(1.736) agreed with that given in the literature for connellite (1.724-1.735), as did all other optical properties except the highest index. It was noted that when the needles were immersed in a liquid with n 1.738, some needles had the same index as the liquid when turned 20° away from the vibration direction of the polarizer, and some at 35°. The first were thought to be those needles showing β and γ, the second those showing α and γ. From the known values for α, n of the liquid, and the angles turned through, β and γ were calculated as 1.737 and 1.741, respectively. Since the mineral was found to be uniaxial, the value ϵ was calculated as 1.758. An actual determination of ϵ, using a solution of sulfur in methylene iodide, gave 1.756, which agrees with the figure for connellite (1.746-1.758).

All essential differences between "ceruleofibrite" and connellite are now accounted for. The first name should of course be dropped. The unfortunate errors here acknowledged may serve to emphasize that new species should be based only on fairly abundant material, and that all reagents, even though marked "C.P.," should be carefully examined for impurities in work of this kind.

FOURTH ANNUAL MEETING OF THE MINERALOGICAL SOCIETY OF AMERICA

Frank R. VanHorn, *Secretary*

The Mineralogical Society of America held its fourth annual meeting at Washington, D. C. on December 28 and 29, 1923, in conjunction with the Geological Society of America. Joint sessions with the Geological Society were held in the Interior Building on Friday afternoon, December 28, presided over by President Edgar T. Wherry, and on Saturday morning, December 29, presided over by Dr. David White, President of the Geological Society. At these sessions papers of combined mineralogical and geological interest were presented. The final paper of the session was the presidential address of Dr. Edgar T. Wherry entitled "*At the Surface of a Crystal*," which is printed in full in this number.

The regular meeting of the Society was held Saturday afternoon and was preceded by an interesting illustrated lecture by Samuel G. Gordon on his recent expedition to the Ivigtut and Kangerdluarsuk regions of Greenland. At 2 P. M. President Edgar T. Wherry called the meeting to order and proceeded with the regular order of business. On motion of the Secretary, the reading of the minutes of the last annual meeting was dispensed with in view of the fact that they have been printed on pages 46-56 of Volume 8, Number 3 of The American Mineralogist.

ELECTION OF OFFICERS AND FELLOWS FOR 1924

The secretary announced that 101 ballots had been cast for the amendment to the by-laws, and for the officers for 1924, as nominated by the Council. The amendment is therefore declared passed and the officers elected.

AMENDMENT TO THE BY-LAWS

In the constitution of this Society (*Am. Min.* Feb. **1921**, p. 43) it is stated "Fellows shall be persons . . . . who upon nomination by the Council shall have been duly elected to Fellowship in the Society." In the By-Laws (*id.* p. 44), "Election, (a) Fellows . . . . The Council will submit the nominations received by them, if approved, to a vote of the Fellows in the manner provided in the By-Laws."

However, no provision appears to be made therein for election of other than officers. The Council has been acting on the assumption that this omission made necessary its own electing of candidates suggested in the constitutional manner as deserving of Fellowship. As it will be obviously much better to have a uniform regulation governing this matter, the amendment of the By-Laws is hereby recommended, as specified in Article IX:

Section IV. Change heading to "Election of Officers and Fellows."

At the end of the section, add "The list of nominations for Fellowship shall be sent out at the same time as those for officers. Five opposing votes shall be considered as rendering a candidate ineligible for Fellowship."

The officers elected for 1924 are the following:

President: Henry S. Washington, Geophysical Laboratory, Washington, D. C.
Vice-president: Washington A. Roebling, Trenton, New Jersey.
Secretary: Frank R. VanHorn, Case School of Applied Science, Cleveland, Ohio.
Treasurer: Alexander H. Phillips, Princeton University, Princeton, New Jersey.
Editor: Walter F. Hunt, University of Michigan, Ann Arbor, Michigan.
Councilor, 1923-1927: A. L. Parsons, University of Toronto, Toronto, Canada.

The Secretary reported that the Council had approved of the list of nominations for Fellows, and asked that in view of the fact that the recent amendment to the By-Laws does not go into effect until January 1, 1924, that the annual meeting of the Society express its approval of the present list of Fellows, and also ratify the action of past Councils on all previous lists. A motion to this effect was made, seconded and carried. The list of Fellows so approved follows:

Harold L. Alling, University of Rochester, Rochester, N. Y.
G. M. Butler, University of Arizona, Tucson, Arizona.
George L. English, Rochester N. Y.
Joseph L. Gillson, Massachusetts Inst. of Technology, Cambridge, Mass.
Frank L. Hess, United States Geological Survey, Washington, D. C.
Paul F. Kerr, Leland Stanford University, Stanford, Cal.
O. Ivan Lee, Newark, N. J.
William J. Miller, Smith College, Northampton, Mass.
Arthur E. Russell, Swallowfield Park, Reading, Berks., England.
Edward Sampson, United States Geological Survey, Washington, D. C.
George Steiger, United States Geological Survey, Washington, D. C.
George Vaux Jr., Bryn Mawr, Pa.
Lewis G. Westgate, Ohio Wesleyan University, Delaware, Ohio.
R. W. G. Wyckoff, Geophysical Laboratory, Washington, D. C.

