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REVISION OF TRIASSIC STRATIGRAPHY OF THE SCORESBY LAND AND JAMESON LAND REGION, EAST GREENLAND

BY

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WITH 22 FIGURES AND 3 TABLES IN THE TEXT,
AND 17 PLATES

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Abstract

A revised stratigraphic scheme is presented for the Triassic rocks between Kong Oscars Fjord and Scoresby Sund, East Greenland. The Triassic succession is described as the Scoresby Land Group comprising four formations. The lower two formations (Wordie Creek Formation and Pingo Dal Formation) belong to the Nordenskiöld Bjerg Subgroup, while the upper two formations (Gipsdalen Formation and Fleming Fjord Formation) belong to the Kap Biot Subgroup. The total thickness of the Triassic sequence attains 1000 to 1500 m of which less than half is composed of marine sediments. The remainder consists of continental deposits and includes red-beds with an important evaporite complex in the middle of the succession.

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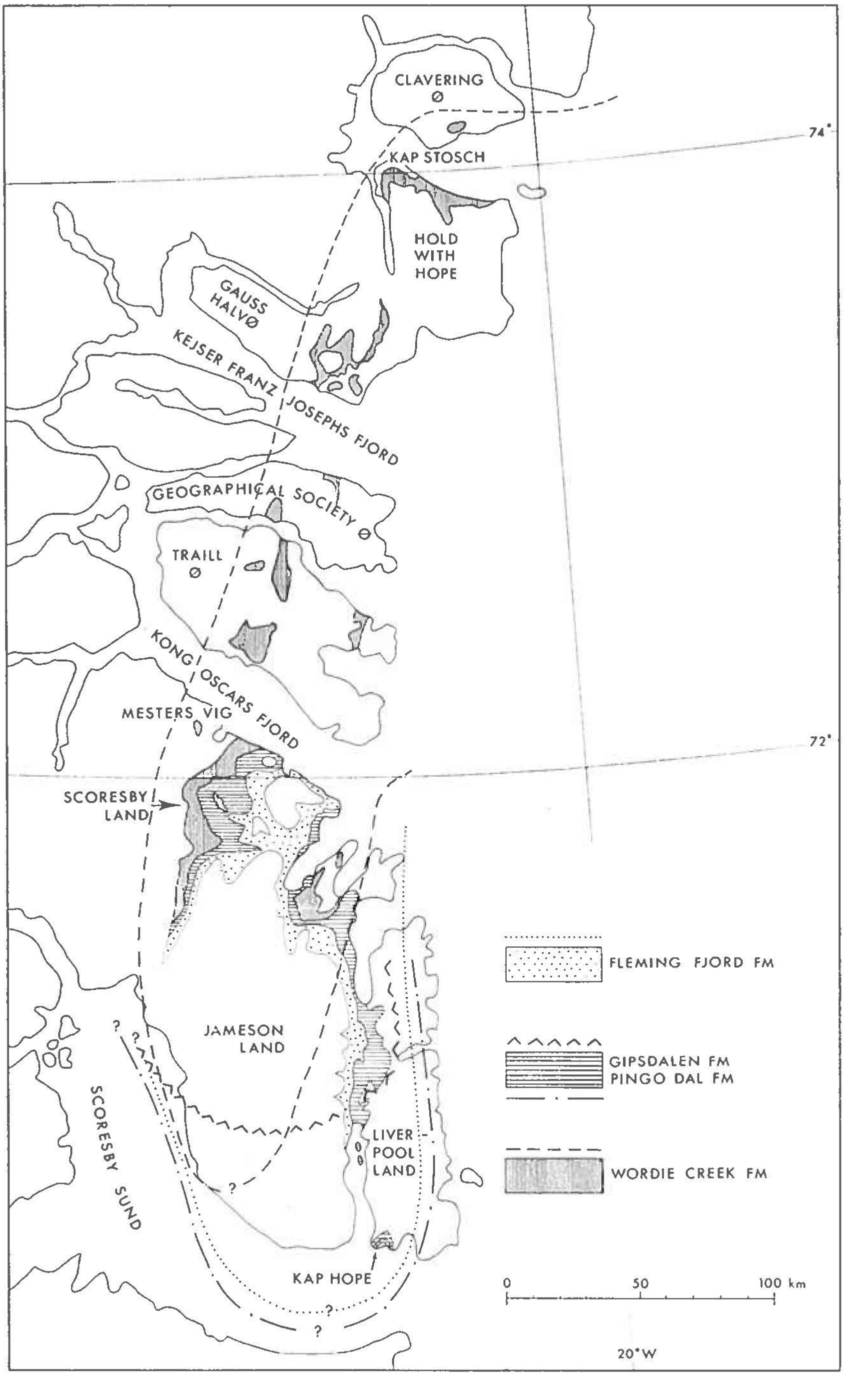


Fig. 1. The distribution of outcropping Triassic sediments and the estimated extensions of the Triassic formations.

