

vicinity of Cahir, co. Tipperary, may possibly be other representatives of this drift. In the first locality it lies under a drift which seems to be due to a glacier that came down one of the valleys of Slieve Aughta, and probably was entombed during a severe season, when the glacier exceeded its normal length, thereby burying a lacustrine accumulation under Moraine drift. In the second case the inter-bedded peat occurs on very high ground, and is undoubtedly in part covered by Moraine drift; but whether the whole of the 96 feet over it is of that nature, I cannot say, as the pits were closed long before the country was visited.<sup>1</sup> Of the third locality only a very scanty record is given, and from it the forty feet over the peat might be either Boulder-clay or Moraine drift;<sup>2</sup> there is, however, on that country a considerable quantity of Moraine drift that has been supplied by the ancient glaciers from the neighbouring hills.

Since the above was sent to press I learn from Prof. J. McK. Hughes, of Cambridge, that he believes "the whole of the beds containing the recent temperate shells in North Wales and to the north and east of St. Asaph are merely the result of a Post-Glacial sea eating back cliffs of Boulder-clay." "It is known that there have been great changes of level since the great cold, and whenever the sea washed the base of a Boulder-clay cliff, it must, as now, have undermined it, and mixed up re-sorted Boulder-clay and shells of the later period, while here and there great slips would throw old beaches on end and bury large masses of clay in sand and shingle." I also find that Professor Hughes has stated this a short time since at a meeting of the Geological Society of London.<sup>3</sup>

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## NOTICES OF MEMOIRS.

### MINERALOGY.

I.—CORUNDUM; ITS ALTERATIONS AND ASSOCIATED MINERALS. By F. A. GENTH. *Contributions from the Laboratory of the University of Pennsylvania*, No. 1. Pp. 46.

**T**HIS memoir relates mainly to the occurrence of Corundum in North America. The largest deposits occur in the chromiferous serpentine, or chrysolite formation, and in the adjacent rocks, although the mineral is also found in small quantity in rocks of Laurentian age, and in certain slates referred to Dr. Emmons' Taconic system. Dr. Genth thinks it not improbable that the emery beds in Asia Minor and in Greece may correspond in age with the corundum and emery of the chromiferous region in the States.

The author describes a large number of minerals which occur in association with the American corundum, and are supposed to result in some cases from its alteration. Among these substances are four new minerals, described under the names of *Dudleyite*, *Kerrite*, *Maconite*, and *Willcoxite*.

<sup>1</sup> GEOL. MAG. Oct. 1865, and Mem. Geol. Survey, Ireland, Ex. Sheet 137, p. 50.

<sup>2</sup> Paper by T. Oldham, M.R.I.A., Journ. Geol. Soc. Dublin, vol. iii. p. 195.

<sup>3</sup> GEOL. MAG. Jan. 1874.

Dr. Genth's studies lead him to conclude—"1. That at the great period when the chromiferous chrysolite beds (in part subsequently altered into serpentine, etc.) were deposited, a large quantity of alumina was separated, which formed beds of corundum. 2. That this corundum has subsequently been acted upon, and thus been changed into various minerals, such as spinel, fibrolite, cyanite, and perhaps into some varieties of felspar; also into tourmaline, damourite, chlorite, and margarite. 3. That a part of the products of the alteration of corundum still exists in the form of large beds of mica- (damourite-) and chlorite-slates or schists. 4. That another part has been further altered and converted into other minerals and rocks, such as pyrophyllite, paragonite, beauxite, lazulite, etc."

F. W. R.

II.—ON A PSEUDOMORPHOUS FORMATION AFTER FELSPAR. Ueber eine pseudomorphe Bildung nach Feldspath. Von Dr. RICHARD v. DRASCHE. *Tschermak's Mineralogische Mittheilungen*, 1873, Heft ii. pp. 125-128.

THE pseudomorphs forming the subject of this communication were obtained from a limestone-quarry near Budweis, in Bohemia. This limestone incloses, among other minerals, large rounded masses of a greenish substance, resembling *steatite*. Each mass, when broken open, usually exhibits a white or greyish nucleus of ellipsoidal form, sharply separated in most cases from the enveloping mineral. The following analyses exhibit the composition of the nucleus (I.) and of the surrounding substance (II.).

|                        | I.     | II.    |
|------------------------|--------|--------|
| Silica .....           | 60·49  | 34·63  |
| Alumina .....          | 24·33  | 17·13  |
| Ferrous Oxide.....     | . . .  | 1·61   |
| Lime .....             | 4·07   | . . .  |
| Magnesia.....          | 1·46   | 33·38  |
| Potash .....           | 4·23   | . . .  |
| Soda .....             | 5·04   | . . .  |
| Loss on ignition ..... | 1·69   | 13·93  |
|                        | 101·31 | 100·68 |

It appears from these analyses that the composition of the nucleus is that of a felspar approximating to *andesine*; whilst the green investing mineral stands near to *pennine* or to *pseudophite*, and is evidently a product of the alteration of the felspar. F. W. R.

