MEDDELELSER OM GRØNLAND
UDGIVNE AF
KOMMISSIONEN FOR VIDENSKABELIGE UNDERSØGELSER I GRØNLAND
BD. 96 · NR. 1

TREAARSEXPEDITIONEN TIL CHRISTIAN DEN X'S LAND 1931-34
UNDER LEDELSE AF LAUGE KOCH

FURTHER CONTRIBUTIONS TO THE DEVONIAN STRATIGRAPHY OF EAST GREENLAND

I.

RESULTS FROM THE SUMMER EXPEDITION 1932

BY

G. SÄVE-SÖDERBERGH

WITH 15 FIGURES IN THE TEXT AND 3 PLATES

KØBENHAVN
C. A. REITZELS FORLAG
BIANCO LUNOS BOGTRYKKERI A/S
1933

CONTENTS

		Page
Preface		5
I.	Introduction	8
II.	Description of the localities visited in 1932	11
	1. Northern slope of Mt. Celsius	11
	2. Southern slope of Mt. Celsius	16
	3. Mt. Rudbeck	21
	4. The outer parts of Dusén Fjord	22
	5. Gauss Peninsula	25
III.	Stratigraphical conclusions	36

PREFACE

The present brief note gives the stratigraphical results of the investigation of the East Greenland Devonian during the Danish Summer Expedition of 1932. It has been written for two purposes.

First it was desirable, before the further paleontological investigation of the fresh material of vertebrate fossils commenced, to have at our disposal a description of the localities from which this material is derived.

Next I have thought it appropriate to give, at the same time, a description of the stratigraphical and other geological observations made during the collection of the fossils. It is my plan to publish a more complete work on the whole Devonian stratigraphy of East Greenland when the Danish Three-year Expedition has finished its work, viz. in the autumn of 1934. However, by giving every year an account of the local finds and of all stratigraphically less important details — of interest rather for the sake of exact knowledge of the provenience of the fossils — too many irrelevant details can be omitted in the final work.

Already during the field-work it was, of course, necessary to name the different localities, mountains, terraces, etc., from which the collections of Vertebrates were secured. In those cases where previously no names had been published, new names had to be given. As soon as the collections arrived home, the specimens were labelled with fixed labels, after the indication of numbers attached to them during the field-work, and corresponding to detailed notes concerning the localities. Thus the new geographical names were introduced on the labels of the whole material, which comprises more than 3000 specimens.

In the meantime a very fragmentary map (1) had been published by the Svalbard Commission. Unfortunately this map introduced a number of new names on mountains, which were, apparently, in part very incompletely known by the mappers. Some of these names refer to mountains within the areas where we made collections during

the summer of 1932, and a few of them clearly indicate points to which other names had been applied by us. As regards other of the Norwegian names it is less clear to which points they refer.

The circumstances sketched out above necessitated a rather detailed critical examination of the Norwegian names in order to justify, when possible, the maintenance of the names given by us, since these names could not reasonably be altered on all the 3000 labels if not absolutely necessary. In cases, however, where the correct indication of a Norwegian name is quite undoubted, this name has, of course, been adopted by us too. But when, for instance, it has been applied to a not specified part of a mountain complex, or to a small "Vorgipfel" incorrectly taken by the Norwegian mappers to be the real top of a mountain differently named by us, I apply our field-names, respectively for the part of the mountain complex from which our collections were made, and for the whole mountain, whose "Vorgipfel" retains the Norwegian name.

When proceeding as stated above, I think I am supported also by the fact that while the names given by us are all of them necessary for a practical purpose, viz. the description of the stratigraphy and the fossil localities, the Norwegian names in several cases seem to be less justified by an actual need for names. For most of the discussed mountains seem to be neither stratigraphically nor topographically even fairly completely investigated by the Norwegian expeditions.

I have to thank most sincerely my esteemed friend, the leader of the Danish Expeditions, Dr. LAUGE KOCH, for much valuable information and for his obliging kindness in allowing me to take with me three assistants, and in placing at my disposal great technical resources and a splendid camping outfit. I am also very indebted to Professor STENSIÖ, Stockholm, for the kind and stimulating interest he has taken in my work, as well as for much valuable advice concerning the technical outfit.

Professor STENSIÖ is also a collaborator in this paper, since he has made the determinations of the stratigraphically important *Antiarchi* and *Arthrodira* found during the field-work last summer.

The petrographical examination of the rock-types has been carried out by Dr. D. MALMQVIST. As yet this examination is only preliminary, but Dr. MALMQVIST intends to make a more extensive petrographical study of the East Greenland Old Red in connection with the writer's forthcoming final publication on the stratigraphy of the formation. I wish to thank Dr. MALMQVIST most sincerely for the allowance to make use in the present publication of his preliminary diagnoses of the rock-types.

I also wish to thank my three assistants, E. JOHANSSON, G. LINDGREN, and T. SÄVE-SÖDERBERGH, for their valuable collabo-

ration in the field, and for the pleasant time we spent together in East Greenland.

The panoramas in colour illustrating this publication, have been drawn by Mr. G. FAGRELL, after photographs and sketches made by the writer. The final preparation of the text-figures and plates has been accomplished by Mrs. A. STENSIÖ. Further technical assistance by Mrs. M. FERM and Miss B. ARNELL has considerably facilitated the rapid publication of this work. To all these collaborators I wish to express my best thanks.

The photographs reproduced in the illustrations were all except one, text-fig. 12, taken by the writer by means of a Zeiss Ikon Nixe apparatus, on Agfa-Isochrome Film and with a Zeiss Yellow Filter Hell ($\times$ $1^1/_2$—2). The photographs used for the coloured panoramas (pls. 1, 2) were taken with the same Nixe apparatus, but on Ilford Soft Gradation Panchromatic plates, with an Ilford Gamma Filter, and a Zeiss Distar Lens 2,5 $\times$ 42. With this outfit I obtained excellent photographs, showing details of the landscape even at a distance of over 50 km (from Mt Celsius to certain parts of Gauss Peninsula).

In the indications of the dip and strike I have counted, throughout the present paper, with a declination of 38° W.

I. Introduction.

For the history of the exploration of the Devonian stratigraphy of East Greenland the reader is referred to my previous publication on the subject (SÄVE-SÖDERBERGH 1932 a). In that paper I critically reviewed the previous attempts at a more detailed stratigraphical subdivision of the formation (KULLING 1930, 1931 a, ORVIN 1930). The result arrived at was that all these attempts are based on a too scanty knowledge of the subject discussed. Hence it was of great interest to me to find that in a somewhat later publication BACKLUND — from a different point of view — expressed a similar scepticism concerning the reliability of the systematisations of KULLING and ORVIN, also criticised by me: "Bei dieser Gelegenheit muss entschieden die Unzulässigkeit der Versuche, eine stratigraphische Einteilung des alten roten Sandsteins (Old Red) einzig auf Grundlage der verschiedenen Färbung der eingehenden Sedimente über weitere Areale hin durchzuführen (8, 10, 18 b)[1]), hervorgehoben werden." (BACKLUND 1932, p. 42, note 1).

The best known part of the East Greenland Devonian is the mountain complex of Mt Celsius, now a classical locality for Old Red vertebrate finds. Here, too, a comparatively long profile through an important part of the formation is exposed. The classification of the formation will therefore have to start from the sequence found in Mt. Celsius, and profiles from other localities will have to be correlated as far as possible with this type profile.

Both KULLING and ORVIN have described profiles from Mt. Celsius. However, as will be easily seen from the earlier publications (KULLING 1930, 1931 a; ORVIN 1930), certain of the similarly denoted divisions of KULLING and ORVIN do not correspond to each other, not even in the type profile, the sequence in Mt. Celsius. More precisely, the systems of the two writers mentioned have to be correlated for this locality as shown below.

---

[1]) ORVIN 1930, KULLING 1930, 1931b.

Orvin	Kulling
Obere graue Sandsteinabteilung	Upper Grey Sandstone Series
Obere rote —	Upper Red — —
Mittlere graue —	Midmost Grey — —
Untere rote —	Midmost Red — —
Untere graue —	(In other localities the sequence is supposed to continue below with the: Lower Grey Sandstone Series Lower Red — — Basal conglomerates.)
(Below this the basal conglomerate is supposed to be situated in other localities.)	

Even because of this a confusion will always be possible when applying the terms proposed by either of the authors mentioned. But moreover both of them apply their terms without sufficient reservation also to strata which are by no means certainly equivalent to the strata with the same names in Mt. Celsius (cf. Säve-Söderbergh 1932a, pp. 26—28). Hence it is evidently necessary to get an entirely new nomenclature of the divisions of the East Greenland Old Red, beginning with Mt. Celsius, — a nomenclature that will not give rise to confusions, nor express as evident facts a merely hypothetical correlation of strata without conclusive evidence from fossil contents or detailed petrographical studies.

As will be evident already from my earlier publication (1932a, pp. 10—13, 15, 27), the series of strata in Mt. Celsius referred to the so-called Upper Red Sandstone Series of Orvin and Kulling is especially characterised by the abundance of members of the genus *Remigolepis*. Hence this series of strata may appropriately be termed the *Remigolepis* Series. Its type locality is the northern slope of Mt. Celsius.

In the lower part of the mainly grey series overlying the *Remigolepis* Series in Mt. Celsius the only Arthrodires known from East Greenland have been found by Orvin (Heintz 1932, pp. 18—24, 26). Hence this part, corresponding in Mt. Celsius to the lower part of Orvin's and Kulling's "Upper Grey Series", will be termed in the following the Arthrodire Sandstone Series. Its type locality is the higher portion of Mt. Celsius.

In the upper part of Kulling's and Orvin's "Upper Grey Sandstone Series" no determinable fossils have as yet been found. The age

of this upper part is, in reality, quite uncertain. It may be Carboniferous just as well as Devonian. And no natural upper boundary has been found near above the uppermost certain Devonian strata in the profile discussed (cf. below pp. 19—21). Thus, until further, more complete, investigations have been carried out, it seems most practical not to fix the upper boundary of the Arthrodire Sandstone Series in the profile of Mt. Celsius. Instead of this I define the Arthrodire Sandstone Series as the Devonian part of the grey series overlying the *Remigolepis* Series in Mt. Celsius. Further investigations will show whether there is a post-Devonian upper part in the grey series, or whether it should be totally included in the Arthrodire Sandstone Series. In the following the whole grey series will, however, for the sake of brevity provisionally be termed the Arthrodire Sandstone Series.

Below the *Remigolepis* Series there is in Mt. Celsius a complex of mainly grey, but also, though less prominent, light red and varicoloured sandstones and conglomerates. This complex includes KULLING's "Midmost Grey" and "Midmost Red" divisions, and ORVIN's "mittlere graue", "untere rote", and "untere graue" divisions in the descriptions by these authors of the sequence in Mt. Celsius. No fossils have as yet been found in this complex, nor has it previously been subjected to a detailed petrographical examination. Hence it seems too early to make a subdivision of it. For the time being I designate this complex the "Lower Sandstone Complex".

The knowledge of the fossils found at the different localities, described by me in 1932 (1932a), has been further increased through my paper on the Devonian Stegocephalians (SÄVE-SÖDERBERGH 1932b). The investigation of the greatest part of the fauna of the Devonian area round Franz Joseph Fjord, in which collections were made in 1931 and 1932, is not yet finished; a paper by STENSIÖ on the *Antiarchi* is under preparation.

In this connection I wish to call attention to the interesting recent publication by E. S. HILLS (1932) on the Devonian of New South Wales. In that paper the determination of *Remigolepis* from the Devonian of Australia, mentioned in my earlier publication (1932a, p. 35), is definitely established.

A Devonian fauna of an entirely new type has been found by Mr. A. NOE-NYGAARD at Cape Brown during the first wintering of the Danish Three-year Expedition. The local stratigraphy will be described by Mr. NOE-NYGAARD (1933), and the best specimen has been described, and the general stratigraphical position and relations of the fauna have been discussed in a paper by myself (SÄVE-SÖDERBERGH 1933, pp. 95—98).

In the following I shall first describe, locality upon locality, the stratigraphical and geological data gathered last summer during the collecting of vertebrate fossils.