INTRODUCTION

During the summers of 1968–1971 the Triassic succession of Scoresby Land and Jameson Land was investigated in some detail by the Geological Survey of Greenland as part of its programme of mapping the area between Kong Oscars Fjord and Scoresby Sund. In 1968 work was concentrated in the area of northern Jameson Land and southern Scoresby Land (fig. 1 in BIRKELUND & PERCH-NIELSEN, 1969), and in 1969 other areas of southern Scoresby Land and northern Jameson Land were investigated (BROMLEY *et al.*, 1970). In 1971 the mapping of the Triassic deposits continued in the eastern part of Jameson Land (Klitdal), the north-eastern part of Jameson Land and parts of Scoresby Land. Along with the mapping, sedimentological studies were made and fossils collected (PERCH-NIELSEN *et al.*, 1972; SURLYK & BIRKELUND, 1972).

The lithostratigraphical scheme proposed by TRÜMPY (1961) and GRASMÜCK & TRÜMPY (1969) was used preliminarily by the members of the expeditions in 1968, 1969 and 1970 for the mapping of the Triassic deposits. This scheme, however, did not lend itself to use over a wider area. The aim of the present paper, therefore, is to introduce a slightly revised stratigraphical scheme for the Triassic rocks of Scoresby Land and Jameson Land (see tables 1 and 2), with properly defined lithostratigraphical units suitable for mapping. The paper includes only a limited part of the information obtained during the field work. Subsequent publication of geological maps and detailed investigations of special topics are planned for the coming years by members of the expeditions and other specialists. A note on certain Triassic trace fossils from Carlsberg Fjord has already been published by BROMLEY & ASGAARD (1972). Since further publications on trace fossils are expected from these authors, emphasis is not placed on ichnology in the present paper.

HISTORICAL REVIEW

In central East Greenland Triassic sediments are known from the fjord and island coast-line north of Scoresby Sund, between latitudes 70°30′ and 74°30′ N. Large fjords divide the area into three parts: (a) a northern area with Clavering Ø, Hold with Hope (with the famous localities of the Kap Stosch coast) and Gauss Halvø, (b) a central area with Geographical Society Ø and Traill Ø and (c) a southern area including eastern Scoresby Land, Jameson Land, Wegener Halvø and Liverpool Land. As brief historical reviews of the investigations in these areas are given by TRÜMPY (1961, 1969) and GRASMÜCK & TRÜMPY (1969) only a review of the investigations made before 1968 of Triassic deposits and faunas in the southern area need be mentioned here. Table 2 summarises and correlates previous attempts at subdivision of the Triassic succession.

Table 1. *Lithostratigraphical subdivision of the Triassic rocks between Kong Oscars Fjord and Scoresby Sund, East Greenland*

<table>
<tr><th>GROUP</th><th>SUBGROUP</th><th>FORMATION</th><th colspan="2">MEMBER</th></tr>
<tr><td rowspan="9">* SCORESBY LAND</td><td rowspan="5">▲ KAP BIOT</td><td rowspan="3">▲ FLEMING FJORD</td><td colspan="2">ØRSTED DAL</td></tr>
<tr><td colspan="2">* MALMROS KLINT</td></tr>
<tr><td colspan="2">* EDDERFUGLEDAL</td></tr>
<tr><td rowspan="2">* GIPSDALEN</td><td colspan="2">▲ KAP SEAFORTH</td></tr>
<tr><td colspan="2">SOLFALDSDAL</td></tr>
<tr><td rowspan="4">▲ NORDENSKIÖLD BJERG</td><td rowspan="3">* PINGO DAL</td><td>* SYDKRONEN</td><td rowspan="3">▲ KLITDAL</td></tr>
<tr><td>▲ PARADIGMABJERG</td></tr>
<tr><td>RØDSTAKEN</td></tr>
<tr><td colspan="3">WORDIE CREEK</td></tr>
</table>

* New units ▲ Redefined units

In the area of Hurry Inlet (including Kap Hope and Kap Stewart) and farther north in Klitdal, ROSENKRANTZ (1929, 1934, 1942) distinguished the Triassic Klitdal Formation and subdivided it into three members: (a) arkose, (b) gypsum and (c) red marl. The overlying Kap Stewart Formation, not treated in this paper, represents the beds of the Triassic-

