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DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

THE

SUPERIOR ANALYSES OF IGNEOUS ROCKS

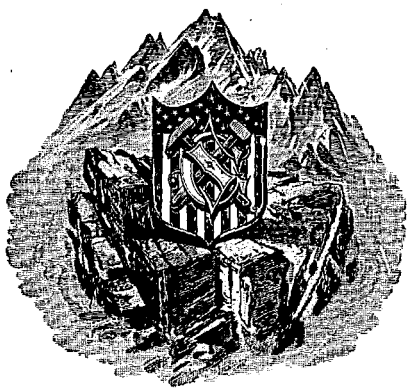
FROM

ROTH'S TABELLEN, 1869 TO 1884

ARRANGED ACCORDING TO THE QUANTITATIVE SYSTEM OF CLASSIFICATION

BY

HENRY STEPHENS WASHINGTON



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CONTENTS.

LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
Washington, D. C., March 5, 1904.

SIR: I have the honor to transmit to you a manuscript entitled "Superior Analyses of Igneous Rocks from Roth's Tabellen, 1869 to 1884," by Henry Stephens Washington, with the recommendation that it be published by the Survey as a Professional Paper. This compilation brings together all the quantitative analyses of igneous rocks made prior to 1884 that possess a sufficient degree of excellence to render them of value to the petrographer of the present day. The analyses of this collection are arranged according to the method used by the author in his tables of analyses published since the last edition of Roth's tables, issued by the Survey as Professional Paper No. 14. The two compilations thus bring into uniform shape for ready reference all the "superior" analyses of igneous rocks published up to 1901. In view of the long recognized value to geologists and petrographers of the compilations by Justus Roth, it is clear that the tables prepared by Doctor Washington, embracing all the analyses of high grade and accompanied by critical discussion, must be of still greater benefit to all students of igneous rocks.

Very respectfully,

WHITMAN CROSS,
Geologist in Charge, Section of Petrology.

Dr. C. W. HAYES,
Geologist in Charge of Geology.

THE SUPERIOR ANALYSES OF IGNEOUS ROCKS FROM ROTH'S TABELLEN, 1869 TO 1884.

By HENRY S. WASHINGTON.

INTRODUCTION.

In Professional Paper No. 14[a] there were collected the chemical analyses of igneous rocks published from 1884 to 1900, inclusive, arranged according to the quantitative system of classification recently proposed by Cross, Iddings, Pirsson, and Washington[b]. In order to supplement this work it has appeared advisable to select the more reliable and complete of the earlier analyses collected by Justus Roth[c] and arrange them also in the same manner for publication. Petrographers would thus have available for use according to the new system almost the entire body of chemical work of real value on igneous rocks, the exceptions being a few analyses published prior to 1900 which may have been overlooked by both Roth and myself. The two collections would form a foundation as broad as possible for future research and discussion.

I must express my sense of obligation to the United States Geological Survey for publishing the present collection of analyses, and my thanks to my colleagues in the new system of classification for their friendly advice and assistance.

BASIS FOR THE SELECTION OF ANALYSES.

GROUNDS FOR THE REJECTION OF CERTAIN CLASSES OF ANALYSES.

In view of the time at which the majority of the analyses collected by Roth were made it is of course natural that a very large proportion of them do not come up to modern standards and must be rejected as unfit for use in the quantitative classification of rocks. A critical examination shows, in fact, that,

[a] Washington, H. S., Chemical analyses of igneous rocks published from 1884 to 1900: Prof. Paper U. S. Geol. Survey No. 14, 1903. This will be referred to by the abbreviation W. T.

[b] Quantitative Classification of Igneous Rocks, Chicago, 1903.

[c] Roth, Justus, Die Gesteins-Analysen, Berlin, 1861. Roth, Justus, Beiträge zur Petrographie der plutonischen Gesteine: Abhandl. Kön. Akad. Wiss. Berlin, 1869, 1873, 1879, and 1884. These will be referred to as Roth's Tabellen (R. T.), with the appropriate date.

adopting the criteria used in the earlier tables,[a] the proportion of "superior" analyses is in reality exceedingly small. The numerical data will be discussed on a subsequent page.

The criteria according to which the "ratings" or indication of the relative value of the analyses have been assigned by me may be summarized from Professional Paper No. 14 (pp. 39–41).

The general idea is that followed by Dun and Bradstreet in assigning credit ratings to commercial houses. The factors on which the value of an analysis depends are two—its accuracy and its completeness—and, within restricted limits, each of these compensates for the other to a certain extent. The degree of accuracy is expressed by the letters A, B, C, D, and the degree of completeness by the figures 1, 2, 3, 4, in combinations of a letter and a figure, the former preceding.

A is used when the analysis gives evidence of a high degree of accuracy—that is, when it corresponds well with the mode (actual mineral composition), and when the summation is between the limits 99.50 and 100.75. B is assigned when the analysis and the mode correspond, and when the summation is between 99.50 and 99.00, or between 100.75 and 101.25. C applies when the analysis corresponds fairly well with the mode, or when the sum is between 99.00 and 98.50 or between 101.25 and 101.75. D is to be used when the analysis varies decidedly from the mode in any important particular, or when the sum is below 98.50 or above 101.75.

1 is assigned when the analysis is perfectly complete or nearly so, as when, in addition to all the main constituents and those of secondary importance, there are determined ZrO_2, Cr_2O_3, NiO, BaO, and the like, or several of these. The iron oxides should be separately determined in all cases to have this figure apply. 2 will be used when all the main constituents, including both oxides of iron, have been determined, as well as the constituents of secondary importance, including especially TiO_2 and P_2O_5, but when the minor constituents, as ZrO_2, etc., have not been determined. 2 will also be applied to the analysis of salic rocks in which the iron oxides are present in small amount, but have not been separated, and which are otherwise so complete as to fall under 1. 3 applies to analyses in which the main constituents, including both oxides of iron, have been determined, but not TiO_2, P_2O_5, Cl, etc. (or the minor constituents), unless minerals rich in these are so abundant as to make their estimation of the same importance as that of the main constituents. 3 also includes analyses of rocks which are very low in iron oxides when these have not been separated, but which are otherwise complete according to the requirements of 2. 4 is assigned when, with the exceptions noted above, the iron oxides have not been separated, when the

[a] Washington, H. S., Prof. Paper U. S. Geol. Survey No. 14, p. 28.

alkalies or other constituents are determined by difference from 100 per cent, when the alkalies have not been separated, or when any constituent of the first importance has not been determined, etc.

To express the various ratings of equal value the following terms are employed: Excellent or first rate, good or second rate, fair or third rate, poor or fourth rate, and bad or fifth rate. Their meanings, in terms of the symbols chosen, are seen in the subjoined table, ratings of the same value falling on the same horizontal line:

Scheme for rating rock analyses.

First rate	A1				Excellent	Superior.
Second rate	A2	B1			Good	
Third rate	A3	B2	C1		Fair	
Fourth rate	A4	B3	C2	D1	Poor	Inferior.
Fifth rate		B4	C3	D2	Bad	
			C4	D3		
				D4		

The general lines along which the selection of analyses for the present work was made were those laid down in Professional Paper No. 14 for the classification of the tables into two parts, one containing the "superior" analyses, and the other containing the "inferior" ones. With few exceptions there are to be found in the present collection only those analyses which logically fall in the first class.

In the first place, all the analyses found in Roth's Tabellen of 1861 were rejected. By far the greater number of these are "inferior" in any case, as, apart from bad summations and other obvious inaccuracies, only about two dozen show separate determinations of the iron oxides. Furthermore, regard being had to their very early date and the uncertain methods of chemical analysis obtaining at that period, even what are apparently the best of them must be considered as merely more or less rough approximations, chiefly of historical interest, and of little or no use in present-day investigations. On taking up Roth's collections, published respectively in 1869, 1873, 1879, and 1884, all analyses of crystalline schists and other metamorphic rocks were excluded. The many analyses of avowedly or evidently decomposed igneous rocks were also rejected. Partial analyses, those of groundmass, or those of rocks from which it is stated that some of the mineral constituents (as magnetite) had been removed prior to analysis, as well as those of portions soluble and insoluble in HCl, were also passed over. In a number of cases, however, when otherwise deemed to be of superior quality, analyses representing the bulk composition of rocks, calculated from the analyses of the soluble and insoluble portions, were admitted,

though such can not be held to have the weight of a complete rock analysis, made directly.

A few of the analyses appearing in Roth's Tabellen of 1884 were also published in Professional Paper No. 14. These have been included in the present work, with a remark to the effect that they are also to be found in the other paper.

Although it has been impossible to examine thoroughly the vast mass of literature published prior to 1884, yet several analyses have been found which are not given by Roth. All of those so found are, however, of inferior quality, either because the iron oxides were not separately determined or for other reasons, so that in fact no analysis published prior to 1884 and not collected by Roth is present in this work.

COMPLETENESS OF ANALYSES.

Turning from the analyses excluded on the general grounds noted above, we come to those rejected on account of the incompleteness or the inaccuracy of the analysis. By far the most numerous of this group are those in which the iron oxides have not been determined separately. As has been already explained,[a] if the sum of iron oxides exceeds 1 or 2 per cent and they are not separately determined, it is impossible to use an analysis in the calculation of either the norm (and hence in the determination of the classificatory position of the rock) or the mode or actual mineral composition, unless totally arbitrary assumptions are made which may or may not be in accordance with fact. A calculation involving such assumptions will have little or no value. This ground for exclusion is, of course, most seriously felt in the more femic (basic) rocks, since among those which are obviously of the persalane class, especially in the quaric orders, the amount of iron oxides is usually so small as to render practically negligible the error due to their nonseparation and the assumption in the calculation that they are present as FeO. A considerable number of these last will be found in the following pages. Such analyses were similarly treated in Professional Paper No. 14.

Roth's Tabellen also contain some analyses in which K_2O, Na_2O, MgO, or CaO are not determined, as well as a few in which the alumina and iron oxides are not separated. These, of course, are omitted.

Analyses are numerous, in fact they constitute the great majority of those in question, in which TiO_2 or P_2O_5, or both, have not been determined. This affects the apparent amount of alumina, rendering it too high, and among the more femic rocks, especially those of the salfemane class, this defect is apt to lead to serious error in the assigned classificatory position of the rock. All such

[a] Washington, H. S., Prof. Paper U. S. Geol. Survey No. 14, p. 43.

analyses, however, if complete as to the main constituents, have been admitted to the present work, and rated 3 as regards completeness, according to the lines previously laid down. It must be repeated[a] here that the assigned classificatory positions of rocks represented by such incomplete analyses are to be regarded in general as provisional, and subject to change when complete analyses are available.

In this connection attention may be called to the fact that for the proper calculation of the minor divisions, grad, subgrad, and their sections, in Classes II and III, of the Quantitative system, the determination of TiO_2 and P_2O_5, is absolutely necessary. This arises from the following facts: The P_2O_5 determines the amount of apatite, and hence the ratio $\frac{P, O, M}{A}$, and also gives the correct amount of CaO'' which enters normative diopside or wollastonite and which affects the amount of MgO and FeO for normative hypersthene and olivine. The TiO_2 indicates the amount of ilmenite, and hence its determination is essential for a correct statement of the ratio $\frac{P, O}{M}$, which determines the grad, and also affects the amount of FeO available for diopside, hypersthene, and olivine.

It is true that these substances are present usually in comparatively small amounts, most frequently in quantities less than 1 per cent. But as the minor divisions, grad, subgrad, and their sections in the classes named, are based on the mineralogical and chemical characters of the subordinate normative minerals, small amounts will assume here an importance which they do not usually have when dealing with the major divisions, order, rang, and subrang.

It will also be evident that, in dealing with Classes IV and V, the determination of these constituents is necessary for the proper computation of the major divisions, order, rang, and subrang.

ACCURACY OF ANALYTICAL METHODS.

Turning to the other factor involved in the quality of an analysis, its accuracy, we are confronted with the fact in this case that at the time the great majority of the analyses found in Roth's Tabellen were made the methods and means of analysis were inferior to those of the present day. New methods have been devised to eliminate serious constant errors discovered in many of the older methods, and these have been modified or new ones adopted which do not involve such errors, while apparatus has been improved and chemicals have been purified, all these changed conditions leading to greater accuracy and expedition in carrying out the processes involved. This general aspect of all the older work is of such serious importance that the exacting petrographer who demands data of a high degree of excellence

[a] Washington, H. S., Prof. Paper U. S. Geol. Survey No. 14, p. 45.

as a basis for any theoretical discussion must perforce regard with suspicion nearly all of the analyses collected by Roth, and must prefer to use in their stead analyses of more modern date and correspondingly greater degree of accuracy. It is true that there are some excellent analyses among these older ones, especially those made by Rammelsberg, whose early work, in spite of the disadvantages of the time as to both methods and means, is of a character which compares favorably with much of that of the present day. Conversely, it by no means follows that because an analysis is modern it is consequently of a high degree of excellence, as an examination of Professional Paper No. 14 will show. But, speaking generally, it is clear that the great bulk of the analyses in Roth's Tabellen can not be regarded as attaining a high standard of accuracy, just as they fall short of modern work in regard to completeness.

Admitting this aspect of affairs, we are met with certain difficulties in rating the analyses of Roth's Tabellen as to their accuracy. As has been explained elsewhere,[a] the surest method of determining this factor is a comparison of the mode of the rock with the norm deduced from the analysis. If some indication were given in connection with the analysis as to the quantitative relations of the mineralogical composition in any given rock, it would be a comparatively simple matter to arrive at a general idea, at least, of the accuracy of the analysis. But in most cases we are left quite in the dark on this important point, more especially where such early work as most of that represented by Roth's analyses is concerned, for at the time many of them were made little or no microscopical work on rock sections was possible or was done.

Even in such analyses, however, calculation of the norm proves to be of the greatest use in estimating their value. Some experience and study of the relations of norm and mode enable one to form a fairly trustworthy estimate of the value of analyses as regards their accuracy, and although such a judgment is admittedly not to be considered final or absolute, yet the results of its application must be regarded as more valuable than a blind acceptance of the figures reported by the analyst on the tacit assumption of their infallibility.

I have calculated the norm in all cases where the analysis was sufficiently complete to permit this to be done satisfactorily, and have used it as a basis for passing judgment on its accuracy. This process has resulted in the rejection of a number of analyses which might strike one superficially as fairly good.

But again, cases are met with in which even the calculation of the norm is of no great assistance. While the analyses may differ in certain respects from more modern analyses of rocks from the same locality, yet the norms are quite consistent with what is known of the mode. In such cases, although the presumption is against the accuracy of such early work, yet if other features do

[a] Washington, H. S., Prof. Paper No. 14, p. 30.

not indicate any marked degree of inaccuracy, these analyses have been rated A in this respect, although I must confess to considerable private mental reservations as to the applicability of this rating in many cases.

REMARKS ON THE TABLES.

In general, the tables here presented are arranged along the lines laid down in Professional Paper No. 14. The classification is carried as far as subrang, the analyses in each subrang being numbered consecutively in geographical sequence, and of rocks from the same locality according to decreasing SiO_2. The rating assigned by me is given in the left-hand column below the number of the analysis.

No verification of the analytical figures furnished by Roth has been attempted, and they are given as they appear in his Tabellen. In one or two cases there is some error leading to a summation not in accord with the figures of the analysis. In such cases the correct summation of the figures as published is given above, with that of Roth below in parenthesis. There are no columns provided for H_2O- and for BaO, as scarcely any of the analyses in Roth's Tabellen show these constituents.

The name of the analyst is as stated by Roth. In some cases he furnishes this information definitely by the use of the name in parenthesis below that of the author, while in others he leaves it uncertain as to whether the author of the paper made the analysis or not. In such cases the point has not been examined further.

In the reference column is given the name of the author, followed by the original reference as stated by Roth, and the reference to Roth's Tabellen, cited by year of publication and page. As far as my examination extends, the page in the original reference is that on which the analysis is to be found, but no attempt has been made to verify Roth's references, although, of course, great care has been taken to insure that they have been copied correctly. The abbreviations are the same as those used in Professional Paper No. 14.

The name of the rock is that given by Roth, unless he states that the author's name differs from his, in which case that of the author is placed above with that adopted by Roth in parenthesis below.

Reference to Roth's Tabellen is indicated by R. T., and to the collection published in Professional Paper No. 14 by W. T. The present set of tables may be conveniently designated by W. R. T.

DESIGNATION OF THE SUBRANG.

It has been the experience of the authors of the quantitative classification that it is frequently found useful to be able to state the classificatory position of a rock magma without using the subrang name. This may be because the subrang in question has not yet been named, because it is desired to indicate certain affinities of the rock, or for other reasons. We have adopted in such cases a method which was evolved in our correspondence and which has already been published

by Iddings in a recent work.[a] This method, elaborated beyond the form used by Iddings, may conveniently be described here, for the benefit of those petrographers who may desire to use the proposed classification.

It consists of stating numerically the several hierarchical divisions in which the magma falls. Thus the name monzonose may be replaced by the symbol II.5.2.3. Here II indicates that the magma falls in Class II (dosalane), 5 that the order is the fifth (perfelic), 2 that the rang is the second (domalkalic), and 3 that the subrang is the third (sodipotassic).

In the case of a threefold division, as that of a docalcic rang into three subrangs, a prepotassic, a sodipotassic, and a presodic, we have heretofore designated these as the first, second, and third, or as 1, 2, and 3, respectively.[b] We find in practice, however, that this procedure is liable to give rise to serious misunderstanding, since, for example, in one case a 3 which occupies the subrang position in the symbol will mean that the subrang is sodipotassic, and in another that it is presodic, great attention being necessary to keep clear in mind whether the rang is subject to a fivefold or to a threefold division.

We have therefore somewhat modified our original plan, and, keeping to the use of five numbers throughout,[c] propose to indicate the threefold character of a subdivision by combining the numerals of the first and second and of the fourth and fifth divisions, as is done in the classification, placing a comma between them. Thus the presodic subrang auvergnose of the docalcic rang auvergnase will be indicated by the symbol III.5.4.4,5. This may be expressed in words by using the phrase "fourth-fifth subrang." It is not necessary to explain that the numbers referring to orders will be those from 1 to 9.

Sections of any of the divisions may be indicated by the appropriate figures placed exponentially. Thus the subrang uvaldose will have the symbol IV.2^3.1^2.2. Subclasses and suborders, which will be used seldom, may be expressed by the use of the appropriate numeral inclosed in parentheses. Thus the symbol of kyschtymase would be I(3^1).5.5.0., there being no subrang needed, as the rang is percalcic.

Grads and subgrads, with their sections, may be expressed in an exactly similar way, their indicative numerals following those of the major divisions, and being printed in *italics* for greater distinctiveness. Thus the full magmatic symbol of the typical monzonite of Monzoni (monzonote)[d] would be II.5.2.3.*1*,*2.1*,*$2^{1,2}$*.

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[a] Iddings, J. P., Prof. Paper U. S. Geol. Survey No. 18, 1903, pp. 67 and 72.

[b] Cross, Iddings, Pirsson, Washington, op. cit., pp. 122, 137.

[c] An apparent exception is that of the orders in Classes I, II, and III, which number nine. The exception is apparent only, as the orders are really arranged in a series of two fivefold groups, joined by the fifth (perfelic) order, which is common to both. Cf. C. I. P. W., op. cit., p. 131.

[d] As has been pointed out by Milch (Centralblatt für Mineralogie, 1903, p. 691), there was a slight confusion in our statement of the position of this rock (C. I. P. W., op. cit., p. 176), owing to the substitution of a fivefold for a threefold division. The grad was given as the second, while it should be the first-second, and similarly with the subgrad. In the above symbol I have inserted the exponential figure for the section of subgrad, expressing the relation of (Mg,Fe)O:CaO″, although strictly speaking it is not needed.

In the case of a transition rock, the numeral of the division near the border of which it falls may be written *before* the one expressing its exact position (to correspond with the nomenclature),[a] and connected with it by a hyphen. If the rock is transitional in several respects, the numeral of each of such divisions will have its appropriate hyphenated preceding numeral. Thus the magma of the leucitite of Capo di Bove, which is a vesuvose-albanose,[b] may be expressed by III–II.6.2.2, and that of the porphyrite of the Suldenferner,[c] which is an andose, but near the borders of harzose, tonalose, and shoshonose, may be written as II.4–5.4–3.4.

QUALITY OF ANALYSES AT DIFFERENT PERIODS.

It has already been remarked that the proportion of analyses of superior quality to be found in Roth's Tabellen is remarkably small. It may be of interest to examine this matter somewhat more in detail, especially as such an examination brings out very clearly the steady improvement in analytical work which has been in progress since the first tables were compiled by Roth. In the table below is given the number of analyses to be found in the various issues of Roth's Tabellen, omitting those of metamorphic rocks, of groundmass, and of portions soluble and insoluble in HCl. The number which has been admitted to the present work is also given in each case, as well as the percentage which each represents. For comparative purposes there are given below the corresponding figures for the analyses published from 1884 to 1900, taken from my previous work.

Number of analyses published in Roth's Tabellen, with number and percentage of superior analyses republished from that and other sources in Professional Papers Nos. 14 and 28.

	Total number of analyses.	Number of superior analyses in W. R. T.	Per cent of superior analyses in W. R. T.
R. T. 1861	616	0	0
R. T. 1869	744	67	9.01
R. T. 1873	232	24	10.38
R. T. 1879	422	69	16.35
R. T. 1884	408	88	21.57
	2,422	248	10.24
W. T. 1900	2,881	1,864	64.70
	5,303	2,112	39.83

[a] Cf. C. I. P.W., op. cit., pp. 166, 175. [b] W. T., p. 202. [c] W. R. T., No. 11, andose, p. 46.