II. Description of the localities visited in 1932.

The localities visited in the summer of 1932 are as follows in chronological order:

1. Mt. Celsius, northern slope	8 days
2. Mt. Celsius, southern slope	4 —
3. Mt. Rudbeck	half a day
4. The outer parts of Dusén Fjord	2 days
5. Gauss Peninsula:	
a. Mt. Wiman	$3^1/_2$ —
b. Mt. Stensiö	$8^1/_2$ —
c. Mt. Smith Woodward	half a day
d. Mt. Nathorst	half a day
In all...	$27^1/_2$ days

1. Northern slope of Mt. Celsius.

The northern slope of Mt. Celsius was investigated in its main features by KULLING (1931), and subsequently in greater detail by the present writer (1932a).

During the expedition of 1932 further collections were secured both from the old localities: the Coulisses, the East Plateau, and the western corner of the Central part of the slope, (see pl. 3, fig. 1; cf. SÄVE-SÖDERBERGH 1932a, pp. 10—15), and from new localities. The latter are chiefly situated above the old localities, on the western part of the slope, and in the Western Circus Valley.

The westernmost locality visited last summer on the northern slope of Mt. Celsius is the old locality of 1929: behind the Western Coulisse (*W*, pl. 3, fig. 1). Here the talus yielded the following fossils: *Remigolepis acuta* STENSIÖ?, *R. Kullingi* STENSIÖ?, and Crossopterygians.

The fossil locality "Behind the Western Coulisse" is bounded on the E. by a sharp ridge (*K*, pl. 3, fig. 1; also KULLING 1931, fig. 2, and SÄVE-SÖDERBERGH 1932a, fig. 5, at the right *E*), on the western side of which a number of plates of *Remigolepis Kochi* STENSIÖ were found in 1931. Consequently this ridge may be called the *Kochi*-ridge.

The edge of the *Kochi*-ridge continues to the S. with a terrace (*L*—*L*, pl. 3, fig. 1), extending eastward from its junction with the ridge. This terrace, the Lower Terrace, descends gradually towards the E, extending as far as the débris-masses originating from the Western Circus Valley, and is thus situated below the whole eastern half of the Western Part of the slope. Above it all the localities occur which are included in my description of 1932 under the name of "East Plateau", *sensu lato*. However, as it is now necessary to make a distinction be-

tween the different parts of the Plateau, I have found it most practical to retain the name "East Plateau" only for the parts where fossils were collected in 1931. Thus it now means *sensu stricto* only the terrace (*E*—*E*, pl. 3, fig. 1) immediately above the eastern parts of the Lower Terrace.

Above the westernmost parts of the Lower Terrace there are three steeper slopes, rising beyond the level of the East Plateau. Of these slopes the westernmost one terminates in a terrace, called the Western Upper Terrace ("W. Överplatån"; *U*, pl. 3, fig. 1), whereas the other two lead up to two small hillocks. The Western Upper Terrace also continues behind the two hillocks mentioned.

To the E. the small hillocks and the Western Upper Terrace are separated by the Large Débris Cone (*C*, pl. 3, fig. 1) from the Eastern Upper Terrace, which latter, when seen from the N., is hidden by the Topmost Coulisse (*T*, pl. 3, fig. 1). This Coulisse is the highest of the down-slid parts within the W. part of the N. slope of Mt. Celsius. It consists of a higher, reddish, northern ridge, and a parallel, lower, grey-coloured, southern ridge, the latter forming the northern boundary of the Eastern Upper Terrace.

To the E. of the Eastern Upper Terrace there is a slope leading down to the East Plateau, and farther E. the steep slope of the main wall of Mt. Celsius rises directly over the débris-masses of the East Plateau *sensu stricto*.

On and above the Western Upper Terrace some fine fossils were collected, including *Remigolepis* sp., the anterior parts of a Crossopterygian skull with endocranium in situ, and a rather rich collection of other Crossopterygian remains, i. a. scales of *Holoptychius nobilissimus* AG.? [1])

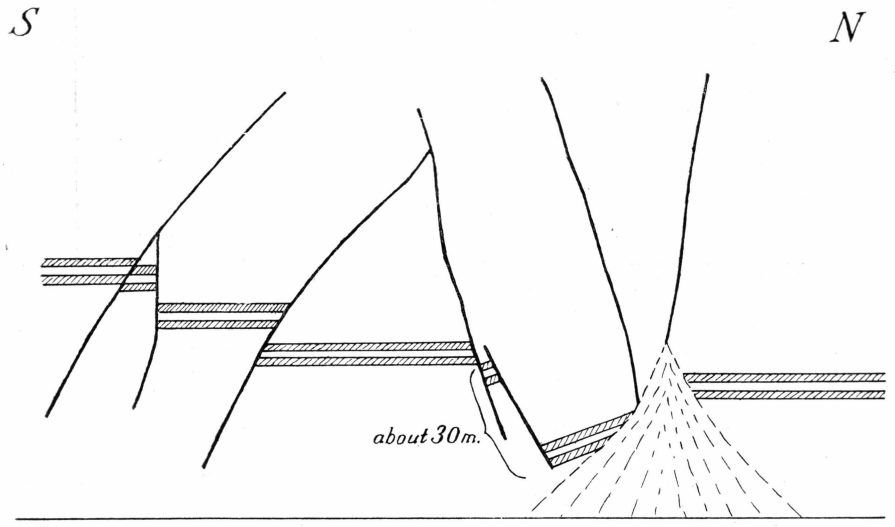
However, we did not succeed in finding the fixed horizon from which these fossils originate. But it is clear from the occurrence of the loose fossils that this horizon must be situated above 485 m. The Western Upper Terrace itself is at about 465 m. One fixed fossiliferous horizon was found above the Western Upper Terrace, at 536 m (*3*, pl. 3, fig. 1), but as the fossils found in it include only *Remigolepis* sp., it seems improbable that the fossils found in the talus should originate from it to any great extent.

In the lower parts of the Large Débris Cone almost no fossils were found. But on climbing its highest parts, and continuing upward above it in the main wall of Mt. Celsius, we found fossils in the talus: at 623 m, a large slab with scales of *Holoptychius giganteus* AG.? [1]) and *Holoptychius* sp. evidently belonging to the local talus, and not transported. The slab itself consists of a brownish-red sandstone with mica; directly above it

[1]) Cf. SÄVE-SÖDERBERGH 1932a, foot-note, p. 15!

the mountain wall consists of a light brownish-red, irregularly splitting marl, at least for the next 18 meters. Below there is a similar reddish-brown, splitting rock, but with hard, dark banks.

To the E. of the Large Débris Cone, in the main mountain wall above the Eastern Upper Plateau two fixed fossiliferous horizons were found, one (*1*, pl. 3, fig. 1) at 534 m with *Holoptychius* sp., the other, much richer, at 567 m. This latter horizon (*2*, pl. 3, fig. 1) yielded a fine material of *Remigolepis* cf. *Kochi* STENSIÖ, including specimens of all the plates, the pectoral fins, the scales, and several complete ventral halves



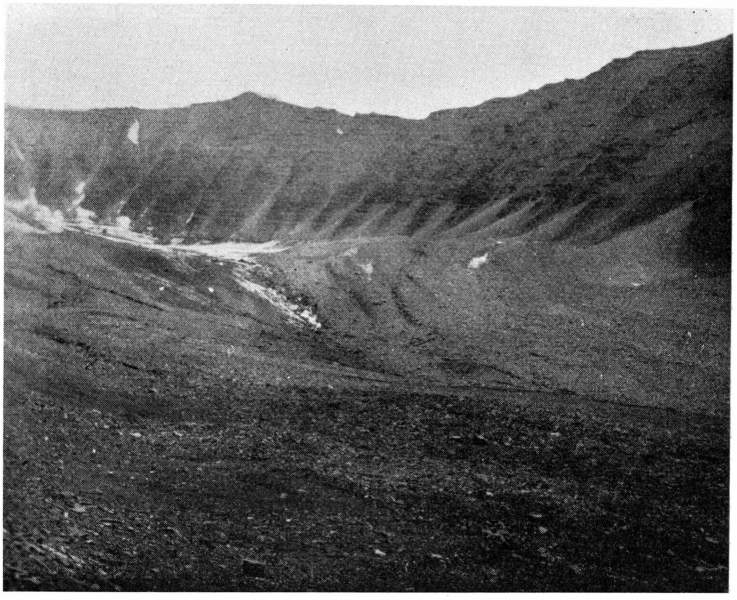
Text.-fig. 1. Diagrammatic sketch of a typical part of the western valley-side of the Western Circus Valley.

of trunk carapaces. — A dip of 20° towards the N. 54° W. was measured in the last-described horizon.

Just at the eastern boundary of the Eastern Upper Terrace, above the slope down to the East Plateau, the point occurs where in 1931 the type skull of *Ichthyostega eigili* S.-SGH was found (SÄVE-SÖDERBERGH 1932b, pp. 41—54).

In the steep slope above the East Plateau the two fossiliferous horizons found in 1931 were further investigated and followed somewhat farther to the W. In the *emarginata*-horizon three orientated samples of the rock were taken at some distance from each other, for the purpose of facial petrographical examination, and a dip of 10° towards the N. 16° W. was measured. According to Dr. MALMQVIST's preliminary determination, the rock is a dark brown marl, rich in mica.

Farther to the W., and some 10 meters below the height of the *emarginata*-horizon (545 m), *Remigolepis*-plates with an ornamentation of the *acuta*-type were found in a fixed horizon.



Text-fig. 2.



Text-fig. 3.

Text-figs. 2, 3. The western side of the Western Circus Valley. Text-fig. 2, in the innermost parts of the valley; text-fig. 3, farther outward — to the N. — with a richly fossiliferous talus cone.

The approximate position of the different new-fixed horizons in relation to the *emarginata*-horizon and the other strata in the eastern corner of the Western Part of the slope will be evident from pl. 3, fig. 1.

In the talus on the East Plateau many fine fossils were secured also this summer, including: *Remigolepis Kullingi* STENSIÖ, *R. acuta* STENSIÖ, *R. n.* sp.?, and large collections of different Crossopterygian remains, i. a. the scales of large parts of the body in nearly undisturbed position. New specimens of Ichthyostegids were also found on the East Plateau in 1932.

The western valley-side of the Western Circus Valley was investigated farther inland, to the S., than in 1931. The guide horizon: a green bank with two red beds, found in 1931 and described already in my previous paper (1932a, p. 14), enabled me to recognise a whole series of minor faults, of the type illustrated in text-fig. 1, and in fig. 7 of my earlier paper. In fact, these faults divide the whole wall of the Western Part of Mt. Celsius in a number of small blocks. The throw of the faults seems to vary from a few to about fifty meters. As a well recognisable general rule, the southern parts are lowered in relation to the northern ones.

In the talus cones along the valley-side collections of vertebrate fossils were made, mostly in one of the cones seen in text-fig. 3. This figure, and text-fig. 2, give a fairly good idea of the appearance of the western side of the Western Circus Valley. The fossils collected here include *Remigolepis Kochi* STENSIÖ?, *R.* sp., *R. Kullingi* STENSIÖ, and a large material of Crossopterygians.

The eastern valley-side of the Western Circus Valley was also searched for fossils in about half its length. Geologically it is very similar to the western side of the valley. The fossils collected in the talus cones of the eastern valley-side were mostly *Remigolepis* sp. Also *Remigolepis acuta* STENSIÖ, *R.* n. sp., and a new specimen of the mysterious fossil described by STENSIÖ as a "fish-like vertebrate of uncertain affinities" (STENSIÖ 1931, pp. 205—207; text-fig. 95; pl. 36, figs. 1—3) were found here.

Below the western corner of the Central Part of the northern slope of Mt. Celsius, banks of light-red sandstone were noticed, for instance at a height of 248 m, intercalated between the grey banks in the "midmost grey" series of KULLING.

The dip of the bank was measured to be 16° towards the N. 78° W.

Already in 1932 (1932a, p. 15) I noticed the "broken and débris-covered character" of the western half of the Central Part of the northern slope of Mt. Celsius. In fact the whole western corner of the Central Part represents a block, totally broken down, lowered in relation to the main mass of Mt. Celsius, and with an extremely disturbed position of the strata. This may perhaps also be understood from pl. 3, fig. 1. In the described corner the branched "Double Ravine" (the eastern branch is the western one of the two snow-covered ravines, seen on pl. 3, fig. 1) is remarkable, since it was here that the only Dipnoan remains then found in East Greenland were collected in 1931. Further work in the Double

Ravine last summer proved to be a very grateful task, as in this locality we secured a rather large collection of vertebrate fossils, including a slab with an Ichthyostegid, with ribs, vertebrae etc., and further *Remigolepis* n. sp., Crossopterygians, etc.