Table 2. *Subdivisions of the Triassic rocks in East Greenland*

Koch 1928, 1929, 1931		Rosenkrantz 1929, 1934, 1942		Stauber 1942	Trümpy 1961		Grasmück & Trümpy 1969		Birkelund & Perch-Nielsen 1969		THIS PAPER					Grasmück & Trümpy 1969, Silberling & Tozer 1968	
					FORMATION	BED	FORMATION	BEDS \ MEMBER	FORMATION	MEMBER	ZONE \ MEMBER	MEMBER	FORMATION	SUB-GROUP	GROUP	STAGE	SYSTEM
Cape Biot Formation		Klitdal Formation	Red marl Member	Bunte Serie	Cape Biot	Ørsted Dal	Cape Biot	Ørsted Dal	Kap Biot	Ørsted Dal	Ørsted Dal		Fleming Fjord	Kap Biot	SCORESBY LAND	Rhaetian	TRIASSIC
						Fleming Fjord		Fleming Fjord		Fleming Fjord	Malmros Klint					Norian? Carnian?	
						Cape Seaforth		Kap Seaforth		Kap Seaforth	Edderfugledal						
Mt. Nordenskiöld Formation			Gypsum Member								Kap Seaforth		Gipsdalen			Ladinian?	
					Mt. Nordenskiöld	Solfaldsdal	Mt. Nordenskiöld	Solfaldsdal	Mt. Nordenskiöld	Solfaldsdal	Solfaldsdal					Anisian?	
			Arkose Member	Kontinentale Serie		Paradigma		Paradigma		Paradigma	Sydkronen	Klitdal	Pingo Dal	Nordenskiöld Bjerg		Scythian: Dienerian?	
											Paradigma bjerg						
Wordie Creek Formation	A. fassaensis	Wordie Creek Formation		Marine Serie		Rødstaken		Rødstaken	Wordie Creek	Rødstaken	Rødstaken						
											A. fassaensis		Wordie Creek				
	A. breviformis				Wordie Creek	Breviformis ? to Vishnuites	Wordie Creek	Breviformis			A. breviformis						
	Proptychites							P. rosenkrantzi			P. rosenkrantzi					Griesbachian: Upper	
	U. Ophiceras							V? decipiens			O. decipiens						
	L. Ophiceras					Ophiceras		O. commune			O. commune					Lower	
								M. subdemissum			M. subdemissum						
	Glyptophiceras					Glyptophiceras		G. martini			G. martini						
								G. triviale			G. triviale						

Jurassic boundary (Rhaetian and Lower Liassic) and has yielded well preserved plant fossils (HARRIS, 1931, 1932, 1935, 1937, 1946, 1961).

KOCH (1928, 1929, 1931) investigated briefly the Triassic deposits of the Nathorst Fjord and Fleming Fjord areas. He subdivided the sequence into the Mount Nordenskiöld Formation and the overlying Cape Biot Formation. NOE-NYGAARD (1934) made further observations in Triassic deposits around Fleming Fjord and collected the first ammonites (determined by L. F. SPATH) from the marine Scythian beds on Wegener Halvø, which represent equivalents to the Wordie Creek Formation as described from Kap Stosch by KOCH (1929, 1931), ROSENKRANTZ (1930) and NIELSEN (1935). The thin Triassic sediments on Depotø (Nathorst Fjord) have been studied by FREBOLD (1931) and SÄVE-SÖDERBERGH (1937).

BIERTHER (1941) gave a short outline of Triassic deposits in the area south-east of Mesters Vig.

An extensive study of the Triassic formations in northern Jameson Land and eastern Scoresby Land was made by STAUBER (1940, 1942). His subdivision of the Triassic beds into "Marine Serie", "Kontinentale Serie" and "Bunte Serie" has been discussed by TRÜMPY (1960) and GRASMÜCK & TRÜMPY (1969), who also presented the most complete accounts of the lithostratigraphy of the Triassic and its fauna of the area around Fleming Fjord. DEFRETIN-LEFRANC (1969) described *Conchostraca* and bivalves from the higher part of the Triassic succession.

TRÜMPY (1961) distinguished three formations within the Triassic: (1) the Wordie Creek formation, divided into (a) *Glyptophiceras* beds, (b) *Ophiceras* beds and (c) *Vishnuites* to *A. breviformis* beds; (2) the Mount Nordenskiöld formation, divided into (a) Rødstaken beds (term introduced by AELLEN in TRÜMPY (1961)), (b) Paradigma beds and (c) Solfalds Dal beds; (3) Cape Biot formation, divided into (a) Cape Seaforth beds, (b) Fleming Fjord beds and (c) Ørsted Dal beds, which are overlain by the Kap Stewart formation. The same stratigraphical units have been described in greater detail by GRASMÜCK & TRÜMPY (1969), see table 2.

The areas of Schuchert Dal, Gurreholm Bjerge and southern Werner Bjerge (Scoresby Land) were mapped by AELLEN (AELLEN in TRÜMPY (1961); AELLEN (unpublished map)), and his ammonite collection from the Wordie Creek Formation was described by TRÜMPY (1969). The Mesozoic rocks of Werner Bjerge were mapped in a general way by BEARTH and WENK (BEARTH, 1959) and some stratigraphical observations from the northern slope of Werner Bjerge and the vicinity of Mesters Vig were presented by GRASMÜCK & TRÜMPY (1969). The Triassic deposits of the west coast of Carlsberg Fjord were mapped by CALLOMON (1970).