Of the above table it must be said in the beginning that the figures for Roth's Tabellen and for Washington's Tables are not quite strictly commensurate. The figures in the second column represent, as far as Roth's Tabellen are concerned, only the analyses which have been admitted to the present work, and thus those of tuffs and of decomposed rocks are excluded, while in the figures for my tables such analyses are counted if of superior quality. Consequently the figures giving the percentages of superior analyses for Roth's Tabellen will be somewhat too low. This, however, is counterbalanced by the fact that a considerable number of analyses of quaric persalane rocks, in which the iron oxides have not been separated and which are consequently fourth rate, have been included in the figures given above for Roth, while all such have been omitted from the total showing the superior analyses published since 1884. As the table is of no great importance, and is intended only to show the general condition of affairs, it has not been thought worth while to adjust these discrepancies.

Perhaps the most obvious fact brought out by the figures above is the very poor, not to say bad, quality of the earlier work, as compared with that of to-day. The average of superior analyses represented by R. T., 1861 to 1884, is only 10.24, while for the seventeen years from 1884 to 1900 it is 64.70.

This great difference is due, as the table testifies most eloquently, to the steady improvement in the quality of analytical work from the beginning. The figures expressing the percentages of superior analyses rise steadily from 1861 to 1884, each being successively higher than the one preceding it. The great improvement shown between 1861 and 1869 is very largely due to the fact that the iron oxides were more often separately determined. After 1884 the improvement is still more rapid, the table showing an average of 64.70 of superior analyses between 1884 and 1900. This is very largely owing to the establishment of the laboratory of the United States Geological Survey in 1880 and its copious output, especially in late years, of rock analyses of the highest quality. Even this last ratio shows a percentage of which neither petrographers nor analytical chemists need be proud, but it is at any rate evidence of a decided change for the better, and, with the increasing emphasis which is being laid on this side of petrography, gives promise of an increasingly brighter future.

Hillebrand, Geikie,[a] and others have called attention to this contrast, but it would be well if every petrographer would consider the data for himself in order that he might fully realize the unsatisfactory character of the great body of analyses on which so much theoretical discussion has been based. He would then surely cast his influence for a higher grade of analytical work.

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[a] Geikie, Sir Archibald, Text-book of Geology, Vol. I, 1903, p. 116.

As to the absolute number of analyses, the table shows that there has been a steady increase, as was to have been expected. In about twenty years prior to 1861 there were made 616 analyses, or on an average about 30 analyses a year. During the twenty-three years from 1861 to 1884, 1,806 analyses were made, an annual average of 78.5, while in the seventeen years from 1884 to 1900 the much larger number of 2,881 analyses were made, or 169.4 a year.

LIST OF ABBREVIATIONS.

In the case of words etymologically alike, but in different languages, only the English form is given. The other abbreviations used will be self-explanatory.

REFERENCES.

A .....American.
Abh .....Abhandlung.
Ac .....Academy, etc.
A. J. S .....American Journal of Science (New Haven).
Ak .....Akademie.
Arch .....Archive.
Att .....Atti.
B .....Bulletin, etc.
B. B .....Beilage Band.
Ber .....Berichte.
Btr .....Beiträge.
C. I. P. W .....Cross, Iddings, Pirsson, Washington.
D .....Deutsch.
Ds .....Denkschrift.
Erdk .....Erdkunde.
Erl .....Erläuterung.
Finl .....Finland.
Fr .....France, Freunde.
G .....Geology, etc.
Geog .....Geognosie.
Ges .....Gesellschaft.
Gest .....Gesteine.
G. S .....Geological Survey.
In. diss .....Inaugural dissertation.
Ir .....Irish.
It .....Italian.
J .....Journal.
Jb .....Jahresbericht.
K .....Kaiserlich.
L-A .....Landes-Anstalt.
Mem .....Memoir, etc.
N .....New, etc.
Nat .....Nature, etc.
Nf .....Naturforscher.
Nh .....Natural history.
N. J .....Neues Jahrbuch für Mineralogie, Geologie, und Paläontologie (Stuttgart).
N. J. B. B .....Neues Jahrbuch, Beilage Band (Stuttgart).
Nk .....Naturkunde.

6623—No. 28—04——2

No .....Number.
Pr.....Proceedings, etc. Also Preussen.
Q .....Quarterly.
Q. J. G. S.....Quarterly Journal of the Geological Society of London.
R .....Royal.
R-A .....Reichs-Anstalt.
Rev .....Review, etc.
R. T.....Roth's Tabellen.
Sb .....Sitzungsberichte.
Soc.....Society, etc.
Sv .....Sverige.
T .....Transactions.
T. M. P. M.....Tschermak's Mineralogische und Petrographische Mittheilungen (Wien).
Und.....Undersökning, Undersögelse.
U. S.....United States.
U. S. G. S.....United States Geological Survey.
Ver .....Verein.
Vh.....Verhandlungen.
Wiss .....Wissenschaft.
W. R. T.....Roth's Tabellen, arranged by Washington. Prof. Paper No. 28.
W. T.....Washington's Tables, 1884–1900. Prof. Paper No. 14.
Z .....Zeitschrift.
Z. D. G. G.....Zeitschrift der Deutsche Geologische Gesellschaft (Berlin).
Z. K .....Zeitschrift für Krystallographie (München).

MINERALS.

A .....Apatite subgroup (apatite, fluorite, calcite, pyrite, iron, etc.).
ab .....albite.
ac.....acmite.
am.....ackermanite.
an .....anorthite.
ap .....apatite.
C .....corundum.
cc.....calcite
cm.....chromite.
di.....diopside.
F .....Feldspar subgroup (orthoclase, albite, anorthite).
fr.....fluorite.
H.....Hemic subgroup (magnetite, chromite, hematite).
hm .....hematite.
hy .....hypersthene.
il .....ilmenite.
ir.....iron (metallic).
kp.....kaliophilite.
ks .....potassium metasilicate.
L .....Lenad subgroup (leucite, nephelite, sodalite, noselite).
lc.....leucite.
M.....Mitic subgroup (magnetite, chromite, hematite, ilmenite, titanite, perofskite, rutile).
mt.....magnetite.
ne .....nephelite.
no .....noselite.
ns.....sodium metasilicate.
O .....Olivine subgroup (olivine, ackermanite).

ol.....olivine.
or.....orthoclase.
org.....organic matter.
P.....Pyroxene subgroup (acmite, sodium metasilicate, potassium metasilicate, diopside, wollastonite, hypersthene).
pf.....perofskite.
pr.....pyrite.
Q.....quartz.
ru.....rutile.
so.....sodalite.
T.....Tilic subgroup (ilmenite, titanite, perofskite, rutile).
tn.....titanite.
wo.....wollastonite.
X.....rare earths, not identified, insoluble in melted KH (SO_4).
Z.....zircon.

MISCELLANEOUS.

cor.....corrected.
E.....east.
M.....miles.
N.....north.
n.....near.
n. d.....not determined.
p.....page.
priv. contrib....private contribution (unpublished.)
R.....rang.
Ref.....reference.
S.....south.
sp. gr.....specific gravity.
SR.....subrang.
tr.....trace.
W.....west.

ANALYSES.

CLASS I. PERSALANE.

RANG 1. PERALKALIC. ALASKASE.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	76.00	8.72	5.33	0.15	0.11	0.79	0.88	7.82	0.40				0.20	100.40	2.588
B3. IV	1.267	.085	.033	.002	.003	.014	.015	.083							

RANG 1. PERALKALIC. ALASKASE.

1	78.40	11.32	0.92	n. d.	0.48	0.45	3.09	4.83	0.56					100.05	
A4. IV	1.307	.111	.006	(.012)	.012	.008	.050	.051							
2	74.88	12.00	3.50	0.20	1.28	0.34	2.49	4.77	1.20					100.66	
A3. III	1.248	.118	.022	.003	.032	.006	.040	.051							
3	77.67	11.47	1.40	0.16	0.16	0.35	3.42	4.76	1.02					100.41	2.600
A3. III	1.295	.112	.009	.002	.004	.006	.055	.051							
4	76.68	12.90	1.02	0.45	0.40	0.69	3.43	4.67	0.72					100.96	2.587
A3. III	1.278	.126	.006	.006	.010	.013	.055	.050							
5	77.68	12.95	0.96	0.37	0.21	0.30	3.18	4.37	0.71			trace		100.73	2.615
A3. III	1.295	.127	.006	.005	.005	.005	.051	.047				—			13°
6	76.12	13.42	1.28	n. d.	0.19	0.34	3.10	4.89	1.06					100.40	
A4. IV	1.269	.131	.008	(.016)	.005	.006	.050	.052							
7	75.31	13.23	1.50	n. d.	0.25	0.65	2.60	5.51	0.86					99.91	
A4. IV	1.255	.130	.009	(.018)	.006	.012	.042	.059							

RANG 1. PERALKALIC. ALASKASE.

1	82.80	7.94	n. d.	1.05	trace	0.35	3.05	1.85	3.94					100.98	2.363
B3. IV	1.380	.078	—	.015	—	.006	.050	.020							20°

RANG 1. PERALKALIC. ALASKASE.

1	80.42	9.22	1.22	0.62	0.34	0.86	4.50	0.62	0.66	0.98	0.06	0.06		99.67	2.652
A2. II	1.340	.090	.007	.008	.009	.015	.072	.006			.001	—			

RANG 2. DOMALKALIC. ALSBACHASE.

1	74.21	12.51	0.78	2.94	0.20	1.82	0.54	6.67	0.50					100.17	2.702
A3. III	1.237	.122	.005	.041	.005	.032	.009	.071							

RANG 2. DOMALKALIC. ALSBACHASE.

1	72.30	15.04	0.64	1.28	0.59	1.59	1.02	4.95	2.18		0.11	0.19		100.02	2.697
A2. II	1.205	.147	.004	.018	.015	.029	.016	.053			.001	.001			

ORDER 3. QUARFELIC. COLUMBARE.

SUBRANG 1. PERPOTASSIC.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 43.6 ns 1.6 or 46.2 di 0.7 ab 1.1 wo 1.3 mt 1.5 hm 5.0	Fork Hill, County Armagh, Ireland.	S. Haughton.	S. Haughton, J. G. Soc. Dubl. IX, p. 334, 1862. R. T. 1869, p. LII.	Felsite-porphyry.	Iron oxides? Alkalies?

SUBRANG 3. SODIPOTASSIC. ALASKOSE.

	Q 39.7 hy 2.8 or 28.4 ab 26.2 an 2.2 C 0.2	Carrickburn, County Wexford, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac. XXIII, p. 615, 1859. R. T. 1869, p. LVIII.	Felsite.	
	Q 39.5 hy 3.2 or 28.4 mt 0.7 ab 21.0 hm 3.0 an 1.7 C 2.1	Pitt's Head, Caernarvonshire, Wales.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac. XXIII, p. 615, 1859. R. T. 1869, p. LVIII.	Felsite.	
	Q 38.6 hy 0.4 or 28.4 mt 0.5 ab 28.8 hm 1.6 an 1.7	Near Andlau, Vogesen.	L. van Werveke.	H. Rosenbusch, Steig. Schiefer, p. 384, 1877. R. T. 1879, p. XX.	Granophyre.	
	Q 36.7 hy 1.0 or 27.8 mt 1.5 ab 28.8 an 3.6 C 0.8	Kirneckthal, Vogesen.	L. van Werveke.	H. Rosenbusch, Steig. Schiefer, p. 383, 1877. R. T. 1879, p. XX.	Quartz-porphyry.	
	Q 41.5 hy 0.5 or 26.1 mt 1.4 ab 26.7 an 1.4 C 2.5	Tryberg Waterfall, Schwarzwald, Baden.	L. McCay.	G. H. Williams, N. J. B. B., II, p. 609, 1883. R. T. 1884, p. XVI.	Quartz-porphyry.	In W. T., p. 129. No. 27, alaskose
	Q 37.4 hy 2.6 or 28.9 ab 26.2 an 1.7 C 2.4	Schönberg, n. Waldheim, Saxony.	Lemberg.	Lemberg, Z. D. G. G., XXVIII, p. 597, 1875. R. T. 1879, p. XII.	Granite.	
	Q 36.1 hy 3.0 or 32.8 ab 22.0 an 3.3 C 1.7	Johanngeorgenstadt, Saxony.	Rube.	Scheerer, Festschrift, p. 180, 1866. R. T. 1869, p. XXXIV.	Granite.	

SUBRANG 4. DOSODIC. TAUROSE.

	Q 56.0 hy 2.0 or 11.1 ab 26.2 an 1.7 C 0.2	Mte. Menone, Euganean Hills, Italy.	G. vom Rath.	G. vom Rath, Z. D. G. G., XVI, p. 516, 1864. R. T. 1869, p. XC.	Perlite.	

SUBRANG 5. PERSODIC. WESTPHALOSE.

S 0.04 Org 0.07	Q 50.2 di 0.7 or 3.3 hy 0.6 ab 37.7 mt 1.9 an 3.3	Pasel, Lennegebiet, Westphalia.	Jacobs.	K. A. Lossen, Sb. Ges. Nf. Freunde, p. 178, 1883. R. T. 1884, p. XX.	Quartz-keratophyre.	In W. T., p. 131. No. 2, westphalose.

SUBRANG 1. PERPOTASSIC.

	Q 39.1 hy 5.3 or 39.5 mt 1.2 ab 4.7 an 8.9 C 1.0	Lappinlax, Isl'd Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl. IV, p. 189, 1867. R. T. 1869, p. L.	Felsite-porphyry.	

SUBRANG 2. DOPOTASSIC. MIHALOSE.

FeS_2 0.13	Q 42.2 hy 3.4 or 29.5 mt 0.9 ab 8.4 an 8.1 C 5.0	"Bodegang," Kestenthal, Harz Mts.	Kinkeldey.	K. A. Lossen, Z. D. G. G. XXVI, p. 889, 1874. R. T. 1879, p. XIV.	Felsite-porphyry.	Border of dike; cf. No. 16, toscanose.

CLASS I. PERSALANE—Continued.

RANG 2. DOMALKALIC. ALSBACHASE.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	76.32	12.96	n.d.	1.86	0.49	1.26	3.13	4.36	n.d.					100.38	
A4. IV	1.272	.127	——	.026	.012	.022	.050	.047							
2	74.56	11.37	3.20	1.98	0.67	0.97	1.97	3.80	0.62					99.14	2.63
B3. IV	1.243	.111	.020	.028	.017	.018	.032	.040							
3	74.46	12.59	2.36	2.01	0.85	0.94	2.78	3.43	0.65					100.07	2.70
A3. III	1.241	.123	.015	.028	.021	.017	.045	.036							
4	71.01	11.86	3.92	2.31	0.26	2.47	2.59	3.02	0.93	0.09		0.85		100.24	
A?2. II	1.184	.116	.024	.032	.007	.045	.042	.032				.006			
5	70.33	11.82	3.73	2.38	0.20	2.75	2.41	3.09	1.38	0.14	1.03	0.53		99.93	
A2. II	1.172	.116	.023	.033	.005	.049	.039	.033			.013	.004			
6	77.34	14.26	0.94	n.d.	0.08	0.83	2.45	4.82	0.28					101.00	2.614
B3. IV	1.289	.140	.006	(.012)	.002	.014	.040	.051							
7	76.60	13.21	1.90	0.20	0.16	0.87	3.03	3.90	0.72					100.59	
A3. III	1.277	.129	.012	.003	.004	.016	.049	.041							
8	76.32	15.44	0.37	n. d.	0.36	1.83	2.06	3.84	0.49					100.34	
A3. II	1.272	.151	.002	(.004)	.009	.032	.033	.040							
9	76.80	12.18	1.56	n. d.	0.20	1.07	2.82	4.50	0.89				trace	100.02	
B3. IV	1.280	.119	.010	(.020)	.005	.020	.045	.048							
10	76.34	13.22	1.93	n. d.	0.21	1.85	2.84	3.67	0.61					100.67	2.403
B3. IV	1.272	.130	.012	(0.24)	.005	.033	.046	.039							

RANG 2. DOMALKALIC. ALSBACHASE.

1	78.75	10.75	1.29	1.95	0.47	1.53	3.18	1.71	0.67					100.30	2.71
A3. III	1.313	.106	.008	.028	.012	.027	.051	.018							
2	74.07	14.47	2.26	n. d.	0.66	2.53	4.23	1.38	0.70					100.30	
B3. IV	1.235	.142	.014	(.028)	.017	.045	.068	.014							

RANG 3. ALKALICALCIC. RIESENASE.

1	71.73	15.41	1.34	1.38	1.08	3.81	3.22	1.47	0.89					100.33	2.54
A3. III	1.196	.151	.008	.019	.027	.068	.052	.015							

ORDER 3. QUARFELIC. COLUMBARE—Continued.

SUBRANG 3. SODIPOTASSIC. TEHAMOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 36.5 hy 4.6 or 26.4 ab 26.2 an 6.1 C 0.8	Baula, Iceland.	P. Schirlitz.	P. Schirlitz, T. M. P. M., 1881, p. 416. R. T. 1884, p. L.	Liparite.	
	Q 45.0 hy 2.8 or 22.2 mt 4.6 ab 16.8 an 5.0 C 2.1	Simonby, Finland.	Kuhlberg.	Kuhlberg, Arch. Nk. Livl. IV, 1867. R. T. 1869, p. XL.	Granite.	
	Q 41.2 hy 3.8 or 20.0 mt 3.5 ab 23.6 an 4.7 C 2.6	Storgard, Finland.	Kuhlberg.	Kuhlberg, Arch. Nk. Livl. IV, 1867. R. T. 1869, p. XL.	Granite.	
F 0.93	Q 41.1 hy 0.7 or 17.8 mt 5.6 ab 22.0 ap 2.0 an 7.0 C 1.7	Capelle Pallokül, Island Dagö, Finland.	Schridde.	v. Ungern-Sternberg, Ueber Rapakiwi, Leipzig, 1882, p. 40. R. T. 1884, p. XIV.	Rapakiwi granite (block).	Cf. No. 24, alaskose, W. T., p. 129.
F 0.14	Q 39.5 hy 0.5 or 18.4 mt 4.6 ab 20.4 il 2.0 an 10.0 hm 0.5 C 0.8 ap 1.3	Capelle Pallokül, Island Dagö, Finland.	Schridde (?).	v. Ungern-Sternberg, Ueber Rapakiwi, Leipzig, 1882, p. 40. R. T. 1884, p. XIV.	Rapakiwi granite (erratic block).	Cf. No. 24, alaskose, W. T., p. 129.
	Q 42.1 hy 1.8 or 28.4 ab 21.0 an 3.9 C 3.6	Kirnockthal, Vogesen.	Unger.	H. Rosenbusch, Steig. Schiefer, 1877, p. 279. R. T. 1879, p. XIV.	Aplite.	Near alaskose.
	Q 42.1 hy 0.4 or 22.8 mt 0.7 ab 25.7 hm 1.4 an 4.5 C 2.4	Ameisenbühl, Oberflockenbach, Baden.	Gabriel.	Benecke and Cohen, Geog. Besch. Heidelb., 1879, p. 125. R. T. 1879, p. XII.	Granite.	
	Q 45.4 hy 1.4 or 22.2 ab 17.3 an 8.9 C 4.7	Grosssachsener Thal, Heidelberg, Baden.	Schröder.	G. Leonhard, Grund. d. Geogn. 1863, p. 45. R. T. 1869, p. XL.	Granite.	Cf. No. 12, tehamose, W. T., p. 133.
	Q 39.4 hy 3.1 or 26.7 ab 23.6 an 5.6 C 0.6	Telkibanya, Hungary.	K. v. Hauer.	K. v. Hauer, Vh. Wien. G. R-A. 1866, p. 99. R. T. 1869, p. LXXXVIII.	Rhyolite.	
	Q 40.0 hy 3.7 or 21.7 ab 24.1 an 9.2 C 1.2	Telkibanya, Hungary.	K. v. Hauer.	K. v. Hauer, Vh. Wien. G. R-A., 1866, p. 99. R. T. 1869, p. LXXXVIII.	Rhyolite.	

SUBRANG 4. DOSODIC. ALSBACHOSE.

	Q 49.1 hy 3.8 or 10.0 mt 1.9 ab 26.7 an 7.5 C 1.0	Storgard, Finland.	Kuhlberg.	Kuhlberg, Arch. Nk. Livl., IV, 1867. R. T. 1869, p. XL.	Granite.	
	Q 36.5 hy 5.4 or 7.8 ab 35.6 an 12.5 C 1.5	Launa Külla, Island Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl. IV, p. 198, 1867. R. T. 1869, p. XLII.	Granite.	

SUBRANG 4. DOSODIC.

	Q 37.2 hy 4.2 or 8.3 mt 1.9 ab 27.3 an 18.9 C 1.6	Sandvik, Finland.	Kuhlberg.	Kuhlberg, Arch. Nk. Livl., IV, 1867. R. T. 1869, p. XL.	Granite.	

CLASS I. PERSALANE—Continued.

RANG 3. ALKALICALCIC. RIESENASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	74.52	14.20	1.26	n. d.	0.72	3.47	4.07	0.58	1.18					100.00	
A4. IV.	1.242	.139	.008	(.016)	.018	.063	.066	.006							

CLASS I. PERSALANE.

RANG 1. PERALKALIC. LIPARASE.

1	74.50	12.69	0.67	n. d.	0.30	0.14	0.92	9.92	0.73					99.85	
A3. III	1.242	.124	.004	(.008)	.008	.003	.015	.106							

RANG 1. PERALKALIC. LIPARASE.

1	76.80	11.64	0.66	0.50	trace	0.43	2.53	6.69	0.77					100.02	2.50
A3. III	1.280	.114	.004	.007	—	.008	.040	.071							
2	75.07	11.40	.053	1.28	0.11	0.61	1.15	8.33	1.74	trace			trace	100.22	2.40
A3. III	1.251	.112	.003	.018	.003	.011	.019	.088							
3	74.62	11.96	1.20	0.10	trace	0.36	2.26	7.76	1.02					99.18	2.23
B3. IV	1.244	.117	.008	.001	—	.006	.036	.083							
4	75.04	13.12	2.12	n. d.	0.34	0.40	2.44	6.32	0.76					100.54	
A4. IV	1.251	.127	.013	(.026)	.009	.007	.039	.067							
5	68.99	13.78	0.75	n. d.	0.15	2.01	2.99	8.01	2.89					99.57	
A3. III	1.150	.135	.005	(.010)	.004	.036	.048	.085							

RANG 1. PERALKALIC. LIPARASE.