Fossils were also found in situ in a fixed horixon in the Double Ravine, but the horizon had been tilted so that it had a dip of 50° towards the NW.

All the fossils enumerated above are derived from the varicoloured, but mostly red or dark sediments of the *Remigolepis* Series, but in the Double Ravine fossils were also found in blocks of grey sandstone, evidently originating from the overlying Arthrodire Sandstone Series. The greater part of these fossils are more or less indeterminable Crossopterygian remains.

2. Southern slope of Mt. Celsius.

During the summer of 1932 we made a five days excursion from the camp at the shore below the Coulisses, travelling by boat eastward along the southern shore of Dusén Fjord, from which rises the northern slope of Mt. Celsius, and then, turning to the S. off C Wijkander, continuing to the W. along the northern shore of Sofia Sound, to which descends the S. slope of Mt. Celsius (see for instance the map of SEIDENFADEN 1931).

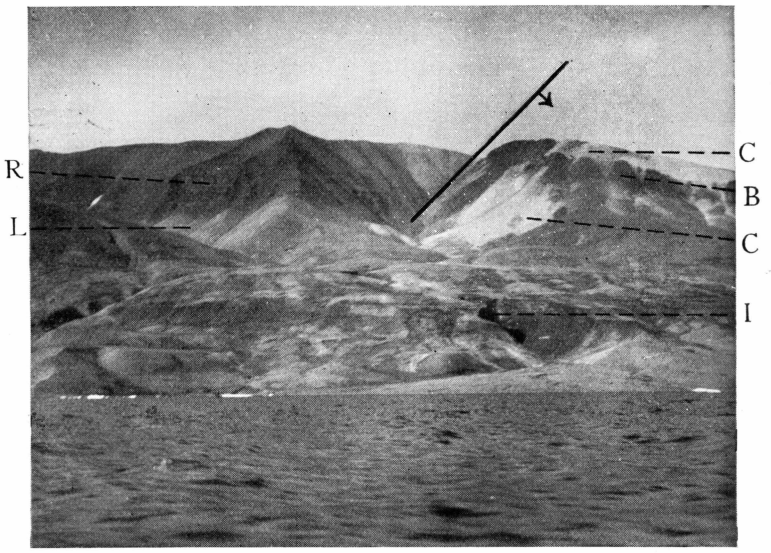
When undertaking this journey one finds analogous geological sceneries on the southern and northern sides of Mt. Celsius.

Thus also the southern slope of Mt. Celsius consists farthest east of continental Carboniferous sediments[1]) with important basalt intrusions, and is separated by a very considerable fault from the main mass of the mountain, which is built up of the Old Red sediments. The mentioned fault, probably of a vertical throw exceeding 1000 meters, does not seem to have been observed by ORVIN (1930; fig. 1; fig. 4, profile V!). It is illustrated by my text-fig. 4, which shows the great similarity to the easternmost part of the northern slope of Mt. Celsius (pl. 1, fig. 1; also SÄVE-SÖDERBERGH 1932, fig. 1). As may be gathered from my pl. 3, fig. 2, the mountain on the opposite shore of Sofia Sound, which I propose to call the Backlund Ridge, apparently shows the same structure as the easternmost part of Mt. Celsius. According to BACKLUND (BACKLUND and MALMQVIST 1932, p. 16) the basalt intrusion is here apparently of the "cone sheet" type.

To the E. of the complex of continental Carboniferous and the large fault-line the southern slope of Mt. Celsius presents three distinct parts, separated by deep circus valleys, similar to those of the northern slope.

[1]) The age is brought out by plant fossils from the northern slope (HALLE 1931, pp. 12, 13, "Cape Humboldt").

The three parts are termed the Eastern, the Central, and the Western Parts. The Western Part leads up to a large plateau, the Western Plateau, from which the southern part of the western slope of Mt. Celsius leads down to the valley called by ORVIN "Forkastningsdalen" (the Fault Valley; see (1) and HEINTZ 1932). In distinction from my "Fault Valley", leading to the Dusén Fjord, it may be called the Southern Fault Valley; my "Fault Valley" then being the Northern Fault Valley. The Northern Fault Valley and the Southern Fault Valley lie in the continuation of



Text-fig. 4. Part of the southern slope of Mt. Celsius, seen from Sofia Sound. C, continental Carboniferous; B, I, basalt untrusions; L, Lower Sandstone Complex; R, *Remigolepis* Series.

each other, and together form the western boundary of Mt. Celsius. Two circus valleys from the western slope of Mt. Celsius debouch into the Fault Valleys and separate the three parts of the western slope from each other. One of these circus valleys is occupied by a large glacier, and both are shown in pl. 1, fig. 1 of the present paper.

The short time at our disposal made a systematical investigation of the whole southern slope of Mt. Celsius impossible. We therefore limited our work to the Western Part, and the lowermost regions of the Central Part, thinking the Eastern Part was the one that had been most thoroughly investigated by the Norwegian expeditions.

Starting from the shore of Sofia Sound below the Central Part of the slope and walking towards the N., one encounters from a height of 183 m up to 265 m banks of grey sandstone with red points and a light pink hue of weathering. Its dip is 10° towards the N. 78° W. Cross-bedding was noticed.

From 265 m and up to about 350 m the banks consist mainly of a reddish sandstone with greyish-green points, apparently quite similar to the rock yielding the *Phyllolepis*-fauna at Cape Graah (SÄVE-SÖDERBERGH 1932a, pp. 19, 20). Above 350 m there is a terrace of loose grey sandstone, and above this the solid rock is covered by reddish-brown and blackish talus, originating from a long terrace, the Eastern Terrace ("E. Läktaren"), probably representing, like the Coulisses on the northern slope, a large down-slid area. In the talus we collected some specimens of *Remigolepis* sp. *a*[1]), suggesting that the sediments of the Eastern Terrace, which are directly continuous with those marked *R* on text-fig. 4, belong to the *Remigolepis* Series.

This suggestion proved to be quite correct, since in the same series of sediments, in the western corner of the Central Part, we found a fixed fossiliferous horizon with abundant *Remigolepis acuta* STENSIÖ at 499 m.

The surrounding talus also yielded abundant *R. acuta* STENSIÖ?, and further *R. Kochi* STENSIÖ? and Crossopterygians.

In the valley between the Central and the Western Parts of the southern slope, bones of the shoulder girdle and other parts of Crossopterygian fishes were found in blocks of grey sandstone, probably originating from the Arthrodire Sandstone Series.

Along the eastern half of the Western Part of the slope there is another down-slid terrace, the Western Terrace ("W. Läktaren", *T*, text-fig. 5), similar to the eastern one and evidently situated in the corresponding strata: in the lower parts of the *Remigolepis* Series.

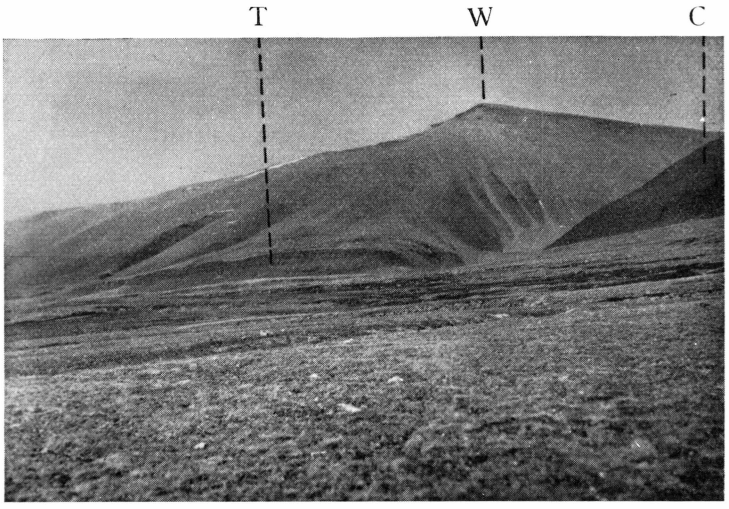
From the eastern corner of the Western Terrace (at about 370 m) we went up a profile through the whole Western Part of the slope, right to the top of the Western Plateau.

The varicoloured, but mainly reddish-brown or dark grey, sediments of the *Remigolepis* Series were found from the base of the profile (370 m) up to about 726 m. Here, as in the northern slope of Mt. Celsius, red, irregularly splitting marls or fine-grained sandstones, and hard grey, finely stratified sandstones, rich in mica, were frequent in the *Remigolepis* Series. Green sediments were also noticed; and among the more remarkable rocks may be mentioned a fine-grained reddish-grey or greyish-green hard limy sandstone, rich in heavy minerals and with a reddish hue of weathering (fixed at 631 m); a very fine-grained red sandstone with small light-coloured nodules of lime, encountered at 651 m; and a red, easily splitting marl mottled with green and rich in mica, at 653—661 m. In this last-mentioned type of rock a rather richly fossiliferous horizon was found at 658 m. The fossils collected

[1]) With an ornamentation similar to that of *Bothriolepis*.

in this horizon are remarkable for their uncompressed condition and good state of preservation. Only the splitting of the rock and the consequent friable consistence of the fossils made collecting a very difficult and patience-requiring work. The fossils collected here include numerous scales and bones of the shoulder girdle of Crossopterygians, at least partly of the type called *Holoptychius nobilissimus* Ag.?

At 691 m a brownish-red, fine-grained, thin-bedded sandstone with lime and mica was found, comparable to that mentioned as the last one on p. 13 of my earlier publication (1932 a), from the transition between the



Text-fig. 5. Western Part (W) and south-western corner of the Central Part (C) of the southern slope of Mt. Celsius, seen from the S. — *T*, the Western Terrace. Below the Western Terrace, beds of the Lower Sandstone Complex; above and in the steep wall of the Terrace, beds of the *Remigolepis* Series.

Remigolepis Series and the Arthrodire Sandstone Series above the East Plateau.

At the very transition between the *Remigolepis* Series and the Arthrodire Sandstone Series a light reddish lime-sandstone with ripple-marks, and a black to grey shaly rock-type were found.

Above 730 m the talus consisted of grey and yellowish sandstones, partly with blackish points. A grey sandstone with blackish points was found in a fixed horizon at 843 m. These sediments belong to the Arthrodire Sandstone Series, which was followed up to 1223 m. In the talus, in the lower parts of the series, scales and bone fragments of Crossopterygians were frequent, mostly in somewhat greenish varieties of the rock.

The upper part of the Arthrodire Sandstone Series presented a greater variation in the rock-types than the lower part. At 936 m a fine-grained greyish-green sandstone, rich in mica, and with nodules of lime, was found;

at 986—988 m. there is a medium-grained to coarse, very light reddish arkose-sandstone, rich in mica and splitting into large blocks; at 1083 m a medium-grained, grey, loose, unstratified lime-cemented sandstone, and at 1121 to 1123 m a black, shaly, finely stratified marl-siltstone (with badly preserved plants), fairly similar to the *Posidonomya*-shale of the marine Carboniferous or Permian, were encountered. From 1146—1156 m a coarse, loose, light grey, unstratified arkose-sandstone with conglomeratic parts crops out, and from 1176 to 1189 m and at 1211 m there occurs a similar grey or very light reddish-grey arkose-sandstone with marked cross-bedding and scattered conglomerate boulders. Finally, at 1223 m, a coarse- to medium-grained greenish-grey sandstone with lime was measured to dip 15° towards the N. 48° W.

In the Arthrodire Sandstone Series several more or less indeterminable stem fragments were collected.

In this profile the grey series with Arthrodires in its lower part does not form the top of the sequence, since above it there follows a complex of sandstones, grey in the upper, but strongly red or red-white-mottled in the lower part.

More precisely, at a height of 1226—1231 m, a strongly brick-red or red-white-mottled fine- to medium-grained loose arkose-sandstone was found, which further occurs in the talus as far up as 1254 m. Above 1254 m the talus consists of a coarse grey (or reddish-grey) sandstone or arkose-sandstone, partly rich in mica, and with clay balls, nodules, and conglomeratic parts. This rock-type was noticed in fixed horizon at 1259 m, and further builds up the remaining part of the Western Plateau right up to its top, at 1296 m.