A preliminary map of south-eastern Scoresby Land and northern Jameson Land with a stratigraphical subdivision of the Triassic based mainly on TRÜMPY's scheme was published by BROMLEY *et al.* (1970). The map was compiled from various sources available up to 1969 and new field work. A preliminary map of southern Jameson Land was published by SURLYK & BIRKELUND (1972).

It should also be mentioned that BÜTLER (1957) assigned 400 m of strongly tilted, dark, micaceous shales between two arkose conglomerate units on the east coast of Hurry Inlet to the "Eotriassic". The lower part of this sequence was considered to be of Devonian age by BACKLUND (1930) and KRANCK (1935). COE (1971) suggested an ?Upper Palaeozoic or Lower Mesozoic age for the whole sequence. Our field investigations in 1971 support a Palaeozoic (probably Devonian) age for these sediments.

Fig. 2. Ridge between Devondal and Permdal, seen from Devondal. Pe = Permian reef, Wo = Wordie Creek Formation, Kl = Klitdal Member, Gi = Gipsdalen Formation, My = *Myalina* limestone, Ed = Edderfugledal Member, Ma = Malmros Klint Member. Photo W. KEGEL CHRISTENSEN.

LITHOSTRATIGRAPHICAL SUCCESSION AND SEDIMENTARY ENVIRONMENT

The revised stratigraphical scheme for the Triassic rocks between Kong Oscars Fjord and Scoresby Sund is presented in table 1. Correlations to the previously used schemes are shown in table 2. The units defined are formal units and are described in ascending order in the next chapter.

The Triassic succession is here referred to the Scoresby Land Group (Scythian to Lower Rhaetian) and comprises four formations. These fall naturally into two subgroups, the Nordenskiöld Bjerg and Kap Biot Subgroups, each containing two formations.

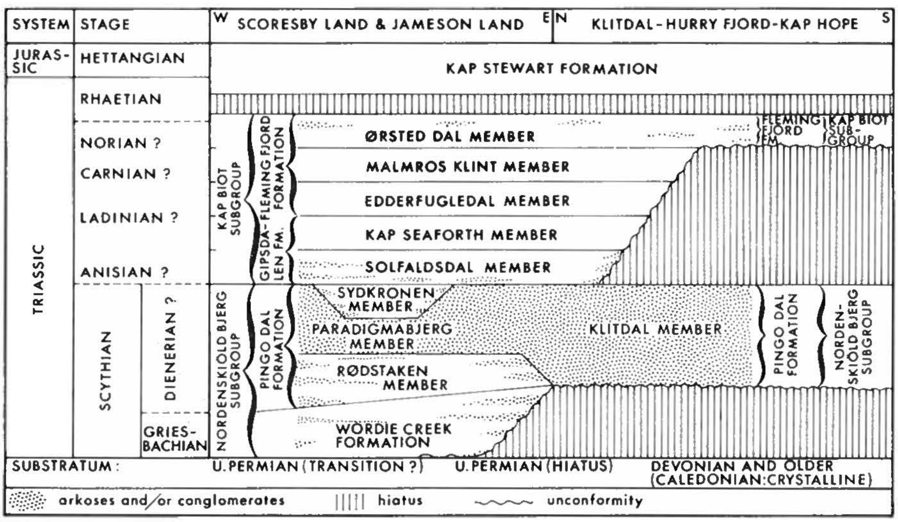
In the western part of the Triassic basin the lithologies of the uppermost Permian (*Cyclolobus*-bearing shales) and the lowermost Triassic (Wordie Creek Formation, consisting of shales with Triassic fishes) are very similar and no evident hiatus can be seen at the lower boundary of the Scoresby Land Group. On the other hand a distinct hiatus at the base of the group is present along the eastern margin of the basin (Wegener Halvø). This hiatus grows towards the east and south. The Wordie Creek Formation disappears towards the south, and the Pingo Dal Formation (Klitdal Member) directly overlies the crystalline basement or ?Devonian non-metamorphic sediments on Liverpool Land (fig. 1).

The upper boundary of the Scoresby Land Group is marked by a rapid change of colour from the Ørsted Dal Member with many red siltstone and clay intercalations between predominantly arkosic sandstones to the Kap Stewart Formation, generally consisting of white or grey, mostly quartzitic sandstones and black shales. Locally dolomitic limestone forms the top of the group. The definition of the boundary between the Ørsted Dal Member and the Kap Stewart Formation in the northern areas, as proposed by Grasmück & Trümpy (1969), is accepted. In Hurry Inlet, however, contrary to these authors, we consider this boundary to correspond very well to the boundary between the Klitdal Formation of Rosenkrantz and the Kap Stewart Formation, as described by Rosenkrantz (1929) and Harris (1946) (Surlyk *et al.*, 1971).

