which I have sought to test the validity of my theory. The theory is nowhere impugned by him. My "estimates" of the annual expenditure of volcanic energy do not profess to greater exactness than the imperfect state of our topographical knowledge and the state of science will admit. They will be subject, no doubt, to future correction, though I am sure without endangering the theory itself which they illustrate. I cannot but remark that while Mr. Scrope has objected to my numerical data, he has not in a single instance supplied in numbers any betters ones, which, as it seems to me, every scientific objector is bound to do. Mr. Scrope ends by declaring that he "prefers" his own old notions to my new ones. That is natural; but we must all yield in the end to the progress of truth, and to this I am sure Mr. Scrope, whose truth love and candour I know from personal intercourse, will, I hope, live to prove no exception.

## NOTICES OF MEMOIRS.

### MINERALOGY.

I.—Mineralogical Observations on Brochantite. Mineralogische Beobachtungen: V. Von Dr. Albrecht Schrauf. *Sitzungsb. d. k. Akad. d. Wissensch.: Math.-Naturwiss. Classe.* lxvii., 1873. pp. 275–360.

THIS Paper, which forms the fifth of a series of communications presented by Dr. Schrauf to the Vienna Academy, is devoted, for the most part, to a discussion of the crystallography of Brochantite. Several minerals, differing from one another both chemically and morphologically, have hitherto been grouped together under this specific name; and, although our knowledge of many of these varieties is still imperfect, yet the author feels justified in referring them to four distinct types, namely:—(1). The Brochantite of Rézbánya in Hungary, of which two varieties (*a* and *b*) are recognized; and some of the Cornish and Russian Brochantites. (2). The Waringtonite of Cornwall, and a third variety (*c*) from Rézbánya. (3). The Brochantite of Nischne-Tagilsk, in Siberia. (4). The Königin of Russia, and a fourth variety (*d*) from Rézbánya.

Dr. Schrauf points out the relation between the crystalline forms of Brochantite and those of Malachite. Just as Malachite was originally described as prismatic and subsequently determined to be monoclinic, so it appears that careful measurements of Brochantite tend to remove it from the prismatic system. The author believes that some varieties of Brochantite are monoclinic and others triclinic.

In addition to the crystallographic details, the paper includes a comparative review of the paragenetic and chemical relations of the Brochantite group of minerals.

Two folding-plates of crystalline forms and projections accompany the memoir. F. W. R.

II.—The Fibrous Quartz of the Cape, a Pseudomorph after Krokydolite. Der Faserquarz vom Cap, eine Pseudomorphose nach Krokydolith. Von Herrn Dr. F. Wibel. *Leonhard u. Geinitz's N. Jahrb. f. Mineralogie u. s. w.* 1873, Heft iv. pp. 367–380.

IT is a curious fact that whilst quartz so commonly occurs crystallized, it has rarely been observed in distinctly fibrous forms.

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The best-known example is that of the so-called fibrous quartz of South Africa. The object, however, of the present paper is to show that this substance is not an original form of quartz, but is merely a product of pseudomorphism, in which the fibrous structure of a pre-existing mineral has been retained.

Dr. Wibel has examined two varieties of this African mineral—the one brown, and the other blue. The brown variety occurs in the form of bands in a highly siliceous brown ironstone. Analysis of the fibrous mineral showed that it contains—silica, 57·46; ferric oxide, 37·56; water, 5·15. Treated with hydrochloric acid, the iron is removed, and a white fibrous siliceous material is obtained. Hence the author concludes that the brown mineral consists of a mixture of white quartz and ferric hydrate in the form of Göthite ($Fe_2O_3 \cdot H_2O$).

Analysis of the blue variety yielded the following results:—silica, 97·27; ferrous oxide, 1·67; lime, 0·15; soda, not determined; water, 0·76. The author is led to regard this variety as a mixture of white quartz with blue krokydolite. He believes that both varieties are pseudomorphs after asbestiform krokydolite; the brown being the product of a perfect and slow alteration, the blue that of an imperfect and rapid alteration.

Since writing his paper, the author has had an opportunity of studying microscopic sections of both varieties of pseudomorphous quartz; and he states, in an appendix, that these observations entirely agree with the conclusions which he had previously expressed.

F. W. R.

## PETROLOGY.

III.—Note on the Basalt and Hydrotachylyte of the Rossberg, near Darmstadt. Notiz über den Basalt und Hydrotachylyt des Rossberges bei Darmstadt. Von Hern Dr. Th. Petersen. *Leonhard u. Geinitz's N. Jahrb. f. Mineralogie, u.s.w.* 1873. Heft iv. pp. 385–390.

THE following minerals have been detected as constituents of the Rossberg basalt, namely—augite, olivine, nepheline, titaniferous magnetite, apatite, a plagioclastic felspar, leucite, mica, melilite, and hauyne or nosean. As products of decomposition, the basalt yields osteolite and certain zeolitic minerals. The osteolite, which has recently been worked commercially, occurs in white veins running through the decomposing rock. A specimen of this osteolite, dried at 100° C., yielded 34·7 per cent. of phosphoric acid ($P_2O_5$), corresponding to 75·7 per cent. of calcium orthophosphate.

The substance described some time ago by Dr. Petersen under the name of *Hydrotachylyte*, is found in certain parts of the Rossberg basalt. A peculiar vitreous variety of tachylyte also occurred as a pellucid bottle-green obsidian-like mass, inclosed in the rock. Dr. Petersen publishes his analyses of both these substances, and compares their composition with that of true tachylytes from other localities.