On invitation, the President appointed the following delegates to the Joseph Leidy Commemorative Meeting in Philadelphia: Samuel G. Gordon, Harry W. Trudell, and Edgar T. Wherry.

By action of the Council it was voted to send 10 complimentary subscriptions of THE AMERICAN MINERALOGIST, beginning January 1, 1924, to ten noted European mineralogists and crystallographers.

REPORT OF THE SECRETARY FOR 1923

The Secretary reports that the roll of the Society now comprises 75 fellows and 199 members, a gain of 6 fellows and 32 members for the year. It is urged that the Society use every effort during the next year to increase the number of fellows, members and subscribers in order that additional funds may be secured to increase the size of the Journal.

Respectfully submitted,
FRANK R. VANHORN, *Secretary*

REPORT OF THE TREASURER FOR 1923

The report of the Treasurer, A. B. Peck, was read by W. F. Hunt. On motion an Auditing Committee consisting of Dr. W. T. Schaller and William F. Foshag was appointed by the President. This Committee later reported to the Secretary that they found the books of the Treasurer correct.

To the Council of the Mineralogical Society of America:

The Treasurer herewith submits his report covering the year from December 1, 1922 to November 30, 1923.

Receipts	
Cash on hand Dec. 1, 1922	$ 244.25
Dues and subscriptions	1052.60
Advertising	237.50
Sale back numbers, volumes, etc.	87.39
Special gifts	275.00
Miscellaneous, including Life Membership	182.87
	2079.61
Expenditures	
Printing Journal	1474.35
Miscellaneous printing and stationery	35.50
Postage	32.28
Bonds-Investment of Life Membership	100.70
Miscellaneous	4.00
	1646.83
Cash in bank Nov. 30, 1923	432.78
	$2079.61

The Treasurer in this last report desires to thank the members of the Society for their co-operation at all times and bespeaks the same co-operation for his successor.

Respectfully submitted,
ALBERT B. PECK, *Treasurer.*

REPORT OF THE EDITOR FOR 1923

To the Council of the Mineralogical Society of America:

Substantial progress can be reported for the year 1923. This progress was manifested in a number of directions. Articles received for publication in the Journal were more numerous this year than during the preceding twelve months. Moreover, the twelve issues have appeared regularly, in most instances between the 15th and 25th of each month. Progress can also be recorded in the size of the Journal. Volume 8 (1923) contains 232 pages of text proper, which compared with the 214 pages of volume 7 indicates an increase of 18 pages (8.4%), or an increase equivalent to one extra issue. This increase while not startling in magnitude was intentionally kept within reasonable bounds in order that the cost might not mount too rapidly.

This past year has seen also a more liberal use of diagrams and half-tones as shown by the 39 illustrations compared with 22 of the previous year. While these cuts add considerably to the cost of the publication they are indispensable and contribute materially to the effectiveness of the accompanying articles.

From the accompanying table it will be noted that 35 papers covering 150 pages were devoted to original articles, 45 pages to proceedings of societies, notes and news and book reviews, while new minerals and abstracts filled 37 pages. This is equivalent to 64.6%, 19.4% and 16%, respectively. In spite of the 176 entries under abstracts we are rapidly losing ground in this department, and in order to close this ever widening gap it is proposed to confine abstracts to reviews of those articles which seem more directly related to mineralogy, and not attempt to cover every article in the entire field of "mineralogy, crystallography and related sciences."

The following table of contents summarizes the distribution of subject matter in volume 8.

DISTRIBUTION OF SUBJECT MATTER IN VOLUME 8

Subjects	*Articles*	*Pages*	*% of tota*
Original articles	35	150	64.6
Proceedings of societies	20	30½	19.4
Notes and news	42	8½	
Book reviews	10	6	
Abstracted accounts of new minerals	33	13	16.0
Abstracts of crystallographic literature	48	8½	
Abstracts of mineralogic literature	95	15½	
Total of Text	283	232	Increase 8.4%
Illustrations	39		
Covers, advertisements, indexes		84	
Total		316	

Respectfully submitted,
WALTER F. HUNT, *Editor.*

Professor Thomas L. Watson, Chairman of the Committee on Nomenclature and Classification of Minerals, read a preliminary report on topics 5 and 6, covering the *Numbering of Mineral Species* and the *Nomenclature of Isomorphous Groups.* This preliminary report will be mimeographed and mailed to the general membership of the Society for suggestions and criticisms. Professor Watson then moved that the final report on topics 3 and 4 be published in the Journal. This motion was seconded and carried and is printed herewith.

