

The Student's Association of Natural Science. Upsala.

Geological and Physico-Geographical Division.

The Student's Association of Natural Science is divided into four parts:

1. *Botanical* Division.
2. *Zoological* »
3. *Chemical* »
4. *Geological and Physico-Geographical* Division.

Each of these divisions is presided over by an elected Secretary.

The Geological and Physico-Geographical Division was organized 6 February 1871. The system of work at present pursued is as follows: Every other Monday during the term, meetings are held, comprising discourses, reports and reviews of newly published geological literature and subjects of debate previously agreed upon.

At the meeting of 21 November 1892 Professor HJ. SJÖGREN communicated his intention of publishing a periodical entitled »Bulletin of the Geological Institution of the University of Upsala» and offered to insert the proceedings of the Division.

The latter resolved to accept his offer with thanks and appointed a committee of three, to prepare the insertion.

Meeting of 26 September 1892.

1. Directors were appointed for the term; namely,
RUTGER SERNANDER, Secretary.
{ CARL WIMAN, Reporter.
{ K. KJELLMARK »

Meeting of 4 October 1892.

Herr HENR. MUNTHE gave an account of last summer's proceedings of the Mineral-geological Division of naturalists in Copenhagen, chiefly dwelling upon K. J. V. STEENSTRUP's *discourse* on »Flyvesandets Indvirkning paa Rullestenenes Form» (The Effect of Drifting Sand on Forming Sand-worn Pebbles).

In illustrating this, MUNTHE showed a collection of sand-worn stones, gathered by himself last summer at Tarbeck in Holstein. Several presented one edge, which was without doubt, formed by the effect of drifting sand, whilst others were furnished with one or more edges, formed by breakage. Herr MUNTHE hoped to enlarge upon the subject after becoming better acquainted with it.

Herr WIMAN also showed some sand-worn stones found in blocks of Gefle sandstone.

2. Herr CARL WIMAN discussed the newly published section map of Mariehamn, Åland, by BENJ. FROSTERUS (Finland) and referred to some of his own observations made in the same district.

The remarks gave rise to a discussion between Hrr NORDENSKJÖLD, MUNTHE, SERNANDER and WIMAN.

Meeting of 10 October 1892.

Herr OTTO NORDENSKJÖLD in a communication on »The Igneous Rocks of England» gave a synopsis of the age and genesis of igneous formations in England mentioning his observations on the subject whilst travelling last summer through several of the western coast districts of Great Britain, illustrating his remarks with maps, rock-specimens and photographs from that country.

After reporting the known mass of tertiary rocks, — some wholly granitic, some trachytic and vitreous, — on the Island of Mull, off the coast of Scotland, — he especially called attention to a peculiar kind of rock found there, in the study of which an opportunity is afforded of investigating the formations consolidated at various depths and times during a whole epoch of eruption.

Herr NORDENSKJÖLD further gave some information respecting igneous formations, — partly silurian, partly in all probability, pre-Cambrian, connected with lava-streams, volcanic breccias, ashes etc., found in Westmoreland and North Wales. The former, lying between Ambleside and Coniston, highly resembled some Swedish archæan rocks, according to Herr NORDENSKJÖLD's opinion, particularly the petrosilexes of the province of Småland (compare this number's paper on the subject). The series of igneous formations, tuffs and sediments, which occur between Bangor and Mount Snowdon in Wales very much resembles formations in the »Dalsland series» in Sweden, where the chlorite-stone with its well developed amygdaloidals is, no doubt, igneous and in some formations probably composed of tuffs and tufaceous sediments, whereas the rock foundation is chiefly composed of sedimentary rocks. Several brec-

ciated formations, probably tufaceous, in the district of Bangor much resembled some forms of the so-called Digerberg-sandstone of Dalecarlia, which name Herr NORDENSKJÖLD found less convenient than Digerberg-breccia.

Finally specimens were exhibited of the granitoid rocks from the island of Anglesey partly resembling our youngest primitive formations.

Special attention was called to the occurrence of a conglomerate formed of quartzitic pebbles in the neighbourhood of Llangefui.

Remarks bearing upon the paper were then made by Herr ANDERSSON.