No fossils were found in the strata above the Arthrodire Sandstone Series. Consequently the age of these uppermost strata, which may provisionally be termed the Upper Sandstone Complex, is as yet entirely unknown. The Upper Sandstone Complex may be supposed to represent either the topmost Devonian, or part of the continental Carboniferous. The same uncertainly — as already pointed out above — is of course present also for the upper part of the grey series provisionally called the Arthrodire Sandstone Series. Only the finding, described by ORVIN (1930, p. 15), of Holoptychiid scales as high up as 1300 m (c. 200 m above the lower boundary of the "upper grey" series) in his profile through Mt. Celsius makes it rather certain that at least the lower two-fifths of the whole grey series here discussed still belongs to the Devonian Arthrodire Sandstone Series.

To summarise the profile exposed in the southern slope of Mt. Celsius, its base consists of at least some 300 m of grey and light red sandstones and conglomerates, belonging to the Lower Sandstone Complex. Above this there are at least 380 m of varicoloured, mainly red and dark, stratified morls and sandstones, representing the *Remigolepis* Series,

and containing two rather richly fossiliferous horizons, one with mainly *Remigolepis acuta* STENSIÖ, the other with Crossopterygians. The *Remigolepis* Series is overlain by the Arthrodire Sandstone Series: about 500 m of mainly grey sandstones and conglomerates with Arthrodires and Crossopterygians in the lower parts, and with fragments of plants. Above this there follow some 20 m of intensely light-red and red-white-mottled sandstones, and at least 40 m of grey sandstone or arkose-sandstone, constituting with the red and mottled rocks the Upper Sandstone Complex, of uncertain age.

3. Mt. Rudbeck.

The sharply cut off, very steep eastern side of Mt. Rudbeck (pl. 3, fig. 2) forms a very marked contrast to the more rounded and gentle topography in the western parts of Geographical Society Island. In the steep slope of Mt. Rudbeck there is, of course, a good profile, showing several series of differently coloured rocks, dipping rather steeply towards the W. and N.

The lowermost parts of the profile in Mt. Rudbeck were directly investigated on the spot; the upper parts could only be studied by observation from a distance and by investigation of the material in the talus cones. It might be noticed, however, that these cones, or rather talus streams, are very sharply distinguished on the steep slope, and accordingly the origin of the talus is often not subject to great doubt.

Lowest down, and farthest to the E. in the profile, a very loose, coarse, light-grey conglomeratic sandstone (*W*, pl. 3, fig. 2) with lime, mica, and pieces of coal was encountered.

Above this a long basalt intrusion (sill or cone sheet?, B_1, pl. 3, fig. 2) was observed, and a sample was taken (Nr. 83b), which was later handed over to Dr. D. MALMQVIST for further examination.

Another flat basalt intrusion (B_2, pl. 3, fig. 2) was observed higher up in the slope, but continues to the N. down to the shore, as may be seen from pl. 3, fig. 2. Of this, too, a sample (Nr. 82b) was taken at the shore for Dr. MALMQVIST. Here the basalt is intercalated between a coarse to medium-grained reddish-grey and greenish lime-cemented conglomeratic arkose-sandstone to the E. (below!), and a hard, light red, lime-cemented arkose-sandstone to the W. (above!). The latter is of the type, found at C. Graah, and in the southern slope of Mt. Celsius. As far as could be ascertained by observation from a distance, this rock builds up the large part of Mt. Rudbeck denoted *R* on pl. 3, fig. 2. Scattered small boulders of milky quartz were found in talus of this light red sandstone. The upper parts of Mt. Rudbeck, above the light red sandstone, are yellow in appearance, and the talus from these parts

(*Y*, pl. 3, fig. 2) consists of a coarse- to medium-grained, brownish-grey or yellow, caolinized sandstone.

No fossils were found in Mt. Rudbeck, and thus a determination of the age of the strata encountered here is as yet impossible. From the dip and strike it seems, however, most probable that the whole sequence in Mt. Rudbeck belongs to the Lower Sandstone Complex, extending farther down than the parts shown in Mt. Celsius.

4. The outer parts of Dusén Fjord.

During two excursions, one lasting one day, the other half a day, the structure of the shores of Dusén Fjord was summarily investigated, as far towards the W. as the mountains immediately E. of the large valley that cuts across the whole Gunnar Andersson Land (the northern half of the Ymer Island), and has been figured by KOCH (1930, fig. 30).

The short time at our disposal only allowed of an investigation from the boat and a few excursions of very short duration inland. Thus on the southern shore of the Gunnar Andersson Peninsula we made one trip on land along Mt. Blask: the mountain[1]) nearest E. of the above mentioned large valley. Here we encountered in the shore proper a white, coarse- to medium-grained, strongly cross-bedded sandstone, with coal and conglomeratic parts. The dip is here about 10° towards the N. 60° W. The same rock was found to form the ground inland, and towards the W., up to a height of about 148 m. At 155 m there is a hard, coarse, grey sandstone, with a dark hue of weathering. The upper and the western parts of Mt. Blask appear reddish from a distance; this colour, however, is found to be due mainly to a dark hue of weathering. Red and brownish beds occur here, but are of quite subordinate importance. — Above the hard grey sandstone in the profile, that is farther to the W. (the dip is here about 20° towards the N. 83° W.), conglomerates and more clayey portions were found, but no typically reddish rock.

Mt. Blask forms part of the western side of a very large anticline, the other side of which is formed by the strata rising towards the W. from the syncline of C. Graah, in Mt. Lunke (cf. pl. 1, fig. 1). The whole of this anticline seems to be built up of light-coloured sediments. A grey colour is prevalent throughout the greater part of the anticline as far as can be observed from a distance. There seem to be several flat basalt intrusions in the middle of the anticline, between Mt. Lunke and Mt. Blask.

As to the age of the strata, the only conclusive evidence is furnished

[1]) Probably the same mountain as that figured farthest E. on FREBOLD's sketch of Gunnar Andersson Land (FREBOLD 1932, fig. 9 C).

by the fossils from ORVIN's locality at Cape Graah (cf. SÄVE-SÖDERBERGH 1932a, pp. 17—21). In Mt. Blask no fossils were found in situ and a loose anterior dorso-median plate of an Antiarch found here can only be determined as *Bothriolepis* sp.

The mentioned fauna at ORVIN's locality fixes the age of the red strata building up most of the higher part of the Cape Graah syncline, and thus forming part of the eastern side of the anticline now discussed (cf. pl. 1, fig. 1). These red strata, with *Bothriolepis grönlandica* HEINTZ and *Phyllolepis*, belong to the upper half of the Upper Devonian. Their relation to the profile in Mt. Celsius, however, is as yet quite obscure. And as to the sequence of grey strata situated below the sandstones with *Phyllolepis*, and apparently forming the main part of the anticline discussed, it cannot even be stated with certainty whether they are really of Upper Devonian age (an indeterminable bone fragment found at Cape Graah — see SÄVE-SÖDERBERGH 1932a, p. 17 — being the only fossil hitherto recorded in situ from this series).

On the southern shore of Dusén Fjord, light grey beds are prevalent from the region opposite Mt. Blask as far E. as the second mountain to the W. from Mt. Zig-zag[1]).

The next mountain W. of Mt. Zig-zag is characterized by its brick-red colour. Because of this it was named by us Mt. Tegelberget (the Brick Mountain). The red colour is due to the predominance of sandstones and conglomerates, similar in colour to those of the beds with *Phyllolepis* on C. Graah, but without any greyish-green dots (cf. SÄVE-SÖDERBERGH 1932a, pp. 12, 20). Rocks of this type were investigated in a profile running from the shore, in the direction S. 48° W., towards the small summit (672 m) at the top of the eastern slope of Mt. Tegelberget. — This small summit is separated by a large terrace from the highest summit of Mt. Tegelberget, situated in the westernmost part of the mountain. — Right at the shore there is, in the profile, a coarse- to medium-grained greyish sandstone with lime and mica, dipping about 25° towards the S. 22° E., but already at a height of 65 m one encounters beds of the typical hard, brick-red, often finely stratified, sandstone, dipping here some 15° towards the E. This red sandstone then forms the bulk of the whole profile. Nevertheless there also occur banks of a grey, medium-grained sandstone (for instance at 515 m), and a bank of a loose, dark-red, unstratified sandstone with white patches was found at 475 m. At about 310 m a remarkable change is observable in the

[1]) The Norwegian map (1), already referred to, fixes the name Mt. Graafjaeld, first introduced by ROSENKRANTZ on a not very instructive drawing (1932, fig. 10), to the southernmost of the three summits W. of Mt. Celsius and the Fault Valley. Mt. Zig-zag is the northernmost of these summits, and is situated nearest to the shore.

dip, which upwards from this altitude is about 20° NW. That is to say, the red strata of Mt. Tegelberget, with a general dip (as was also ascertained in the more western parts) towards the E., are very markedly raised in their easternmost parts towards the irregularly dipping, highly disturbed, grey complex of Mt. Zig-zag (see SÄVE-SÖDERBERGH 1932a, pp. 6, 8, figs. 1, 3). As already pointed out in my earlier publication (1932a, p. 6), basalt intrusions are met with in Mt. Zig-zag; and in 1932, when travelling along the shore below Mt. Zig-zag, we found very large intrusions in the northern slope of the mountain. Samples of basalt and dolerite were taken at the shore below Mt. Zig-zag, and handed over to Dr. MALMQVIST.

It is interesting to compare the geological conditions of Mt. Tegelberget and Mt. Zig-zag with those of Cape Graah, to the E. of ORVIN's locality with *Phyllolepis*.

In both cases there are brick-red hard sandstones and conglomerates, dipping towards the E. in the western parts, but towards the W. in the eastern parts. In Mt. Tegelberget this seems to be clearly due to a violent upheaval of the eastern parts, probably connected in some way with the large basalt intrusions in the grey strata to the E. of the red ones.

From certain of the previous descriptions it might seem that the conditions at C. Graah are of a different kind, there being here a large, normal, flat syncline. But already from KOCH's account (1929, p. 79—80, fig. 26) of the structure of the northern side of Cape Graah it is evident that the eastern side of the Cape Graah syncline is not that of a normal flat one. The dip is very suddenly increased to the E., towards the grey layers, in which numerous basalt dykes (described by KOCH 1929, pp. 79, 80, and by me 1932a, pp. 17, 18; see also BACKLUND and MALMQVIST 1932, p. 39), are intruded. This strong upheaval of the eastern parts of the Cape Graah syncline is also quite evident when one looks at the cape from the SW., in the direction of the synclinal axis, which points right towards Mt. Tegelberget. Thus it seems very probable that the intrusions of C. Graah and those of Mt. Zig-zag may be connected in some way, both being possibly located along a marked tectonic line of minor resistance.

As to the stratigraphical correlation of the layers in Mt. Tegelberget with those of other localities very little can be said. The only fossils found, despite rather careful search, were a few scales of *Holoptychius* and Crossopterygian bones. All of the fossils were found in the local talus of the western parts of Mt. Tegelberget (at 655 m, 555 m, and below). They only prove the age of the strata in question to be Upper Devonian.

5. Gauss Peninsula.

The investigations on Gauss Peninsula during the summer of 1932 were carried out on part of the northern shore of Franz Joseph Fjord, approximately midway between Margrethe Valley (see KOCH 1932, SÄVE-SÖDERBERGH 1932a) and the large valley in the western part of the peninsula, described by KOCH (1929, p. 75) as turning inland from the coast, with an easterly trend, and thus extending behind, and parallel to the coast mountains (pl. 2!). The area investigated lies between the mountains called Mt. Gunnbjørn and Mt. Einar by the Norwegian mappers (pl. 2!). It comprises three and a half of the coast mountains that rise steeply from the narrow strip of alluvial deposits at the northern shore of Franz Joseph Fjord, and are separated from each other by narrow, mainly V-shaped, apparently very young, erosion valleys (cf. below!).