REPORT OF THE COMMITTEE ON NOMENCLATURE AND CLASSIFICATION OF THE MINERALOGICAL SOCIETY OF AMERICA

Final Report, Topics 3 and 4

The recommendations of the Committee on topics 3 and 4 were mimeographed in preliminary form and sent out to the general membership of the Society in the spring of 1923. We feel encouraged in that nearly twice as many letters discussing this preliminary report were received this year as last. Particular thanks are herewith extended to those who considered the matter in detail, especially those in foreign countries (Ashcroft, England; Bøggild, Denmark; and Brauns, Germany).

Topic 3. The Spelling of Mineral Names

On taking up one by one the names of the 850 species and sub-species recognized in Dana's System of Mineralogy (6th edition, 1892) we noted about 50 cases in which changes from the Dana form seemed desirable in the interest of (A) simplification, especially trying to do without diacritical marks as far as possible, (B) transformation of foreign into English spelling, and (C) uniformity in general. "Ignorance or carelessness should not be allowed to give perpetuity to its blunders under any law of priority" (Dana, p. xliii); neither in our opinion should superfluity of letters nor inconsistency of any sort.

In discussing this subject, several fellows and members urged that changes from Dana's usage be not made so suddenly that difficulties in finding individual names in indexes would arise. We have therefore followed the plan used by Dana himself in certain instances, of giving two forms of a name, e.g., p. 48, "GALENA, or *Galenite*"; p. 432, "NOSELITE, or *Nosean*;" and p. 498, "SILLIMANITE or *Fibrolite*." The form of the name preferred by the Committee is given first, in capitals, followed by the Dana alternative. For the present, mineralogists may take their choice of the two forms, but when constructing an index should enter both, with a cross-reference. When the matter is again taken up at some future date it will probably be found that one or the other of these usages has attained such dominance that there can be no further question as to which should be given official recognition.

Others have pointed out (D) that the endeavor to secure simplicity or uniformity should not be carried to the extent of changing essentially the word from which a mineral name is derived. Where the preliminary report does not conflict with this principle it is still adhered to; altho the number of cases in which changes from Dana's usage are now recommended is slightly diminished. Our revised rules are as follows:

(1) The substitution of "f" for "ph" in "sulphur" and names derived from it is believed by the majority of the Committee, though not by all, to have historic justification.

(2) The diphthongs "ae" and "oe" may well be simplified to "e" in general.

(3) (a) The umlaut (¨) in German words may well be replaced by the letter "e" following the modified vowel; this change is not regarded as altering the orig-

inal word by the Germans themselves. (b) In Hungarian or Scandinavian words, however, the Committee among themselves and the fellows who made detailed suggestions have not come to agreement as to the correct course to pursue, and for the present the Dana form may stand.

(4) (a) As to the Swedish letter "å", the Committee and the fellows contributing are also unable to agree. The majority of the Committee favors its reduction to "a", but the alternatives of letting it stand or of replacing it by "o" or "oa" all have supporters. (b) When the word in question is of Norwegian origin, all agree that the "å" may well be changed to "aa" (cf. Dana, p. 375, footnote).

(5) Double-word names may well be combined into single ones.

(6) (Followed but not formulated in the preliminary report). Where the Dana spelling involves the bringing together of letters in a manner not customary in English a change should be made; either (a) one letter may be dropped, provided the derivation is not obscured thereby; or (b) a new letter based on the derivation may be inserted. When, however, (c) either Dana spelling or proposed simplification results in bringing the letter "e" before the "i" of the termination "ite", no additional letter or diacritical mark is considered necessary, mineralogists being accustomed to pronounce such words correctly, with the "e" and "i" in separate syllables (just as the word cooperate is correctly pronounced in ordinary speech).

(7) (Also newly formulated) In the transliteration into English of Russian words the use of the French or German forms is to be discouraged, as leading to both misinterpretation and mispronunciation of the words. The rules of the Library of Congress should preferably be followed.

The mineral named after the Russian general YEBKIH (pronounced chevkin with the "ch" as in chesterlite), is by Dana given the French form "tscheffkinite." We recommend that it be simplified to chevkinite. The name in honor of Professor EPEMEEB (pronounced yer-emma-yev) is given by Dana in a curious combination of German and English "jeremejevite." We recommend its simplification to "eremeyevite" which approximates the correct pronunciation.

The following lists are made up in accordance with these recommendations.