1	72.26	13.59	1.16	2.18	0.06	1.13	3.85	5.58	0.47		0.45		trace	100.73	2.65
A2. II	1.204	.133	.007	.031	.002	.020	.062	.060			.006				
2	73.09	12.76	1.07	4.28	0.09	0.30	3.16	5.10	0.73		0.40		0.08	101.06	2.66
B2. III	1.218	.125	.007	.060	.002	.005	.051	.054			.005		.001		
3	71.07	12.34	2.25	4.92	0.19	0.55	2.84	5.53	0.72		0.27		trace	100.68	2.68
A2. II	1.185	.121	.014	.068	.005	.010	.046	.059			.008				
4	75.44	13.98	0.54	n. d.	trace	0.50	3.48	5.36	0.77					100.07	2.48
A4. IV	1.257	.137	.003	(.006)	—	.009	.056	.057							
5	74.48	16.20	0.20	n. d.	0.27	0.13	3.78	4.56	0.60					100.22	
A3. III	1.241	.159	.001	(.002)	.007	.002	.061	.049							
6	73.60	13.80	2.00	n. d.	0.50	0.79	4.29	5.22	n. d.					100.20	
A4. IV	1.227	.135	.013	(.026)	.013	.014	.069	.055							

ORDER 3. QUARFELIC. COLUMBARE—Continued.

SUBRANG 5. PERSODIC. VULCANOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 39.0 hy 3.9 or 3.3 ab 39.6 an 17.5 C 0.4	Near Launakülla, Isl'd Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl., IV, 382, 1867. R. T. 1869, p. XLII.	Granite.	

ORDER 4. QUARDOFELIC. BRITANNARE.

SUBRANG 1. PERPOTASSIC. LEBACHOSE.

	Q 29.6 hy 1.9 or 58.9 ab 7.9 an 0.8	Selgapajalax, Island Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl., IV, p. 387, 1867. R. T. 1869, p. XLII.	Granite.	

SUBRANG 2. DOPOTASSIC. OMEOSE.

Li_2O trace	Q 36.0 di 0.8 or 39.5 wo 0.2 ab 21.0 mt 0.9 an 0.8	Mohung Hill, Humboldt Range, Nevada.	Woodward.	C. King, G. Expl. 40th Par. I, p. 652, 1877. R. T. 1879, p. LIV.	Liparite.	
Li_2O trace	Q 34.5 di 1.5 or 48.9 hy 1.5 ab 10.0 mt 0.7 an 1.4	Pine Nut Canyon, Nevada.	Woodward.	C. King, G. Expl. 40th Par., I, p. 652, 1877. R. T. 1879, p. LIV.	Liparite.	
	Q 31.7 ac 0.9 or 46.2 wo 0.7 ab 17.8 mt 0.2 hm 0.8	Humboldt Sink, Montezuma Range, Nevada.	Woodward.	C. King, G. Expl. 40th Par., I, p. 652, 1877. R. T. 1879, p. LIV.	Liparite.	
	Q 34.0 hy 4.3 or 37.3 ab 20.4 an 2.0 C 1.4	Brinzio, Varese, Piedmont.	Gümbel.	Gümbel, Sb. Münch, Ak., 1880, p. 589. R. T. 1884, p. XVIII.	Felsite-porphyry.	Near liparose.
	Q 18.0 di 3.4 or 47.3 wo 2.3 ab 25.2 an 0.6	Cala del Inferno, Monte Schiavone, Ponza.	C. Doelter.	C. Doelter, Ds. Wien. Ak., XXXVI, p. 11, 1875. R. T. 1879, p. LII.	Pitchstone.	

SUBRANG 3. SODIPOTASSIC. LIPAROSE.

	Q 25.3 di 2.2 or 33.4 hy 1.4 ab 32.5 mt 1.6 an 3.1 il 0.9	Mount Willard, New Hampshire.	G. W. Hawes.	G. W. Hawes, A. J. S. (3), XXI, p. 25, 1881. R. T. 1884, p. XVI.	Granite.	Cf. next two below.
	Q 31.7 hy 5.1 or 30.0 mt 1.6 ab 26.7 il 0.8 an 1.4 C 1.5	Mount Willard, New Hampshire.	G. W. Hawes.	G. W. Hawes, A. J. S. (3), XXI, p. 25, 1881. R. T. 1884, p. XVI.	Granite-porphyry.	Facies of No. 1, liparase, 3 feet from contact.
	Q 28.5 hy 7.2 or 32.8 mt 3.3 ab 24.1 il 0.5 an 2.8 C 0.6	Mount Willard, New Hampshire.	G. W. Hawes.	G. W. Hawes, A. J. S. (3), XXI, p. 25, 1881. R. T. 1884, p. XVI.	Granite-porphyry.	Facies of No. 1, liparase, 2 inches from contact.
	Q 33.3 hy 0.8 or 31.7 ab 29.3 an 2.5 C 1.5	Mount Moses, Fish Creek Mountains, Nevada.	Woodward.	C. King, G. Expl. 40th Par., II, p. 664, 1877. R. T. 1879, p. LIV.	Liparite.	
	Q 34.1 hy 1.0 or 27.2 ab 32.0 an 0.6 C 4.8	Ross of Mull, Scotland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIV, p. 31, 1866. R. T. 1869, p. XLIV.	Granite.	
	Q 25.1 di 0.7 or 30.6 hy 4.4 ab 36.2 an 3.1	Barnesmore Gap, County Donegal, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIV, 1866. R. T. 1869, p. XLVI.	Granite.	

CLASS I. PERSALANE—Continued.

RANG 1. PERALKALIC. LIPARASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp. gr.
7	74.01	14.22	0.49	0.46	0.49	0.40	3.14	6.03	0.85					100.09	2.59
A3. III	1.234	.139	.003	.007	.012	.007	.051	.064							
8	73.43	13.67	1.41	n. d.	0.20	0.50	3.27	6.27	0.56					99.31	
B4. V	1.224	.134	.009	(.018)	.005	.009	.053	.067							
9	73.26	14.05	1.41	n. d.	0.39	0.65	3.47	5.57	0.63	0.25				99.68	
A4. IV	1.221	.137	.009	(.018)	.010	.012	.056	.060							
10	76.33	12.33	0.82	n. d.	0.35	0.14	3.16	6.28	0.59					100.00	
A4. IV	1.272	.121	.005	(.010)	.009	.003	.051	.067							
11	75.05	12.94	1.56	n. d.	0.23	0.76	2.58	5.77	0.76					99.65	
A4. IV	1.251	.126	.010	(.020)	.006	.014	.042	.062							
12	72.54	14.16	1.53	n. d.	0.68	0.84	3.12	5.59	1.20					99.63	
A4. IV	1.209	.139		(.020)	.017	.015	.050	.060							
13	75.06	11.70	1.04	1.57	0.19	1.01	2.56	6.25	0.63		0.36		trace	100.37	2.642
A2. II	1.251	.115	.006	.022	.005	.018	.041	.067			.005				
14	69.01	17.33	0.41	1.65	1.17	0.75	3.59	5.24	0.62					99.77	2.64
A3. III.	1.150	.170	.003	.023	.029	.014	.058	.055							
15	68.30	15.41	2.97	0.81	1.27	0.46	4.03	5.22	0.81					99.28	2.66
B3. IV	1.138	.151	.019	.011	.032	.008	.065	.055							
16	74.65	13.75	1.86	n. d.	0.14	0.79	3.36	5.85	n. d.					100.40	
A4. IV	1.244	.134	.012	(.024)	.004	.014	.054	.063							
17	77.05	12.64	0.76	0.23	0.09	0.74	3.79	4.50	0.40					100.20	2.599
A3. III	1.284	.124	.005	.003	.002	.013	.061	.048							
18	74.11	13.47	0.83	n. d.	1.27	0.64	4.22	3.92	1.22					99.68	
A4. IV	1.235	.132	.005	(.010)	.032	.012	.068	.041							
19	73.00	15.04	1.74	n. d.	0.41	0.73	3.49	5.23	0.94					100.58	
A4. IV	1.217	.147	.011	(.022)	.010	.013	.056	.055							
20	74.56	13.52	2.04	n. d.	0.44	0.32	3.48	4.94	0.64					99.94	
A4. IV	1.243	.132	.013	(.026)	.011	.005	.056	.052							
21	70.93	16.38	n. d.	0.36	0.58	0.32	4.52	5.47	1.50					100.06	2.592
A3. III	1.182	.160	—	.005	.015	.005	.073	.059							23°
22	70.01	17.63	0.56	n. d.	0.11	0.81	3.92	6.55	0.54					100.13	
A4. IV	1.167	.173	.004	(.008)	.003	.014	.063	.070							

ORDER 4. QUARDOFELIC. BRITANNARE—Continued.

SUBRANG 3. SODIPOTASSIC. LIPAROSE—Continued.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 30.8 hy 1.7 or 35.6 mt 0.7 ab 26.7 an 2.0 C 1.7	Haggais, Finland.	Kuhlberg.	Kuhlberg, Arch. Nk. Livl., IV, 1867. R. T. 1869, p. XL.	Granite.	
	Q 27.8 hy 2.9 or 37.3 ab 27.8 an 2.5 C 0.5	Helsingfors, Finland.	Lemberg.	Lemberg, Z. D. G. G., XXII, p. 369, 1870. R. T. 1873, p. X.	Granite.	
	Q 28.4 hy 3.4 or 33.4 ab 29.3 an 3.3 C 0.9	Helsingfors, Finland.	Lemberg.	Lemberg, Z. D. G. G., XXII, p. 366, 1870. R. T. 1873, p. X.	Granite.	
	Q 32.3 hy 2.2 or 37.3 ab 26.7 an 0.8	Selgapajalax, Island Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl., IV, p. 387, 1867. R. T. 1869, p. XLII.	Granite.	
	Q 34.4 hy 3.2 or 34.5 ab 22.0 an 3.9 C 0.8	Launaküla, Island Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl., IV, p. 198, 1867. R. T. 1869, p. XLII.	Granite.	
	Q 28.9 hy 4.3 or 33.3 ab 26.2 an 4.2 C 1.4	Abö, Finland.	Lemberg.	Lemberg, Z. D. G. G., XXII, p. 360, 1870. R. T. 1873, p. X.	Granite.	
	Q 33.7 di 2.6 or 37.3 hy 0.6 ab 21.5 mt 1.4 an 2.0 il 0.8	Himmekül Quarry, Pyterlaks, Finland.	H. Struve.	H. Struve, Mem. Ac. St. Pet., VI, No. 4, p. 33, 1862. R. T. 1869, p. XLII.	Rapakiwi granite.	
	Q 23.7 hy 5.5 or 30.6 mt 0.7 ab 30.4 an 3.9 C 4.4	Ahlön, Vannäs, Finland.	Kuhlberg.	Kuhlberg, Arch. Nk. Livl., IV, 1867. R. T. 1869, p. XL.	Granite.	
	Q 22.2 hy 3.2 or 30.6 mt 2.6 ab 34.1 hm 1.3 an 2.2 C 2.4	Mustfinn, Finland.	Kuhlberg.	Kuhlberg, Arch. Nk. Livl., IV, 1867. R. T. 1869, p. XL.	Granite.	
	Q 29.2 hy 3.6 or 35.0 ab 28.3 an 3.9 C 0.3	Elfdalen, Sweden.	Olshausen.	Olshausen, Z. D. G. G., XVI, p. 680, 1864. R. T. 1869, p. LII.	Felsite-porphyry.	
	Q 36.1 hy 0.2 or 26.7 mt 0.7 ab 32.0 hm 0.3 an 3.6 C 0.2	Kirneckthal, Vogesen.	Van Werveke.	H. Rosenbusch, Steig. Schiefer, 1877, p. 378. R. T. 1879, p. XX.	Granophyre.	Near toscanose.
	Q 30.9 hy 4.5 or 22.8 ab 35.6 an 3.3 C 1.1	Rabenberg, Waldheim, Saxony.	Lemberg.	Lemberg, Z. D. G. G., XXVII, p. 545, 1875. R. T. 1879, p. X.	Granite.	Near kallerudose.
	Q 29.6 hy 3.9 or 30.6 ab 29.3 an 3.6 C 2.4	Waldheim, Saxony.	Lemberg.	Lemberg, Z. D. G. G., XXVIII, p. 597, 1876. R. T. 1879, p. XII.	Granite.	
	Q 32.9 hy 4.5 or 28.9 ab 29.3 an 1.4 C 1.9	Near Figino, Piedmont.	Gümbel.	Gümbel, Sb. Münch. Ak., 1880, p. 589. R. T. 1884, p. XVIII.	Felsite-porphyry.	
	Q 21.6 hy 2.2 or 32.8 ab 38.3 an 1.4 C 2.4	Ortaccio, Campiglia Marittima, Tuscany.	G. vom Rath.	G. vom Rath, Z. D. G. G., XX, p. 328, 1868. R. T. 1869, p. LII.	Granite (felsite-porphyry).	
	Q 20.0 hy 1.4 or 38.9 ab 33.0 an 3.9 C 2.7	Capo Vardella, Palmarola, Ponza Islands.	C. Doelter.	C. Doelter, Ds. Wien. Ak., XXXVI, p. 28, 1875. R. T. 1879, p. LII.	Obsidian.	

CLASS I. PERSALANE—Continued.

RANG 1. PERALKALIC. LIPARASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	70.97	13.84	3.21	0.78	0.20	1.26	6.27	1.57	0.74	0.79	0.25			100.09	2.709
A2. II	1.183	.136	.020	.011	.005	.022	.102	.017			.003				

RANG 2. DOMALKALIC. TOSCANASE.

1	68.94	14.31	2.29	2.75	0.47	2.25	1.13	7.38	0.46					99.98	
A3. III	1.149	.140	.014	.039	.012	.010	.018	.079							
2	69.19	14.12	1.64	1.71	1.66	1.58	1.81	8.45	n. d.			0.15	trace	100.31	2.69
A3. III	1.153	.138	.010	.024	.042	.029	.029	.090				.001			

RANG 2. DOMALKALIC. TOSCANASE.

1	70.29	14.85	1.20	1.20	0.26	1.09	3.66	5.66	1.36				0.16	99.73	2.12
A3. III	1.172	.146	.008	.017	.007	.020	.059	.061					.002		
2	70.17	14.53	2.54	1.74	0.93	2.29	3.25	3.35	1.53				trace	100.33	
A3. III	1.170	.142	.016	.024	.023	.041	.052	.036							
3	73.96	12.44	3.07	0.55	0.14	1.28	3.00	5.10	1.00					100.54	
A3. III	1.233	.122	.019	.008	.004	.023	.048	.054							
4	72.24	14.92	1.63	0.23	0.36	1.68	3.51	5.10	n. d.				0.32	99.99	
A3. III	1.204	.146	.010	.003	.009	.030	.056	.054					.005		
5	71.76	16.68	1.08	n. d.	0.28	1.48	2.97	5.13	0.60					99.98	
A4. IV	1.196	.163	.007	(.014)	.007	.027	.048	.054							
6	70.00	16.36	2.80	0.08	0.71	1.12	4.13	4.66	n. d.					99.86	
A3. III	1.167	.160	.018	.001	.018	.020	.066	.050							
7	69.20	16.40	2.09	1.00	0.85	1.03	4.20	5.22	n. d.					99.99	
A3. III	1.153	.161	.013	.014	.021	.018	.068	.055							
8	68.80	16.40	2.60	0.65	0.85	1.75	3.78	5.31	n. d.					100.14	
A3. III	1.147	.161	.016	.009	.021	.031	.061	.056							
9	68.20	15.96	3.69	1.00	0.78	2.92	3.75	4.14	n. d.					100.44	
A3. III	1.137	.156	.023	.014	.020	.052	.060	.044							
10	73.70	14.44	0.43	1.49	trace	1.08	4.21	4.43	0.40			trace	trace	100.18	2.69
A3. III	1.228	.141	.003	.021	—	.020	.068	.047							
11	68.04	17.20	3.15	0.41	1.20	2.92	3.25	3.90	n. d.					100.07	
A3. III	1.134	.169	.020	.006	.030	.052	.053	.041							

ORDER 4. QUARDOFELIC. BRITANNARE—Continued.

SUBRANG 4. DOSODIC. KALLERUDOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
S trace Org 0.01	Q 25.4 di 1.1 or 9.5 mt 1.9 ab 53.5 il 0.5 an 4.7 hm 1.9	Muhlenthal, n. Elbingerode, Harz Mountains.	Jacobs.	K. A. Lossen, Sb. Ges. Nat. Fr., 1883, p. 178. R. T. 1884, p. xx.	Quartz-keratophyre.	Near lassenose.

SUBRANG 2. DOPOTASSIC. DELLENOSE.

Q 27.0 hy 4.5 or 43.9 mt 3.3 ab 9.4 an 11.1 C 0.3	Pochjakörkia, Island Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl., IV, p. 181, 1867. R. T. 1869, p. L.	Felsite-porphyry.	
Cl_2 trace ZnO trace BaO trace	Q 20.1 di 2.3 or 50.0 hy 5.0 ab 15.2 mt 2.3 an 5.3	Tryberg Waterfall, Schwartzwald, Baden.	Hebenstreit.	Hebenstreit, Btr. Kenntn. Schww., 1877, p. 27. R. T. 1879, p. xii.	Granite.	

SUBRANG 3. SODIPOTASSIC. TOSCANOSE.

Q 23.6 hy 2.2 or 33.9 mt 1.9 ab 30.9 an 5.6 C 0.6	Harlequin Canyon, Montezuma Range, Nevada.	R. W. Woodward.	C. King, G. Expl. 40th Par. I, p. 652, 1878. R. T. 1879, p. liv.	Liparite.	Sp. gr. low.
Li_2O trace Q 31.7 hy 3.4 or 20.0 mt 3.7 ab 27.3 an 11.4 C 1.4	Shoshone Peak, Nevada.	R. W. Woodward.	C. King, G. Expl. 40th Par. I, p. 576, 1878. R. T. 1879, p. lxiv.	Dacite.	
Q 34.4 di 0.8 or 30.0 mt 1.9 ab 25.2 hm 1.8 an 5.6	Camaros Hill, County Wexford, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIII, p. 608, 1859. R. T. 1869, p. xlvi.	Granite.	
Q 28.5 hy 0.9 or 30.0 mt 0.7 ab 29.3 hm 1.1 an 8.3 C 0.6	Doochary Bridge, County Donegal, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIV, 1866. R. T 1869, p. xlvi.	Granite.	
Q 30.5 hy 2.6 or 30.0 ab 25.2 an 7.5 C 3.5	Poulmounty, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIII, p. 599, 1859. R. T. 1869, p. xliv.	Granite.	
Q 24.8 hy 1.8 or 27.8 mt 0.2 ab 34.6 hm 2.7 an 5.6 C 2.5	Ard Malin, County Donegal, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIV, p. 8, 1866. R. T. 1869, p. xlvi.	Granite.	
Q 21.4 hy 2.2 or 30.6 mt 3.0 ab 35.6 an 5.0 C 2.0	Tory Island, County Donegal, Ireland.	S. Haughton.	S. Houghton, Tr. R. Ir. Ac., XXIV, 1866. R. T. 1869, p. xlvi.	Granite.	
Q 21.7 hy 2.1 or 31.1 mt 2.1 ab 32.0 hm 1.1 an 8.6 C 1.3	Arranmore Island, County Donegal, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIV, 1866. R. T. 1869, p. xlvi.	Granite.	
Q 23.3 hy 2.0 or 24.5 mt 3.3 ab 31.4 hm 1.4 an 14.5	Poison Glen, County Donegal, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac. XXIV, 1866. R. T. 1869, p. xlvi.	Granite.	
Li_2O trace Q 28.8 hy 2.4 or 26.1 mt 0.7 ab 35.6 an 5.6 C 0.6	Peterhead, Scotland.	A. H. Phillips.	A. H. Phillips, Q. J. G. S., XXXVI, p. 13, 1880. R. T. 1884, p. xiv.	Granite.	
Q 26.2 hy 3.0 or 22.8 mt 1.4 ab 27.8 hm 2.2 an 14.5 C 2.4	Creetown, Kirkcudbright, Scotland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIII, p. 607, 1859. R. T. 1869, p. xliv.	Granite.	

CLASS I. PERSALANE—Continued.

RANG 2. DOMALKALIC. TOSCANASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
12	72.96	14.00	2.42	0.38	0.14	1.12	4.33	4.47	n. d.				0.40	100.22	2.671
A3. III	1.216	.137	.015	.005	.004	.020	.069	.048					.006		
13	73.88	14.86	0.10	1.64	0.23	0.89	3.94	3.89	0.82					100.25	
A3. III	1.231	.146	.001	.022	.006	.016	.064	.041							
14	70.40	15.29	0.09	1.69	0.58	1.62	4.09	3.89	1.13		0.28	0.22		99.51	2.68
A2. II	1.173	.150	.001	.024	.015	.029	.066	.041			.004	.001			
15	73.39	14.12	0.77	0.67	0.29	1.25	3.66	4.47	1.22					99.84	
A3. III	1.223	.138	.005	.010	.007	.022	.059	.048							
16	71.65	15.58	0.64	2.21	0.05	2.13	3.44	3.66	1.48				trace	100.84	2.679
A3. III	1.194	.152	.004	.031	.001	.038	.055	.039							
17	71.55	15.00	0.87	3.01	0.06	1.21	3.61	4.92	0.75				trace	100.98	2.661
A3. III	1.193	.147	.006	.042	.002	.021	.058	.052							
18	71.12	14.58	1.69	n. d.	0.15	1.50	3.26	6.01	0.95				trace	99.26	
B4. V	1.185	.143	.011	(.022)	.004	.027	.053	.064					—		
19	65.66	15.78	3.25	0.16	0.88	2.07	3.77	5.82	3.45					100.84	2.459
A3. III	1.094	.155	.021	.002	.022	.038	.061	.062							

RANG 2. DOMALKALIC. TOSCANASE.