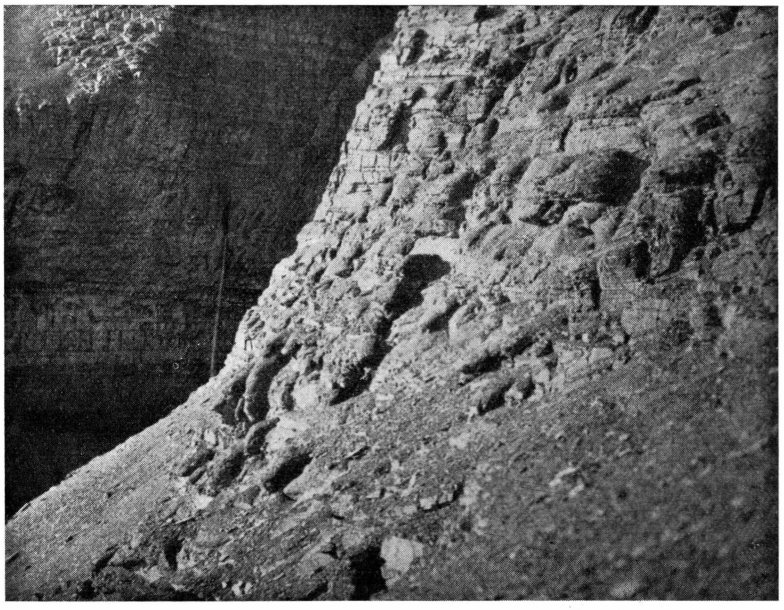
The easternmost of these coast mountains (see pl. 2) forms the southern part of a mainly N—S. directed mountain chain, separated from Mt. Gunnbjørn by the Agda Valley with the river Skolmaa. The northern part of this chain has been called Mt. Ketil on the Norwegian map. For the southern part I propose the name Mt. Nathorst, after the first explorer that recognised the Devonian Old Red Sandstone in East Greenland and the discoverer of the first vertebrate fossils in this area.

Mt. Nathorst is separated from the shore by a number of terraces, and is bounded on the W. by a deep valley with very steep sides, the Elsa Valley. To the W. of the Elsa Valley, in which runs the river named Skjervaa by the Norwegians, there is a long ridge with a steep slope descending towards the S., and to the N. leading to the mountain Ravnfjaeldet. For this ridge I propose the name Mt. Wiman, after the initiator of the Swedish investigations of Arctic Vertebrate Paleontology. The definition of the mountain denoted by the name Ravnfjaeldet is not quite clear, but I think it most closely covers the mainly E.—W. directed ridge that forms the northern boundary both of Mt. Wiman and of the large eastern branch of the upper half of the valley bounding Mt. Wiman on the W., the Aina Valley (text-fig. 5).

The other branch, the eastern one, of the upper half of the Aina Valley leads down from a pass between Mt. Ravnfjaeldet and the next coast mountain W. of Mt. Wiman. A small "Vorgipfel", at 1275 m of this last-mentioned coast mountain is named Mt. Solve on the Norwegian map, but for the whole mountain, with its dôme-shaped summit, situated farther to the N. and not visible from the coast, I propose the name Mt. Stensiö, introduced already during the field work on the labels of very large collections of vertebrate fossils. A justification of this name is hardly necessary.



Text-fig. 6. Looking towards the S. through the upper part of the Aina Valley, between Mt. Wiman (to the left) and Mt. Stensiö (to the right). Sediments of the *Remigolepis* Series.



Text-fig. 7. Cascade in the Britta Valley, between Mt. Stensiö — in the foreground — and Mt. Smith Woodward — in the background to the left. Sediments of the *Remigolepis* Series.

To the W. of Mt. Stensiö there is another deep valley, the Britta Valley, with a small river forming two cascades (text-fig. 7). To the W. of this valley there is a large mountain complex with several summits, two of which were called Einarfjaeld (Mt. Einar) and Havgrimfjaeld (Mt. Havgrim) by the Norwegian mappers. For the whole mountain complex, extending westward to the large valley described by Koch and mentioned above, I propose the name Mt. Smith Woodward, after



Text-fig. 8. Mt. Gunnbjørn, and the SW. corner of Mt. Nathorst, seen from a point near the shore below Mt. Nathorst. In Mt. Gunnbjørn the very dark portions are built up of the *Remigolepis* series, the more light-coloured parts of the Lower Sandstone Complex, with basalt intrusions. The lower boundary of the *Remigolepis* Series in Mt. Nathorst is seen on a level with the same boundary in the down-faulted part of Mt. Gunnbjørn.

the eminent English connoisseur of fossil fishes, who described the first Devonian vertebrates from East Greenland (1900).

Geologically the coast section now described forms a flat syncline, with its bottom approximately in the middle of Mt. Stensiö. The stratigraphically lowermost parts, investigated this summer, in the south-eastern corner of Mt. Nathorst, are mainly built up of grey sandstones, with a rather sharp boundary towards the overlying dark red and grey series of sediments, which by its content of fossils (see below) proves to belong to the *Remigolepis* Series. Consequently the grey sandstones represent the Lower Sandstone Complex.

In Mt. Gunnbjørn, nearest E. of the more closely investigated

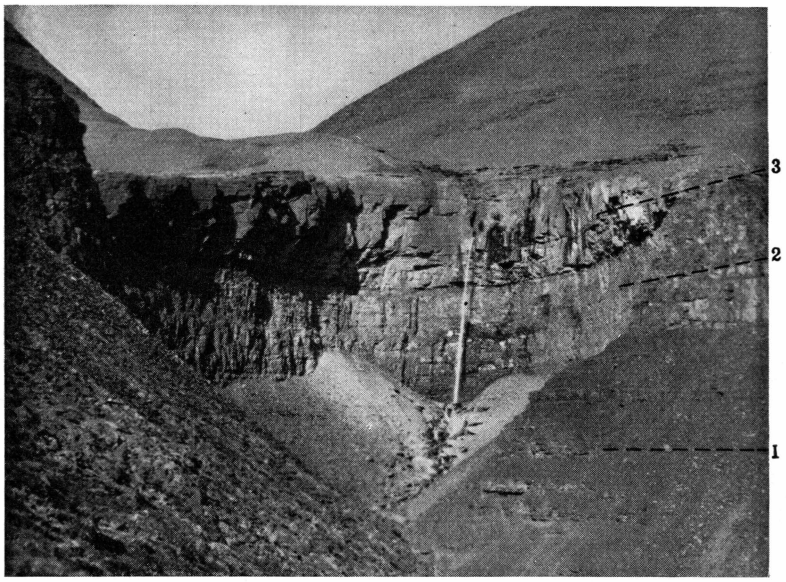
area, the Lower Sandstone Complex can be ascertained already from a distance to be disturbed and injected by numerous basalt intrusions. The sharp boundary towards the *Remigolepis* Series enables us to recognize a large fault in the W. part of Mt. Gunnbjørn, along which the westernmost part of the mountain is lowered in relation to the main part of it (see text-fig. 8; cf. ROSENKRANTZ 1932, fig. 12). The lowered westernmost part apparently forms a direct, undisturbed, continuation of the syncline to the W. of it (see pl. 2). It may be noticed that the area of disturbance in Mt. Gunnbjørn lies in direct continuation of a line through the disturbed areas of C. Graah and Mt. Zig-zag.

In the southeastern corner of Mt. Nathorst a profile was measured in the direction S. 12° W.—N. 12° E., from the lowermost parts exposed here of the Lower Sandstone Complex up to the lowermost beds of the *Remigolepis* Series. At 114 m a grey, cross-bedded, polymict conglomerate was found; above this, at 124—129 m there is a very coarse, grey, conglomeratic arkose-sandstone with brown dots; then at 132 m a bank of light red sandstone; at 144—156 m a light red, coarse arkose-sandstone with small brown dots; at 254 m a light red, coarse to medium-grained sandstone; at 279 m a loose, coarse to medium-grained, light red sandstone with brown spots; at 281 m a dark, shaly sandstone, rich in mica; at 394 m a grey heterogenous sandstone; and from 401 up to 431 m there is a light grey, fine-grained shaly sandstone with fine, brown dots, alternating with a coarse, reddish-grey sandstone in splitting banks. In this latter part of the profile inhomogenous parts with green spots and banks occur upwards from 421 m, and in the uppermost part also black rocks are found. From 431 to 438 m transitional rocks occur, while from 438 m the chocolate-brown to dark red, irregularly splitting marl, typical of the *Remigolepis* Series, predominates.

In the delta proper of the river occurring between Mt. Nathorst and Mt. Gunnbjørn, a little to the E. of the above-described profile, disturbed beds of greenish-grey sandstones were found (at about 115—150 m), overlain by intensely red or brown, very fine-grained sandstones and a light-grey, coarse conglomeratic sandstone with brown dots. These beds dip 30° towards the SW. They are rather isolated and may represent either an abnormally inclined part of the Lower Sandstone Complex, situated below the above-described profile, or a down-slid part of a grey series, situated above the *Remigolepis* Series. Great precaution is necessary in the interpretation, not only because of the dip, but also because of the evidence of magmatic activity, furnished by the discovery, in the neighbourhood, of a small basalt dyke (at 159 m). However, the locality is interesting, since a fossiliferous bed in the greenish sandstone yielded plates of *Remigolepis* sp.

A profile at the very transition from the Lower Sandstone Complex

to the *Remigolepis* series was measured in the southeastern corner of Mt. Wiman. Here a mainly green sandstone, rich in mica, and with red portions, was found at 207 m, and similar as well as greyish-green rocks were seen to be prevalent for another 50 m downwards towards the river Skjervaa. At 208 m the upper boundary of the Lower Sandstone Complex occurs. The lowermost parts of the *Remigolepis* Series in this locality up to about 233 m consist of a brownish, stratified sandstone. Above this there are dark red to chocolate-coloured, irregularly splitting



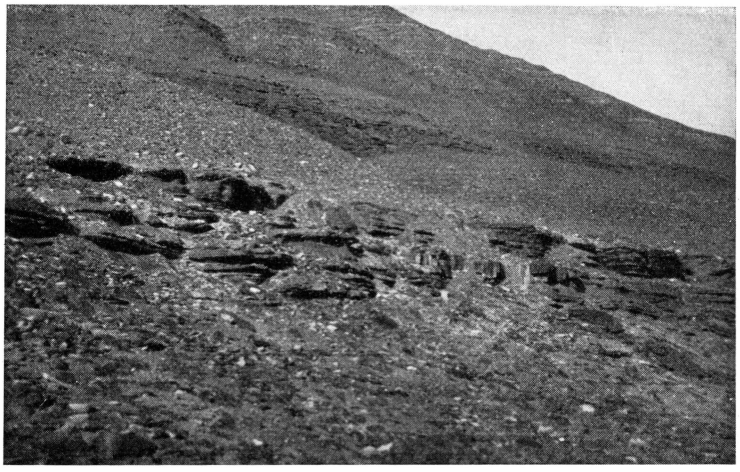
Text-fig. 9. The cascade of the Gløysaa, in the Aina Valley. Mt. Wiman to the right. 1, finely stratified brownish sandstone; 2, irregularly splitting, dark red or chocolate-brown, homogenous marl; 3, mainly dark grey sandstone.

marls up to 279 m, overlain at 280 m by dark greyish sandstones. Farther upwards dark greyish and dark red sandstones alternate.

In Mt. Wiman the main dip is about 5° to the NW., and accordingly the rocks of the lowermost parts of the *Remigolepis* Series were found to the W. at a lower level. In the southwestern corner of Mt. Wiman at the cascade of the Gløysaa (text-fig. 9, 13), the lowermost beds exposed are the brownish, finely stratified sandstones (siltstones), with lime, observed from 27—28, and from 29—79 m. From 79—103 m the irregularly splitting, dark red or chocolate-brown homogenous marl occurs in banks, alternatingly with small and with very large cleavage. At 104 m a dark brownish, but otherwise similar, marl was found, overlain by a fine-grained black rock-type, ascertained at 106 m, and a finely cross-bedded dark grey sandstone from 108 m upwards. A little

higher up banks of irregularly splitting, brownish-red marl were found to be intercalated between banks of dark grey sandstones, which give rise to the characteristic weathering phenomena illustrated in text-fig. 10. Finally, at 350 m, a very rich fossiliferous horizon was found in a hard bank of dark grey sandstone. The fossils found here were mostly *Remigolepis acuta* STENSIÖ, but also *R. incisa* STENSIÖ, and Crossopterygians were collected from this horizon.

The continuation of the profile through the *Remigolepis* Series was measured in the eastern side of Mt. Stensiö, which we ascended



Text-fig. 10. Dark grey sandstones of the *Remigolepis* Series in the SW. corner of Mt. Wiman, above the cascade of the Gløysaa.

from the upper half of the Aina Valley, at a height of about 500 m.

From about 600 m the dark grey banks of sandstone decrease in importance. These banks are intercalated between banks of light greyish-green or brownish-red, irregularly splitting marls.