III.—ON SYNGENITE. Ueber den Syngenit. Von dem c. M. v. Ritter v. ZEPHAROVICH. *Sitzungsb. d. k. Akad. d. Wissensch.: Math.-Naturw. Classe.* lxxvii., 1873, pp. 128-142.

SYNGENITE is a new mineral species, discovered a short time since in the salt-deposits of Kalusz, in Eastern Galicia. It occurs in association with cubic crystals of rock-salt, and in general appearance resembles gypsum, from which it differs, however, both in its hardness and in the character of its cleavage. Chemical examination

showed that it was closely related to polyhalite, and this relation suggested to Zepharovich the specific name (*συνγενής*, related).

Syngenite is a hydrous double sulphate of calcium and potassium, containing  $\text{CaK}_2\text{S}_2\text{O}_8 \cdot \text{H}_2\text{O}$  (corresponding to the rational formula  $\text{CaO} \cdot \text{SO}_3 + \text{K}_2\text{O} \cdot \text{SO}_3 + \text{H}_2\text{O}$ ). Its crystals, though commonly affecting a monoclinic habit, were originally described as rhombic, partly on account of their optical characters, and partly because their forms resembled those of the corresponding artificial salt, which was believed to be rhombic. The present paper describes in great detail the crystallographic and optical characters of Syngenite, and the author shows that both this mineral and the artificial salt must be referred to the monoclinic system.

The mineral recently described by Rumpf under the name of *Kaluszite* seems to be identical with Syngenite.

Zepharovich's paper is accompanied by figures of the principal combinations exhibited by the crystals of syngenite, and by a stereographic projection of the poles of 21 observed planes. F. W. R.

#### PETROLOGY.

IV.—MICROSCOPIC EXAMINATION OF SOME PORPHYRITES AND ALLIED ROCKS FROM THE DISTRICT OF THE NAHE. Mikroskopische Untersuchung einiger Porphyrite und verwandter Gesteine aus dem Nahe-Gebiete. Von Herrn Prof. A. STRENG. *Leonhard u. Geinitz's Neues Jahrb. f. Mineralogie, u.s.w.* 1873, Heft iii. pp. 225–241.

SOME time ago, Prof. Streng published the results of a microscopic study of the rock called *Palatinit*, which occurs in the Valley of the Nahe, a tributary to the Rhine. In the present paper he extends his researches to the other crystalline rocks associated with the Rothliegende of this district, and describes in detail the microscopic structure of the following rocks, namely—(1). A Quartz-porphyrity, from Münster on the Stein. (2). An Orthoclase-porphyrity, from the foot of the Unterhäuser Berg. (3). A porphyrite, from the southern foot of the Gienberg. (4). A grey porphyrite, containing tridymite, from near the railway-station of Waldböckelheim. (5). A brown porphyrite, from the same locality. (6). A porphyrite, from the valley below Bokenau. (7). A dark porphyrite, occurring in loose fragments in this valley. (8). A brownish-grey porphyrite, from the same locality. (9). A quartziferous Palatinit, from the foot of the Welschberg.

These nine rocks fall into a natural series, having at one end a quartz-porphyrity, containing quartz, orthoclase, a triclinic lime-soda felspar, and a little hornblende. By gradual diminution in the proportion of quartz and orthoclase, a transition is effected, through the quartziferous porphyrite, to the typical porphyrites, which consist mainly of a lime-soda felspar and hornblende; thence, by addition of an augitic mineral and removal of hornblende, a rock may be obtained with the composition of Palatinit, which therefore constitutes the final term of this series. F. W. R.

V.—OBSERVATIONS ON THE DETRITAL TIN-ORE OF CORNWALL. By W. J. HENWOOD. *Journal Royal Institution Cornwall*, No. xv. 1874.

THESE deposits in Cornwall and Devon have been worked for ages, and are now nearly exhausted. This paper refers chiefly to those few still in progress.

Between the Land's End and St. Ives the granite and slate are crossed by lodes, differing in direction and character in different parts. To the south they are poorer, in the central tract richer, and in one spot tin-ore is generally disseminated; to the north and north-east many rich lodes have been and are largely worked, sometimes long irregular "off-shoots" spring from the lodes, and at one place immense metalliferous masses occur in the granite. In this tract tin-ore has been the chief product, though other ores have been worked.

At Bosworlas a narrow strip of "tin-ground" (granitic gravel, with pieces of tin-stone, etc.) is worked, at a depth of about 3ft. from the surface, having a sea-ward slope down the ravine, and varying much in thickness (3in. to 30in.) from the uneven surface of the granite beneath.