1	69.36	16.23	0.88	1.53	1.34	3.17	4.06	3.02	0.45					100.04	
A3. III	1.156	.159	.005	.021	.034	.057	.065	.032							
2	67.91	17.38	1.77	1.25	1.35	2.81	5.43	1.84	—				0.04	99.84	
A3. III	1.132	.170	.011	.018	.034	.050	.087	.020							
3	75.24	13.36	0.60	n. d.	0.14	2.25	4.86	3.27	n. d.					99.72	
A4. IV	1.254	.131	.004	(.008)	.004	.040	.079	.035							
4	75.05	13.66	0.62	1.11	0.46	1.82	4.78	2.84	0.36					100.70	
A3. III	1.251	.134	.004	.015	.012	.032	.077	.030							
5	74.04	13.01	0.80	0.95	1.02	2.33	4.60	2.75	0.86				trace	100.39	
A3. III	1.234	.127	.005	.014	.026	.041	.074	.030							
6	66.69	15.72	3.10	0.68	1.18	1.98	4.45	2.97	2.86					99.63	2.287
A3. III	1.112	.154	.019	.010	.030	.036	.072	.032							

ORDER 4. QUARDOFELIC. BRITANNARE—Continued.

SUBRANG 3. SODIPOTASSIC. TOSCANOSE—Continued.

Inclusive.		Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
		Q 28.2 hy 0.4 or 26.7 mt 1.2 ab 36.2 hm 1.6 an 5.6	500 feet below summit, Mont Blanc, France.	S. Haughton.	S. Haughton, J. G. Soc. Dubl. IX, p. 219, 1862, R. T. 1869, p. XLIV.	Protogine.	
		Q 32.5 hy 3.4 or 22.8 mt 0.2 ab 33.5 an 4.5 C 2.6	Björketorp, Sect. Linde, Sweden.	Hasselbom	Hummel, Sv. G. Und., Sect. Linde., p. 16, 1873. R. T. 1879, p. XIV.	Granite.	Near liparose.
FeS_2	0.28	Q 26.3 hy 4.0 or 22.8 mt 0.2 ab 34.6 il 0.6 an 8.1 C 1.4	"Bodegang," Kestenthal, Harz Mountains.	Kinkeldy.	K. A. Lossen, Z. D. G. G., XXVI, p. 889, 1874. R. T. 1879, p. XIV.	Granite-porphyry.	Center of dike. cf. No. 1, mihalose.
		Q 31.5 hy 1.4 or 26.7 mt 1.2 ab 30.9 an 6.1 C 0.9	Schaufelgraben, Gleichenberg, Styria.	Frisch.	Ludwig, T. M. P. M., 1877, p. 277. R. T. 1879, p. LII.	Liparite.	
		Q 31.6 hy 3.4 or 21.7 mt 0.9 ab 28.8 an 10.6 C 2.0	Zehnerkopf, West Tyrol.	Stache and von John.	Stache and von John, Jb. Wien. G. R-A., XXVII, p. 237, 1877. R. T. 1879, p. XXII.	Felsite-porphyry.	
		Q 27.2 hy 5.0 or 28.9 mt 1.4 ab 30.4 an 5.8 C 1.6	Zwölfergipfel, West Tyrol.	Stache and von John.	Stache and von John, Jb. Wien. G. R-A., XXVII, p. 237, 1877. R. T. 1879, p. XXII.	Felsite-porphyry.	
		Q 24.2 hy 3.3 or 35.6 ab 27.8 an 7.5	Chiaja di Luna, Ponza, Ponza Islands.	C. Doelter.	C. Doelter, Ds. Wien. Ak., XXXVI, p. 10, 1875. R. T. 1879, p. LII.	Liparite.	
		Q 15.8 di 1.3 or 34.5 hy 1.6 ab 32.0 mt 0.5 an 8.9 hm 3.0	Molivo, Mytilene, Ægean Sea.	K. von Hauer.	K. von Hauer, Vh. Wien. G. R.-A., 1873, p. 220. R. T. 1879, p. LIV.	Perlite.	Iron oxides.

SUBRANG 4. DOSODIC. LASSENOSE.

		Q 24.6 hy 5.5 or 17.8 mt 1.2 ab 34.1 an 15.8 C 0.5	Near Lassen Peak, California.	J. W. Shimer.	Hague and Iddings, A. J. S., XXVI, p. 232, 1883. R. T. 1884, p. LXVIII.	Dacite.	In W. T., p. 177, No. 38, lassenose.
ZnO	0.06	Q 20.9 hy 4.3 or 11.1 mt 2.6 ab 45.6 an 13.9 C 1.3	Castillo de la Nueva Guatemala, Guatemela.	Marx.	Marx, Z. D. G. G., XX, p. 521, 1868. R. T., 1869, p. CXVIII.	Andesite.	Dried before analysis. $H_2O+ = 0.27$.
		Q 30.1 di 2.9 or 19.5 wo 1.3 ab 41.4 an 4.7	Dunlewy, County Donegal, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIV, 1866. R. T. 1869, p. XLVI.	Granite.	Near kallerudose.
		Q 31.6 di 1.1 or 16.7 hy 2.1 ab 40.4 mt 0.9 an 7.5	Harparboda, Sect. Linde, Sweden.	Hasselbom.	Hummel, Sv. G. Und., XLVII, p. 16, 1873. R. T. 1879, p. XIV.	Granite.	
		Q 30.7 di 4.1 or 16.7 hy 1.8 ab 38.8 mt 2.2 an 6.4	Baldersnäs, Ulfserud, Sweden.	Erdmann.	Hummel and Erdmann, Sv. G. Und., XXXV, p. 87, 1870. R. T. 1873, p. X.	Granite.	
		Q 23.2 hy 3.0 or 17.8 mt 2.3 ab 37.7 hm 1.4 an 10.0 C 1.4	Alagez, Armenia.	Plohn.	Abich, G. Armen. Hochl., 1882, p. 35. R. T. 1884, p. LXVIII.	Pitchstone.	

CLASS I. PERSALANE—Continued.

RANG 2. DOMALKALIC. TOSCANASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	71.08	17.19	0.52	n. d.	0.43	3.16	5.55	0.92	1.15					100.00	
A4. IV	1.185	.169	.003	(.006)	.011	.044	.099	.010							

RANG 3. ALKALICALCIC. COLORADASE.

1	65.26	14.96	1.14	4.92	0.70	3.30	2.54	4.70	2.16					99.68	2.77
A3. III	1.088	.147	.007	.068	.018	.059	.041	.050							
2	68.79	14.80	2.32	0.85	1.15	3.81	2.46	4.54	0.71		0.31		0.01	99.93	2.68
A2. II	1.147	.145	.014	.012	.029	.068	.040	.048			.004		—		

RANG 3. ALKALICALCIC. COLORADASE.

1	63.19	18.65	4.01	1.89	1.20	4.86	3.69	1.95	0.07		0.18	0.25	0.13	100.07	
A2. II	1.053	.183	.025	.027	.030	.088	.059	.021			.002	.002	.002		
2	67.17	16.96	3.45	1.20	1.50	4.46	3.70	1.55	0.89				trace	100.88	
A3. III	1.120	.166	.022	.017	.038	.080	.060	.017					—		
3	65.71	17.08	2.84	1.79	2.57	5.24	3.87	1.02	n. d.					100.12	
A3. III	1.095	.167	.018	.025	.064	.094	.063	.012							

CLASS I. PERSALANE.

RANG 1. PERALKALIC. NORDMARKASE.

1	66.06	16.46	2.25	1.10	0.19	0.79	6.81	5.52	0.62				0.55	100.35	
A3. III	1.101	.161	.014	.015	.005	.014	.110	.059					.008		

RANG 2. DOMALKALIC. PULASKASE.

1	60.60	17.22	4.37	1.96	0.75	2.87	3.39	6.75	0.80	1.57			0.24	100.52	
A3. III	1.010	.169	.028	.028	.019	.052	.055	.072					.003		
2	62.17	20.83	2.26	2.12	0.45	1.68	4.40	6.76	0.25			0.03	trace	100.95	2.45
B3. IV	1.036	.204	.114	.029	.011	.030	.071	.072				—	—		
3	61.87	18.33	3.23	2.51	0.65	2.11	5.07	6.51	0.46			trace	0.01	101.07	2.45
														.07	
B3. IV	1.031	.180	.020	.035	.016	.038	.082	.069				—	—	101.00	
4	61.55	17.81	3.01	2.60	0.47	1.69	4.08	7.51	0.86			0.01	trace	99.59	2.46
A3. III	1.026	.174	.019	.036	.012	.030	.066	.080				—	—		
5	61.49	20.02	3.11	2.72	0.52	1.88	3.39	7.13	0.46			0.02	0.01	100.75	2.43
A3. III	1.025	.196	.019	.038	.013	.034	.055	.076				—	—		

ORDER 4. QUARDOFELIC. BRITANNARE—Continued.

SUBRANG 5. PERSODIC. MARIPOSOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 25.6 hy 1.9 or 5.6 ab 51.9 an 12.2 C 1.6	Pascolax, Island Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl., IV, p. 383, 1867. R. T. 1869, p. XLII.	Granite.	

SUBRANG 3. SODIPOTASSIC. AMIATOSE.

	Q 21.0 di 0.8 or 27.8 hy 9.5 ab 21.5 mt 1.6 an 15.6	Flogda Quarry, Bondkyrkasocken, Sweden.	M. Stolpe.	M. Stolpe, Sv. G. Und., XXXI, p. 20, 1869. R. T. 1873, p. X.	Granite.	Near toscanose. Nearly in dosalane.
	Q 28.0 di 1.9 or 26.7 hy 2.0 ab 21.0 mt 1.9 an 15.9 il 0.6 hm 1.0	Barr-Andlau, Vogesen.	Unger.	H. Rosenbusch, Steig. Schiefer, 1877, p. 147. R. T. 1879, p. XIV.	Granitite.	

SUBRANG 4. DOSODIC. YELLOWSTONOSE.

	Q 22.0 hy 3.0 or 11.7 mt 5.8 ab 30.9 il 0.3 an 24.5 C 1.5	Mount Tajumbina, Peru.	C. Hoepfner.	C. Hoepfner, N. J., 1881, II, p. 189. R. T. 1884, p. LXVI.	Dacite.	In W. T., p. 191. No. 47, yellowstonose.
	Q 27.6 hy 3.8 or 9.5 mt 3.9 ab 31.4 hm 0.8 an 22.2 C 0.9	Nagy-Sebes, Siebenbürgen, Hungary.	C. Doelter.	C. Doelter, T. M. P. M., 1873, p. 93. R. T. 1879, p. LXIV.	Dacite.	
	Q 23.3 di 0.4 or 6.7 hy 7.1 ab 33.0 mt 4.2 an 25.6	Dognacska, Banat, Hungary.	Niedzwiedzki.	Niedzwiedzki, T. M. P. M., 1873, p. 256. R. T. 1879, p. XXXII.	Quartz-diorite.	Near tonalose.

ORDER 5. PERFELIC. CANADARE.

SUBRANG 4. DOSODIC. NORDMARKOSE.

	Q 4.5 ac 3.7 or 32.8 di 3.3 ab 53.5 mt 1.4	Hohenburg, n. Berkum, Rhenish Prussia.	Laspeyres.	Laspeyres, Vh. Nh. Ver. Bonn, X, p. 394, 1883. R. T. 1884, p. XLVIII.	Liparite.	Near phlegrose.

SUBRANG 3. SODIPOTASSIC. PULASKOSE.

	Q 8.1 di 2.2 or 40.0 hy 0.9 ab 28.8 mt 6.3 an 11.7	Arzbacherkopf, Westerwald.	Gümbel.	Gümbel, Sb. Münch. Ak., 1882, p. 220. R. T. 1884, p. L.	Trachyte.	
Cl trace	Q 5.5 hy 3.1 or 40.0 mt 3.3 ab 37.2 an 8.3 C 3.2	Monte Tabor, Ischia.	C. W. C. Fuchs.	C. W. C. Fuchs, T. M. P. M., 1872, p. 229. R. T. 1873, p. XXXVI.	Trachyte.	
Cl 0.32	Q 6.7 di 0.9 or 38.4 hy 3.1 ab 32.5 mt 4.6 an 9.5 so 4.9	Monte Vetta, Ischia.	C. W. C. Fuchs.	C. W. C. Fuchs, T. M. P. M., 1872, p. 232. R. T. 1873, p. XXXVIII.	Trachyte.	
	Q 3.8 di 0.5 or 44.5 hy 3.2 ab 34.6 mt 4.4 an 7.8	Punta della Cima, Ischia.	C. W. C. Fuchs.	C. W. C. Fuchs, T. M. P. M., 1872. p. 230. R. T. 1873, p. XXXVI.	Trachyte.	
	Q 8.3 hy 3.8 or 42.3 mt 4.4 ab 28.8 an 9.5 C 3.2	Marecocco, Ischia.	C. W. C. Fuchs.	C. W. C. Fuchs, T. M. P. M., 1872, p. 229. R. T. 1873, p. XXXVI.	Trachyte.	

CLASS I. PERSALANE—Continued.

RANG 2. DOMALKALIC. PULASKASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	Mno	Sum	Sp. gr.
6	60.77	19.83	4.14	2.43	0.34	1.63	4.90	6.27	0.24			trace	trace	100.55	2.44
A3. III	1.013	.194	.026	.033	.009	.029	.079	.067				—	—		
7	59.12	21.46	2.68	2.72	0.84	2.16	3.78	7.66	0.25			trace		100.67	
A3. III	.985	.210	.017	.038	.021	.039	.061	.082				—			

RANG 2. DOMALKALIC. PULASKASE.

1	61.05	18.35	4.21	2.12	0.90	2.05	5.94	5.28	0.32			trace	0.04	100.26	2.53
A3. III	1.018	.180	.026	.029	.023	.037	.096	.056				—	.001		
2	61.47	18.09	5.14	3.06	1.32	3.00	5.85	2.83	n. d.					100.76	2.72
A3. III	1.025	.177	.032	.043	.033	.053	.094	.030							
3	61.43	17.51	5.11	2.30	0.54	2.45	6.22	3.95	n. d.					99.51	2.34
A3. III	1.024	.171	.032	.032	.014	.044	.100	.042							
4	60.24	20.28	2.32	3.88	0.50	1.96	7.80	4.28	n. d.					101.26	
C3. V	1.004	.198	.014	.054	.013	.036	.126	.046							

CLASS I. PERSALANE.

RANG 1. PERALKALIC. MIASKASE.

1	56.43	20.58	2.88	1.28	0.28	1.45	8.62	4.23	2.90		trace	0.06	0.66	99.66	2.499
A2. II	.941	.202	.018	.018	.007	.026	.139	.045			—	—	.009		
2	55.92	20.35	2.16	0.94	0.62	2.21	8.35	4.83	3.51			0.18	0.50	100.04	2.452
A2. II	.932	.200	.014	.013	.016	.039	.135	.052				.001	.007		
3	55.01	21.67	1.95	1.86	0.13	2.12	9.78	3.54	2.17		0.27	0.08	0.22	99.41	2.513
A2. II	.917	.212	.012	.026	.003	.038	.158	.037			.003	.001	.003		
4	55.21	21.78	2.06	2.01	0.13	2.10	10.64	3.48	2.07		trace		trace	100.00	
A2. II	.920	.213	.013	.028	.003	.038	.172	.037			—				
5	56.30	24.14	1.99	n. d.	0.13	0.69	9.28	6.79	1.58					100.90	2.48
A4. IV	.938	.236	.013	(.026)	.003	.013	.150	.072							

RANG 2. DOMALKALIC. VIEZZENASE.

1	55.40	21.03	1.64	3.04	0.91	3.57	7.64	4.42	0.95		0.43	0.23	trace	99.83	2.54–2.59
A2. II	.923	.206	.010	.042	.023	.064	.123	.047			.005	.002	—		
2	48.46	21.81	2.17	3.75	0.68	4.58	8.41	5.86	2.08		trace			100.90	
A3. III	.808	.214	.014	.052	.017	.082	.135	.063			—				

ORDER 5. PERFELIC. CANADARE——Continued.

SUBRANG 3. SODIPOTASSIC. PULASKOSE—Continued.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 3.8 hy 1.8 or 37.3 mt 6.0 ab 41.4 an 8.1 C 1.9	Monte Rotaro, Ischia.	C. W. C. Fuchs.	C. W. C. Fuchs, T. M. P. M., 1872, p. 232. R. T. 1873, p. XXXVIII.	Trachyte-obsidian.	
	Q 0.4 hy 4.9 or 45.6 mt 3.9 ab 32.0 an 10.8 C 2.9	Panza, Ischia.	C. W. C. Fuchs.	C. W. C. Fuchs, T. M. P. M., 1872, p. 230. R. T. 1873, p. XXXVI.	Trachyte.	

SUBRANG 4. DOSODIC. LAURVIKOSE.

	Q 0.3 di 2.0 or 31.1 hy 1.8 ab 50.3 mt 6.0 an 7.8	Monte dell'Imperatore, Ischia.	C. W. C. Fuchs.	C. W. C. Fuchs, T. M. P. M., 1872, p. 231. R. T. 1873, p. XXXVIII.	Trachyte.	Near pulaskose.
	Q 7.9 di 4.7 or 16.7 mt 7.4 ab 49.3 an 14.7	Montagna Grande, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 155, 1884. R. T. 1884, p. LXVIII.	Augite-andesite.	In W. T., p. 203, No. 24, laurvikose.
	Q 5.0 di 3.3 or 23.4 mt 7.4 ab 52.4 an 8.1	Porto Scauri, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 164, 1884. R. T. 1884, p. LXVIII.	Augite-andesite.	In W. T., p. 203, No. 25, laurvikose.
	or 25.6 di 2.4 ab 50.3 ol 4.1 an 7.2 mt 3.2 ne 8.5	Montagna Grande, Pantelleria.	E. Maegis.	H. Förstner, Z. K., VIII, p. 155, 1884. R. T. 1884, p. LXVIII.	Augite-andesite.	In W. T., p. 203, No. 26, laurvikose.

ORDER 6. LENDOFELIC. RUSSARE.

SUBRANG 4. DOSODIC. MIASKOSE.

ZrO_2 trace SO_3 0.22 Cl 0.07 F trace Li_2O trace	or 25.0 di 1.7 ab 45.1 mt 4.2 an 5.0 ne 15.1	Magdeberg, Hegau, Germany.	G. F. Föhr.	G. F. Föhr, In. Diss., Wurzburg, 1883, p. 32. R. T. 1884, p. LIV.	Phonolite.	In W. T., p. 211, No. 40, miaskose.
SO_3 0.23 Cl 0.06 F trace Li_2O trace Cu 0.18	or 28.9 di 3.4 ab 35.6 wo 2.3 an 3.6 mt 3.2 ne 19.0	Staufen, Hegau.	G. F. Föhr.	G. F. Föhr, In. Diss., Wurzburg, 1883, p. 28. R. T. 1884, p. LII.	Phonolite.	In W. T., p. 211, No. 41, miaskose.
SO_3 0.41 Cl 0.08 F trace NiO trace Cu 0.12 Zn trace	or 20.6 di 3.4 ab 40.9 wo 0.8 an 6.1 mt 2.8 ne 18.5 il 0.5 no 2.6	Hohentwiel, Hegau.	G. F. Föhr.	G. F. Föhr, In. Diss., Wurzburg, 1883, p. 28. R. T. 1884, p. LII.	Phonolite.	In W. T., p. 213, No. 42, miaskose.
SO_3 0.46 Cl 0.07 Li_2O trace	or 20.6 di 4.4 ab 38.8 wo 1.9 an 1.1 mt 3.0 ne 27.8	Hohentwiel, Hegau.	Bernath.	Bernath, Btr. Kenntn. Phon. Hohentw., Berne, 1877, p. 41. R. T. 1879, p. LVIII.	Phonolite.	Cf. Nos. 40–42, miaskose, W. T., p. 213.
	or 40.0 ol 2.9 ab 21.5 an 3.6 ne 31.0	Ditro, Siebenbürgen, Hungary.	Fellner.	Fellner, Vh. Wien., G. R.-A., 1867, p. 286. R. T. 1869, p. LX.	Ditroite.	Cf. No. 46, miaskose, W. T., p. 213.

SUBRANG 4. DOSODIC. VIEZZENOSE.

SO_3 0.57 Cl trace S trace	or 26.1 di 6.6 ab 33.5 ol 2.9 an 10.0 mt 0.9 ne 16.8 il 0.8	Campanario, Palma, Canary Islands.	Mardner.	Sauer, Unters. Phon. Gest. Canar., 1876, p. 60. R. T. 1879, p. LXVI.	Hornblende-andesite.	Calc. from sol. and insol.
SO_3 2.97 Cl 0.13	or 35.0 di 6.4 ab 7.9 ol 2.6 an 15.3 mt 3.3 ne 0.3 so 1.9 no 26.3	Sant' Antao, Cape Verde.	Kertscher.	C. Doelter, Die Capverden., 1882, p. 21. R. T. 1884, p. LXII.	Leucitophyre.	Near essexose.

CLASS I. PERSALANE.

RANG I. PERALKALIC. VARINGASE.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	68.54	9.49	8.60	3.23	0.42	0.54	3.14	5.11	0.30		1.36	trace		100.73	2.789
A2. II.	1.142	.093	.054	.044	.011	.010	.051	.054			.017	—			16°
2	70.30	6.32	9.23	1.40	0.89	0.84	7.70	2.50	0.82					100.00	2.69
A3. III.	1.172	.062	.057	.019	.022	.015	.124	.026							

RANG 2. DOMALKALIC.