2. Herr RUTGER SERNANDER reviewed *Wahnschaffe: »Mittheilungen über das Glacialgebiet Nordamerikas I. Die Endmoränen von Wisconsin und Pennsylvanien»* (Zeits. d. deuts. geol. Ges., Bd. 44, H. 1., 1892) and on this subject drew some comparisons between the second glaciation in North America and Sweden.

Herr WIMAN and MORTON then expressed their opinions in relation to Herr SERNANDER'S review, Herr MORTON alluding to some moraines in the parishes of Pajala and Arwidsjaur.

Meeting of 24 October 1892.

1. Herr JOH. GUNNAR ANDERSSON read a paper on the subject of »Conglomerates and Their Signification».

Regarding conglomerates, chiefly from a practical standpoint, they may be divided into bottom conglomerates and imbedded. The former were formed by the overflowing of a district, which had been elevated above the sea for a comparatively long period, and the surface of which had been *transformed* to a considerable depth on account of *secular weathering*. The difference in age between the conglomerate and the *subjacent bed* would, in this case, be greater, but the limit between the undermost parts of the conglomerate and the weathered subjacent bed would often be hard to trace.

The imbedded conglomerates, on the contrary, were formed, when a receding of the shore-line was closely succeeded by a speedy advance of the shore-line, so quickly, in fact, that the secular weathering had not had time to exercise any essential influence upon the land thus exposed. The difference in age between the conglomerate and subjacent bed, is, in this case, little, and the limit between them often very sharp.

After mentioning that by studying the conglomerates of Omberg, Öland, and the Baltic provinces, HOLM had succeeded in more accurately fixing the shore-line as it existed during certain spaces of the silurian period, he gave a report of his own studies on some Öland conglomerates. The conglomerates which HOLM had discovered were to his knowledge, generally only known to

be found in one locality. It was, therefore, interesting that he had succeeded in proving their occurrence over large districts.

In like manner, the *Ölandicus-Tessini* conglomerate, found by ANGELIN, near Borgholm, was discovered in sinking a well in the village of Runsbäck, Torslunda Parish, and the *Forchhammeri-pisiformis* conglomerate, discovered by HOLM at South Möckleby, has also been found at Eriksöre. The distance between the two localities is, in both cases, about 30 kilometres. The conglomerates in question seem accordingly to be largely diffused, when compared with the thickness of their deposits, which is only from 5 to 20 cm.

Of still greater importance is the fact that WIMAN also found *Forchhammeri-pisiformis* conglomerates in Jämtland, which find seems to indicate, that the change or changes in the level, which occasioned this conglomerate, were vast in extent. A remarkable circumstance, connected with some of these conglomerates, and which might seem to contradict their being *beach-formations*, is the fact that the fossils, imbedded in them, were exceedingly well preserved, lacking all trace of friction. As illustrating this fact Herr ANDERSSON showed, among others, the *Ölandicus-Tessini* conglomerate, in which numerous specimens of an *Acrothele* species with coherent ventral and dorsal shells occurred.

In the cementing matrix, on the contrary, of other conglomerates, as the *Forchhammeri-pisiformis* conglomerate and a new one found at Eriksöre and belonging to the *Orthis lenticularis-zone*, some worn fossils occur. Certain cambrian conglomerates on Öland are, as even their names indicate, situated on the boundary line between two zones, and the fossils occurring in them, may be divided into:

1. Species characterizing the subjacent beds.
2. » peculiar to the conglomerate.
3. » characterizing the superincumbent beds.

This seems to denote that the changes in the level which occasioned the formation of the conglomerate were also accompanied by a change in the condition of the fauna, and this, either by immigration of foreign animal forms, or by the development of new ones out of those previously existing, or, as it seems most probable, by both these processes combined.

In the ensuing discussion Hrr WIMAN, MUNTHE, SERNANDER, MORTON, NORDENSKJÖLD and ANDERSSON himself took part.

Hrr WIMAN, MUNTHE and SERNANDER endeavoured to prove, from circumstances occurring in recent and post-tertiary beach formations, that entire shells of delicate species might very well be imbedded in formations, afterwards transformed into conglomerate.

Herr WIMAN signified the importance of stating whether a conglomerate had any considerable extent in two dimensions or not. Herr NORDENSKJÖLD

agreed with REYER in objecting to all conglomerates being classified as beach-formations, and considered hardly a single archæan conglomerate as having been fully proved.