At 747 m scales of *Holoptychius?* were found in a fixed horizon, but a much richer fossiliferous horizon was encountered at 812 m. The latter yielded numerous fragments of *Remigolepis Kochi* STENSIÖ?, imbedded in a fine-grained, brownish-red sandstone or marl.

From 832 m upwards the sediments are of the type found in the Arthrodire Sandstone Series. The rock-types include for instance finely stratified, light grey, medium-grained sandstone (at 832 m); fine-grained, light-grey, or greenish sandstone with lime, intercalated with irregularly splitting marl of the same colour, and holding indeterminable fragments of fossils (at 842—844); fine-grained, light-grey to light-yellow, or brownish sandstones, partly rich in mica; greenish-grey (seldom chocolate-brown), irregularly splitting or finely stratified marls; greenish grey silt-

stone, rich in mica; unstratified, medium- to fine-grained, grey lime-sandstone, etc. Above 1032 m these types are succeeded by mostly more purely grey, though also greenish-grey, coarser sandstones rich in mica, with ripple-marks at 1162 m, and cross-bedding, for instance at 1232 m. Intercalated in this series of grey, coarse sandstones there is, curiously enough, a bank of very dark or black, dense, shaly marl (at 1220 m), very similar to the rock-type found at 1111—1113 m in the profile on the southern side of Mt. Celsius.

The top of the Arthrodire Sandstone Series is found at 1232 m. Above it follows, exactly as in Mt. Celsius, a series of intensely brick-red and red-white-mottled loose sandstones, mostly medium-grained, and with lime, up to 1327 m, overlain by a series of light grey, medium-grained sandstone, rich in mica, and with lime, forming the very top of Mt. Stensiö, at 1354 m (± 2).

In the summit of Mt. Stensiö the layers have practically a horizontal position.

Thus, summarising the profiles investigated on Gauss Peninsula, we find, at the base, at least 325 m of the mainly light grey Lower Sandstone Complex, overlain by probably about 800 m[1]) of the mainly dark grey or dark brownish-red sediments of the *Remigolepis* Series. Above this the Arthrodire Sandstone Series occupies the next 400 m of the profile, and is overlain by the Upper Sandstone Complex: 95 m of intensely brick-red and red-white-mottled sandstones, below, and more than 27 m of light grey sandstone, at the top.

Three fossiliferous horizons with determinable fossils were found in the profile, viz.: the extremely rich *Remigolepis incisa-R. acuta*-horizon at 350 m in Mt. Wiman; the *Holoptychius*?-horizon at 747 m, and the *Remigolepis Kochi*?-horizon at 812 m, both in Mt. Stensiö.

Another fossiliferous horizon with at any rate very nearly the same stratigraphical position as the *Remigolepis incisa-R. acuta*-horizon in Mt. Wiman, was found in the eastern half of the southern slope of Mt. Stensiö, at an altitude of 330 m. Like the horizon at 350 m in Mt. Wiman, it is extremely rich in plates of *Remigolepis incisa* Stensiö or *R. acuta* Stensiö, but also scales of *Holoptychius* and Crossopterygian bones were found here. The position of the exposed part of the horizon will be evident from pl. 3, fig. 3. A dip of about 5° towards S. 12° W., that is, towards the shore, was measured some 40 m below the fossiliferous horizon in the eastern part of Mt. Stensiö.

The very large material collected in the two localities of the *Remigolepis incisa-R. acuta*-horizon in Mt. Stensiö and Mt. Wiman do not

---

[1]) An incertainty in the figures, here as in Mt. Celsius, is due to the very frequent small faults, of the type described in the W. Circus Valley (p. 15).

yet form the bulk of our collections from Gauss Peninsula. By far the larger part of these consist of the finds in the local talus masses of the *Remigolepis* Series, especially on the southern side of Mt. Stensiö.

The terraces below Mt. Nathorst were very rapidly searched during a few hours only, so the bad result — almost no fossils were found here — is probably due to the incomplete investigation.

In the southern slope of Mt. Wiman two parts may be readily distinguished. The lower part is formed by the terraces leading up from the shore to the very steep wall, cut out in the lowermost rocks of the *Remigolepis* Series, mainly in the irregularly splitting, very fine-grained,



Text-fig. 11. The coast cliff below the lowest part of the Bottom Terrace, seen from the W. Sediments of the lowermost part of the *Remigolepis* Series.

intensely chocolate-brown or dark-red marl (occurring from 79—103 m in the above described profile at the cascade of the Gløysaa). Above this steep wall, which is especially marked at the cascade of the Gløysaa (the river in the Aina Valley; see text-fig. 9), there is in Mt. Wiman a marked terrace, which becomes gradually steeper to the N. and passes into the very steep walls of the higher parts of the mountain.

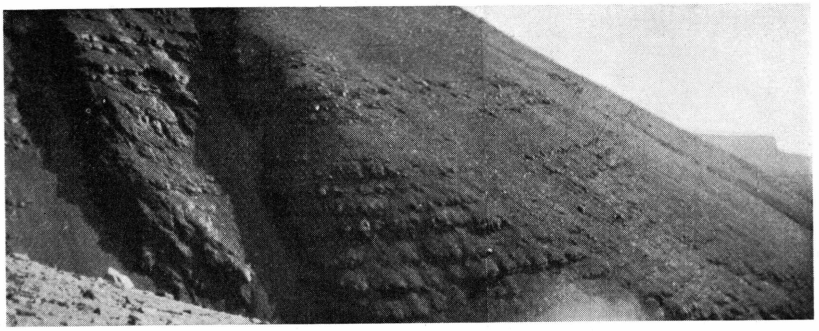
Below the steep wall very few fossils were found, viz. a specimen of *Bothriolepis* n. sp.?

A few *Remigolepis*-plates were found in the talus in the south-eastern corner of Mt. Wiman, just at the steep wall.

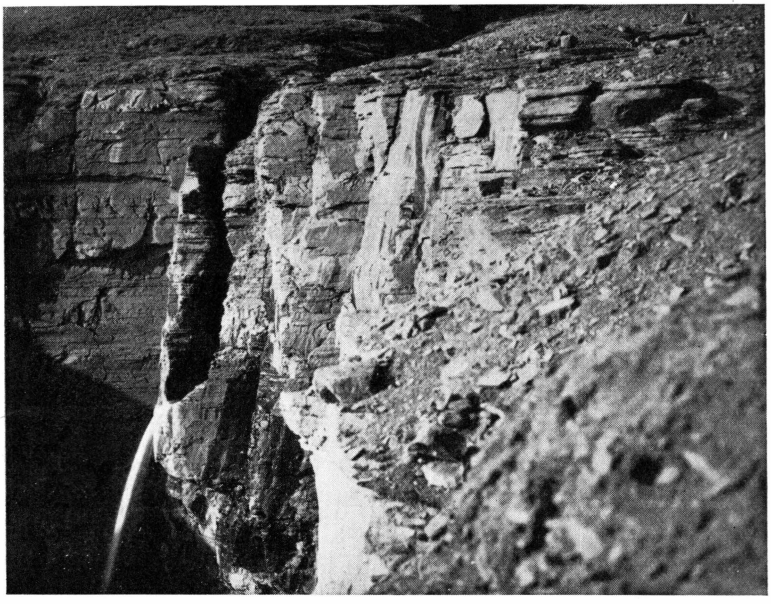
Above this steep wall, on the terrace already described, somewhat richer collections were made, including both fossils from the *Remigolepis incisa-R. acuta*-horizon and fossils embedded in light greyish sandstones, apparently originating from the Arthrodire Sandstone Series. Among the

latter category of fossils are abundant remains of *Holoptychius*, including scales, fins, and also cranial remains.

Much richer collections were, however, made on the southern side



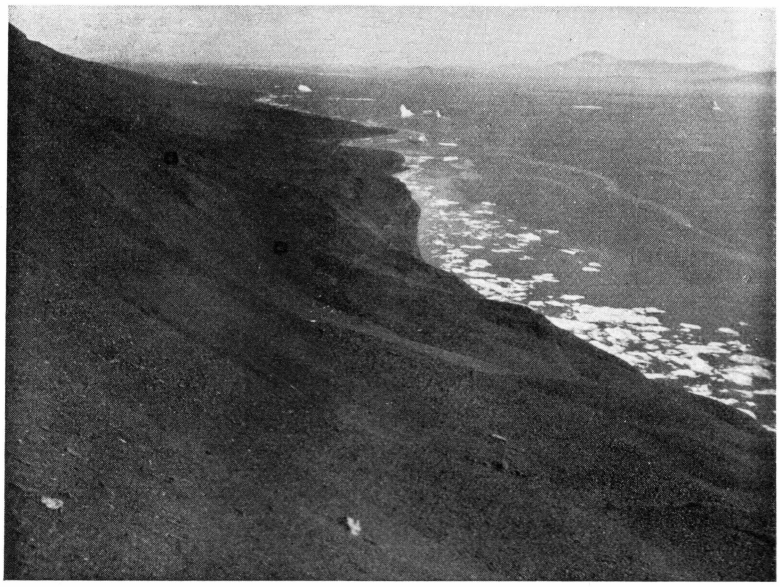
Text-fig. 12. The south-western corner of Mt. Wiman, seen from the south-eastern corner of Mt. Stensiö. Flexure in the beds of the *Remigolepis* Series. Phot. T. Säve-Söderbergh.



Text-fig. 13. Uppermost part of the cascade of the Gløysaa, in the Aina Valley, between Mt. Wiman and Mt. Stensiö. Dark grey sandstones of the *Remigolepis* Series.

of Mt. Stensiö. Here the steep wall, described above in Mt. Wiman, continues right down to the shore, forming for a distance a steep, though not very high, coastal cliff (see text-fig. 11; pl. 3, fig. 3). As is evident from the dip (see pl. 2; pl. 3, fig. 3), this coast cliff and the terrace above it, the Bottom Terrace (»Bottenterrassen«) represent a down-slid

part below Mt. Stensiö. Numerous small, vertical faults were also observed in the wall of the Gløysaa, above the cascade figured in text-figs. 9 and 13. And in the western wall of Mt. Wiman, as seen from Mt. Stensiö (text-fig. 12), an important flexure is visible, a flexure by which the southern parts, nearest the shore, are much lowered in relation to the main mass of the mountain. — On the whole, the steep southern coast-line of Gauss Peninsula seems to me to be most naturally interpreted as due



Text-fig. 14. Central and Western Parts of the southern slope of Mt. Stensiö. View towards the SE. **o**, fossiliferous localities in the talus.

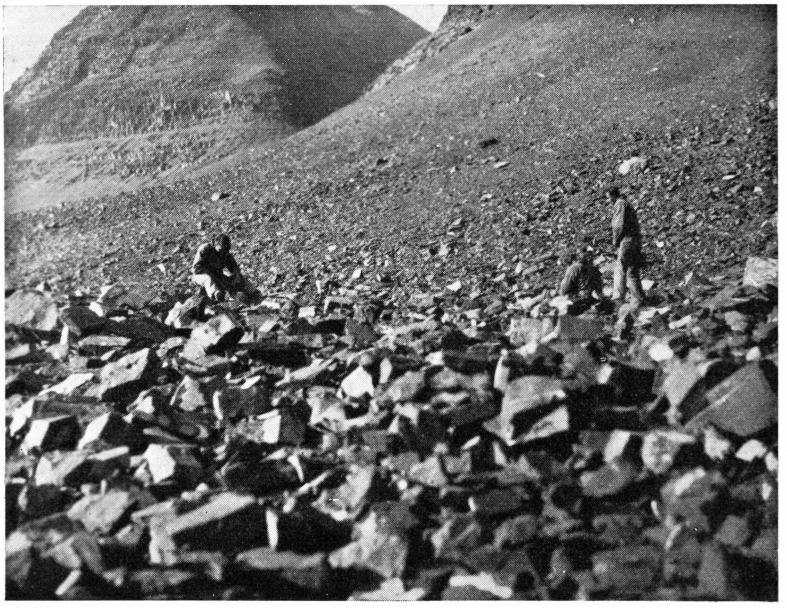
to a more or less recent long fault, along which occur minor accessory faults, separating terraces and small down-slid parts from the main mass of the peninsula. The conditions at the rivers Gløysaa and Skjervaa, and the river in the Britta Valley between Mt. Stensiö and Mt. Smith Woodward (text-figs. 6, 7, 9, 13), apparently indicate a very young age of the Elsa, Aina, and Britta Valleys.