1	72.32	13.37	0.57	2.34	3.57	1.88	2.76	2.30	0.68					99.79	
A3. III.	1.205	.131	.004	.032	.089	.034	.045	.024							

RANG 4. DOCALCIC.

1	66.88	11.69	1.68	8.94	3.55	5.45	1.25	0.20	1.03	trace		trace		100.67	
A3. III.	1.115	.115	.011	.124	.089	.097	.020	.002		—		—			

CLASS II. DOSALANE.

RANG 1. PERALKALIC. PANTELLERASE.

1	71.50	10.79	3.52	2.88	0.31	0.15	2.76	6.87	1.00	0.13	0.25		0.30	100.46	
A2. II.	1.192	.106	.022	.040	.008	.003	.045	.073			.003		.004		

RANG 1. PERALKALIC. PANTELLERASE.

1	65.80	12.80	6.64	0.18	1.78	2.92	4.16	4.40	1.20					99.88	
A3. III.	1.097	.125	.041	.003	.045	.052	.067	.047							
2	68.75	11.40	4.30	3.30	1.46	1.24	5.37	4.22	0.30		in SiO_2		trace	100.34	
A3. III.	1.146	.112	.027	.046	.037	.022	.087	.045					—		
3	69.61	8.02	7.17	2.83	0.65	0.88	7.47	2.88	0.74					100.25	2.44
A3. III.	1.160	.078	.045	.039	.016	.016	.120	.031							
4	69.02	10.09	4.42	4.56	0.76	1.45	6.29	3.70	n. d.					100.58	2.46
A3. III.	1.150	.099	.027	.063	.019	.026	.101	.039							
5	68.33	10.94	3.74	5.41	0.16	1.36	7.09	4.08	n. d.					101.36	2.48
B3. IV.	1.139	.107	.023	.075	.004	.024	.115	.044							

ORDER 3. QUARFELIC. HISPANARE.

SUBRANG 3. SODIPOTASSIC. VARINGOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
Cl trace CuO trace	Q 31.0 ac 5.5 or 30.0 di 2.2 ab 20.4 mt 6.3 il 2.6 hm 2.4	Altendiez, Nassau.	Senftner.	J. Petersen, N. J., 1872, p. 593. R. T. 1873, p. XII.	Felsite-porphyry.	
	Q 29.1 ac 26.2 or 14.5 ns 3.9 ab 18.9 di 3.5 hy 3.1	Khartibugal, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 173, 1884. R. T. 1884, p. LXVI.	Pantellerite.	In W. T., p. 219, No. 4, varingose.

SUBRANG 4. DOSODIC.

	Q 36.4 hy 12.6 or 13.3 mt 0.9 ab 23.6 an 9.5 C 2.9	Fabbiasco, n. Lugano, Piedmont.	Slaytor.	T. Harada, N. J. B. B., II, p. 42, 1883. R. T. 1884, p. XVIII.	Felsophyre.	Alkalies low?

SUBRANG 4,5. PRESODIC.

	Q 35.5 di 0.9 or 1.1 hy 23.4 ab 10.5 mt 2.6 an 25.9	Little Falls, Minnesota.	Streng.	Streng, N. J., 1877, p. 230. R. T. 1879, p. XXXVI.	Quartz-diorite.	

ORDER 4. QUARDOFELIC. AUSTRARE.

SUBRANG 2. DOPOTASSIC.

	Q 28.2 ac 5.5 or 40.6 di 0.7 ab 17.3 hy 4.0 mt 2.3 il 0.5	Monte Mufetto, Serimando Valley, Bergamask Alps.	Gümbel.	Gümbel, Sb. Münch. Ak., 1880, p. 189. R. T. 1884, p. XVIII.	Felsite-porphyry.	Near omeose.

SUBRANG 3. SODIPOTASSIC. GRORUDOSE.

	Q 18.5 di 8.9 or 26.1 hy 0.4 ab 35.1 mt 0.7 an 3.1 hm 6.1	Urrismenagh, County Donegal, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIV, 1866. R. T. 1869, p. XLVI.	Granite.	Iron oxides?
	Q 17.8 ac 9.2 or 25.0 di 5.1 ab 35.1 hy 6.8 mt 1.6	Balduinstein, Hesse-Nassau.	Gümbel.	Gümbel, Sb. Münch. Ak., 1882, p. 210. R. T. 1884, p. XVI.	Felsite-porphyry.	
	Q 24.8 ac 20.8 or 17.2 ns 3.5 ab 24.6 di 3.8 hy 4.8	Khartibugal, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 173, 1884. R. T. 1884, p. LXVI.	Pantellerite.	In W. T., p. 224, No. 7, grorudose.
CuO 0.29	Q 19.6 ac 12.1 or 21.7 ns 1.7 ab 31.4 di 6.3 hy 7.0	Cuddia Mida, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 182, 1884. R. T. 1884, p. LXVI.	Pantellerite.	In W. T., p. 221, No. 8, grorudose.
CuO 0.25	Q 14.5 ac 10.6 or 24.5 ns 4.9 ab 33.0 di 6.0 hy 7.1	Khania, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 170, 1884. R. T. 1884, p. LXVI.	Pantellerite.	Not in W. T.

CLASS II. DOSALANE—Continued.

RANG 1. PERALKALIC. PANTELLERASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp. gr.
1	65.93	11.33	4.65	4.69	1.10	2.36	4.58	3.44	1.83					99.91	
A3. III	1.099	.111	.029	.065	.028	.042	.074	.036							
2	67.89	11.53	4.51	4.52	0.62	1.51	5.79	3.71	0.33					100.41	2.43
A3. III	1.132	.113	.028	.062	.016	.027	.093	.039							
3	67.48	9.70	7.42	2.21	0.77	1.45	7.21	2.94	0.96					100.14	2.68
A3. III	1.125	.095	.046	.030	.019	.026	.116	.031							
4	67.18	14.18	4.00	2.48	0.34	2.78	5.89	4.01	——					100.86	2.40
A3. III	1.120	.139	.025	.035	.009	.050	.095	.043							

RANG 2. DOMALKALIC. DACASE.

1	61.93	13.18	3.63	2.31	4.59	3.48	2.67	6.11	1.14					99.04	
B3. IV	1.032	.129	.023	.032	.115	.063	.044	.065							
2	64.94	17.50	0.69	3.94	2.83	2.59	3.44	3.11	1.36					100.40	2.72
A3. III	1.082	.171	.004	.055	.071	.046	.055	.033							
3	64.65	14.13	5.24	3.02	1.41	1.65	2.78	5.26	1.97	0.29	0.50		trace	100.90	2.659
A2. II	1.078	.138	.033	.042	.035	.030	.045	.056			.006		——		
4	66.57	15.59	0.37	4.25	1.88	1.85	3.69	5.27	0.62	trace	trace	trace		100.09	2.637
A3. III	1.110	.152	.002	.059	.047	.033	.060	.056			——	——			

RANG 2. DOMALKALIC. DACASE.

1	65.27	15.76	1.36	3.44	2.14	3.70	4.57	3.97	0.42			0.26		100.89	
A3. III	1.088	.154	.009	.048	.054	.066	.074	.043				.002			
2	56.59	12.41	5.39	10.28	2.02	6.70	4.27	1.02	1.45	trace	0.22	0.44		100.79	
A2. II	.943	.122	.034	.143	.051	.120	.069	.012			.003	.003			
3	63.49	12.42	6.41	1.34	1.32	4.17	4.90	1.78	2.88			trace	0.85	99.56	2.52
A3. III	1.058	.121	.040	.018	.033	.075	.079	.019				——	.012		15°
4	64.39	15.99	1.47	5.98	1.67	2.57	4.96	2.46	0.76			trace	trace	99.25	
B3. IV	1.073	.156	.009	.083	.042	.046	.080	.027							
5	67.74	13.04	4.48	3.81	1.01	3.08	4.80	1.55	0.88					100.39	
A3. III	1.129	.128	.028	.053	.025	.055	.077	.017							
6	70.17	11.10	1.92	2.86	1.23	3.34	3.77	3.23	1.87					99.49	
A3. III	1.170	.109	.012	.040	.031	.060	.061	.034							
7	60.78	16.90	4.79	4.11	2.89	1.50	4.01	2.69	2.84					100.51	2.698
A3. III	1.013	.166	.030	.057	.072	.027	.065	.029							

ORDER 4. QUARDOFELIC. AUSTRARE—Continued.

SUBRANG 4. DOSODIC. PANTELLEROSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 19.9 di 9.6 or 20.0 hy 2.7 ab 38.8 mt 6.7 an 0.3	Yxsta, Sect. Örebro, Sweden.	Hasselbom.	Gumälius, Sv. G. Und., XLVIII, p. 18, 1873. R. T. 1879, p. xiv.	Granite.	
	Q 16.9 ac 8.8 or 21.7 di 6.5 ab 38.8 hy 5.3 mt 2.1	Monte San Elmo, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 186, 1884. R. T. 1884, p. lxvi.	Pantellerite.	In W. T., p. 221, No. 3, pantellerose.
	Q 17.4 ac 21.3 or 17.2 ns 0.8 ab 33.5 di 6.2 hy 2.8	Monte San Elmo, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 186, 1884. R. T. 1884, p. lxvi.	Pantellerite.	In W. T., p. 221, No. 4, pantellerose.
	Q 13.3 di 4.4 or 23.9 wo 3.5 ab 49.8 mt 5.8 an 0.3	Cala Porticello, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 133, 1883. R. T. 1884, p. l.	Liparite.	Not in W. T
SUBRANG 3. SODIPOTASSIC. ADAMELLOSE.						
	Q 10.3 di 9.4 or 36.1 hy 8.3 ab 23.1 mt 5.3 an 5.6	Laveline, Vogesen.	van Werveke.	H. Rosenbusch, N. J., 1881, I, p. 235. R. T. 1884, p. xiv.	Granite.	
	Q 21.0 hy 13.8 or 18.4 mt 0.9 ab 28.8 an 12.8 C 3.8	Lippenhof, n. Tryberg, Schwarzwald, Baden.	Gattermann?	G. H. Williams, N. J. B. B., II, p. 624, 1883. R. T. 1884, p. xxx.	Quartz-diorite-porphyry.	Near dacase, cf. No. 12, adamellose, W. T., p. 223.
	Q 22.4 hy 8.9 or 31.1 mt 7.7 ab 23.6 il 0.9 an 8.3 C 0.7	Corällchen, n. Liebenstein, Thuringia.	G. Pringsheim.	G. Pringsheim, Z. D. G. G., XXXII, p. 144, 1880. R. T. 1884, p. xvi.	Granite-porphyry.	Near toscanose.
CuO trace	Q 14.6 hy 12.2 or 31.1 mt 0.5 ab 31.4 an 9.2 C 0.3	Kirche Wange, Silesia.	O. Jung.	O. Jung, Z. D. G. G., XXXV, p. 830, 1883. R. T. 1884, p. xvi.	Granite-porphyry.	Near toscanose.
SUBRANG 4. DOSODIC. DACOSE.						
	Q 11.6 di 6.7 or 23.9 hy 6.8 ab 38.8 mt 2.0 an 10.3	Watab, Minnesota.	Streng.	Streng, N. J., 1877, p. 230. R. T. 1879, p. xxxvi.	Quartz-diorite.	Near adamellose.
	Q 8.8 di 16.4 or 6.7 hy 11.1 ab 36.2 mt 7.9 an 11.4 ap 1.0	Sauk Center, Minnesota.	Streng.	Streng, N. J., 1877, p. 227. R. T. 1879, p. xxxiv.	Quartz-diorite.	Near III, 4, 2, 4.
SO_3 trace Cl trace Cu trace	Q 20.3 di 7.2 or 10.6 wo 2.2 ab 41.4 mt 4.2 an 6.4 hm 3.5	Yate Volcano, Patagonia.	H. Ziegenspeck.	H. Ziegenspeck, In. Diss., Jena, 1883, p. 46. R. T. 1884, p. lxxii.	Augite-andesite.	In W. T., p. 227, No. 11, dacose.
	Q 12.2 hy 14.0 or 15.0 mt 2.1 ab 41.9 an 12.8 C 0.3	Peterhead, Scotland.	A. Phillips.	A. Phillips, Q. J. G. S., XXXVI, p. 13, 1880. R. T. 1884, p. xiv.	Segregation in granite.	Cf. No. 10, toscanose.
	Q 25.6 di 4.9 or 9.5 hy 3.4 ab 40.4 mt 6.5 an 9.5	Finaker, Sect. Linde, Sweden.	Hummel.	Hummel, Sv. G. Und., XLVII, p. 16, 1873. R. T. 1879, p. xiv.	Granite.	
	Q 28.0 di 10.6 or 18.9 hy 1.5 ab 32.0 mt 2.8 an 3.9	Klausen, Vildarthal, Tyrol.	von John?	Teller and von John, Jb. Wien. G. R-A., XXXII, p. 653, 1882. R. T. 1884, p. xxviii.	Quartz-diorite.	
	Q 17.8 hy 10.8 or 16.1 mt 7.0 ab 34.1 an 7.5 C 4.6	Suldenferner, Mte. Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 403, 1879. R. T. 1884, p. xxxiv.	Quartz-porphyrite.	

CLASS II. DOSALANE—Continued.

RANG 3. ALKALICALCIC. TONALASE.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	57.88	15.20	7.50	1.35	6.34	4.81	2.67	3.03	1.04					99.82	
A3. III	.965	.149	.047	.019	.159	.086	.044	.032							
2	56.32	18.26	3.70	4.28	4.15	6.13	2.37	2.67	2.22					100.10	
A3. III	.939	.179	.023	.060	.104	.109	.039	.029							
3	62.75	17.11	2.20	5.61	0.77	4.57	2.57	4.41	0.50					100.49	
A3. III	1.046	.168	.014	.078	.019	.082	.042	.047							
4	57.02	16.52	3.25	6.27	2.42	8.64	2.38	2.54	1.28					100.32	2.703
A3. III	.950	.162	.020	.088	.061	.154	.039	.027							

RANG 3. ALKALICALCIC. TONALASE.

1	60.32	16.92	5.88	1.40	3.52	5.64	3.83	2.42	0.44					100.37	
A3. III	1.005	.166	.036	.019	.087	.101	.061	.025							
1	59.97	16.93	2.41	4.83	3.61	5.10	3.87	1.32	1.60					99.64	
A3. III	1.000	.166	.015	.067	.090	.091	.063	.014							
2	59.95	17.35	1.44	5.59	2.88	6.75	3.30	2.08	1.42					100.76	2.776
A3. III	.999	.170	.009	.078	.072	.121	.053	.022							
3	56.85	16.70	5.92	7.13	3.25	5.97	2.78	1.91	0.54					101.05	
B3. IV	.948	.164	.037	.099	.081	.107	.045	.020							
4	58.01	18.19	3.40	2.89	3.01	7.55	3.92	1.39	1.60					99.96	
A3. III	.967	.178	.021	.040	.075	.135	.063	.015							

RANG 4. DOCALCIC. BANDASE.

1	52.02	17.14	7.96	3.52	3.13	11.57	2.38	0.60	0.28			trace	trace	99.45	2.76
A3. III	.867	.168	.050	.049	.078	.207	.039	.006				—	—		16°
2	56.20	15.26	7.74	5.09	3.21	9.50	2.70	0.62	—					100.32	
A3. III	.937	.150	.048	.071	.080	.170	.044	.006							
3	61.37	15.76	4.06	2.94	2.86	7.27	3.04	0.71	2.64					100.65	2.72
A3. III	1.023	.154	.026	.041	.072	.130	.049	.008							
4	57.82	18.00	2.15	3.47	3.16	11.90	2.34	0.97	1.03					100.84	
A3. III	.964	.176	.014	.049	.079	.213	.038	.010							

ORDER 4. QUARDOFELIC. AUSTRARE—Continued.

SUBRANG 3. SODIPOTASSIC. HARZOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 11.5 di 2.8 or 17.8 hy 14.6 ab 23.1 mt 4.4 an 20.3 hm 4.5	West Aston, County Wicklow, Ireland.	S. Haughton	S. Haughton, Tr. R. Ir. Ac., XXIII, p. 619, 1859. R. T. 1869, p. LXIV.	Greenstone (diorite).	Iron oxides? Cf. No. 2, shoshonose.
	Q 10.3 hy 15.3 or 16.1 mt 5.3 ab 20.4 an 30.3 C 0.2	Gäddviken, Animskogssocken, Sweden.	Törnebohm.	Törnebohm, Sv. G. Und., XXXIV, p. 31, 1870. R. T. 1873, p. XVIII.	Diorite.	Near II. 5. 4. 3.
	Q 16.1 di 0.7 or 26.1 hy 9.9 ab 22.0 mt 3.3 an 22.0	Launa Körkia, Island Hochland, Finland.	Lemberg.	Lemberg, Arch. Nk. Livl., IV, p. 179, 1867. R. T. 1869, p. LXIV.	Labradorite-porphyry (diorite).	
	Q 10.5 di 13.5 or 15.0 hy 8.3 ab 20.4 mt 4.6 an 26.7	Hintere Gratspitze, Mte. Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 395, 1879. R. T. 1884, p. XXXIV.	Suldenite.	

SUBRANG 4. DOSODIC. TONALOSE.

	Q 13.3 di 4.5 or 13.9 hy 6.6 ab 32.0 mt 4.4 an 22.2 hm 2.7	Hac. de Chuquipoyo, Chimborazo, Ecuador.	A. Schwager.	Gümbel, Sb. Münch. Ak., 1881, p. 348. R. T. 1884, p. LXX.	Andesite.	In W. T., p. 239. No. 77, tonalose.
	Q 13.1 di 0.4 or 7.8 hy 15.4 ab 33.0 mt 3.5 an 24.7	Vildarthal, Tyrol.	von John?	Teller and von John, Jb. Wien. G. R-A., XXXII, p. 653, 1882. R. T. 1884, p. XXVIII.	Quartz-norite.	
	Q 11.5 di 6.0 or 12.2 hy 13.3 ab 27.8 mt 2.1 an 26.4	Lienz, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 400, 1879. R. T. 1884, p. XXXII.	Porphyrite.	
	Q 12.5 di 1.8 or 11.1 hy 15.4 ab 23.6 mt 8.6 an 27.5	Tinnebach, Tyrol.	von John?	Teller and von John, Jb. Wien. G. R-A., XXXII, p. 653, 1882. R. T. 1884, p. XXVIII.	Norite-porphyry.	
	Q 10.2 di 7.7 or 8.3 hy 6.4 ab 33.0 mt 4.9 an 27.8	Hajto, n. Nagyag, Siebenbürgen.	C. Doelter.	C. Doelter, T. M. P. M., 1873, p. 95. R. T. 1879, p. LXIV.	Dacite.	Near andose.

SUBRANG 4,5. PRESODIC. BANDOSE.

SO_3 trace Cl trace	Q 11.3 di 16.9 or 3.3 wo 0.8 ab 20.4 mt 11.5 an 34.2	Portañuela, Yate Volcano, Patagonia.	H. Ziegenspeck.	H. Ziegenspeck, In. Diss., Jena., 1883, p. 29. R. T. 1884, p. LXXIV.	Basalt.	In W. T., p. 249, No. 14, bandose.
	Q 15.8 di 15.6 or 3.3 hy 3.6 ab 23.1 mt 11.1 an 27.8	Stransko, n. Liebstadt, Bohemia.	Werther.	Werther, Jb. Pr. Chem., XCI, p. 330, 1864. R. T. 1869, p. LXXVIII.	Melaphyre.	Cf. No. 9, andose.
	Q 22.0 di 7.3 or 4.5 hy 5.7 ab 25.7 mt 6.0 an 27.0	St. Egidi, Styria.	Niedzwiedki.	Niedzwiedki, T. M. P. M., 1872, p. 255. R. T. 1873, p. XLVIII.	Pitchstone.	
	Q 13.3 di 19.3 or 5.6 hy 3.1 ab 19.9 mt 3.3 an 35.6	Suldenferner, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 341, 1879. R. T. 1884, p. XXX.	Diorite-porphyry.	

CLASS II. DOSALANE—Continued.

RANG 1. PERALKALIC. UMPTEKASE.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	61.86	16.58	2.17	6.39	0.54	0.28	4.98	5.34	1.95	0.30	0.10	0.11	trace	100.72	2.701
A2. II	1.031	.162	.014	.089	.014	.005	.081	.056			.001	.001	—		

RANG 1. PERALKALIC. UMPTEKASE.

1	63.69	15.03	2.51	2.41	0.80	3.30	6.54	2.46	2.23			trace	0.55	99.52	2.55
A3. III	1.062	.147	.015	.033	.020	.059	.105	.026				—	.008		15°

RANG 2. DOMALKALIC. MONZONASE.

1	52.14	15.37	6.83	3.35	6.62	6.54	3.38	4.43	2.15					100.81	
A3. III	.869	.150	.043	.047	.166	.117	.055	.047							
2	57.73	17.85	4.44	3.90	1.77	3.65	3.77	7.65	0.09			trace		100.85	2.61
A3. III	.962	.175	.028	.054	.044	.065	.061	.082				—			

RANG 2. DOMALKALIC. MONZONASE.

1	59.62	18.81	2.03	2.99	1.92	5.13	5.65	2.68	1.04					99.84	
A3. III	.994	.183	.013	.042	.048	.091	.091	.029							
2	57.89	16.82	5.61	2.83	3.51	3.01	5.87	2.96	1.38		0.57		0.14	100.59	2.779
A2. II	.965	.165	.035	.039	.088	.054	.095	.032			.007		.002		
3	51.42	16.52	6.64	4.42	4.62	6.48	4.72	3.46	1.82		0.64			100.74	2.722
A2. II	.857	.162	.042	.061	.116	.116	.076	.037			.008				
4	52.85	13.70	6.91	7.32	2.88	7.00	4.23	2.74	1.98					99.61	2.796
A3. III	.881	.134	.043	.102	.072	.125	.068	.029							
5	56.02	16.52	5.02	5.51	4.67	4.20	5.83	1.66	0.47				0.36	100.26	
A3. III	.934	.162	.031	.076	.117	.075	.093	.018					.005		

RANG 3. ALKALICALCIC. ANDASE.