I. List of Mineral Names in Which Changes from Dana's Form are Recommended

Preferred form	**Dana form**	**Reference and discussion.**
SULFUR	Sulphur	(1) Several members of the Committee adhere to sulphur.
SELENSULFUR	Selensulphur	(1)
STUETZITE	Stützite	(3a)
LINNEITE	Linnaeite	(2) (6c) Named after Linné, so "e" must remain.
LOELLINGITE	Löllingite	(3a)
SALAMMONITE	Sal-Ammoniac	(5) Double name for artificial salt
TACHYHYDRITE	Tachhydrite	(D) (6b) Dana's form unacceptable in English.
GOETHITE	Göthite	(3a) Dana's form incorrect; named after Goethe.
SPHEROCOBALTITE	Sphaerocobaltite	(2)

Preferred form	**Dana form**	**Reference and discussion**
CERUSITE	Cerussite	(A) First form simpler to spell and pronounce.
BISMUTOSPHERITE	Bismutosphärite	(2) (B) Dana's form German, not English.
HYDROCERUSITE	Hydrocerussite	(A) Follows CERUSITE, above.
GAYLUSSITE	Gay-Lussite	(5)
LAAVENITE	Låvenite	(4b) Named after Laaven, Norway.
WOEHLERITE	Wöhlerite	(3a)
ENIGMATITE	Aenigmatite	(2) *Cf.* the word enigma.
CATAPLEITE	Catapleiite	(6a) Doubling "i" unnecessary.
HAUYNITE	Haüynite	(A) Correctly pronounced without dieresis.
AKERMANITE	Åkermanite	(4a) Some prefer OKERMANITE
LANGBANITE	Långbanite	(4a) Some prefer LONGBANITE
SCHROETTERITE	Schrötterite	(3a)
CHEVKINITE	Tscheffkinite	(7) Dana's form French, not English
AANERÖDITE	Ånnerödite	(4b) (3b) Named after Aaneröd, Norway.
HJELMITE	Hielmite	(D) Named after Hjelm; Dana's form incorrect.
ESCHYNITE	Aeschynite	(2)
BERZELITE	Berzeliite	(6a) Doubling "i" unnecessary.
MANGANOSTIBITE	Manganostibiite	(6a) Doubling "i" incorrect.
KOETTIGITE	Köttigite	(3a)
SPHERITE	Sphaerite	(2) *Cf.* the word sphere.
TROEGERITE	Trögerite	(3a)
LUENEBURGITE	Lüneburgite	(3a)
NITRATITE	Soda-Niter	(C) Double name for artificial salt.
EREMEYEVITE	Jeremejevite	(7) Dana's form hybrid German-English.
URANOSPHERITE	Uranosphaerite	(2)
ZINCOSITE	Zinkosite	(B) Dana's form German, not English.
PHENICOCHROITE	Phoenicochroite	(2)
SULFOHALITE	Sulphohalite	(1)
LOEWITE	Löweite	(3a) (6a) Second "e" unnecessary (*cf.* goethite).
BLOEDITE	Blödite	(3a)
IHLEITE	Ihlëite	(6c) Named after Ihlé, so "e" remains
KROEHNKITE	Kröhnkite	(3a)
ROEMERITE	Römerite	(3a)
LOEWIGITE	Löwigite	(3a)
HUEBNERITE	Hübnerite	(3a)

Total.............................44

II. List of Mineral Names in Which Changes from Dana's Form are now Opposed

CLAUSTHALITE	(D) Named after Clausthal, which has not been changed.
BASTNÄSITE	(3b) Named after Bastnäs, Sweden.

AEGIRITE	(D) Named after Aegir, a Scandinavian deity.
CYANITE	(D) Greek kappa is uniformly transliterated "c".
SKOGBÖLITE	(3b) Named after Skogböle, Finland.
HYDROCYANITE	(D) Follows cyanite, above.
CYANOCHROITE	(D) Follows cyanite and hydrocyanite.
CYANOTRICHITE	(D) Follows cyanite, etc.
FELSÖBANYITE	(3b) Named after Felsö-banya, Hungary.
Total................9	

III. Omit as not Representing Species: Turgite, bauxite, titan-olivine.
Total..........3 GRAND TOTAL..........56.

Finally, it is urged that mineralogists who have occasion to coin new names in the future follow the rules and illustrations herein presented, to the end that mineralogical nomenclature be kept as simple and uniform as practicable.

Topic 4. Arrangement of Minerals in Classes

Nearly every one accepts the preliminary recommendations of the Committee, and these are therefore repeated here with but slight modifications, to form a final report.

Some prefer that oxides precede halides, since oxides are more like sulfides than carbonates, but the view that the oxides should be adjacent to the oxygen-salts seems to have the majority in its favor.

The Dana order silicates-columbates-phosphates-sulfates is still favored by a few, but as certain important recent works in this country place the silicates last, and as most European collections are believed to be so arranged (following Groth's Tabellarische Uebersicht), the reverse of Dana's arrangement seems most acceptable.

The need of class 11 is questioned; the hydrocarbons, if included at all, (many of them are rocks) should be placed in class 2, alongside of carbides, and the other mineraloids in classes appropriate to their composition. Further, it will simplify any scheme of numbering minerals which may be worked out in the future to have but 10 classes. Accordingly the 11th class as given in the preliminary report is now omitted.

The numbers assigned to the classes are also omitted, so that work on the numbering of minerals in general may some day be carried out without hindrance from prior designation of class numbers without consideration of the plan as a whole.