The two formations of the Nordenskiöld Bjerg Subgroup are closely interrelated. This is especially well illustrated by the presence of pink and red arkoses and arkosic conglomerates, typical for the Pingo Dal Formation, occurring as intercalations in the greenish grey sediments of the underlying Wordie Creek Formation. These arkoses were supplied from various sources situated along the eastern and western border of the Triassic basin and may serve as local correlation horizons (e. g. on Wegener Halvø). The sedimentary environment of the Wordie Creek Formation was shallow marine, with a palaeo-slope uniformly tilted northwards, which is well documented by the consistency of palaeocurrent directions.

The transition from marine to non-marine environment characterises the boundary between the Wordie Creek and the Pingo Dal Formations.

Table 3. *Spatial–time relationship of the Triassic deposits between Kong Oscars Fjord and Scoresby Sund, East Greenland*



The rapid increase in supply of clastic material from the western and eastern sources may be related to upheaval of borderlands and resulting high-relief topography. Chemical weathering was negligible, and arid, hot climate is thought to be responsible for the formation of the feldspar-rich sediments (arkoses, arkosic conglomerates and breccias) deposited as piedmont fans and deltas by rapidly but intermittently flowing waters. In the middle of the basin, which south-eastwards occupied a much larger area than the previous marine basin, flood-plain conditions may explain the formation of much finer grained, red sandstones and shales, interfingering with the deltaic, more feldspar-rich sediments. Locally, e.g. at the southern slopes of Werner Bjerge and at the head of Nathorst Fjord, red jasper and greenish siliceous bands are developed in the Solfaldsdal Member, possibly also indicating an arid climate. These rocks may be used for local correlation purposes.

The borderlands of the Triassic basin were less active during the time represented by the Kap Biot Subgroup, the amount of coarse clastic material decreased, and very shallow marine conditions were re-established from time to time. The Gipsdalen Formation represents the establishment of a shallow evaporite basin covering the marine basin of the Wordie Creek Formation and, in addition, extending farther to the south-east. It was smaller than the basin of the Pingo Dal Formation, and connected with the open sea towards the north (fig. 1). A thick sequence of gypsiferous shales, siltstones and sandstones with gypsum bands and nodules often shows cyclic sedimentation. Marine incursions from the north are recorded as thin layers of black and often bituminous limestones and shales (sometimes also dolomite) with marine bivalves and *Conchostraca* in the *Myalina* limestone of the Solfaldsdal Member. A transition from continental to evaporite lagoonal conditions is marked in the lower part of the gypsiferous formation (Solfaldsdal Member) where arkoses still commonly occur.

The predominantly silty sediments of the Fleming Fjord Formation were deposited into a shallow bay covering large areas of Scoresby Land and Jameson Land. Intertidal to supratidal environment was recognised in the southern part of the basin and intertidal to subtidal environment prevailed farther north. Oolitic limestones and algal stromatolites occur in the Edderfugledal Member.

There is a gradual transition between the red silty sediments of the Malmros Klint Member and the coarser, red siltstones and sandstones of the Ørsted Dal Member. The sedimentary environment changes locally from shallow marine to continental and back to marine again. These red-beds are much finer grained than those in the Pingo Dal Formation and contain red-brown siltstones, shales and fine-grained sandstones grading into light-coloured and green arkoses in Scoresby Land. A vast flood-plain was established covering approximately the same area as the basin of the Pingo Dal Formation. The flood-plain deposits were channelled by sparse rivers leaving cross-bedded arkose bodies. Thin beds of nodular pink or white limestone occur near the top of the formation and resemble freshwater limestones of the central European Keuper. In the northern part of the area, yellow-weathering, grey limestones and dolomites form the top of the Ørsted Dal Member. In a few places they contain thin bone-beds and black shale intercalations with bivalves and ostracods which may indicate the proximity of the sea.

The red-beds disappeared in the Rhaetian, probably due to a general change in climatic conditions from arid to more humid. Limnic basins appeared, in which river-transported sands and clays rich in plant remains were deposited in the Kap Stewart Formation where thin coal seams occur locally.

DEFINITIONS OF
THE LITHOSTRATIGRAPHICAL UNITS

SCORESBY LAND GROUP

The Scoresby Land Group consists of four formations. These are, from bottom to top, the Wordie Creek Formation and the Pingo Dal Formation in the Nordenskiöld Bjerg Subgroup, the Gipsdalen Formation and the Fleming Fjord Formation in the Kap Biot Subgroup.

Name

From Scoresby Land, East Greenland.

Lithology and type sections

See formations.

Thickness

About 1000 m to more than 1500 m.

Distribution

Eastern Scoresby Land, Wegener Halvø, northern Jameson Land, boundary of Liverpool Land and Jameson Land and at Kap Hope on southern Liverpool Land. To the north, all the Triassic sediments of Traill Ø, Geographical Society Ø, Gauss Halvø, Hold with Hope and Clavering Ø are included in the group (fig. 1).

Age

Triassic (Scythian to Lower Rhaetian).

Equivalents

See table 2.

Nordenskiöld Bjerg Subgroup

The Nordenskiöld Bjerg Subgroup consists of two formations, the Wordie Creek Formation at the bottom and the Pingo Dal Formation above.