1	56.51	19.61	5.10	0.98	2.66	7.89	3.12	3.67	0.40				0.11	100.05	2.50
A3. III	.942	.192	.032	.014	.067	.141	.050	.039					.002		
2	52.08	15.60	5.75	2.57	8.40	6.52	2.92	3.80	2.24					99.88	
A3. III	.868	.153	.036	.036	.210	.116	.047	.040							
3	54.65	15.72	2.00	6.26	5.91	7.83	2.90	3.79	1.90			trace	trace	100.96	2.864
A3. III	.911	.154	.013	.087	.148	.139	.047	.040							

ORDER 5. PERFELIC. GERMANARE.

SUBRANG 3. SODIPOTASSIC. ILMENOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
SO_3 0.12	Q 6.6 hy 11.3 or 31.1 mt 3.3 ab 42.4 an 1.4 C 2.0	Ortberg, n. Elbingerode, Harz Mountains.	Jacobs.	K. A. Lossen, Sb. Ges. Nat. Fr., 1883, p. 178. R. T. 1884, p. XXII.	Keratophyre.	

RANG 4. DOSODIC. UMPTEKOSE.

SO_3 trace Cl trace Cu trace	Q 9.8 di 9.4 or 14.5 mt 3.5 ab 55.0 an 4.4	Yate Volcano, Patagonia.	H. Ziegenspeck.	H. Ziegenspeck, In. Diss., Jena., 1883, p. 42. R. T. 1884, p. LXXII.	Andesite.	In W. T., p. 253, No. 4, umptekose near pantellerose and kallerudose.

SUBRANG 3. SODIPOTASSIC. MONZONOSE.

or 26.1 di 14.9 ab 25.2 ol 7.2 an 13.3 mt 10.0 ne 2.0	Wehling, n. Heidelberg, Rhenish Prussia.	Nietzsche.	Beneke and Cohen, Geog. Besch. Heidelb., 1879, p. 93. R. T. 1879, p. XXIV.	Syenite.	
or 45.6 di 7.6 ab 26.2 ol 3.0 an 8.9 mt 6.5 ne 3.1	L'Arso, Ischia.	C. W. C. Fuchs.	C. W. C. Fuchs, T. M. P. M., 1872. p. 230. R. T. 1873, p. XXXVIII.	Trachyte.	Cf. No. 40, monzonose, W. T., p. 259.

SUBRANG 4. DOSODIC. AKEROSE.

Q 2.6 di 6.4 or 16.1 hy 5.5 ab 47.7 mt 3.0 an 17.5	Busholm, Sweden.	Törnebohm.	Hummel and Erdmann, Sv. G. Und., XXXIV, p. 27, 1870. R. T. 1873, p. X.	Granite.	
Q 1.4 di 3.5 or 17.8 hy 7.2 ab 49.8 mt 7.4 an 10.6 il 1.1 hm 0.5	Barr-Andlau, Vogesen.	Unger.	H. Rosenbusch, Steig. Schiefer., 1877, p. 154. R. T. 1879, p. XIV.	Segregation in granite.	Cf. No. 2, amiatos.
or 20.6 di 14.6 ab 28.8 ol 4.4 an 13.6 mt 9.7 ne 5.9 il 1.2	Hopfenberg, n. Schwarzenfels, Rhöngebirge.	Möhl.	Möhl, N. J., 1874, p. 906, R. T. 1879, p. LXXII.	Basalt.	
Q 0.4 di 20.4 or 16.1 hy 4.8 ab 35.6 mt 10.0 an 10.3	Suldenferner, Monte Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 368, 1879. R. T. 1884, p. XXXII.	Ortlerite.	
or 10.0 di 5.3 ab 48.7 hy 10.8 an 14.2 ol 3.1 mt 7.2	Taal Volcano, Luzon, Philippines.	K. Oebbeke.	K. Oebbeke, N. J. B. B. I., p. 482, 1881. R. T. 1884, p. LXX.	Augite-andesite.	

SUBRANG 3. SODIPOTASSIC. SHOSHONOSE.

Li_2O trace	Q 5.8 di 8.2 or 21.7 hy 2.9 ab 26.2 mt 3.3 an 28.6 hm 2.9	Truckee Canyon, Purple Hills, Nevada.	R. W. Woodward.	C. King, G. Expl. 40th Par., II, p. 833, 1877. R. T. 1879, p. LVIII.	Trachyte.	
	or 22.2 di 10.8 ab 24.6 hy 6.8 an 18.4 ol 6.4 mt 8.3	West Aston, County Wicklow, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIII, p. 619, 1859. R. T. 1869, p. LXIV.	Greenstone (diorite).	Cf. No. 1, harzose.
Cl trace S trace	or 22.2 di 16.3 ab 24.6 hy 8.0 an 18.6 ol 6.3 mt 3.0	Hohne, Harz Mountains.	Keibel.	Keibel, Z. D. G. G., IX, p. 575, 1857. R. T. 1869, p. LVIII.	Diorite (syenite).	

CLASS II. DOSALANE—Continued.

RANG 3. ALKALICALCIC. ANDASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp. gr.
4	53.73	18.22	5.83	6.32	1.62	7.00	2.76	2.83	1.68					99.99	2.765
A3. III	.896	.178	.036	.088	.041	.125	.045	.030							
5	48.95	14.80	8.42	10.23	2.08	7.40	3.23	2.97	1.76					99.84	2.832
A3. III	.816	.145	.053	.142	.052	.132	.052	.032							
6	55.35	17.51	3.39	7.61	1.45	6.36	3.51	3.45	1.82					100.45	2.794
A3. III	.923	.172	.021	.106	.036	.114	.056	.037							
7	54.48	19.44	1.80	4.90	3.72	7.08	3.58	3.32	1.70					100.02	
A3. III	.908	.190	.011	.068	.093	.127	.058	.035							

RANG 3. ALKALICALCIC. ANDASE.

1	56.19	16.12	4.92	4.43	4.60	7.00	2.96	2.37	1.03			0.27	trace	99.91	2.742
A3. III	.937	.158	.031	.061	.115	.125	.048	.025				.002	—		
2	49.04	18.11	2.71	7.70	4.72	7.11	4.22	2.11	1.29		2.46			99.42	2.80
B2. III	.817	.177	.017	.107	.118	.127	.068	.022			.031				
3	54.52	19.10	2.83	5.89	3.92	7.25	3.73	2.30	0.59		trace			100.13	2.6—
A3. III	.909	.187	.018	.082	.098	.130	.060	.024			—				2.7
4	53.94	17.05	2.93	7.15	4.67	7.41	3.45	2.19	1.10				trace	99.89	2.6—
A3. III	.899	.167	.018	.099	.117	.132	.056	.023					—		2.7
5	58.45	17.08	0.76	4.61	5.15	7.60	4.25	1.02				trace	trace	99.99	2.94
A3. III	.974	.167	.005	.064	.129	.136	.069	.011				—	—		
6	54.89	15.16	3.05	5.08	5.79	7.94	3.24	2.32	1.80					99.27	
B3. IV	.915	.148	.019	.071	.145	.142	.052	.024							
7	54.68	15.52	2.70	5.32	4.22	9.82	3.27	2.13	1.94					99.60	
A3. III	.911	.152	.017	.074	.106	.175	.053	.022							
8	55.10	15.72	3.23	5.40	6.48	7.73	3.19	1.20	1.45	0.50		trace		100.00	
A3. III	.918	.154	.020	.075	.162	.138	.052	.013				—			
9	51.69	15.72	3.25	6.80	4.85	9.38	3.90	1.05	1.42	0.87	1.51		trace	100.44	2.931
A3. III	.862	.154	.020	.094	.121	.168	.063	.011			.019				15°
10	53.18	18.43	6.46	3.46	4.55	6.85	3.05	2.56	1.98			trace		100.52	2.842
A3. III	.886	.180	.040	.048	.114	.122	.049	.028							
11	61.80	16.70	3.28	3.89	1.87	6.60	3.97	2.08	0.09					100.28	2.764
A3. III	1.030	.162	.021	.054	.047	.118	.079	.022							

ORDER 5. PERFELIC. GERMANARE—Continued.

SUBRANG. SODIPOTASSIC. SHOSHONOSE—Continued.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 7.4 di 5.1 or 16.7 hy 8.4 ab 23.6 mt 8.4 an 28.6	Plimabach, Monte Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 371, 1879. R. T. 1884, p. xxxii.	Ortlerite.	
	or 17.8 di 16.8 ab 27.3 hy 3.1 an 17.0 ol 4.0 mt 12.3	Gratspitze, Monte Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 362, 1879. R. T. 1884, p. xxxii.	Ortlerite.	
	Q 3.1 di 9.3 or 20.6 hy 10.6 ab 29.3 mt 4.9 an 22.0	S. of Zehnerkopf, Wildkaar, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXVII, p. 227, 1877. R. T. 1879, p. xliv.	Proterobase.	
	or 19.5 di 6.8 ab 30.4 hy 8.2 an 27.0 ol 3.9 mt 2.6	Limansua, Island Leyte, Philippines.	K. Oebbeke	K. Oebbeke, N. J. B. B., I, p. 461, 1881. R. T. 1884, p. lxviii.	Hornblende-andesite.	Near andose.

SUBRANG 4. DOSODIC. ANDOSE.

Cl 0.02	Q 8.6 di 9.0 or 13.9 hy 11.0 ab 25.2 mt 7.2 an 23.6	Buffalo Peak, Colorado.	W. F. Hillebrand.	W. Cross, A. J. S., XXV, p. 142, 1883. R. T. 1884, p. lxxii.	Andesite.	In W. T., p. 277, No. 35, andose.
	or 12.2 di 9.1 ab 24.6 ol 11.1 an 29.9 mt 3.9 ne 3.1 il 4.7	Buffalo Peak, North Park, Colorado.	R. W. Woodward.	C. King, G. Expl., 40th par., II, p. 126, 1877. R. T. 1879, p. lxxiv.	Basalt.	
	Q 1.0 di 6.2 or 13.3 hy 14.3 ab 31.4 mt 4.2 an 28.6	Diabase Hills, Truckee Range, Nevada.	R. W. Woodward.	C. King, G. Expl., 40th par., II, p. 574, 1877. R. T. 1879, p. xlii.	Diabase.	
	Q 0.4 di 10.1 or 12.8 hy 17.4 ab 29.3 mt 4.2 an 24.5	Diabase Hills, Truckee Range Nevada.	R. W. Woodward.	C. King, G. Expl., 40th par., II, p. 812, 1877. R. T. 1879, p. lxxiv.	Basalt.	
	Q 5.0 di 11.1 or 6.1 hy 15.3 ab 36.2 mt 1.2 an 24.2	Pen Maen Mawr Wales.	Phillips.	Phillips, Q. J. G. S., XXXIII, p. 424, 1877. R. T. 1879, p. xxxiv.	Diorite.	
	Q 2.8 di 15.7 or 13.3 hy 13.8 ab 27.3 mt 4.4 an 20.0	Langviksuäs, Animskogssocken, Sweden.	Törnebohm.	Törnebohm, Sv. G. Und., XXXIV, p. 31, 1870. R. T. 1873, p. xviii.	Diorite.	
	Q 2.8 di 22.2 or 12.2 hy 7.3 ab 27.8 mt 3.9 an 21.4	N. of Myran, Animskogssocken, Sweden.	Törnebohm.	Törnebohm, Sv. G. Und., XXXIV, p. 31, 1870. R. T. 1873, p. xviii.	Diorite.	
Li_2O trace Rb_2O trace Cs_2O trace	Q 50.4 di 11.0 or 7.2 hy 18.1 ab 27.3 mt 4.6 an 24.7	Bet. Konken and Herchweiler, Palatinate.	Laspeyres.	Laspeyres, Vh. Nh. Ver. Bonn., X, p. 381, 1883. R. T. 1884, p. xlvi.	Melaphyre.	
	or 6.1 di 20.0 ab 33.0 hy 8.3 an 22.2 ol 0.1 mt 4.6 il 2.9	Dietesheim, Mainthal.	Hornstein.	Hornstein, Z. D. G. G., XIX, p. 341, 1867. R. T. 1869, p. cxxxii.	Anamesite.	Near camptonose.
	Q 4.6 di 4.2 or 15.6 hy 10.5 ab 25.7 mt 9.3 an 28.6	Stransko, n. Liebstadl, Bohemia.	Mikula.	G. Tschermak, Vh. Wien. G. R-A., 1867, p. 52. R. T. 1869, p. lxxviii.	Melaphyre.	Cf. No. 1, bandose.
	Q 10.0 di 13.1 or 12.2 hy 2.4 ab 41.4 mt 4.9 an 17.0	Suldenferner, Monte Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 403, 1879. R. T. 1884, p. xxxiv.	Quartz-porphyrite.	Near harzose, tonalose, and shoshonose.

CLASS II. DOSALANE—Continued.

RANG 3. ALKALICALCIC. ANDASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
12	55.15	17.92	2.82	3.82	2.86	11.30	3.25	1.28	2.49					100.89	2.731
A3. III	.919	.175	.018	.053	.072	.202	.053	.014							
13	55.05	17.16	5.19	5.01	2.47	8.30	3.79	2.84	1.23					101.04	2.764
B3. IV	.918	.168	.033	.069	.062	.148	.061	.030							
14	54.90	16.32	6.52	5.81	1.66	6.80	3.87	1.61	2.47					99.86	2.775
A3. III	.915	.160	.041	.081	.042	.121	.063	.017							
15	57.85	17.32	4.38	5.19	2.97	7.08	4.02	1.23	0.98					101.02	2.706
B3. IV	.964	.170	.028	.072	.074	.127	.065	.013							
16	55.80	17.20	5.22	7.13	2.76	6.97	3.62	1.23	1.23					101.16	
B3. IV	.930	.169	.033	.099	.069	.125	.058	.013							
17	55.18	16.80	1.93	10.37	2.62	6.90	3.20	2.42	1.63					101.05	2.818
B3. IV	.920	.165	.012	.144	.066	.123	.052	.026							
18	54.55	15.15	4.62	10.42	2.93	6.06	4.25	1.20	1.97					101.15	2.828
B3. IV	.909	.148	.029	.144	.073	.108	.069	.013							
19	51.75	18.96	2.34	10.42	3.25	6.84	3.45	1.93	1.23					100.17	2.837
A3. III	.863	.186	.014	.144	.081	.122	.056	.021							
20	48.18	18.86	2.27	6.22	8.46	9.95	3.88	1.23	0.45		trace	0.37	trace	99.87	2.954
A3. III	.803	.185	.014	.086	.212	.178	.063	.013			—	.003	—		
21	49.27	18.54	6.98	5.62	3.76	10.38	3.45	2.22	——					100.36	2.738
A3. III	.821	.182	.044	.078	.094	.186	.056	.023							
22	49.24	19.06	1.77	10.33	5.00	8.75	3.89	1.19	0.63					99.86	
A3. III	.821	.186	.011	.143	.125	.156	.063	.013							
23	58.42	17.64	5.66	4.00	2.54	4.50	4.44	2.52	0.42		0.31		0.48	100.93	
B2. III	.974	.173	.036	.056	.064	.080	.072	.027			.004		.007		
24	54.62	16.96	4.50	4.27	5.20	8.56	3.26	1.80	0.73		trace		.035	100.25	
A3. III	.910	.166	.028	.060	.130	.153	.053	.019			—		.005		
25	53.39	15.23	8.73	3.61	4.12	8.46	3.60	1.84	1.14	0.22		0.16		100.66	2.814
A2. II	.890	.149	.054	.050	.103	.151	.058	.020				.001			

ORDER 5. PERFELIC. GERMANARE—Continued.

SUBRANG 4. DOSODIC. ANDOSE—Continued.

Inclusive.		Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
		Q 6.0 di 21.3 or 7.8 hy 1.4 ab 27.8 mt 4.2 an 30.0	Suldenferner, Monte Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 395, 1879. R. T. 1884, p. xxxiv.	Suldenite.	
		Q 2.9 di 16.0 or 16.7 hy 3.2 ab 32.0 mt 7.7 an 21.4	Near Schaubach, Monte Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 395, 1879. R. T. 1884, p. xxxiv.	Suldenite.	
		Q 9.1 di 9.5 or 9.5 hy 4.7 ab 33.0 mt 9.5 an 22.2	Suldenferner, Monte Cevedale, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 395, 1879. R. T. 1884, p. xxxii.	Suldenite.	Near tonalose.
		Q 9.5 di 8.0 or 7.2 hy 9.3 ab 34.1 mt 6.5 an 25.6	Pradaccio, Valforno, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXIX, p. 341, 1879. R. T. 1884, p. xxx.	Diorite.	Near tonalose.
		Q 8.6 di 6.3 or 7.2 hy 12.8 ab 30.4 mt 7.7 an 27.2	Tinnebach, Tyrol.	von John.	Teller and von John, Jb. Wien. G. R-A., XXXII, p. 653, 1882. R. T. 1884, p. xxviii.	Enstatite-norite.	
		Q 2.6 di 8.6 or 14.5 hy 19.7 ab 27.3 mt 2.8 an 24.2	Zehner Kopf, Wild Kaar, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXVII, p. 226, 1877. R. T. 1879, p. xliv.	Labradorite-porphyrite.	
		Q 3.3 di 9.8 or 7.2 hy 17.5 ab 36.2 mt 6.7 an 18.4	Zehner Kopf, Wild Kaar, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXVII, p. 227, 1877. R. T. 1879, p. xliv.	Labradorite-porphyrite.	
		or 11.7 di 3.1 ab 29.3 hy 13.8 an 30.3 ol 7.4 mt 3.3	Sobretta, Tyrol.	von John.	Stache and von John, Jb. Wien. G. R-A., XXVII, p. 226, 1877. R. T. 1879, p. xliv.	Labradorite-porphyrite.	
NiO Cu	trace trace	or 7.2 di 13.2 ab 20.4 ol 17.6 an 30.3 mt 3.3 ne 6.8 ap 0.9	Mosso, n. Biella, Piedmont.	Cossa.	Cossa, Ricerche Chem. e Micros. 1881, p. 63. R. T. 1884, p. xlii.	Olivine-diabase.	
Cl	0.14	or 12.8 di 18.6 ab 22.5 ol 3.6 an 28.6 mt 10.2 ne 3.7	Lava of Jan. 30, 1865. Lingua Grossa, Mount Etna.	C. W. C. Fuchs.	C. W. C. Fuchs, N. J., 1865, p. 713. R. T. 1869, p. cxxviii.	Dolerite	
		or 7.2 di 10.7 ab 26.2 ol 18.3 an 30.6 mt 2.6 ne 3.7	Ferdinandea Island, Mediterranean.	H. Förstner.	H. Förstner, T. M. P. M., XV, p. 391, 1883. R. T. 1884, p. lxxvi.	Basalt.	In W. T., p. 283, No. 94, andose.
		Q 8.6 ... 0.9 or 15.0 hy 8.1 ab 37.7 mt 8.4 an 21.1 il 0.6	Taal Volcano, Luzon, Philippines.	K. Oebbeke.	K. Oebbeke, N. J., B. B., I, p. 481, 1881. R. T. 1884, p. lxx.	Andesite.	
		Q 3.5 di 13.1 or 10.6 hy 10.9 ab 27.8 mt 6.5 an 26.1	Sierra de Mariveles, Luzon, Philippines.	K. Oebbeke.	K. Oebbeke, N. J., B. B., I, p. 471, 1881. R. T. 1884, p. lxx.	Andesite.	
FeS_2	0.16	Q 5.8 di 17.3 or 11.1 hy 2.3 ab 30.4 mt 11.6 an 19.7 hm 0.9	Snow River, North Gippsland, Victoria.	A. W. Howitt.	A. W. Howitt, N. J., 1882, I, p. 416. R. T. 1884, p. xl.	Diabase-porphyrite.	

CLASS II. DOSALANE—Continued.

RANG 3. ALKALICALCIC. ANDASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	49.97	17.01	0.86	5.94	7.75	6.39	5.14	.077	5.08	0.03	0.32	.045	0.10		
A1. I	.833	.167	.006	.082	.194	.114	.083	.008			.004	.003	.001		
2	54.14	13.12	7.20	4.72	5.94	7.34	3.82	0.57	2.78		0.88	trace	trace	100.51	2.578
A2. II	.902	.128	.045	.065	.149	.131	.061	.006			.011	—	—		

RANG 4. DOCALCIC. HESSASE.

1	52.95	19.25	4.57	4.69	4.12	9.12	2.09	2.42	0.71	0.34				100.26	2.875
A3. III	.883	.190	.029	.065	.103	.163	.034	.025							

RANG 4. DOCALCIC. HESSASE.

1	47.54	19.52	4.24	6.95	6.66	11.70	3.09	0.16	—		0.18		0.18	100.22	
A2. II	.792	.191	.026	.097	.167	.209	.050	.002			.002		.003		
2	54.80	17.58	0.97	8.84	4.47	8.22	3.14	1.16	0.94				trace	100.12	2.50
A3. III	.913	.172	.006	.123	.112	.146	.051	.012					—		
3	50.08	18.84	7.05	1.03	6.57	12.37	2.39	0.57	0.80				0.88	100.58	
A3. III	.835	.184	.044	.014	.164	.221	.039	.006					.013		
4	48.88	18.85	2.13	6.62	6.45	11.46	2.93	0.70	2.54					100.56	
A3. III	.815	.185	.013	.092	.161	.205	.047	.007							
5	53.00	17.19	4.78	5.05	4.66	8.08	2.92	1.49	1.35		0.57	0.37	trace	99.46	2.856
A2. II	.883	.169	.030	.070	.117	.145	.047	.016			.007	.003	—		
6	43.19	18.69	7.94	6.07	4.98	9.93	3.50	1.15	1.94	0.23	0.90	0.47	1.72	100.71	3.092
B2. III	.720	.183	.050	.085	.125	.177	.056	.012			.011	.003	.024		
7	53.65	20.77	0.98	7.61	1.57	9.16	3.33	1.61	1.33					100.01	2.82
A3. III	.894	.203	.006	.106	.039	.164	.054	.017							.11°
8	46.71	22.23	0.79	5.46	10.30	11.69	1.70	0.15	1.15					100.18	3.017
A3. III	.779	.218	.005	.076	.258	.209	.027	.002							

CLASS II. DOSALANE.