Near Bejowans the tin-ground occurs at a rather greater depth below gravel, sand, and peat. Other places give like sections, and generally there is an uneven surface of granite beneath.

Around the Camborne granite-tract there are lodes with tin-ore, especially near the southern boundary, and the streams crossing these parts are still worked for tin, the sections being of the same kind as before, and the detrital matter sometimes resting on the outcrop of tin-bearing veins in the granite. Near Tregedna the stream tin-deposit is overlaid by from 20ft. to 30ft. of mould and hardened silt. The largest body of stream-tin wrought of late years is near Restrouguet-creek, not only by open works, but by shafts 50 or 60ft. deep, and drifts below the water.

In the central district (Hensbarrow) tin-ore occurs not only in the lodes, but is sometimes scattered through the granite (St. Austell), and the detrital deposits on the north and east are still worked. Three sections, of varying depth, near St. Austell, show like deposits (with peat) to those noticed above, and there are others close by. On Tregoss Moors, which are on the slate, often soft, and with "elvans," three shallow sections are still open.

The eastern district includes the great granitic range, the highest part of Cornwall. The granite, slate, elvan, and hornblendic rocks are all crossed by lodes and cross-veins. Tin-ore occurs in some of the lodes, and also in scattered masses. Near St. Neot stream-tin is worked.

The water-shed of Cornwall has several flexures, but its range is nearly always much nearer to the north coast than to the south; consequently the shorter and swifter brooks on the north have greater wearing and carrying powers than the longer and slower streams on the south, and the former, therefore, deposit very little matter in their beds, whilst the latter deposit more.

The *débris* of the bed beneath the tin-ground always prevails in it. Other ores than tin-ore occur. The proportion of tin-ore in one of the richest works scarcely exceeded that in one of the poorest

lodes, but the metal from the stream-ore is the best. Gold has been found, but very sparingly, in the detritus of every tin-district.

The blocks and smaller fragments on the tin-ground show marks of abrasion, and the interstices are filled with sand and clay. The bed that rests on it is scarcely distinguishable from it, but that its ingredients are perhaps less abraded, and that it is almost destitute of tin-ore. The bed next above this has a likeness in neighbouring valleys, and yet sometimes differs in different parts of the same valley: it seems that after the tin-ground was deposited timber sometimes flourished in the lower valleys, and brushwood in the upland glens, subsequent change in the relative levels of land and sea affecting the former more than the latter; and that the deposit of barren *débris* was once or twice interrupted by a large formation of peat. Vegetable remains of the same kind occur within short vertical distances from the "tin-ground" both north and south of the water-shed.

The deep valleys which formerly opened to the sea below high-water mark, on the south coast, contain alternations of mineral with vegetable matter, and of fresh-water with salt-water deposits.

In the shallow stream-works of the moorlands the upper parts consist of much the same ingredients as the neighbouring rocks, are like the beds of the neighbouring brooks, and are disposed in thin layers with clay-partings.

Detrital tin-ore does not occur only (though chiefly) in the low grounds, but has also been found in abraded masses on the slopes of hills, whence it has been traced to the parent lodes.

If detrital tin-ore has also been deposited in the sea, it must be covered, as on land, by more recent deposits, soundings having failed to find it. At Cligger Head the ore derived from the waste of the cliffs is collected.

The paper concludes with three tables, giving the composition of the tin-ground and of the adjoining and neighbouring rocks, the comparison of vegetable remains in the upper and lower parts of the same and of different valleys, and the mineral composition and organic contents of the beds laid open in various stream-works.

Throughout is a very large number of foot-notes, giving references to the many works on the district. W. W.

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#### VI.—BRIEF ABSTRACTS.

1873.

GREENFELL, J. G. *Streptorhyncus Kellii*. *Trans. Clifton Coll. Sci. Soc.*, part iv. pp. 16, 17.

The shells were found in an "Oolitic" Limestone, from the lower part of the Carboniferous Limestone (above the Black Rock), at the foot of the gully down to the river from the Downs, and are important as showing that *Streptorhyncus Kellii* of McCoy is only a variety of *S. crenistria*, as suggested by Davidson. The deep mesial furrow and the rounded cardinal angles were the points on which McCoy chiefly insisted as specific differences, and in one of these specimens the former character occurs with acute cardinal angles,

whilst in others the mesial furrow varies very much in depth, being almost obliterated in some.

GREENFELL, J. G. Lower Limestone Shales, Clifton. *Trans. Clifton Coll. Sci. Soc.*, part iv. pp. 17–23.

These beds, consisting of alternations of shale and thin limestones, separate the Old Red Sandstone from the Carboniferous Limestone, the thickness of the last being 1450 feet, and that of the shales 500. The “bone-bed,” over 100 feet up in the shales, was once taken to be their base.