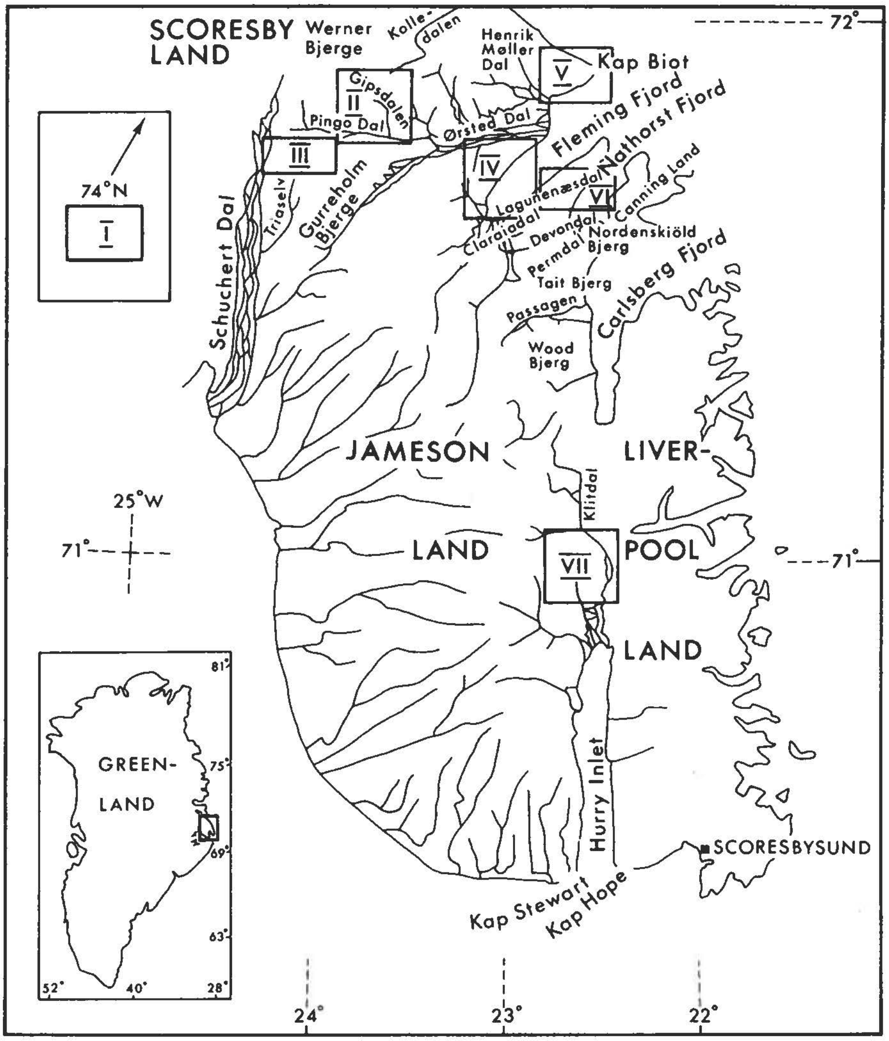


Fig. 3. Key map to show the location of the investigated area in East Greenland and names used in the text.

Name

From Nordenskiöld Bjerg, north-eastern Jameson Land.

Lithology and type section

See formations.

Thickness

Maximum over 1000 m (Gurreholm Bjerge, north-eastern slope).