RANG 1. PERALKALIC. LAURDALASE.

1	54.52	13.37	0.61	3.52	6.37	4.38	1.60	10.73	2.76	1.82				99.58	
A3. III	.909	.131	.004	.049	.159	.079	.026	.114							

ORDER 5. PERFELIC. GERMANARE—Continued.

SUBRANG 5. PERSODIC. BEERBACHOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
Cl 0.03 F 0.10 S 0.12 CuO 0.12 BaO 0.06 Li_2O 0.02	or 4.5 di 8.5 ab 36.2 ol 17.9 an 21.1 mt 1.4 ne 4.0 il 0.6 ap 1.0	Norheim Tunnel, Nahethal, Rhenish Prussia.	Laspeyres.	Laspeyres, Z. D. G. G., XIX, p. 855, 1867. R. T. 1869, p. LXX.	Gabbro.	
	Q 8.9 di 15.3 or 3.3 hy 9.2 ab 32.0 mt 10.4 an 17.0 il 1.7	Säsebuhl, n. Drausfeld, Hanover.	Möhl.	Möhl, N. J., 1874, p. 906. R. T. 1879, p. LXXIV.	Tachylyte.	Near hessose.

SUBRANG 3. SODIPOTASSIC.

	Q 5.8 di 7.2 or 13.9 hy 11.6 ab 17.8 mt 6.7 an 36.4	Monte Mulatto, Predazzo, Tyrol.	Szameit.	G. Tschermak, Porphyrgest. Oester., 1867, p. 127. R. T. 1869, p. LXXVIII.	Melaphyre.	Al_2O_3 high? MgO low?

SUBRANG 4,5. PRESODIC. HESSOSE.

	or 1.1 di 15.8 ab 23.6 ol. 13.2 an 38.6 mt 6.0 ne 1.4 il 0.3	Cascade Mountains, Oregon.	Jannasch.	Jannasch and Kloos, T. M. P. M., 1881, p. 102, R. T. 1884, p. LXXIV.	Dolerite.	
	Q 3.1 di 8.6 or 6.7 hy 23.3 ab 26.7 mt 1.4 an 30.3	Ombe Mountains, Nevada.	R. W. Woodward.	C. King, G. Expl. 40th Par., II, p. 500, 1877. R. T. 1879, p. LXXIV.	Basalt.	Near andose.
	Q 2.5 di 17.7 or 3.3 hy 8.2 ab 20.4 mt 3.3 an 38.6 hm 4.8	Doonane Hill, County Donegal, Ireland.	S. Haughton.	S. Haughton, Tr. R. Ir. Ac., XXIV, p. 28, 1866, R. T. 1869, p. LXIV.	Trap (diorite).	Iron oxides?
	or 3.9 di 16.8 ab 24.6 hy 13.4 an 36.4 mt 3.0	N. of Sörskogen, Animskogssocken, Sweden.	Törnebohm.	Törnebohm, Sv. G. Und., XXXIV, p. 31, 1870, R. T. 1873, p. XVIII.	Diorite.	
	Q 6.8 di 6.5 or 8.9 hy 13.0 ab 24.6 mt 7.0 an 29.5 il 1.1 ap 0.9	Schwarzenberg, Vogesen.	L. von Werveke.	H. Rosenbusch, Steiger Schiefer., 1877, p. 334, R. T. 1879, p. XXX.	Quartz-diorite.	Near andose.
	or 6.7 di 11.5 ab 19.9 ol 7.3 an 32.0 mt 11.6 ne 5.1 il 1.7 ap 1.0	Colonat Hervel, Kr. Altena, Westphalia.	von d. Mark.	von d. Mark, Vh. Nh. Ver. Rheinl., XXXV, p. 257, 1878, R. T. 1879, p. LXXIV.	Basalt.	MnO high.
	Q 2.0 di 7.6 or 9.5 hy 13.2 ab 28.3 mt 1.4 an 36.7	Torfhaus, n. Baste, Harz Mountains.	Streng.	Streng, N. J., 1862, p. 963, R. T. 1869, p. LXX.	Gabbro.	
	or 1.1 di 4.5 ab 14.2 hy 6.9 an 52.5 ol 18.8 mt 1.2	Langenlois, Lower Austria.	Beauregard.	Beauregard, T. M. P. M., 1878, p. 369, R. T. 1879, p. XXXVIII.	Forellenstein.	

ORDER 6. LENDOFELIC. NORGARE.

SUBRANG 1. PERPOTASSIC.

Li_2O trace	or 49.5 ac 1.9 lc 10.9 ns 0.9 ne 4.3 di 17.7 ol 10.0	Point of Rocks, Leucite Hills, Wyoming.	R. W. Woodward.	C. King, G. Expl. 40th Par., II, p. 237, 1877, R. T. 1879, p. LX.	Leucitite.	Near wyomingose; cf. No. 1, wyomingose, W. T. p. 339.

CLASS II. DOSALANE—Continued.

RANG 3. ALKALICALCIC.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp. gr.
1	48.68	18.74	2.67	7.18	3.04	10.24	2.47	6.46	——					99.65	
A3. III.	.811	.183	.017	.100	.076	.183	.040	.069							

RANG 3. ALKALICALCIC.

1	47.17	18.87	5.31	5.66	3.86	10.30	2.69	6.60	——				trace	100.46	
A3. III.	.786	.185	.033	.079	.097	.184	.044	.070					—		

CLASS II. DOSALANE.

RANG 1. PERALKALIC.

1	48.21	18.33	4.29	4.64	1.41	2.77	11.75	5.83	1.97				0.13	99.47	
A3. III.	.804	.180	.027	.064	.035	.050	.190	.062					.002		

CLASS III. SALFEMANE.

RANG 1. PERALKALIC. ROCKALLASE.

1	68.75	5.91	5.81	5.33	0.08	2.11	7.52	4.28	n. d.					100.02	
A3. III	1.146	.058	.036	.074	.002	.038	.121	.046							

CLASS III. SALFEMANE.

RANG 3. ALKALICALCIC. VAALASE.

1	52.82	12.51	9.07	3.98	4.74	8.08	2.58	2.44	0.75	0.21	2.08	0.49		99.75	2.86
A2. II	.880	.122	.057	.053	.119	.145	.042	.026			.026	.004			

RANG 3. ALKALICALCIC. VAALASE.

1	53.39	12.18	6.18	6.70	6.17	6.80	2.70	1.76	2.09	0.28	1.39	0.25		100.13	
A2. II	.890	.119	.039	.093	.154	.121	.044	.019			.017	.002			
2	52.41	13.04	9.46	8.35	3.50	8.36	3.24	1.23	1.26					100.85	
A3. III	.874	.128	.059	.116	.088	.149	.052	.013							

RANG 4. DOCALCIC.

1	49.57	15.56	8.79	4.68	7.09	8.10	2.18	1.07	0.68	0.50	2.15			100.37	2.927
A3. III	.826	.152	.055	.065	.177	.145	.035	.012			.027				15°

ORDER 7. LENFELIC. ITALARE.

SUBRANG 2. DOPOTASSIC.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
Cl 0.17	or 17.8 di 25.3 an 20.6 ol 4.4 lc 16.1 mt 3.9 ne 11.4	Lava of 1871, Mount Vesuvius.	Morawski and Schinnerer.	Morawski and Schinnerer, Vh. Wien. G. R-A., 1872, p. 161. R. T. 1873, p. XL.	Leucitophyre.	Near II. 7. 3. 3.

SUBRANG 3. SODIPOTASSIC.

	or 10.0 di 25.6 an 19.7 ol 2.4 lc 22.7 mt 7.7 ne 12.5	Lava of 1871, Mount Vesuvius.	Morawski and Schinnerer.	Morawski and Schinnerer, Vh. Wien. G. R-A., 1872, p. 161. R. T. 1873, p. XL.	Leucitophyre.	Near II. 7. 2. 3. and II. 7. 3. 2.

ORDER 8. FELDOLENIC. CAMPANARE.

SUBRANG 4. DOSODIC.

NiO 0.14	or 14.5 ac 12.5 lc 15.7 ns 5.5 ne 33.5 di 11.8 ol 4.5	Katzenbuckel, Odenwald.	H. Rosenbusch.	H. Rosenbusch, Neph. v. Katzenb., Freiburg, 1869, p. 61. R. T. 1869, p. CVIII.	Nephelinite-porphyry.	

ORDER 3. QUARFELIC. ATLANTARE.

SUBRANG 2. DOPOTASSIC.

CuO 0.23	Q 28.0 ac 16.6 or 25.6 ns 8.5 ab 6.3 di 9.4 hy 5.1	Sidori, Fosso del Gallo, Pantelleria.	H. Förstner.	H. Förstner, Z. K., VIII, p. 179, 1884. R. T. 1884, p. LXVI.	Pantellerite.	In W. T., p. 311. No. 1, III. 3. 1. 2.

ORDER 4. QUARDOFELIC. VAALARE.

SUBRANG 3. SODIPOTASSIC.

Traces of Cu, Co, Ni, As.	Q 10.0 di 16.9 or 14.5 hy 4.1 ab 22.0 mt 7.0 an 15.0 il 4.0 hm 4.3 ap 1.3	Frauenberg, Breitfirst, Hesse.	F. Knapp.	F. Knapp, Doler. Gest. Frauenb., Würzburg, 1880, p. 15. R. T. 1884, p. LXXII.	Dolerite.	

SUBRANG 4. DOSODIC. VAALOSE.

SO_3 0.24	Q 8.8 di 14.4 or 10.6 hy 13.1 ab 23.1 mt 9.1 an 15.6 il 2.6	Near Hasserode, Harz Mountains.	Pufahl.	K. A. Lossen, Z. D. G. G., XXXII, p. 212, 1880. R. T. 1884, p. XXXIV.	Quartz-gabbro.	
	Q 7.6 di 19.5 or 7.2 hy 6.6 ab 27.3 mt 13.7 an 17.5	Lion's Head, Capetown, Cape Colony.	W. F. Hillebrand.	Cohen, N. J., 1874, p. 475. R. T. 1879, p. XLII.	Diabase.	Near camptonose. Cf. Nos. 6–8, vaalose, W. T., p. 311.

SUBRANG 4,5. PRESODIC.

	Q 7.6 di 10.8 or 6.7 hy 12.7 ab 18.3 mt 8.8 an 26.4 il 4.1 hm 2.7	Bockenheim, Mainthal.	Hornstein.	Hornstein, Z. D. G. G., XIX, p. 315, 1867. R. T. 1869, p. CXXXII.	Anamesite.	

CLASS III. SALFEMANE—Continued.

RANG 2. DOMALKALIC. KILAUASE.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	47.56	12.69	5.26	3.35	10.91	8.38	2.33	3.98	2.16	0.88		0.91		99.75	
A3. III	.793	.124	.033	.047	.273	.150	.037	.043				.006			

RANG 2. DOMALKALIC. KILAUASE.

1	50.82	9.14	7.33	7.03	7.22	11.63	3.06	1.02	1.74				0.38	99.37	2.66
B3. IV	.847	.089	.046	.097	.181	.207	.049	.011					.005		19°

RANG 2. DOMALKALIC. KILAUASE.

1	49.86	12.75	3.36	11.38	4.39	8.71	5.25	0.57	2.56		1.33	0.58		100.74	
A2. II	.831	.125	.021	.158	.110	.155	.085	.006			.017	.004			

RANG 3. ALKALICALCIC. CAMPTONASE.

1	52.35	15.72	2.90	7.32	7.36	8.98	2.81	1.32	1.35	0.23		0.30		100.64	
A3. III	.873	.154	.018	.101	.184	.161	.045	.014				.002			
2	52.00	15.75	3.55	12.84	3.42	7.39	3.37	1.24	0.35	0.11		1.06		101.08	
B3. IV	.867	.154	.022	.178	.086	.132	.055	.014				.008			
3	48.60	15.78	3.22	7.21	10.13	8.34	3.77	1.65	1.30			0.11		99.79	2.81
A3. III	.810	.154	.020	.100	.253	.149	.061	.018				.001			
4	47.53	14.95	6.73	8.04	7.41	8.50	2.98	1.12	1.95			trace	0.73	99.94	2.95
A3. III	.792	.147	.042	.112	.185	.152	.048	.012				—	.010		
5	51.56	14.78	5.32	7.01	6.35	8.06	3.27	1.26	1.10	0.46	1.25			100.42	2.931
A3. III	.859	.145	.033	.097	.159	.144	.053	.014			.016				15°
6	50.93	12.80	4.32	8.08	5.94	8.24	3.28	0.77	1.65	0.14	3.17	0.75		100.08 (99.51)	2.897
B2. III	.850	.125	.027	.113	.149	.147	.053	.008			.040	.005			
7	50.76	14.50	4.26	6.93	6.75	7.55	2.92	0.85	1.78	0.20	3.06	0.16		99.75 (99.69)	
A2. II	.846	.142	.027	.096	.169	.135	.047	.009			.038	.001			
8	49.35	15.71	7.44	6.96	5.71	9.80	2.96	1.31	0.49					99.73	2.98
A3. III	.823	.154	.047	.097	.143	.175	.048	.014							
9	51.41	12.92	2.87	9.29	5.45	11.46	2.92	0.70	0.32		2.61		0.16	100.11	2.69
A3. III	.857	.127	.018	.129	.136	.205	.047	.008			.033		.002		17°

ORDER 5. PERFELIC. GALLARE.

SUBRANG 3. SODIPOTASSIC. LAMAROSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	or 23.9 di 16.5 ab 15.2 ol 15.2 an 12.2 mt 7.7 ne 5.1 ap 3.0	Libsic, N. of Prague, Bohemia.	Plaminek.	Boricky, T. M. P. M., 1878, p. 510. R. T. 1879, p. XLVI.	Mica-picrophyre.	

SUBRANG 4. DOSODIC. KILAUOSE.

	Q 1.1 di 39.7 or 6.1 hy 5.8 ab 25.7 mt 10.7 an 8.1	Kilauea, Hawaii.	Cohen.	Cohen, N. J., 1880, II, p. 41., R. T. 1884, p. LXXX.	Basalt (Pele's hair).	Cf. Nos. 9 and 10, kilauose. W. T., p. 315.

SUBRANG 5. PERSODIC.

	or 3.3 di 25.1 ab 36.7 ol 10.6 an 9.5 mt 4.9 ne 4.3 il 2.6 ap 1.3	South Staffordshire, England.	Henry.	Beete-Jukes, B. G. Soc. Fr., XXIII, p. 121, 1866. R. T. 1869, p. LXXXII.	Greenrock.	

SUBRANG 4. DOSODIC. CAMPTONOSE.

Li_2O	trace	Q 1.3 di 14.9 or 7.8 hy 18.7 ab 23.6 mt 4.2 an 26.4	Little Falls, Minnesota.	Streng.	Streng, N. J., 1877, p. 129. R. T. 1879, p. XXXIV.	Augite-diorite.	Near auvergnose.
		Q 1.3 di 4.7 or 7.8 hy 26.8 ab 28.8 mt 5.1 an 23.6 ap 2.7	Richmond, Minnesota.	Streng.	Streng, N. J., 1877, p. 124. R. T. 1879, p. XXXIV.	Augite-diorite.	
		or 10.0 di 16.6 ab 19.9 ol 20.1 an 20.9 mt 4.6 ne 6.5	Navesink Peak, Elkhead Mts., Colorado.	R. W. Woodward.	C. King, G. Expl. 40th Par., I, p. 676, 1878. R. T. 1879, p. LXII.	Nephelite-basalt.	
		or 6.7 di 14.7 ab 25.2 hy 6.6 an 24.2 ol 10.5 mt 9.7	Stichill, Scotland.	J. J. H. Teall.	J. J. H. Teall, N. J., 1884, I, p. 73. R. T. 1884, p. XLII.	Porphyrite.	Not in W. T.
		Q 1.7 di 14.8 or 7.8 hy 15.1 ab 27.8 mt 7.7 an 21.7 il 2.4	Louisa, Mainthal.	Hornstein.	Hornstein, Z. D. G. G., XIX, p. 325, 1867. R. T. 1869, p. CXXXII.	Anamesite.	
Cl	0.01	Q 5.7 di 15.0 or 4.5 hy 13.6 ab 27.8 mt 6.3 an 17.8 il 6.1 ap 1.7	Bühl, n. Weimar, Cassel.	Dietrich.	Möhl, Ber. Offenb. Ver. Nk., 1868, p. 77. R. T. 1869, p. CXXXII.	Anamesite.	Sum given as 99.505.
SO_3	0.03	Q 5.3 di 10.9 or 5.0 hy 15.8 ab 24.6 mt 6.3 an 23.9 il 5.8	Bühl, n. Weimar, Cassel.	Dietrich.	Möhl, Ber. Offenb. Ver. Nk., 1868, p. 77. R. T. 1869, p. CXXXII,	Anamesite.	Sum given as 99.69.
		or 7.8 di 18.7 ab 25.2 hy 9.9 an 25.6 ol 1.4 mt 10.9	Cuddie Monti, Pantelleria.	Förstner.	Förstner, T. M. P. M., 1883, p. 393. R. T. 1884, p. LXXVI.	Basalt.	Not in W. T.
		Q 1.6 di 28.0 or 4.5 hy 10.2 ab 24.6 mt 4.2 an 22.8 il 5.0	Lava of 1843, Kilauea, Hawaii.	Cohen.	Cohen, N. J. 1880, II, p. 41. R. T. 1884, p. LXXX.	Basalt obsidian.	Near ornose.

CLASS III. SALFEMANE—Continued.

RANG 3.' ALKALICALCIC. CAMPTONASE—Continued.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	53.81	13.48	3.02	7.39	6.46	10.34	3.23	0.64	0.57		2.01		trace	100.95	2.75
B2. III	.897	.132	.019	.103	.162	.185	.052	.007			.025				17°
2	51.12	10.09	5.35	8.59	9.68	9.72	3.38	0.56	1.31				——	99.80	2.73
A3. III	.852	.099	.034	.119	.242	.173	.055	.006							16°
3	50.74	11.98	3.41	8.11	7.25	12.42	2.74	0.24	0.52		1.68		0.54	99.63	2.98
A2. II	846	.118	.021	.113	.181	.221	044	.002			.021		.008		

RANG 4. DOCALCIC. AUVERGNASE.

1	49.18	13.52	5.52	10.31	6.83	11.51	1.84	0.06	0.34		0.52	0.13	0.28	100.04	3.016
A2. II	.820	.132	.034	.143	.171	.205	.030	.001			.007	.001	.004		
2	48.04	13.13	6.89	11.14	5.17	10.87	2.83	0.06	——		0.39	0.07	0.11	100.72	3.024
A2. II	.801	.129	.043	.155	.154	.195	.045	.001			.005	.001	.002		
3	52.68	14.14	1.95	9.79	6.38	9.38	2.56	0.87	1.60				0.44	99.79	2.97
A3. III	.878	.137	.013	.136	.160	.168	.042	.009					.006		
4	52.42	14.54	1.25	9.84	7.53	10.59	2.23	0.49	0.55				0.51	99.75	3.00
A3. III	.874	.142	.008	.137	.188	.189	.035	.005					.007		
5	51.78	14.20	3.59	8.25	7.63	10.70	2.14	0.39	0.63			0.14	0.44	99.89	3.03
A3. III	.863	.139	.023	.115	.191	.191	.034	.004				.001	.006		
6	53.13	13.74	1.08	9.10	8.58	9.47	2.30	1.03	0.90				0.43	99.76	2.96
A3. III	.886	.135	.007	.126	.215	.170	.037	.011					.006		
7	49.67	13.57	7.79	7.21	5.53	12.37	1.57	1.20	0.15		1.50			100.56	2.958
A3. III	.828	.133	.049	.100	.138	.221	.026	.013			.019				
8	49.63	16.18	1.92	12.03	5.38	9.33	1.89	0.81	0.55		1.75	0.44	0.30	100.66	3.02
A1. I	.827	.159	.012	.167	.145	.166	.031	.008			.022	.003	.004		16°
9	47.36	16.79	1.53	7.93	6.53	10.08	2.85	0.84	3.05	0.48	0.51	0.26	0.44	100.61	3.081
A2. II	.799	.165	.009	.110	.163	.180	.046	.009			.006	.002	.006		
10	45.93	15.09	1.87	11.45	14.82	8.92	1.93	0.22	0.58					100.81	
A3. III	.766	.148	.012	.159	.371	.159	.031	.002							
11	49.87	14.80	8.25	6.88	6.77	9.36	2.81	0.68	0.45					99.87	
A3. III	.831	.145	.052	.096	.169	.167	.045	.007							
12	50.75	16.54	2.10	7.88	7.65	11.96	2.13	0.56	0.35					99.92	
A3. III	.846	.162	.013	.110	.191	.214	.034	.006							

ORDER 5. PERFELIC. GALLARE—Continued.

SUBRANG 5. PERSODIC. ORNOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	Q 3.8 di 25.2 or 3.9 hy 11.8 ab 27.3 mt 4.4 an 20.3 il 3.8	Kilauea, Hawaii.	Cohen.	Cohen, N. J., 1880, II, p. 41. R. T. 1884, p. LXXX.	Basalt-obsidian.	Near camptonose.
	or 3.3 di 30.3 ab 28.8 hy 30.3 an 10.6 ol 7.9 mt 7.9	Lava of 1868, Mauna Loa, Hawaii.	Cohen.	Cohen, N. J., 1880, II, p. 41. R. T. 1884, p. LXXX.	Basalt-pumice.	
	Q 1.5 di 33.5 or 1.1 hy 11.3 ab 23.1 mt 4.9 an 20.0 il 3.2	Lava of April, 1867, Niuafou, Tonga Islands.	von Werveke.	Cohen, N. J., 1880, II, p. 41. R. T. 1884, p. LXXX.	Basalt-obsidian.	