The new railway gives a good section, a detailed account of which (showing 148 beds, with a thickness of over 130 feet) is given, and the result of the examination is to throw the “passage-beds” of Mr. Sanders into the Carboniferous series, and to draw the line sharper between that and the Old Red Sandstone—Carboniferous fossils having been found to a lower depth than before.

The bearing that this may have on the “Devonian question” is noticed, and a conglomerate-bed is taken as the top of the Old Red Sandstone, which, however, may run a few feet higher. The beds seem to thin out rapidly along the strike (S.W.).

GREENFELL, J. G. Iron Mine recently opened in the Royal York Crescent, Clifton. *Trans. Clifton Coll. Sci. Soc.*, part iv. pp. 46–53.

The mine is sunk in Millstone Grit, the upturned beds of which are overlaid by horizontal beds, probably Triassic, five to twelve feet thick, and composed of clay with fragments and masses of hæmatite. At another pit, close by, these latter beds have not been bottomed at a depth of fifty feet, and a mass of hæmatite (probably lenticular), ten to twelve feet thick, is worked in them: they are the débris of the Millstone Grit beds. In the mine (an open pit) there are two beds of hæmatite, each four feet thick, with five of sandstone and one of shale (also rich in iron).

Most of the ore is Limonite, in six varieties; red hæmatite occurs in the inside of lumps of ore, and goethite in crystals coating the limonite, and in cavities of the hæmatite. Quartz and sulphate of baryta are associated with the iron-ore, the former disseminated through the hæmatite, and in crystals; as a rule, the silica has been deposited after the iron; the sulphate of baryta is in the form of small thin tables in cavities in the ore and in the sandstone-matrix.

The ore was introduced since the deposit of the beds, and the author thinks that the cavities in which it is found may have been formed by the dissolving away of limestone that once existed amongst the sandstone beds.

From the perpendicularity of the stalactitic masses of limonite, it is clear that the deposit of ore must have taken place after the beds were tilted into their present position. If, then, the overlying horizontal beds are Triassic, and the lumps of hæmatite in them were derived from the Millstone Grit, we can fix the date of introduction of the ore, viz. during the Permian and Bunter periods. The author thinks that the iron may have been derived from the carbonate of iron of the Coal-measures that have been denuded away in the neighbourhood.

GREENFELL, J. G. Minerals of Clifton and the Neighbourhood. *Trans. Clifton Coll. Sci. Soc.*, part iv. pp. 63, 64.

A list of 30 minerals, giving the formation in which they are found, and the forms and conditions in which they occur.

W. W.

MELLO, Rev. J. M. On Coal: its Nature and Uses. *Trans. Chesterfield and Derbyshire Inst. of Eng.*, vol. ii. part i. pp. 37-55.

The author first notices the chemical composition of coal, and the evidences of its vegetable origin (in swamps that were slowly sinking), and then treats of its uses and products.

W. W.

TOPELY, W. On the Relation of the Parish Boundaries in the South-East of England to great Physical Features, particularly to the Chalk Escarpment. *Journ. Anthropological Inst.*, vol. iii. pp. 32-55.

The author points out the connexion between the form of the ground and the great physical features of the country, and shows that a certain relation exists between them and the boundaries of the parishes. This he illustrates more particularly by reference to the geology of part of Sussex.

Looking to the probable state of the country before the earliest settlements were made, it appears that the low-lying clayey lands were very thickly wooded, the higher lands of moderate elevation were in great part covered with wood, whilst the high lands and slopes of escarpments were generally open land.

Escarpments being mostly formed of porous rocks, resting upon strata more or less impervious, are generally found to give out springs at their base. Hence the conclusion is justified that the earliest settlements in the south of England would take place along the wider chalk valleys, in which probably water then flowed, or along the foot of the escarpment, where good water, a productive soil, and a sheltered situation may be found. The author points out the relations of the manor or parish boundaries to the character of the country in regard to agricultural and farming capabilities, and demonstrates how these older boundaries are simpler than those of parishes subsequently formed. In conclusion he directs attention to the physical origin of many of the names of the villages. H. B. W.

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## REVIEWS.

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I.—THE NATURALIST IN NICARAGUA: A Narrative of a Residence at the Gold Mines of Chontales; Journeys in the Savannas and Forests, with Observations on Animals and Plants in Reference to the Theory of Evolution of Living Forms. By THOMAS BELT, F.G.S., etc., etc. 8vo. pp. 403, with a Map and numerous Illustrations. (London, John Murray. 1874.)

THE name of the author of this book has already become a familiar one in the pages of the GEOLOGICAL MAGAZINE<sup>1</sup> since its earliest volume. But although a good geologist and

<sup>1</sup> "On the Formation and Preservation of Lakes by Ice-action," by Thomas Belt,