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These analyses may be usefully reproduced.

| | I. | II. | III. | IV. | V. |
|---|---|---|---|---|---|
| Silica | 51·08 | 54·93 | 55·74 | 66·42 | 47·52 |
| Titanic acid | 1·24 | 0·28 | ... | 0·31 | 1·13 |
| Alumina | 16·38 | 19·36 | 12·40 | 13·07 | 17·35 |
| Ferric oxide | 4·27 | 3·68 | 13·16 | 3·66 | 4·36 |
| Ferrous oxide | 7·33 | 6·48 | | | 3·05 |
| Manganous oxide | 0·31 | 0·06 | 0·19 | trace | 0·26 |
| Magnesia | 2·07 | 2·16 | 5·92 | 1·30 | 4·07 |
| Lime | 8·12 | 6·27 | 7·28 | 1·19 | 1·85 |
| Soda | 6·12 | 3·14 | 3·88 | 6·09 | 2·38 |
| Potash | 3·63 | 0·73 | 0·60 | 7·36 | 4·63 |
| Phosphoric acid | 0·05 | 0·04 | ... | ... | ... |
| Chlorine | trace | trace | ... | ... | ... |
| Fluorine | | ... | ... | ... | ... |
| Water | 0·78 | 2·16 | 2·73 | 0·73 | 12·90 |
| | 101·38 | 99·29 | 101·80 | 100·13 | 99·50 |

I. Tachylyte; Bobenhausen; by Möhl. Spec. grav. 2·686.
II. Tachylyte; Sababurg; by Möhl. Spec. grav. 2·757.
III. Tachylyte; Säsebühl; by Schnederman. Spec. grav. 2·578.
IV. Tachylytic Glass (*tachylytisches Glas*); Rossberg; by Petersen. Spec. grav. 2·524.
V. Hydrotachylyte; Rossberg; by Petersen. Spec. grav. 2·130.

F. W. R.

## IV.—Brief Abstracts for 1873.

Tregay, Capt. William. Some Remarks on Crossbranches and Crossheads; being an Inquiry into their Effect on Mineral Lodes. *Rep. Miners' Assoc. Cornwall and Devon for* 1872–3, pp. 57–61.

By crossbranches are meant small local branches, sometimes only extending the breadth of the lode they traverse. The details of some of these are considered, and it is concluded that in many cases they have a beneficial effect on the lodes, when they are filled with carbonate of lime; whilst when they are hollow or filled with quartz, the lodes are less productive.

Collins, J. H. (1). Note on the Rocks and Goonbarrow Mines, near St. Austell. (2). Note on the Evidences of Vertical Movement in the Lodes of Cornwall. (3). Note on the Iron Deposits at Smallacombe, in Devonshire. *Rep. Miners' Assoc. Cornwall and Devon for* 1872–3, pp. 66–71.

(1). The mines are worked for tin and iron. There is a large open work in a hill of granite (the felspar of which is in parts decomposed, forming china-clay), crossed by tin-lodes. A plan and section are given. The hard schorlaceous bands in the granite give evidence of pseudomorphism on a large scale, and are more like veins of segregation than true fissure veins. In the lodes crystals of felspar have been replaced by quartz, schorl, and cassiterite.

(2). A tin-lode at East Rocks Mine, near St. Austell, is inferred

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to be in a line of fault, along which there has been movement at a comparatively recent period, since the deposition of some fathoms of the superficial deposit.

(3). The estate consists of Killas traversed by diorite (much decomposed at top). The ores are limonite and magnetite, the former in irregular layers of nodules in a thick mass of sands and clays; the latter as beds of variable thickness in the greenstone. The hæmatite is being worked in an open quarry.

TILLY, Henry. Particulars of a Thermal Spring at Wheal Seton Mine, in the Parish of Camborne. *Rep. Miners' Assoc. Cornwall and Devon for* 1872–3, pp. 53–56.

The spring is about 140 fathoms below the surface, and discharges 30 gallons a minute, at a temperature of 94° Fahr. The water is moderately clear, but brackish. Analyses are given, from which it is seen that a gallon of the water contains as much as 1072 grains of solid matter.

COLLINS, J. H. On the Mining District of Cornwall and West Devon. *Proc. Inst. Mechan. Eng.* (*Birmingham*) *for* 1873, pp. 89–118. 15 Plates (Map, Plans, and Sections).

The geological structure of the district is first described. The fundamental rock is granite, upon the flanks of the masses of which rests the Killas or slate-rock, which is of variable composition, but generally more crystalline near the granite. The mineral lodes are next noticed: they are most numerous near the junction of granite and slate, especially those of tin and copper, whilst those of lead and iron are often found far off the junction. The different veins are true fissure-veins, often in lines of faults, and they are very often displaced by faulting: their mean directions vary in different parts. Both granite and slate are traversed by intrusive igneous rocks, the elvan dykes occurring chiefly near, and the diorites further off, the granite. The diorites sometimes seem to improve the ore, but sometimes not, whilst the elvans are often very beneficial: the majority of the latter have a general east and west direction, and some have been traced for 12 miles. The method of working the tin and copper mines is then described, and the iron ores and china clay are noticed.

1874.

MELLO, Rev. J. M. The Midland Coal Field. Pp. 135–140 of "the Derbyshire Red Book," with Map and Section. 8vo. *Derby.*

The author notices the probable former continuity of some coal-fields, which have since been separated, through upheaval and denudation; describes the extent of the Midland Coal-field (half of which is concealed by overlying beds); notes the estimates that have been made of its probable underground extension eastward; and gives an account of the Derbyshire Coal-measures and of their associated bands of ironstone, with a vertical section of the beds.

W. W.

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