Meeting of 7 November 1892.

1. Herr A. CEDERSTRÖM read a paper on »Rocks of the Northern Part of Ornön» (Stockholms skärgård) showing a number of rock-specimens and some photographs from that district. Furthermore he exhibited a specimen of »gneiss» from the ore-bed of Gellivara, which quite resembled the »Ornöite» denominated by him — and a »quartzite» from the Langö-Iomö district (Norway), fully analogous, in its petrographic character, with the foliated granite which occurs on Ornön as veins in massive diorite.

2. Herr HENR. MUNTHE discussed TH. THORODDSEN'S paper on »Postglaciale marine Aflejninger, Kystterrasser og Strandlinjer i Island» (Geografisk tidskrift, Kjøbenhavn 1892).

Herr MUNTHE remarked that, the author, not having yet had the opportunity of ascertaining whether the contemporary traces of depression showed any inclination, it must be still unknown if the changes of the level on Iceland were connected with movements in Greenland or Scandinavia, or if they were to be looked upon more as local phenomena confined to Iceland. The informations concerning the fauna in the marine formations were not sufficient to establish whether the island had been subjected to any post-glacial depression, as for instance, has been the case with the southern part of Sweden.

3. Herr MUNTHE further discussed E. FRAAS: Ueber einen neuen Fund von Ichtyosaurus in Württemberg (Neues Jahrb. etc. 1892).

Meeting of 21 November 1892.

Herr OTTO NORDENSKJÖLD spoke on »Småland Petrosilexes» and showed numerous specimens (see paper »Zur Kenntniss der s. g. Hälleflinten des N. O. lichen Småland» in this number).

2. Herr RUTGER SERNANDER explained a profile of a smaller dislocation with breccia (probably *post glacial*) from Kluhäll on the western coast of Lilla Karlsö off Gothland.

Meeting of 5 December 1892.

1. Herr CARL WIMAN read a paper on »Study of the Silurians of the Gulf of Bothnia», displaying at the same time a number of fossils. (The chief contents of his paper occur in »Ueber das Silurgebiet des Bottnischen Meeres», published in this number.

In connection with the above Professor H. VON POST remarked that in a marsh near Löfsta (North Upland) a large conglomerate block of sandstone had been found, containing boulders up to a foot in diameter.

Herr MUNTHE remarked of the occurrence of Tåsjöberg-alum-slate in moraine near Hernösand and presented the possibility that some part, though little, of the Cambrian-Silurian blocks found in northern Upland and other places might have been transported thither from northern tracts of Sweden.

This possibility should be taken into consideration when determining the sources of erratic silurian material in Upland.

These remarks induced Herr WIMAN to call attention to the difference between certain Norrland rocks and the material of such blocks in determining the origin of which one might possibly be mistaken.

He had, however, not yet found any Norrland Silurian blocks either in Upland or Åland.

2. Herr JOH. GUNNAR ANDERSSON spoke on »Dislocations in the Silurian District of Nerike», illustrated by outline profiles, his paper causing a discussion between Herr SERNANDER, VON POST, MUNTHE and himself.

In opposition to Herr ANDERSSON, who was inclined to consider also the lines of dislocation in western and southern Nerike as post-Silurian — an opinion which he based on analogies with certain unmistakable post-Silurian dislocations in the southern part of the province — Herr SERNANDER believed that the first mentioned dislocations ought rather to be interpreted as pre-Silurian and mentioned, in support of this, the fact, that the archæan formations in those districts seemed to have undergone considerable denudation.

During the discussion of post-Silurian dislocations in Sweden, Herr VON POST remarked that he had long ago observed a breccia between the granite and Silurian at the »Stygforsen», Dalecarlia, and that he — contrary to the usual interpretation at that time of similar phenomena as depending on the breaking forth of the eruptive material — had regarded the breccia as having originated from the sinking of the silurian beds relative to the massive granite; and Herr MUNTHE said that on a visit last summer to a limestone quarry about 1 kilometre S. S. E. of Vadstena, he had found beds of orthoceran limestone dipping about 30° N. E. and furnished on the surfaces of stratification with fine striations in the direction of the dip, specimens of which were exhibited.