SUBRANG 4,5. PRESODIC. AUVERGNOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
Cl trace Cu trace	Q 3.3 di 23.7 or 0.6 hy 18.9 ab 15.7 mt 7.9 an 28.1 il 1.1	Brededal, Disco, Greenland.	Nauckhoff.	Nauckhoff, T. M. P. M., 1874, p. 120. R. T. 1879, p. LXXIV.	Basalt.	
Cl trace S 0.98 C 0.79 H? 0.25	Q 0.4 di 25.5 or 0.6 hy 14.4 ab 23.6 mt 10.0 an 23.1 il 0.8 pr 1.8	Ovifak, Greenland.	Nauckhoff.	Nauckhoff, T. M. P. M., 1874, p. 121. R. T. 1879, p. LXXIV.	Basalt.	
	Q 2.1 di 18.9 or 5.0 hy 22.9 ab 22.0 mt 3.0 an 23.9	Mount Holyoke, Massachusetts.	G. W. Hawes.	G. W. Hawes, A. J. S. (3), IX, p. 186, 1875. R. T. 1879, p. XLII.	Dolerite (diabase).	
	Q 1.6 di 19.9 or 2.8 hy 26.0 ab 18.3 mt 1.9 an 28.4	Wintergreen Lake, New Haven, Connecticut.	G. W. Hawes.	G. W. Hawes, A. J. S. (3), IX, p. 189, 1875. R. T. 1879, p. XLII.	Dolerite (diabase).	
	Q 3.5 di 20.4 or 2.2 hy 21.4 ab 17.8 mt 5.3 an 28.1	West Rock, New Haven, Connecticut.	G. W. Hawes.	G. W. Hawes, A. J. S. (3), IX, p. 186, 1875. R. T. 1879, p. XLII.	Dolerite (diabase).	
	Q 0.4 di 18.9 or 6.1 hy 28.0 ab 19.4 mt 1.6 an 24.2	Jersey City, New Jersey.	G. W. Hawes.	G. W. Hawes, A. J. S. (3), IX, p. 187, 1875. R. T. 1879, p. XLII.	Dolerite (diabase).	
	Q 6.5 di 28.2 or 7.2 hy 4.5 ab 13.6 mt 11.4 an 26.1 il 2.9	Thiorsa, Iceland.	S. von Waltershausen.	S. von Waltershausen, Abh. Ges. Wiss. Gött., X, p. 23, 1862. R. T. 1869, p. CXXXVI.	Anorthite rock.	Mean of several.
F trace S 0.07 Cr_2O_3 0.38 CuO trace	Q 2.3 di 8.3 or 4.5 hy 27.9 ab 16.2 mt 2.8 an 33.4 il 3.3 ap 1.0	Radauthal, Harz Mountains.	Streng.	Streng, N. J., 1862, p. 966. R. T. 1869, p. LXX.	Gabbro.	
Cl trace FeS_2 1.96	or 5.0 di 15.9 ab 24.1 hy 3.4 an 30.6 ol 12.9 mt 2.1 il 0.9 pr 2.0	Lupbode, Harz Mountains.	Kayser.	Kayser, Z. D. G. G., XXII, p. 159, 1870. R. T. 1873, p. XXIV.	Diabase.	Not fresh.
	or 1.1 di 9.9 ab 16.2 hy 2.9 an 32.0 ol 35.3 mt 2.8	Ottenschlag, Austria.	Gamroth.	Gamroth, T. M. P. M., 1877, p. 278. R. T. 1879, p. XLVI.	Paleopicrite.	
	Q 2.8 di 16.5 or 3.9 hy 14.8 ab 23.6 mt 12.1 an 25.9	San Marco, Pantelleria.	Förstner.	Förstner, T. M. P. M., 1883, p. 393. R. T. 1884, p. LXXVI.	Basalt.	Not in W. T.
	or 3.3 di 20.9 ab 17.8 hy 18.6 an 33.9 ol 1.3 mt 3.0	Kilauea, Hawaii.	Allen.	J. D. Dana, A. J. S. (3), XVIII, p. 134, 1879. R. T. 1884, p. LXXX.	Basalt (Pele's hair).	

CLASS III. SALFEMANE—Continued.

RANG 3. ALKALICALCIC. LIMBURGASE.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	43.60	11.76	7.84	15.38	3.33	10.32	3.42	1.36	1.00		0.82		0.23	99.06	2.842
B2. III	.727	.115	.055	.214	.083	.184	.055	.015			.010		.003		
2	41.01	11.58	12.54	7.60	8.67	12.20	2.57	1.45	1.87		0.48	0.75		100.72	3.024
A2. II	.684	.113	.078	.106	.217	.218	.042	.016			.006	.005			
3	41.97	15.83	6.06	8.38	15.81	6.32	2.64	1.55	1.08		0.02		0.23	99.89	
A3. III	.700	.154	.038	.117	.395	.113	.042	.017			—		.003		

RANG 4. DOCALCIC.

1	41.33	18.31	8.52	6.10	8.40	11.76	2.34	1.01	1.63					99.40	
A3. III	.689	.179	.053	.085	.210	.210	.038	.011							

CLASS III. SALFEMANE.

RANG 1. PERALKALIC. MALIGNASE.

1	46.97	14.55	8.79	6.02	1.40	9.46	8.18	3.07	1.53					99.97	
A3. III	.783	.142	.055	.083	.035	.169	.132	.033							

RANG 2. DOMALKALIC. KAMERUNASE.

1	45.04	16.04	7.10	8.23	4.46	10.19	6.11	2.85	0.33					100.35	
A3. III	.751	.157	.044	.114	.112	.182	.098	.031							
2	42.65	15.35	6.46	8.19	7.14	11.96	5.02	1.47	1.28					99.52	
A3. III	.711	.150	.040	.114	.179	.214	.081	.016							

RANG 3. ALKALICALCIC. ETINDASE.

1	40.53	14.89	1.02	11.07	8.02	14.62	2.87	1.95	1.44	0.17	1.80	1.32	0.16	99.86	3.043
A2. II	.676	.146	.006	.154	.201	.261	.047	.021			.023	.009	.002		18°

CLASS III. SALFEMANE.

RANG 2. DOMALKALIC. ALBANASE.

1	41.24	15.28	4.64	9.09	8.69	12.97	3.66	3.64	0.92					100.13	
A3. III	.687	.150	.029	.126	.217	.282	.059	.038							

RANG 2. DOMALKALIC. ALBANASE.

1	39.64	16.98	6.61	9.31	6.65	10.58	5.95	3.09	1.32					100.13	
A3. III	.661	.166	.041	.129	.166	.189	.096	.033							

ORDER 6. LENDOFELIC. PORTUGARE.

SUBRANG 4. DOSODIC. LIMBURGOSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
	or 8.3 di 33.0 ab 14.7 ol 8.3 an 12.5 mt 12.8 ne 7.7 il 1.5	Scheidsberg, Remagen, Rhenish Prussia.	Möhl.	Möhl, N. J., 1874, p. 203. R. T. 1879, p. LXXII.	Anamesite.	
	or 9.0 di 32.0 ab 7.3 ol 6.8 an 15.3 mt 18.1 ne 8.0 il 0.9 ap 1.7	Sparbrod, Rhöngebirge.	Sommerlad.	Sommerlad, N. J. B. B., II, p. 155, 1882. R. T. 1884, p. LXXIV.	Hornblende-basalt.	
	or 9.5 di 4.0 ab 7.3 ol 35.6 an 26.4 mt 8.8 ne 8.0	Philip Island, Victoria, Australia.	Selwyn and Ulrich.	Selwyn and Ulrich, Geog. Phys. Vict., 1866, p. 59. R. T. 1869, p. CXII.	Basalt.	

SUBRANG 4,5. PRESODIC.

	or 6.1 di 17.6 ab 6.3 ol 12.0 an 36.1 mt 12.3 ne 7.4	Weilberg, Nassau.	v. Gerichten.	v. Gerichten, N. J., 1874, p. 740. R. T. 1879, p. LXXVI.	Basalt.	

RANG 7. LENFELIC. KAMERUNARE.

SUBRANG 4. DOSODIC. MALIGNOSE.

	or 18.4 ac 10.6 ab 2.6 di 20.0 ne 29.5 wo 9.6 mt 7.4	Katzenbuckel, Odenwald.	H. Rosenbusch.	H. Rosenbusch, Neph. Katzenb., Freiburg, 1869, p. 39. R. T. 1869, p. CVI.	Nephelinite.	

SUBRANG 4. DOSODIC. KAMERUNOSE.

	or 17.2 di 35.3 an 7.8 ol 2.2 ne 27.8 mt 10.2	Upper Picos Valley, Santiago, Cape Verde Islands.	Kertscher.	C. Doelter, Die Capverden, 1882, p. 79. R. T. 1884, p. LXXXII.	Augitite.	
	or 3.3 di 36.4 an 14.7 ol 7.2 lc 4.4 mt 9.3 ne 23.0	Upper Picos Valley, Santiago, Cape Verde Islands.	Kertscher.	C. Doelter, Die Capverden, 1882, p. 49. R. T. 1884, p. LXXIV.	Basalt.	

SUBRANG 4. DOSODIC. ETINDOSE.

Traces of Cl, F, S, Cr_2O_3, NiO, and BaO.	an 21.7 di 19.3 lc 9.2 ol 19.9 ne 13.4 am 6.9 mt 1.4 il 3.5 ap 3.0	Rossberg, n. Rossdorf, Hesse-Darmstadt.	Petersen.	Petersen, N. J., 1869, p. 36. R. T. 1869, p. CXII.	Basalt.	

ORDER 8. FELDOLENIC. BOHEMARE.

SUBRANG 3. SODIPOTASSIC.

	an 14.7 di 1.6 lc 16.6 ol 24.5 ne 16.8 am 17.4 mt 6.7	Herchenberg, Laacher See, Rhenish Prussia.	Rammelsberg.	Rammelsberg, priv. contrib., 1872. R. T. 1873, p. XLIV.	Nephelinite.	Calc. from sol. and insol.

SUBRANG 4. DOSODIC. COVOSE.

	an 10.3 di 6.4 lc 14.4 ol 18.3 ne 27.3 am 12.5 mt 9.5	St. Vincent, Cape Verde Islands.	Kertscher.	C. Doelter, Die Capverden, 1882, p. 15. R. T. 1884, p. XLII.	Olivine-diabase.	

CLASS III. SALFEMANE—Continued.

RANG 1. PERALKALIC. IJOLASE.

No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	Sum	Sp.gr.
1	45.04	11.35	13.92	4.89	4.62	7.86	7.86	2.93	1.52		trace	0.12	0.18	100.29	3.096
A2. II	.751	.111	.087	.068	.116	.140	.127	.031				.001	.003		25.5°
2	44.80	11.11	9.82	5.83	4.88	9.55	6.75	3.67	2.96			0.45	0.12	99.94	2.843
A2. II	.747	.109	.061	.081	.122	.171	.109	.039				.003	.002		22.5°

CLASS IV. DOFEMANE.

RANG 1. PERMIRLIC. CORTLANDTASE. SECTION 1. PERMIRIC. CORTLANDTIASE.

1	40.79	10.41	3.52	6.39	23.34	8.48	1.71	0.71	4.04	trace				99.39	
A3. III	.680	.102	.022	.089	.584	.152	.027	.007							

CLASS IV. DOFEMANE.

RANG 1. PERMIRLIC. PAOLASE. SECTION 2. DOMIRIC.

1	42.68	9.42	11.55	7.23	10.09	13.15	2.71	1.16	1.06		0.51	1.29		100.85	3.114
A2. II	.711	.092	.072	.100	.252	.235	.043	.012			.006	.009			

CLASS IV. DOFEMANE.

RANG 1. PERMIRLIC. TEXASE. SECTION 2. DOMIRIC. UVALDIASE.

1	39.59	12.25	10.15	4.69	14.50	14.13	1.89	0.76	0.57	0.89			trace	99.55	3.15
A3. III	.660	.120	.064	.065	.363	.252	.031	.008					—		

ORDER. 9. PERLENIC. FINNARE.

SUBRANG 4. DOSODIC. IIVAAROSE.

Inclusive.	Norm.	Locality.	Analyst.	Reference.	Author's name.	Remarks.
SO_3 trace SrO trace	or 2.5 ac 21.3 lc 11.6 di 31.1 ne 23.0 ol 0.2 mt 9.5	Katzenbuckel, Odenwald.	H. Rosenbusch.	H. Rosenbusch, Nephel. Katzenb., Freiburg, 1869, p. 39. R. T. 1869, p. CVI.	Nephelinite.	Nearly in dofemane.
	lc 17.0 ac 18.0 ne 19.9 di 23.3 ol 6.3 am 6.9 mt 5.1	Katzenbuckel, Odenwald.	H. Rosenbusch.	H. Rosenbusch, Nephel. Katzenb., Freiburg, 1869, p. 65. R. T. 1869, p. CVIII.	Nephelinite.	Nearly in dofemane.

ORDER 1. PERPOLIC. HUNGARARE. SECTION 4. DOMOLIC.

SUBRANG 2. DOMAGNESIC. CUSTEROSE.

	or 2.8 di 18.4 an 18.9 ol 41.6 lc 0.9 mt 5.1 ne 7.7	Gümbelberg, Neutitschein, Moravia.	Jubasz.	G. Tschermak, Porphyrg. Oestr., 1869, p. 247. R. T. 1869, p. LXXXVI.	Picrite.	

ORDER 2. DOPOLIC. SCOTARE. SECTION 2. DOPYRIC. PAOLIARE.

SUBRANG 2. DOMAGNESIC.

	or 6.7 di 36.9 ob 11.5 ol 7.6 an 10.0 mt 16.7 ne 6.3 il 0.9 ap 3.0	Todtenkopfchen, Rhöngebirge.	H. Sommerlad.	H. Sommerlad, N. J. B. B., II, p. 155, 1882. R. T. 1884, p. LXXIV.	Hornblende-basalt.	In W. T., p. 359. No. 4. IV. $2^2.1^2.2$. Mol. ratio of Fe_2O_3 in W. T. wrong, also norm. Correct here.

ORDER 2. DOPOLIC. SCOTARE. SECTION 3. PYROLIC. TEXIARE.

SUBRANG 2. DOMAGNESIC. UVALDOSE.

Cr_2O_3 0.13 NiO trace	an 22.5 di 27.4 lc 3.5 ol 16.5 ne 8.8 am 4.4 mt 14.8	Ottendorf, Silesia.	Scharizer.	Scharizer, Jb. Wien. G. R-A., XXXII, p. 475, 1882. R. T. 1884, p. LXIV.	Nephelite-basalt.	

INDEX TO TEXT.

INDEX TO NEW ROCK NAMES.

INDEX TO OLD ROCK NAMES.

6623—No. 28—04——5

INDEX TO LOCALITIES.

ERRATA IN PROFESSIONAL PAPER NO. 14.

I take advantage of this opportunity to call attention to a number of corrections which must be made in Professional Paper No. 14, for some of which I have to thank several friends. While the majority may be regarded as of slight importance, yet those which affect the norms and the classificatory positions of several rocks should be carefully noted. The most important changes in position are:

No. 12 umptekose, p. 253, should be No. 18*a* laurdalose, p. 297.
No. 2 vulturose, p. 305, should be No. 2 II.8.2.4., p. 307.
No. 2 vesuvose, p. 307, should be No. 4 braccianose, p. 305.
No. 1 paolose, p. 361, should be No. 1, subrang 2 of section 3 of texase, p. 363.

I may add once more that I shall consider it a very great favor to be informed of any errors or omissions either in Professional Paper No. 14, or in the present work, so that the proper corrections may be incorporated in a subsequent paper.

Page 23, line 6 from bottom, *for* miaskares *read* miaskases.
Page 34, lines 7 and 9 from bottom, *for* one-ninth *read* one-tenth.
Page 34, line 5 from bottom, *for* one-tenth *read* one-ninth.
Page 83, line 6, *dele* femic.
Page 84, lines 7, 8, 9 from bottom, *for* q *read* 60q.
Page 85, lines 10–14 and 19–23, *for* r *read* (r+u); *for* s *read* (s+v).
Page 85, lines 19–24, *for* Rang *read* Subrang.
Page 90, line 10, *for* 436 *read* 462.
Page 104, line 7 from bottom, *after* silica *insert* and soda with decreasing silica.
Page 112, Femic Subrangs, *for* NgO *read* MgO.
Page 139, No. 1 riesenose, Author's name col., *insert* Porphyry.
Page 195, No. 3 nordmarkose, Remarks col., *insert* phleg:ose.
Page 199, No. 4 vulsinose, Remarks col., *for* syenase *read* nordmarkase.
Page 207, No. 3 canadase, Remarks col., *for* A.G. *read* J.G.
Page 226, heading, Fe_2O_3 col., *for* Fe_2O_2 *read* Fe_2O_3.
Page 232, No. 21 tonalose, Sp. gr. col., *place* 16° *under* 2.740.
Page 244, No. 115 tonalose, H_2O col., *for* 0.52 *read* 0.36.
Page 245, No. 119 tonalose, Norm col., *for* di 17 *read* di 17.6.
Page 253, No. 1 umptekose, Norm col., *for* ne 9.9 *read* ne 9.4.
Page 253, No. 12 umptekose, Norm col., *for* ab 52.4 *read* ab 46.1.
for ne 5.7 *read* ne 9.1.
after ns 4.7 *insert* di 7.2.
(This should be No. 18*a* laurdalose.)
for ol 4.0 *read* ol 1.5.
for il 3.4 *read* il 3.3.
Page 253, No. 13 umptekose, Norm col., *for* am *read* an.

Page 253, No. 14 umptekose, Reference col., *for* V.R.S. *read* P. R. S.
Page 255, No. 1 ciminose, Norm col., *for* am *read* an.
Page 255, No. 6 ciminose, Reference col., *for* V.G. *read* J.G.
Page 257, No. 12 monzonose, Locality col., *for* Indian Creek laccolith *read* Electric Peak.
Page 261, No. 14 akerose, Locality col., *for* Fairvew *read* Fairview.
Page 279, No. 65 andose, Norm col., *for* an 22.2 *read* an 19.5.
(The position of this rock is not changed by these corrections.) *for* di 9.0 *read* di 11.0.
for hy 7.9 *read* hy 10.7.
for ol 7.2 *read* ol 5.9.
Page 295, heading, *insert* 3 *after* Subrang.
Page 298, No. 7 essexose, CaO col., *for* 1.31 *read* .131.
Page 298, No. 12 essexose, MgO col., *for* 1.11 *read* .111.
Page 304, No. 2 vulturose, CaO col., *for* .106 *read* .155.
Page 305, No. 2 vulturose, Norm col., *for* or 19.5 *read* or 4.5.
for lc 6.1 *read* lc 17.9.
(This should be No. 2 II.8.2.4.) *for* di 13.9 *read* di 23.0.
for ol 8.2 *read* ol 3.7.
Page 307, No. 2 vesuvose, Norm correct, but should be No. 4 braccianose, p. 305.
Page 317, No. 8 kentallenose, Locality col., *for* Indian Creek laccolith *read* Electric Peak.
Page 317, No. 10 kentallenose, Reference col., *for* 1698 *read* 168.
Page 329, No. 21 ornose, Locality col., *for* Koolan *read* Koolau.
Page 345, No. 1 III.6.4.2, Remarks col., *after* and 6 *insert* limburgose.
Page 349, catch title, *for* SR3 *read* SR2.
Page 351, No. 1 III.7.3.5, Author's name col., *for* nepholite *read* nephelite.
Page 351, No. 1 III.8.2.3, Norm col., *for* an 10.2 *read* am 10.2.
Page 353, No. 1 covose, Norm col., *for* di 12.6 *read* di 12.5.
for am 6.1 *read* am 17.8.
dele wo 10.3.
Page 353, No. 2 covose, Norm col., *for* di 6.8 *read* di 15.9.
for ol 8.4 *read* ol 5.3.
for am 11.2 *read* am 17.0.
dele wo 11.8.
Page 353, No. 5 covose, Norm col., *for* di 18.0 *read* di 21.0.
for ol 1.9 *read* ol 1.0.
for am 2.8 *read* am 6.5.
dele wo 5.7.
Page 353, No. 6 covose, Norm col., *for* di 32.4 *read* di 35.0.
for am 1.2 *read* am 2.4.
dele wo 2.9 *and* ol 0.9.
Page 355, catch title, *for* salfemane *read* dofemane.
Page 361, No. 1 paolose, Norm col., *for* di 21.8 *read* di 27.4.
for ol 7.3 *read* ol 5.5.
(This should be IV.2^3.1^8.2.) *for* am 10.8 *read* am 17.8.
dele wo 11.4.
Page 412, No. 1 porphyrite, Sum col., *insert* 100.55.
Page 418, No. 3 andesite, No. col., *for* B4 *read* D4.
Page 455, Nos. 80 and 81 basalt, Locality col., *for* Panahou *read* Punahou.
Page 489, Ciminite, *for* 261 *read* 259.
Page 490, Granite, inclusion in, *insert* 145, *for* 263 *read* 261.
Page 490, Granite, segregation in, *insert* 145.
Page 490, Hornblende-basalt, *insert* 359, *for* 459 *read* 455.
Page 491, Pantellerite, *after* 219 *insert* 221.
Page 494, Greece, *after* 249 *insert* 251.

O

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Correspondence should be addressed to—

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UNITED STATES GEOLOGICAL SURVEY,
WASHINGTON, D. C.

MAY, 1904.