It is recommended that classes be based on composition in the broad sense, and taken up in the order of increasing complexity as far as possible. All mineralogists appear to be agreed that, in accordance with the principle that the simplest substances shall be taken up first, the native elements shall form the first class of minerals in any system of classification. That sulfides and related compounds should come second is also a matter of general agreement, for many of them have metallic properties, and therefore appropriately follow the metals directly.

In Dana's arrangement the halides follow the sulfides, and are in turn followed by the oxides. Some authors, notably von Groth, have urged that the oxides should be placed next to the sulfides, because oxygen belongs in the same group withsulfur in the periodic system of the elements This system is, however, an arrangement of the elements according to certain of their chemical properties, and their electronic structure, and is only remotely connected with the mineralogic relations. In it sulfur and arsenic are in different groups, whereas they clearly belong together in mineralogical class B, "sulfides, arsenides, etc."; magnesium and iron widely separated, yet in minerals they are almost universally isomorphous; columbium and titanium show no relationship, whereas they usually occur associated; and so on. Sequence of classes should be based on mineralogical relationships, not on chemical ones. The Dana arrangement is accordingly preferred here, since it brings the oxides adjacent to the "oxygen salts," the carbonates, sulfates, silicates, etc.

The carbonates, as the simplest of the oxygen-salts, are by almost universal consent taken up first in that group. The few known mineral salts of organic acids, chiefly oxalates, may well be grouped with the carbonates, since they differ from these only in the relative amounts of carbon and oxygen; just as all phosphates and arsenates are grouped together. The borate minerals resemble in their properties the carbonates far more than they do the so-called aluminates, with which they are sometimes placed, or the phosphates and uranates, between which they are thrust by Dana, and may well come next.

Dana places the silicates next to the carbonates, presumably because carbon and silicon fall in the same column in the periodic system; but mineralogically there is practically no relationship between them, and it seems preferable to follow von Groth, and make the silicates, the most complex as well as the most numerous of minerals, the last class. If this be done, the sulfates, together with the analogous chromates, molybdates, and tungstates, may well make up the sixth class. Dana has the phosphates precede the sulfates, but the reverse order appears to express their relative complexity better. The phosphates, with the nitrates, arsenates, antimonates, and vanadates, then form class 7. The columbates are placed by Dana between the titanosilicates and the phosphates, which may be followed here except that the order of these two types of compounds is reversed. The titanates are so plainly related mineralogically to the columbates that it is impracticable to treat them separately, and they show a sort of transition to the next and final class, the silicates.

It is realized that many collections of minerals, both public and private, are already arranged in accordance with the Dana System and that the change entailed by placing the silicates last may be a serious burden in some cases. However, it may be noted that such changes have occurred in the past repeatedly, even from one edition of Dana's System to another, yet it has been practicable in most cases to carry out the rearrangement required without disrupting the collections.

In accordance with these considerations the following arrangement of classes is recommended to the Society:

Classes and Chemical Types Included Therein

Native elements, including their isomorphous mixtures.

Sulfides, oxysulfides, selenides, tellurides, nitrides, phosphides, arsenides, antimonides, bismuthides, carbides, hydrocarbons, silicides, etc.; double sulfides or sulfo-salts, also seleno-salts and telluro-salts; and any of these with water-of-crystallization.

Halides: comprising fluorides, chlorides, bromides, iodides; oxy- and hydroxy-halides; hydro-halides, or those containing water-of-crystallization.

Oxides: comprising simple oxides, oxy-hydroxides, simple hydroxides; also double oxides or so-called aluminates.

Carbonates: comprising simple carbonates, oxy- and hydroxy-carbonates; halo-carbonates; also salts of organic acids, since these contain carbon too.

Borates: hydro-borates, hydroxy-borates, and halo-borates.

Sulfates, hydroxy-, hydro- and halo-sulfates; selenates, tellurates, chromates, molybdates, tungstates, uranates.

Phosphates, arsenates, antimonates; hydroxy-, hydro-, and halo-phosphates and arsenates; vanadates, hydroxy- and halo-vanadates; also arsenites, antimonites and nitrates.

Columbates, tantalates, and titanates isomorphous with them.

Silicates, divided into acidic, normal, and basic; hydro-, hydroxy-, halo-, sulfo-, arseno-, alumino-, boro-, and titano-silicates.

Respectfully submitted,
W. F. Foshag,
A. F. Rogers,
T. L. Walker,
H. S. Washington,
E. T. Wherry,
T. L. Watson, *Chairman.*

University of Virginia,
December 1, 1923.

PRESENTATION OF PAPERS

There being no further business the Society proceeded to the reading of the papers. The papers presented with short abstracts follow:

A. C. Hawkins: *Crystallographic Notes on Pyrite and Fluorite.* Fluorite from Rochester, New York, shows several forms new to the species. Associated minerals were briefly discussed. Pyrite crystals from Cornwall, Pa., furnished by J. F. Kemp also show several new forms.