To return now to the fossils, there are two very rich localities at the coast cliff below the Bottom Terrace. One of these, situated farthest left on pl. 3, fig. 3, is near the lowermost part of the syncline of the Bottom Terrace. It yielded large collections of Crossopterygians and Dipnoans, and also Ichthyostegids and *Remigolepis* cf. *Kochi* STENSIÖ. Most of the fossils were found in a dark grey sandstone, but the specimens of *Remigolepis* cf. *Kochi* STENSIÖ, and scales of *Holoptychius?* were found in a very fine-grained red rock-type.

A little farther to the E. is another very rich locality below the Bottom Terrace, as shown in pl. 3, fig. 3. Here i.a. plates of *Remigolepis* cf. *Kochi* STENSIÖ and various bones of Crossopterygians were found.

Some distance to the W. of the western locality described here the local talus below the Bottom Terrace yielded different bones of *Holoptychius* sp.

In order to describe the fossiliferous localities above the Bottom



Text-fig. 15. On the Central Part of the southern slope of Mt. Stensiö. Talus of the *Remigolepis* Series.

Terrace in Mt. Stensiö, it is useful to divide the southern slope of that mountain into three parts. The Eastern Part of the slope will be the part extending from the cascade of the Gløysaa, in the Aina Valley, to the eastern end of the exposed part of the *Remigolepis incisa-R. acuta*-horizon (see pl. 3, fig. 3), the Central Part stretching from and including the exposed parts of the mentioned horizon to the westernmost of the two largest ravines of the slope, clearly visible on pl. 2 and pl. 3, fig. 3 (R_1). The Western Part accordingly extends from the western large ravine to the river between Mt. Stensiö and Mt. Smith Woodward, in the Britta Valley.

The Eastern Part of the slope was rather poor in fossils. Only some scales of *Holoptychius?* and other indeterminable Crossopterygian remains were found here. Equally poor was the result in the Western Part of the slope, which only yielded *Remigolepis* sp.

The contrary was the case as regards the Central Part (text-figs. 14, 15), where very large collections were secured. In two localities, situated below the *Remigolepis incisa-R. acuta*-horizon, and close together on pl. 3, fig. 3, a large material of *Remigolepis acuta* STENSIÖ was collected, evidently originating from the above-described horizon at 330 m.

A fauna of another, and richer type was found at the place (named »Stora Raset« on the labels) indicated to the right on text-fig. 14, and farther to the left (W) on pl. 3, fig. 3, and on the terraces below that place (altitude about 130—200 m). Here an abundant material of small specimens of *Remigolepis* n. sp.?, with a remarkably small pectoral fin, was found, mixed with large plates of *Remigolepis incisa* STENSIÖ, and *R. acuta* STENSIÖ, Crossopterygians, Dipnoans of a quite new, long-nosed type, and Ichthyostegids.

To the W. of the eastern large ravine, in the westernmost portion of the Central Part of the slope, scales of *Holoptychius*?, Crossopterygian bones, and a few plates of *Remigolepis* sp. were found.

Because of the limited time at our disposal, Mt. Smith Woodward was only investigated during a short excursion across the southern corner of the mountain. No fossils at all were found here, but further investigation will no doubt result in such finds. A sample of the chocolate-brown marl, also forming the steep wall of Mt. Wiman (see above), was taken in Mt. Smith Woodward, in order to enable Dr. MALMQVIST to investigate the variation in the size of grain in that rock along the shore from Mt. Smith Woodward to Mt. Stensiö, Mt. Wiman, and Mt. Nathorst.

III. Stratigraphical conclusions.

Stratigraphically, the most important result of the investigations of the East Greenland Devonian during the summer expedition of 1932 is the finding of a sequence of strata on Gauss Peninsula well comparable to that earlier found in Mt. Celsius. The *Remigolepis* Series, well characterised by its fossil contents, is recognised with certainty on Gauss Peninsula, and a remarkable parallellism in the higher parts of the profiles above this series seems to justify a correlation with Mt. Celsius also for the Arthrodire Sandstone Series and the Upper Sandstone Complex.

As might be expected in beds of the continental type, represented by the East Greenland Upper Devonian Old Red, the thicknesses of the different series are subject to important variations. In spite of the uncertainty when estimating the real thicknesses, owing to frequent smaller or greater faults, the conclusion can hardly be avoided that the *Remigolepis* Series has a much greater thickness in Mt. Stensiö, Mt.

	Mt. Celsius	Mt. Stensiö and surrounding parts of Gauss Peninsula
Upper Sandstone Complex { Grey Upper Part	40+	27+
Upper Sandstone Complex { Red and red-white-mottled Lower Part	20	95
Arthrodire Sandstone Series (incl. possibly lowermost grey post-Devonian sandstones)	500	400
Remigolepis Series	380	800
Lower Sandstone Complex	300+	325+

Wiman, and Mt. Nathorst than in Mt. Celsius, whereas the opposite may be true of the Arthrodire Sandstone Series. This will be evident from the table given above, showing the approximate thicknesses in meters in the two localities.

Owing to this marked difference in the thickness of the *Remigolepis* Series in Mt. Celsius and in the discussed parts of Gauss Peninsula, it is difficult to parallellise accurately the fossiliferous horizons found at the two localities.

Fossiliferous niveaus in stratigraphical order:	Approximate distance from base of *Remigolepis* Series	Twice this distance in the case of Mt. Celsius, unaltered for localities on Gauss Peninsula
Remigolepis Kochi Stensiö?, 812 m, in Mt. Stensiö	780 m	780 m
Crossopterygians, 658 m, in Mt. Celsius, S. slope	300 -	600 -
Remigolepis incisa Stensiö—*R. acuta* Stensiö, 330 m in Mt. Stensiö, 350 m in Mt. Wiman	330 -	330 -
Remigolepis acuta Stensiö, 499 m, in Mt. Celsius, S. slope	145 -	290 -
Remigolepis sp., 536 m, above the Western Upper Plateau	135 -	270 -
Remigolepis Kochi Stensiö?, 567 m, above the Eastern Upper Plateau		
Remigolepis, sp. (with an ornamentation of the *acuta*-type) 535 m, above the western part of the East Plateau	85 -	170 -
Emarginata-horizon, 545 m, above the easternmost part of the East Plateau	80 -	160 -
Remigolepis sp., 534 m, above the easternmost part of the East Plateau	70 -	140 -
Possibly *Remigolepis* sp. *a* (with an ornamentation like that of *Bothriolepis*), from below the Eastern Terrace, Mt. Celsius, S. slope; and *Remigolepis* cf. *Kochi* Stensiö from below the Bottom Terrace, Gauss Peninsula	25—70 m?	50—140 m?

However, with great reservation one may calculate the correlation of the most important fossiliferous niveaus as shown in the above table, assuming that the thicknesses of the different parts of the series are increased at about the same rate towards the N.

The strata investigated during the summer of 1932 in Mt. Blask and Mt. Tegelberget, like those previously investigated on Cape Graah, in Margrethe Valley, in Kungaborgen, in Muskox Fjord (KOCH 1929, BACKLUND 1930), etc., cannot yet be safely correlated with the type sequence of Mt. Celsius. And it should be especially pointed out that the beds with *Bothriolepis* n. sp., on Gauss Peninsula (see KULLING 1931, p. 13, fig. 4; cf. SÄVE-SÖDERBERGH 1932a, p. 27!) have not yet been convincingly correlated with those of the area farther to the E. on the same peninsula, described in this paper; and that the parallellisation, outlined above (p. 24), of Mt. Tegelberget with Cape Graah, is as yet merely a tectonical one. For conclusive evidence of the relative age of the beds in the two localities we must await the finds of typical fossils.

REFERENCES

For a more complete account of the literature the reader may consult my earlier paper (1932a).

Only the works cited in the present publication are enumerated below.

(1) East Greenland, Eirik Raudes Land. Map published by Norges Svalbard og Ishavs-Undersøkelser. Oslo 1932.

Backlund, H. G. 1930. Contributions to the Geology of Northeast Greenland. Medd. om Grønland, Bd. 74.

— 1932. Das Alter des "metamorphen Komplexes" von Franz Josef Fjord in Ost-Grönland. Medd. om Grønland, Bd. 87, Nr. 4, 1932.

— and Malmqvist, D. 1932. Zur Geologie und Petrographie der nordost-grönländischen Basaltformation. Teil I. Medd. om Grønland, Bd. 87, Nr. 5, 1932.

Frebold, H. 1932. Grundzüge der tektonischen Entwicklung Ostgrönlands in postdevonischer Zeit. Medd. om Grønland, Bd. 94, Nr. 2, 1932.

Halle, T. 1931. Younger palaeozoic plants from East Greenland. Medd. om Grønland, Bd. 85, Nr. 1, 1931.

Heintz, A. 1930. Oberdevonische Fischreste aus Ost-Grönland. Norges Svalbard- og Ishavs-undersøkelser. Skrifter om Svalbard og Ishavet, Nr. 30, Oslo 1930.

Heintz, A. 1932. Beitrag zur Kenntnis der devonischen Fischfauna Ost-Grönlands. Norges Svalbard- og Ishavsundersøkelser, Skrifter om Svalbard og Ishavet, Nr. 42, Oslo 1932.

Hills, E. S. 1932. Upper Devonian Fishes from New South Wales. London, Geolog. Soc., Quarterly Journ., Vol. 88, pt. 4, 1932.

Koch, L. 1929. The Geology of East Greenland. Medd. om Grønland, Bd. 73 II, 1929.

— 1930. Remarks on the map of Dusén Fiord. Medd. om Grønland, Bd. 74, 1930.

— 1931. Carboniferous and Triassic Stratigraphy of East Greenland. Medd. om Grønland, Bd. 83, Nr. 2, 1931.

Kulling, O. 1930. Stratigraphic studies of the geology of Northeast Greenland. Medd. om Grønland, Bd. 74, 1930.

— 1931a. An account of the localities of the Upper Devonian vertebrate finds in East Greenland in 1929. Medd. om Grønland, Bd. 86, Nr. 2, 1931.

— 1931b. De nordöstgrönländska fjordarnas problem. Stockholm, Geol. För. Förh., 55, 1931, p. 209.

Nathorst, A. G. 1901. Bidrag till nordöstra Grönlands geologi. Stockholm, Geol. För., Förh., 23, 1901.

NOE-NYGAARD, A. 1933. Stratigraphical outlines of the area round Fleming Inlet. In Medd. om Grønland. (Under preparation.)

ORVIN, A. 1930. Beiträge zur Kenntnis des Oberdevons Ostgrönlands. Norges Svalbard- og Ishavs-Undersøkelser, Skrifter om Svalbard og Ishavet, Nr. 30, Oslo 1930.

ROSENKRANTZ, A. 1932. Geologiske Undersøgelser i Øst-Grønland Sommeren 1929. I. København 1932.

SÄVE-SÖDERBERGH, G. 1932a. Notes on the Devonian stratigraphy of East Greenland. Medd. om Grønland, Bd. 94, Nr. 4, 1932.

— 1932b. Preliminary note on Devonian Stegocephalians from East Greenland. Medd. om Grønland, Bd. 94, Nr. 7, 1932.

— 1933. On the dermal bones of the head and the lateral line system in *Osteolepis macrolepidotus*. Upsala, R. Soc. Sci., N. Acta, Ser. IV, Vol. 9, N:o 2. (In press.)

SEIDENFADEN, G. 1931. Notes on a map of East Greenland from 73°00′ to 74°50′ N. Lat. Medd. om Grønland, Bd. 87, Nr. 3, 1931.

WOODWARD, A. S. 1900. Notes on some Upper Devonian fish-remains, discovered by Prof. A. G. Nathorst in East Greenland. Stockholm, K. Sv. Vet. Ak., Handl., Bih., Bd. 26, Afd. IV, 1900.

EXPLANATION OF PLATES

Plate 1.

Fig. 1. The northern sides of Mt. Celsius and Cape Graah, seen from the N., from below Mt. Wiman on Gauss Peninsula. Drawing by G. FAGRELL after a photographic panorama, taken with the Zeiss-Ikon Nixe apparatus, on Ilford Soft Gradation Panchromatic plates, with an Ilford Gamma Filter, and a Zeiss Distar Lens 2.5 × 42. All dimensions and topographical details exact (drawing with square grating). The parts of Cape Graah to the W. of the down-slid parts at the coast studied only from the boat, so that the geology there may in part be inexactly figured.

