## NOTICES OF MEMOIRS.

### I.—Glaciation of Salzach District.

Die Vergletscherung des Salzachgebietes nebst Beobachtungen über die Eiszeit in der Schweiz. von Dr. Eduard Brückner. Geographische Abhandlungen; herausgegeben von Dr. Albrecht Penck. Bd. 1. (Vienna, Hölder, 1887.)

DR. BRÜCKNER'S paper on the glaciation of the Salzach district furnishes us with another chapter in the history of the Glacial period on the northern slopes of the Alps. Whilst previous writers, such as Al. Favre and Falsan, have traced out the development of the Rhone glacier of the ice period, and Penck has worked at the glacial deposits between the Lake of Constance and the Chiem Lake, the present author has chosen the district of the Salzach, further to the eastward, as the field of his observations, and has in this memoir accumulated a great amount of detailed evidence on the extent of the glaciation, its effects on the configuration of the surface and its recurrence at distinct intervals. The results obtained agree with and confirm those of the authors above mentioned in the more westerly districts of the Alps.

One very noticeable fact is the decrease in the intensity of the glaciation in passing from the west towards the east. This is well shown by the author in a table in which a comparison is made between the level of the upper surface and the thickness of the more important Alpine glaciers at their points of issue from the mountains, together with the respective distances and the levels to which they extended from the foot of the mountains and the width of their outer morainic areas. Thus, for example, the upper surface of the ancient Rhone-glacier at the position indicated was 1500 mètres and its thickness 1300 mètres; it reached 170 kilom. from the mountains, and descended to a level of 300 m. The old Salzach glacier, on the other hand, was only 650 m. in thickness, and its upper surface 1050 m., whilst it only reached 32 kilom. from the mountains, and not lower than 500 m. The height of the snow-line in the Salzach district during the Glacial period is estimated at 1200 m.

The author points out the very distinctive character of the two zones of ancient moraines; an outer, distinct petrographically as well as by its having a covering of Loess or of a fine clay of a similar character, and an inner moraine which has a well-marked terminal wall, and is without a layer of Loess. The author has ascertained the extension of the inner moraine over the Loess as well as over the outer moraine, thus indicating its interglacial age, and he has further discovered no fewer than seven profiles in which the two moraines were clearly separated from each other, either by the Loess, or by important beds of gravel and conglomerate, thus showing an interglacial interval between their deposition. The high terrace gravels which occur beneath the outer moraine, and the lower terrace gravels deposited in advance of the inner second moraine, are well developed in the Salzach district, and the author further describes

a third series of widely-distributed gravels, which are believed to indicate a more extensive and an older advance of the glaciers.

The character and origin of the lakes not only of the Salzach district, but of the Linth and those of the Neuenburg group, are fully treated, and a special chapter is devoted to the Glacial deposits of the Lake of Geneva.

The text is accompanied by several figures and tables, as well as by three elaborate coloured maps of the district described.

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## II.—The Matrix of the Diamond. By Prof. Carvill Lewis.

(Abstract of a Paper read at the Manchester Meeting of the British Association, September, 1887.)

A MICROSCOPICAL study of the remarkable porphyritic peridotite which contains the diamonds in South Africa demonstrates several interesting and peculiar features.

The *olivine*, forming much the most abundant constituent, is in porphyritic crystals, sometimes well bounded by crystal faces, at other times rounded and with corrosive cavities, such as occur in it in basaltic rocks. It rarely encloses rounded grains of glassy bronzite, as has been observed in meteorites. The olivine alters either into serpentine in the ordinary way, or into an aggregate of acicular tremolite crystals, the so-called '*pilit*,' or becomes surrounded by a zone of indigo blue bastite—a new variety of that substance. The olivine is distinguished by an unusually good cleavage in two directions.

*Bronzite*, *chrome diallage*, and *smaragdite* occur in fine green plates, closely resembling one another. The bronzite is often surrounded by a remarkable zone, with a centric pegmatitic, or chondritic structure, such as occurs in certain meteorites. This zone is mainly composed of wormlike olivine grains, but a mineral having the optical characters of cyanite also occurs in this zone.

*Biotite*, a characteristic constituent, occurs in conspicuous plates, often twinned, generally rounded, and distinguished by its weak pleochroism, a character peculiar to the biotite of ultra-basic eruptive rocks. It alters by decomposition into the so-called *Vaalite*.

*Perowskite* occurs in very numerous but small crystals, which optically appear to be compound rhombic twins.

Pyrope is abundant in rounded red grains. Titanic iron, chromic iron, and some fifteen other minerals were also found. Rutile is formed as a secondary mineral through the alteration of olivine into serpentine, being a genesis of rutile not heretofore observed.

The *chemical composition* shows this to be one of the most basic rocks known, and is a composition which by calculation would belong to a rock composed of equal parts of olivine and serpentine, impregnated by calcite.

The *structure* is at the same time porphyritic and brecciated, being one characteristic of a volcanic rock which after becoming hard had been subjected to mechanical movements. It is a volcanic breccia, but not an ash or tuff, the peculiar structure being apparently due

to successive paroxysmal eruptions. A similar structure is known in *meteorites*, with which bodies this rock has several analogies. A large amount of the adjoining bituminous shale is enclosed, and has been more or less baked and altered. The occurrence of minute tourmalines is evidence of fumarole action.