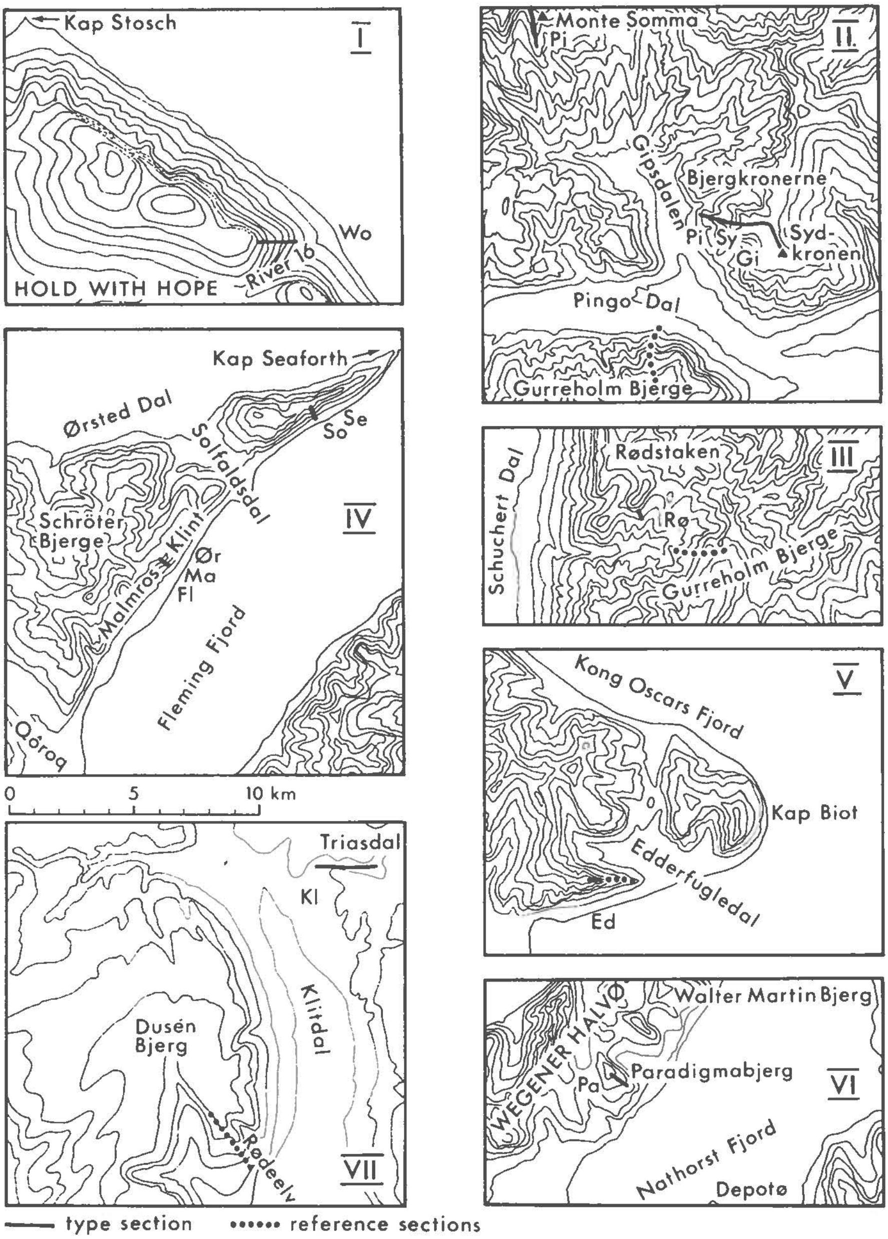


Fig. 4. Maps of the type localities of the Triassic formations in East Greenland.

Distribution

Complete sections including both formations are known from eastern Scoresby Land and north-eastern Jameson Land. In Klitdal, at the boundary of Liverpool Land and Jameson Land, and on Kap Hope on southern

Fig. 5. Nordenskiöld Bjerg seen from the south-west. To the right Carlsberg Fjord, to the left Nathorst Fjord. Kl = Klitdal Member, Gi = Gipsdalen Formation, Fl = Fleming Fjord Formation (here Edderfugledal Member and Ørsted Dal Member).
Photo W. Kegel Christensen.

Fig. 6. River 14 at Kap Stosch. The steep wall below is a 100 m thick Permian conglomerate, Pe. Wo = Wordie Creek Formation. Tertiary plateau basalts cover the sediments. Photo TB.

Liverpool Land, the sequence is incomplete due to primary absence of the Wordie Creek Formation. North of the area described here all the Triassic sediments belong to the Nordenskiöld Bjerg Subgroup, which apparently is represented there by the Wordie Creek Formation only.

Age

Lower Triassic.

Equivalents

See table 2.

Wordie Creek Formation

Pl. 1, figs 1–3; pl. 2, figs 1–2; pl. 4, fig. 3; pl. 5, figs 1–3; pl. 6, fig. 1; pl. 7, fig. 1; pl. 17, figs 2–5, 7–8, 13–17, 19; textfigs 2, 6–8.

The Wordie Creek Formation is the lowermost formation in the Scoresby Land Group.

Name

From Wordie Creek at Kap Stosch, Hold with Hope, East Greenland (Koch, 1929).

Type section

Wordie Creek, on maps designated as Blåelv (Blue River or River 16) about 15 km south-east of Kap Stosch (fig. 1; fig. 4/I; plate 17, fig. 3).