Lewis S. Ramsdell: *Crystallographic-optical Observations of Strychnine Sulfate.* The conflict of evidence as to the proper crystallographic classification of strychnine sulfate is noted, and an explanation is suggested. Optical changes due to dehydration are described.

Austin F. Rogers: *Friedel's Law of Rationality of Symmetric Intercepts.* To the law of constancy of interfacial angles and the law of rationality of indices there must be added a third fundamental law of geometrical crystallography, namely, the law of rationality of symmetric intercepts, which was formulated by G. Friedel in 1905. As was first shown by Gadolin in 1867 it is mathematically possible for crystal faces to have rational indices and irrational symmetric intercepts at the same time. A crystal with such an irrational ternary axis could have no space lattice. The fact that crystals with ternary axes of symmetry always have rational symmetric intercepts proves that crystals must have a space lattice. This proof was given by Friedel in 1905, seven years before the actual discovery of the space lattice by Laue and his associates.

Paul F. Kerr: *The Determination of Opaque Ore-Minerals by X-ray Diffraction Patterns.* The paper is an introduction of a possible new method for determining opaque ore-minerals. X-ray apparatus is described that has been specially constructed for this work and special mention is made of conditions and technique necessary to secure powder photographs. Variations of the patterns for simple minerals and mixtures were discussed.

T. L. Walker: *Chapmanite: A New Mineral from South Lorrain, Ontario.* A hydrous ferrous silico-antimonate, $5FeO. 5SiO_2. Sb_2O_5. 2H_2O$, occurs in the oxidized part of a silver-bearing vein at the Keeley Mine. The mineral is yellowish-green in color, pulverulent, and doubly refracting. $\alpha = 1.85$, $\gamma = 1.96$. Sp. gr. 3.58. Almost insoluble in all acids other than hydrofluoric, in which it is very easily dissolved.

T. L. Walker and A. L. Parsons: *Cobalt Nickel Arsenides from Cobalt, Ontario.* An exhibition of polished vein specimens, accompanied by photographs, showing the arrangement of the principal minerals found in association with silver in the Cobalt District, Ontario.

Ellis Thompson: *A Mineralographic Study of Germanite, a Germanium Mineral from South West Africa.* In polished section this mineral resembles bornite very closely, being pinkish-grey in color, but, unlike that mineral, it has high relief and is medium to high in hardness. It has a grey streak, is brittle, has no pronounced cleavage, and is seamed with numerous fracture cracks in which most of the associated minerals occur. It is inert to the standard reagents with the exception of dilute nitric acid which tarnishes it a faint brown. Associated with it are pyrite, tennantite, enargite, sphalerite, and galena in the order of abundance.

Austin F. Rogers: *Kempite, A New Manganese Mineral from California.* A huge boulder of manganese ore occurring in Alum Rock Park near the city of San Jose, California, and locally known as the "Alum Rock Meteor," contains a new hydrous manganese oxychloride mineral which has been named kempite in honor of Professor J. F. Kemp of Columbia University. The mineral occurs in small orthorhombic crystals of prismatic habit and in scattered specks thru an impure massive hausmannite. The other associated minerals are tephroite, rhodochrosite, barite, pyrochroite, ganophyllite and psilomelane. The chemical formula of kempite is probably $H_2Mn_2ClO_4$ or $MnCl_2.3MnO_2.2H_2O$.

Esper S. Larsen and Earl V. Shannon: *Wardite and Some Other Alteration Products of Variscite from Utah.* A systematic microscopic and chemical study of specimens labelled "wardite" from Utah shows that there are seven different phosphates derived from the variscite. Six of these are new or imperfectly described.

Earl V. Shannon: *The Apparent Non-existence of Carrollite and Remingtonite.* Two cobalt minerals, one a hydrous carbonate and the other a cobalt-copper sulfide, have their original localities in Maryland. Examination of a dozen apparently authentic specimens failed to detect any carrollite, the mineral being linneite. Only one original specimen of remingtonite proves to be a cobaltiferous serpentine allied perhaps to garnierite.

Albert B. Peck: *Note on Andalusite, A New Use and Some Thermal Properties.* The paper describes andalusite from Inyo County, California, of unusual habit in being crystals of diamond shaped cross section showing forms *k* (210) and *r* (101). Rather unusual associates among which are pyrophyllite, corundum, rutile, and lazulite, are also described. The recent use of this mineral in the manufacture of spark plugs is noted and the reasons therefor. A preliminary statement was also included concerning some of the changes which take place at high temperatures during the burning of andalusite and cyanite.

Edw. F. Holden: *The Cause of Color in Rose Quartz—A Summary.* It is concluded from analyses of rose quartz, a study of its absorption spectrum and pleochroism, synthetic reproduction of the color, its decolorization by heat and behavior on exposure to radium radiations, that rose quartz owes its color to a compound of trivalent manganese.

