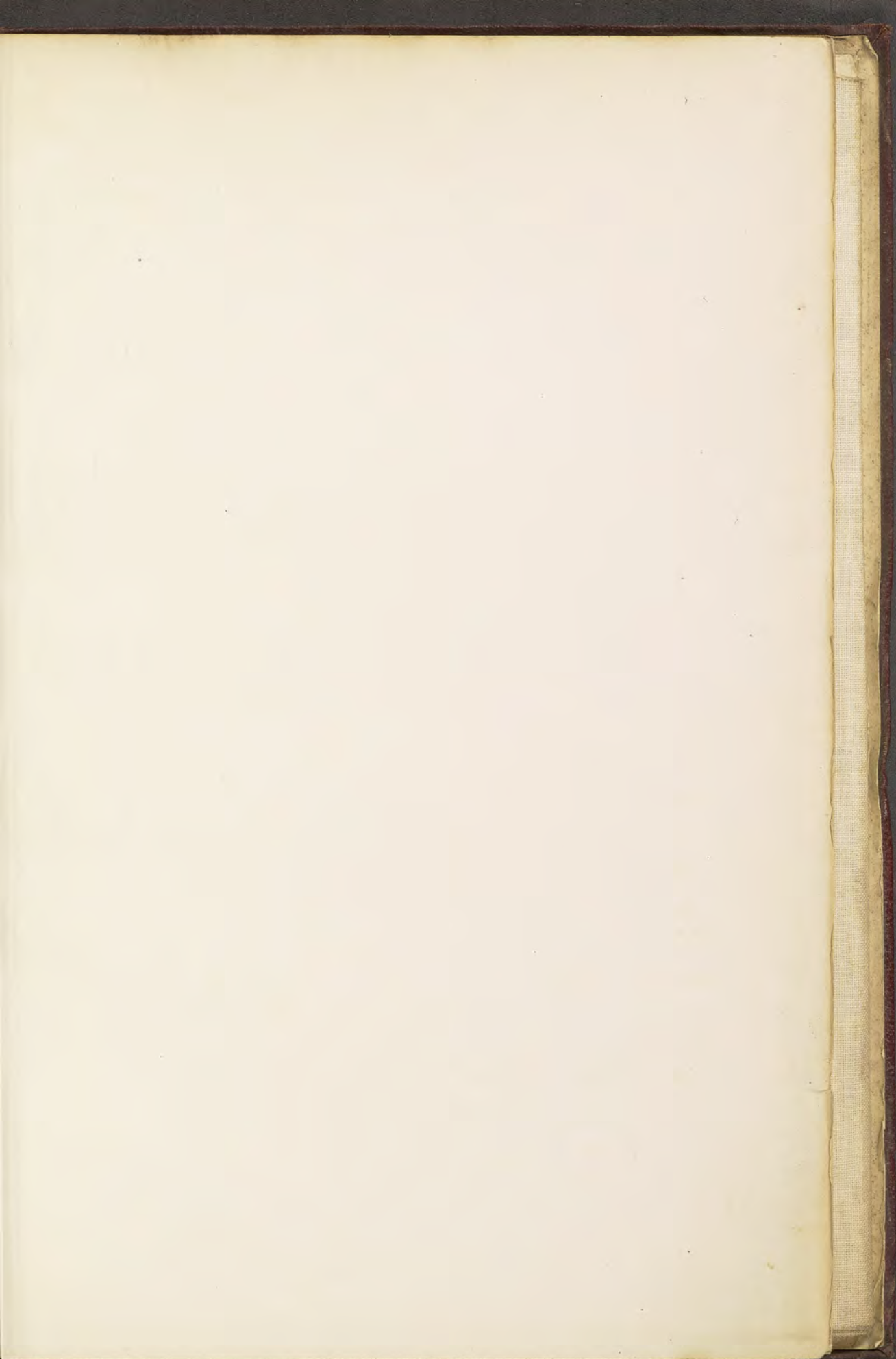
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THE CHEMICAL RELATIONSHIPS IN THE MINERAL KINGDOM

Table with columns for elements (Ag, Al, As, Au, B, Ba, Bi, C, Ca, Cd, Ce, Co, Cs, Cu, Er, Fe, H, Hg, Ir, K, La, Lu, Mg, Mn, Mo, Ni, N, O, Os, Pb, Pt, Pu, Rb, Rh, Ru, S, Se, Si, Sm, Sn, Sr, Ta, Te, Th, Ti, Tl, U, V, W, Y, Yb, Zr, Zn) and rows for various chemical groups (H2O, Si2O5, SO4, SO3, P2O5, NO3, CO2, Zn, Yt, Yb, W, U, V, Tm, Ti, Ta, Th, Te, Tb, Ta, Sr, Sn, Sm, Si, Se, Sc, Sb, S, Ru, Rh, Rb, Ra, Re, Pt, Pd, P, Pb, P, Os, Ni, NH4, Na, N, Mo, Mn, Mg, Lu, Li, La, K, Ir, In, I, Ho, Hg, Hf, He, Ge, Ga, Gd, Ca, Fe, Fe, F, Eu, Er, Dy, Di, Cu, Cs, Cr, Co, Cl, Ce, Cd, Cb, Ca, C, Br, Bi, Ba, B, Au, As, Al, Ag, A, H, OH, O, NATEL).