The microscopical examination supports the geological data in testifying to the igneous and eruptive character of the peridotite, which lies in the neck or vent of an old volcano.

While belonging to the family of peridotites, this rock is quite distinct in structure and composition from any member of that group heretofore named. It is more basic than the picrite porphyrites, and is not holocrystalline like dunite or saxonite. It is clearly a new rock-type, worthy of a distinctive name. The name *Kimberlite*, from the famous locality where it was first observed, is therefore proposed.

Kimberlite probably occurs in several places in Europe, certain garnetiferous serpentines belonging here. It is already known at two places in the United States: at Elliott County, Kentucky, and at Syracuse, New York; at both of which places it is eruptive and Post-Carboniferous, similar in structure and composition to the Kimberley rock.

At the diamond localities in other parts of the world diamonds are found either in diluvial gravels or in conglomerates of secondary origin, and the original matrix is difficult to discover. Thus, in India and Brazil the diamonds lie in conglomerate with other pebbles, and their matrix has not been discovered. Recent observations in Brazil have proved that it is a mistake to suppose that diamonds occur in itacolumite, specimens supposed to show this association being artificially manufactured. But at other diamond localities, where the geology of the region is better known than in India or Brazil, the matrix of the diamond may be inferred with some degree of certainty. Thus, in Borneo, diamonds and platinum occur only in those rivers which drain a serpentine district, and on Tanah Laut they also lie on serpentine. In New South Wales, near each locality where diamonds occur, serpentine also occurs, and is sometimes in contact with Carboniferous shales. Platinum, also derived from eruptive serpentine, occurs here with the diamonds. In the Urals, diamonds have been reported from four widely separated localities, and at each of these, as shown on Murchison's map, serpentine occurs. At one of the localities the serpentine has been shown to be an altered peridotite. A diamond has been found in Bohemia in a sand containing pyropes, and these pyropes are now known to have been derived from a serpentine altered from a peridotite. In North Carolina a number of diamonds and some platinum have been found in river sands, and that State is distinguished from all others in eastern America by its great beds of peridotite and its abundant serpentine. Finally, in northern California, where diamonds occur plentifully and are associated with platinum, there are great outbursts of Post-Carboniferous eruptive serpentine, the serpentine being more abundant than elsewhere in North America. At all the localities mentioned chromic and

titanic iron ore occur in the diamond-bearing sand, and both of these minerals are characteristic constituents of serpentine.

All the facts thus far collected indicate *serpentine*, in the form of a decomposed eruptive peridotite, as the original matrix of the diamond.

## III.—Permian Fossils from Spitzbergen.

Anmärkningar om Permfossil från Spetsbergen, af Bernhard Lundgren. Bihang till K. Svenska Vet. Akad. Handlingar. Bd. 13 (1887), Afd. iv. No. 1, pp. 3—26, t. 1.

THE fossils from Spitzbergen which by de Koninck[1] and Geinitz were accepted as proving the Permian character of the beds in which they occurred, were shown subsequently by Lindström to be associated with species which, in other localities, are distinctly characteristic of the true Carboniferous Limestone, and the Spitzbergen strata, in which this intermingling of Carboniferous and Permian fossils takes place, have therefore been termed the Permo-carbon series. In the Swedish expedition to this island in 1882, Nathorst and De Geer discovered in Belsund and Tcefjord a series of rocks, principally shales and sandstones, reaching a thickness of about 300 mètres, which rests upon the thick mass of cherty and siliceous rocks of the Permo-carbon series, and are overlaid by rocks with Trias fossils. A scanty fauna, entirely marine, was found in this sandstone and shale series, and is described in this paper by Prof. Lundgren. It consists principally of small Brachiopods and Lamellibranchs with a single Coral, *Stenopora columnaris*, Schlot. Some of these forms are identical with, and others are closely allied to, those in the Permian series of England, Germany, Petschora-land, and the North-west of North America. In these Spitzbergen rocks all the fossils are distinctly of a Permian type, and the Carboniferous Limestone forms have quite disappeared, thus showing a gradual extinction of these latter before the deposition of this series, which may justly be regarded as Permian. Prof. Lundgren figures the new forms, which are of a dwarfed character. G. J. H.

## IV.—Preliminary Observations on the Geology of Wicklow and Wexford. By Professor Sollas, LL.D., F.G.S.

OF rocks older than the Cambrian examples probably occur in the Carnsore district, but most of the presumed Archæan rocks are to be explained as crushed igneous dykes and flows. The Cambrian are certainly unconformably succeeded by the Ordovician.

The main granite of the district is a truly intrusive rock; but at its junction with the Ordovician which it penetrates, it possesses the characters of a true gneiss, the schistosity of which corresponds in direction with that of the adjoining schists, having resulted from earth-movements which took place after the Ordovician and before the Lower Carboniferous period.

[1] Bull. de l'Acad. Royale de Belgique, ser. 1, vols. 13, 16.