Austin F. Rogers: *The Chemical Composition of Collophane.* Chemical analyses of three specimens of collophane (from fossil bones) free from mechanical impurities prove its formula to be $3\ Ca_3(PO_4)_2.\ n[Ca(CO_3,F_2,O,SO_4)]\ (H_2O)_x$, where n varies from 1 to 2 and x is indefinite. Collophane is a typical amorphous mineral of variable composition and may be regarded as a solid solution of calcium carbonate, etc., in calcium phosphate.

E. H. Kraus: *Some Interesting Specimens of Native Copper.* These specimens were found on a farm about two and one-half miles in a northwesterly direction from the Franklin Mine in Houghton County, Michigan. They were discovered while plowing. The largest is 32 by 44 inches in length, about 8 or 9 inches maximum thickness, and weighs 483 pounds. One side has been well glaciated. The outline of the specimen is in the form of a huge head of an Indian chief. The specimen was undoubtedly found by the Indians on the surface or near the surface in post glacial times and it was noticed that the outline was similar to that of an Indian head. Several smaller specimens of native copper from the same locality proved to be Indian implements, either only partially finished, or what is more probable, of a very primitive type. (Complete article appeared in the February issue.)

A. H. Phillips: *Thomsonite from Peeksville, New York.* A new locality near Peeksville, New York, associated with analcite in shrinkage cracks of a pyroxenite, gave the theoretical composition with $Na_2:Ca=1:4$. Sp. gr. = 2.386 at 20° C. Indices of refraction determined on polished sections: $\alpha=1.529$; $\beta=1.531$; $\gamma=1.541$.

A. L. Parsons: *Pectolite and Apophyllite from Thetford Mines, Quebec.* Slightly pleochroic pectolite occurs with large crystals of apophyllite in the so-called granite at the asbestos mines at Thetford Mines, Quebec. The pleochroism of the pectolite almost entirely disappears on exposure to light.

Thomas L. Watson: *Hoegbomite from Virginia.* In a microscopic study of thin sections of iron ores from the Routevare region, Lapland, Axel Gavelin identified "a new rock-forming mineral" which he named hoegbomite in honor of Professor A. G. Högbom, of the University of Upsala. According to him the hoegbomite occurs chiefly in the iron-rich and silicate-free types of iron ores. The physical properties, including optical data, and a chemical analysis are given by Gavelin who regards it as a primary magmatic mineral.

In a recent petrographic study of the Virginia emery the writer noted a brown mineral, rather abundant in some thin sections and absent in others, whose optical properties accord with those determined by Gavelin for hoegbomite. The Virginia rock is a spinel emery, the dominant minerals of which are a green spinel, corundum, and ilmenitiferous magnetite, and in some thin sections more or less of the brown mineral hoegbomite. Two possible forms of the mineral are noted. One form suggests primary crystallization; the other form is developed as alteration rims or borders about the spinel individuals and is definitely secondary. The Virginia emery is of contact-metamorphic origin.

Charles Palache: *The Chrysoberyl Pegmatite of Hartford, Maine.* Chrysoberyl in well-formed crystals occurs in a quartz pegmatite in Hartford, Maine. Other minerals associated with the chrysoberyl besides massive quartz, which is the major constituent, are microcline, black tourmaline, muscovite, and garnet, all in well-formed crystals. The chrysoberyl is of a pale yellowish-green color and occurs in crystals reaching a diameter of two inches with a thickness not to exceed a quarter of an inch and generally less than one-eight inch. The crystals are practically all simple contact twins of two individuals and are extremely symmetrical.

Charles Palache: *The Granite Pegmatite at Bennett's Quarry, West Buckfield, Maine.* During the past summer operations on a large scale for the mining of feldspar were begun on a granite pegmatite ledge in West Buckfield, Maine on the farm of Mr. Paul M. Bennett. The ledge dips at a low angle and reaches a thickness of about 25 feet. The quartz and feldspar are largely segregated in large, relatively pure masses, single crystals of feldspar sometimes showing cleavages two or more yards in length and a yard wide. At one point in the quarry a large cavity was exposed lined with quartz crystals some of which reach very large dimensions, up to 5 feet in length, partly milky white, partly clear and of dark smoky color. They show remarkable forms of parallel growth in two generations. The feldspar lining this cavity in part is covered with a delicate coating of pale green cookeite. In the cavity was a large mass of kaolin running through which were remarkable curved veinlets of pale lavender lepidolite. This whole mass appears to represent the replacement of some earlier mineral, possibly spodumene The most interesting minerals of the occurrence are phosphates representing the alteration of lithiophyllite which was found in a few places still fresh. These minerals reproduce the association first described by Brush and Wells at Branchville, Connecticut. They include eosphorite, fairfieldite, reddingite, and other phosphates as yet unidentified, together with considerable masses of clear well-crystallized rhodochrosite and oxides of manganese. This paper is a preliminary announcement of the occurrence of these minerals and the writer expects to publish later a full description of them with analyses.