— 2. View from the top of Mt. Stensiö (1354 m) on Gauss Peninsula towards the SE. and S. Prepared as fig. 1, but from photographs taken on Agfa Isochrome Film, with a Zeiss Yellow Filter Hell (× $1^1/_2$—2).

Obs. By mistake Mt. Gunnbjørn has been denoted Mt. Grimbjørn in fig. 2.

Fig. 1a

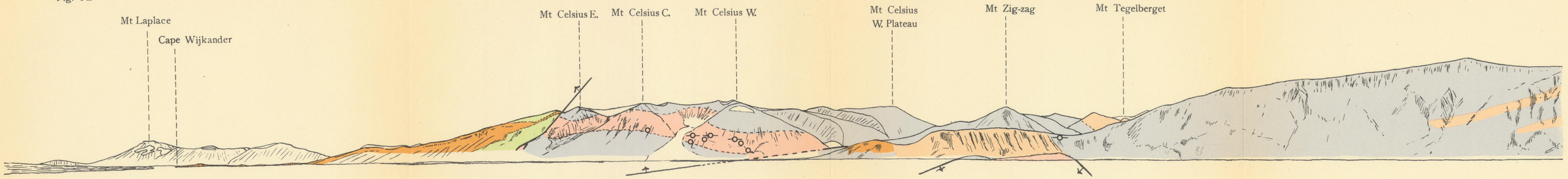


Fig. 1b

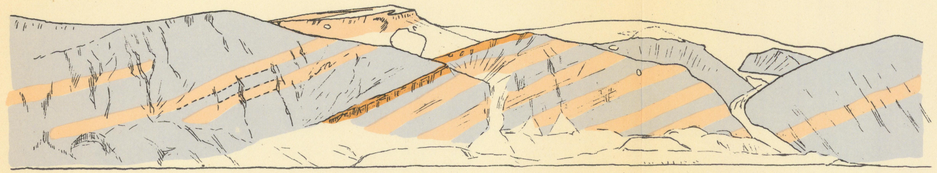
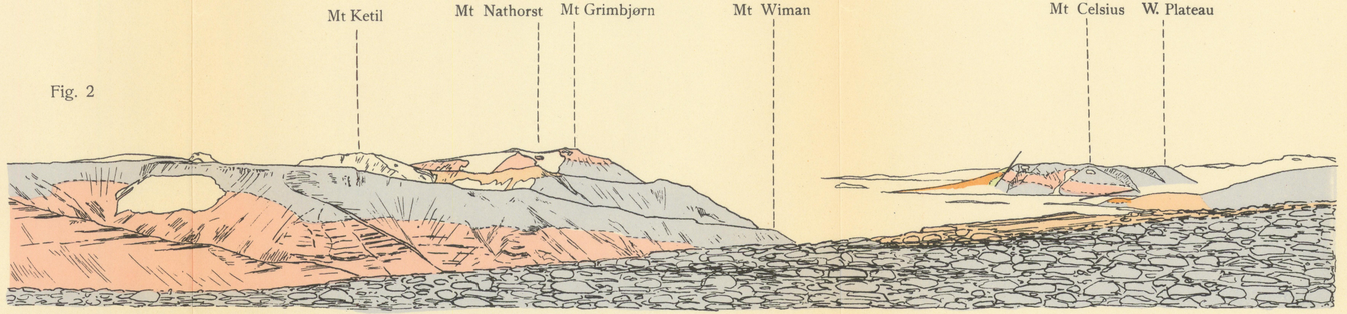


Fig. 2



Basalt

Basalt and grey sandstone

Carboniferous and Mesozoic sediments

Light red sandstones (incl. *Phyllolepis*-sandstone)

Remigolepis Series

Grey sandstones (incl. Arthrodire Sandstone)

Fault-line

Fossils in situ

Fossiliferous talus

Plate 2.

The main geological features of the southern sides of C. Graah and Gauss Peninsula, seen from the Double Ravine, on the Central Part of the southern slope of Mt. Celsius. Drawing by G. FAGRELL after a photographic panorama, taken with the Zeiss Ikon Nixe apparatus, on Ilford Soft Gradation Panchromatic plates, with an Ilford Gamma Filter, and a Zeiss Distar Lens 2.5 × 42. Drawn with a square grating like pl. 1, figs. 1, 2.

According to information most kindly furnished by Prof. H. BACKLUND there are also sedimentary deposits (Carboniferous, according to BACKLUND 1930) in part of the area W. of Margrethe Valley, indicated as basalt in the panorama (partly after KOCH 1931, pl. VI).

Obs. By mistake Mt. Gunnbjørn has been denoted Mt. Grimbjørn, and the names Waltershausen Glacier and Strindberg Peninsula have changed their places.

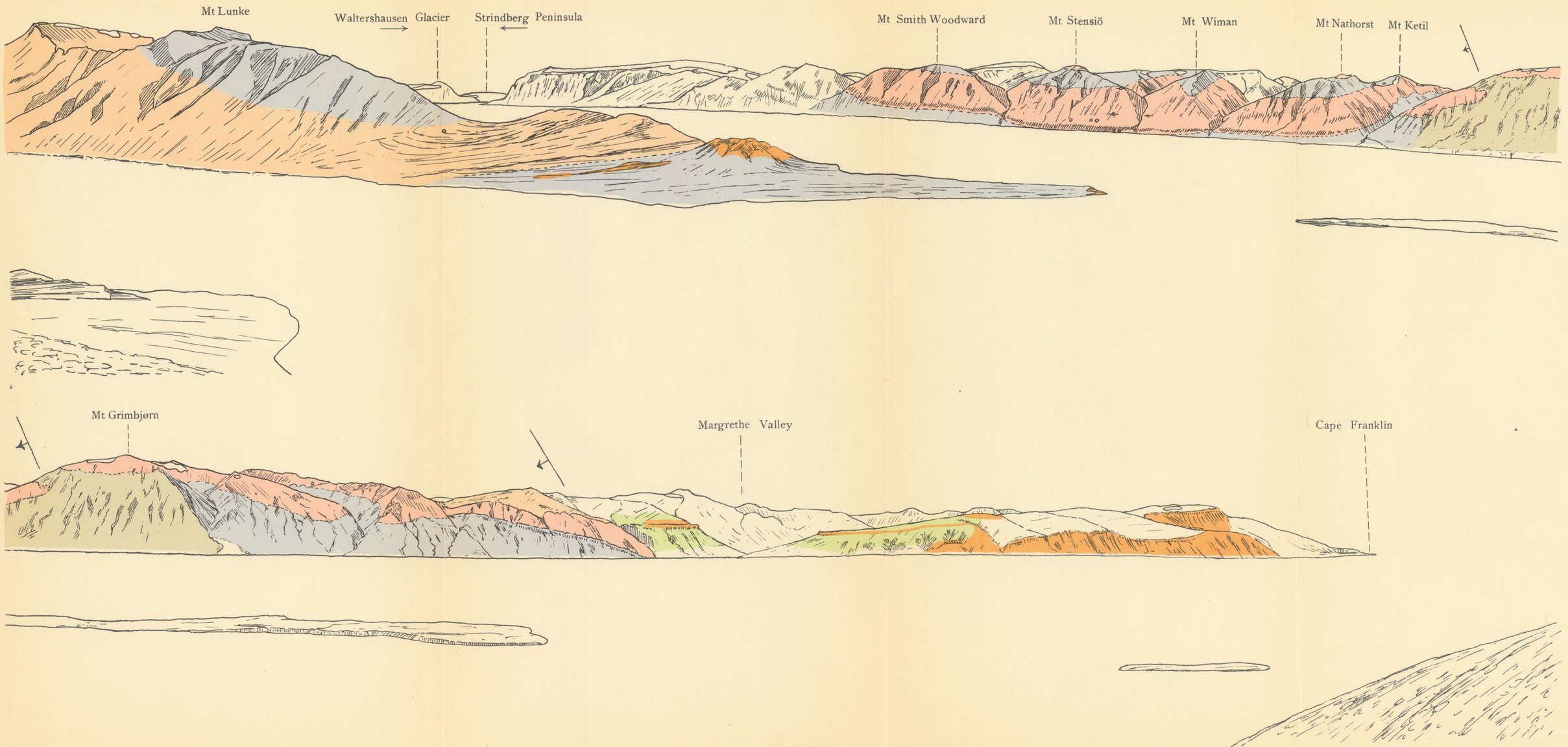

Mt Lunke
Waltershausen Glacier
Strindberg Peninsula
Mt Smith Woodward
Mt Stensiö
Mt Wiman
Mt Nathorst
Mt Ketil
Mt Grimbjørn
Margrethe Valley
Cape Franklin

Plate 3.

Fig. 1. Western and Central Parts of the northern slope of Mt. Celsius, seen from a point near the S. shore of the Dusén Fjord.
C, the large Débris Cone; *CP*, Central Part of the northern slope of Mt. Celsius; *E*—*E*, the East Plateau; *K*, the *Kochi*-Ridge; *L*—*L*, the Lower Terrace; *T*, the Topmost Coulisse; *U*, the Western Upper Plateau; *V*, the Western Circus Valley; *W*, the Western Coulisse; 1, 2, 3, fossil localities, see the text.

— 2. Mt. Rudbeck and the Backlund Ridge (Geographical Soc. Isl.), seen from the N. (below Mt. Celsius).
The dark parts of the Backlund Ridge: basalt intrusion; the light-coloured parts: probably continental Carboniferous. In Mt. Rudbeck: *W*, white loose sandstone; B_1, B_2, basalt intrusions; *R*, light red sandstone; *Y*, yellow or brownish grey, caolinized sandstone. To the W. of Mt. Rudbeck mainly light grey beds.

— 3. The coast mountains between Mt. Gunnbjørn and Mt. Smith Woodward on Gauss Peninsula, seen from the southernmost point of the delta of the Gløysaa. R_1, R_2, large ravines in Mt. Stensiö; o, fossils in talus; — — — fossiliferous horizon. The *Remigolepis acuta*—*R. incisa*-horizon in Mt. Wiman (at 350 m), not marked on the figure, is situated 33 mm immediately below the *y* in Aina Valley, about 9—10 mm to the right of the line from the name Aina Valley.

Obs. By mistake Mt. Gunnbjørn has been denoted Mt. Grimbjørn in fig. 3.

Photographs taken with the Zeiss Ikon Nixe apparatus, on Agfa Isochrome Film, with a Zeiss Yellow Filter Hell ($\times$ $1^1/_2$—2).

Fig. 1

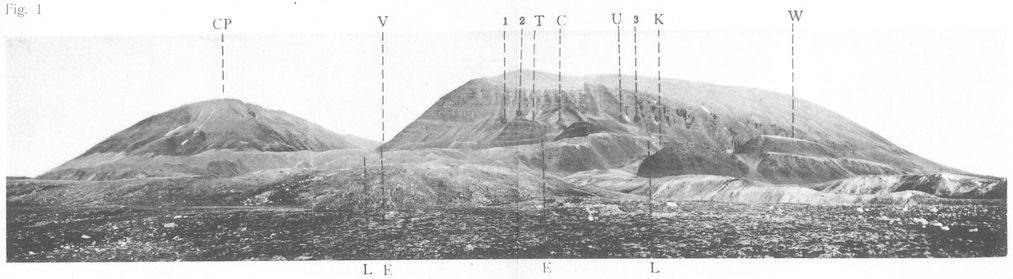


Fig. 2

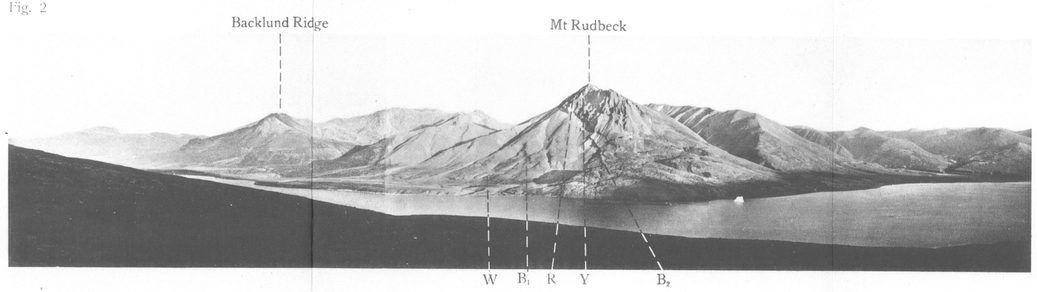


Fig. 3