R. C. Wells: *The Reaction of Cupric Salts in Aqueous Solution on Chalcocite above 200° C.* Experiments in sealed tubes at 200° to 350° C. have shown that cupric salts in aqueous solution oxidize the sulphur of chalcocite to sulphuric acid with the simultaneous formation of cuprous salts. The extent of the reaction varies with the character and quantity of the cupric salts used. With the sulphate the reaction apparently reaches an equilibrium. These facts may throw light on the genesis of certain ores, especially native copper and cuprite.

W. F. Foshag: *The Minerals of Obsidian Cliff and Their Origin.* The minerals of Obsidian Cliff are cristobalite, tridymite, quartz, natrosanidine, fayalite and opal, found in cavities in glassy soda rhyolite or in lithophysae. Cristobalite is found in small pellets in the upper part of the flow, tridymite as small hexagonal plates in the lower part of the flow. Quartz is rare. The natrosanidine is in distinct single crystals or in minute crystals aggregated into hairlike groups. The process of formation is as follows: Small amounts of water, freed during the beginnings of crystallization, dissolve some of the glass. As the solubility of the glass is greater than that of the crystalline phases the various crystalline phases crystallize out. According to Ostwald's law of succession, crystallization takes place thru the unstable forms. This accounts for the presence of the unstable forms, cristobalite and tridymite.

WALTER F. HUNT: *Assaying with the Blowpipe: Lead, Copper and Silver Ores.* The old methods of assaying with the blow-pipe using coal crucibles are briefly referred to and attention directed to the advantages resulting from the employment of the Fletcher Blowpipe Furnace. With this modern equipment the influence of time of fusion and variation in flux can be more readily ascertained. Methods for the successful determination of lead, copper and silver ores are indicated, and the results compared with either wet methods or checked against the results obtained by the regular fire assay.

ESPER S. LARSEN AND WALDEMAR T. SCHALLER: *Variscite, Peganite and Lucinite.* A microscopic study of a large number of specimens labelled peganite, and variscite from different localities and of lucinite from Lucin, Utah, shows that there are but two species represented and that the mineral called lucinite by Schaller and specimens from all other localities labelled either variscite or peganite are alike, but that the mineral called variscite from Lucin, Utah by Schaller is different.

W. M. MYERS: *Advantages of Oblique Illumination in Mineragraphy.* It is urged that oblique illumination—conveniently produced by the Silverman Illuminator—be used to supplement vertical illumination in mineragraphy. Some of the advantages noted are (1) observation of the normal color of minerals, (2) illumination of cavities, (3) differentiation of gangue from ore minerals, (4) disclosure of internal structure and detection of minerals below the surface of a polished section, (5) indication of relative hardness of minerals by emphasized relief and (6) observation of the action of reagents.

R. C. WALLACE: *An Unusual Occurrence of Cyanite.* In northern Manitoba a cyanite bearing schist is found associated with other schists and gneisses, all of which appear to be of sedimentary origin. The cyanite occurs in clusters and tufts, seldom in isolated crystals, and shows a reddish tint except where the mineral has weathered white. The conditions favorable for the formation of cyanite appear to be (a) excess of alumina and low content of alkalies and alkaline earths and (b) high temperature, though not high enough to produce sillimanite. In general, staurolite is a high pressure mineral with pressure of greater significance than temp; while garnet may form under a greater range of pressure and temp. than either of the other two minerals. The stability of cyanite appears to be conditioned by proximity to igneous intrusion.

The following fifty-four fellows and members were present at the various sessions, making the fourth annual meeting the largest in the history of the Society: Harold L. Alling; Florence Bascom; N. L. Bowen; R. J. Colony; H. V. Ellsworth; George L. English; Chas. R. Fettke; W. F. Foshag; Joseph L. Gillson; Samuel G. Gordon; Alfred C. Hawkins; Frank L. Hess; T. M. Hills; Arthur P. Honess; E. O. Hovey; Walter F. Hunt; Herbert Insley; Paul F. Kerr; Edward H. Kraus; George F. Kunz; Alfred C. Lane; Esper S. Larsen; J. Volney Lewis; John T. Lonsdale; George D. Louderback; Lea McI. Luquer; Edward B. Mathews; H. E. Merwin; William J. Miller; A. L. Parsons; Alexander H. Phillips; C. H. Richardson; Heinrich Ries; A. F. Rogers; Edward Sampson; W. T. Schaller; Earl V. Shannon; C. B. Slawson; George Steiger; Ellis Thomson; Frank R. Van Horn; George Vaux Jr.; A. J. Walcott; T. L. Walker; H. R. Wanless; H. S. Washington; Thos. L. Watson; R. C. Wells; L. G. Westgate; Edgar T. Wherry; H. P. Whitlock; Frank A. Wilder; Fred E. Wright; and R. W. G. Wyckoff.