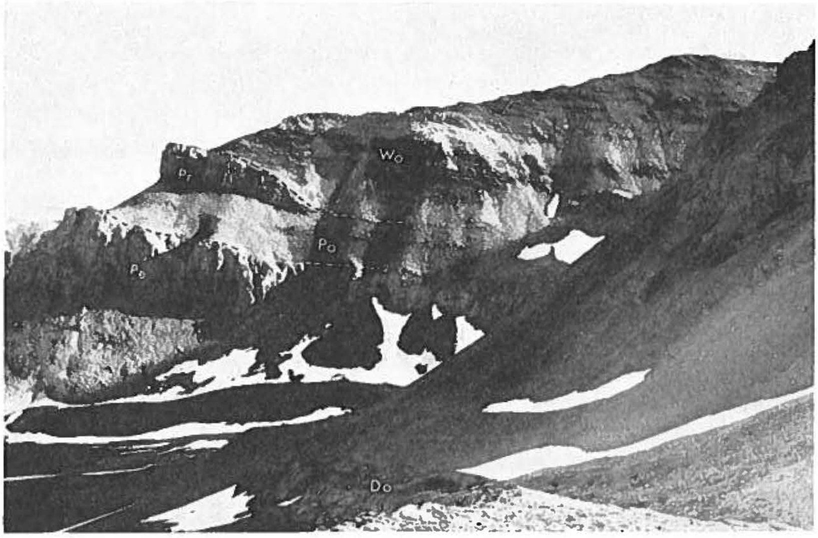


Fig. 7. Ridge overlooking Calamiteselv on Wegener Halvø. In the foreground conglomerates of the Carboniferous Domkirken Member, Do. Pe = Permian reef, Po = Permian *Posidonia* Shale, Pr = Permian ***Productus*** Limestone, Wo = Wordie Creek Formation. The ***Productus*** Limestone has been eroded to the right, so that the dark-green shales of the Wordie Creek Formation lie directly on the dark-grey shales of the *Posidonia* Shale. Photo KPN.

Reference sections

Wegener Halvø: Lagunenæsdal (GRASMÜCK & TRÜMPY, 1969, fig. 2, B); Paradigmabjerg (plate 17, fig. 17); Rødstaken in Gurreholm Bjerge (plate 17, fig. 4).

Dominant lithology

Marine, grey shales with ammonite and fish-bearing calcareous concretions and subordinate grey or green glauconitic or arkosic sandstones dominate the lower part of the unit. In the Schuchert Dal area, gypsum and/or conglomeratic layers occur locally at the base and thin algal limestone at the top of the formation. On Wegener Halvø, sandstones with conglomeratic layers may form the base of the Wordie Creek Formation. The marine shales and sandstones are predominantly green and subordinately variegated in the upper part. Locally they contain mud cracks and more generally characteristic associations of current-produced structures such as flute casts, prod marks and groove markings, ripple marks, convolute lamination and parting lineation. Ammonites, bivalves, brachiopods, gastropods and plant remains occur throughout the unit. Thicker pink arkose and arkosic conglomerate intercalations occur locally in the lower and upper parts of the unit and can be used as local correlation horizons on Wegener Halvø and in the Schuchert Dal area.

Boundaries

In the area of Schuchert Dal and Werner Bjerge the lithology of the Upper Permian and the basal Wordie Creek Formation is very similar. The lower boundary of the Wordie Creek Formation usually coincides with the appearance of a thicker zone of grey shale above fossiliferous Permian siltstones; concretions with ammonites and fishes appear a short distance above the base of that shale.

In the type area at Kap Stosch the boundary between the Permian and the Wordie Creek Formation is unconformable in most places. It was described by NIELSEN in 1935. A more detailed description of the boundary in this area by TEICHERT and KUMMEL is in preparation.

In the area of Wegener Halvø, a hiatus between the Upper Permian and the Wordie Creek Formation is suggested on faunal evidence (GRASMÜCK & TRÜMPY, 1969). This hiatus increases towards the east. The lower boundary of the unit may be established here at the base of easily weathering shale-sandstones with a "mixed" Upper Permian–Lower Triassic fauna (p. 45) overlying the more resistant limestone units of the Upper Permian.

The upper boundary is everywhere characterised by transition to brackish or non-marine conditions.

Thickness

On Wegener Halvø *c.* 70 to 500 m, in Schuchert Dal area and southern Werner Bjerge 300–350 m.

Distribution

Eastern Scoresby Land, Wegener Halvø. North of the area here described, all the Triassic sediments seem to belong to the Wordie Creek Formation as defined in the type area.

Age and fauna

Scythian; the lowermost zone recognised with certainty in this area is the *Glyptophiceras martini* Zone and the uppermost is the *Ophiceras decipiens* Zone (GRASMÜCK & TRÜMPY, 1969, pp. 34–36). The lowermost part of the Wordie Creek Formation as defined here may include layers of Permian age.

Pingo Dal Formation

The Pingo Dal Formation is the second formation in the Scoresby Land Group. It consists of four members: Rødstaken Member, Paradigmabjerg Member, Klitdal Member and Sydkronen Member.

Name

From Pingo Dal, Scoresby Land.

Type section (composite)

Sydkronen in Bjergkronerne (plate 17, fig. 10) and Monte Somma, Werner Bjerge, south slope (plate 17, fig. 8; fig. 4/II).

Dominant lithology

Dark red, usually cross-bedded sandstones dominate the lower part and the upper part of the unit (Rødstaken Member and Sydkronen Member). Red, pink and yellowish to white or variegated arkoses and arkosic conglomerates and breccias dominate the middle (Paradigmabjerg Member) or lower, middle and upper parts (Klitdal Member) of the unit.

Boundaries

The lower boundary may be sharply marked by a paraconformity, with or without a basal conglomerate. In many localities, however, there is a gradual transition from the Wordie Creek Formation to the Rødstaken Member. Here the lower boundary of the unit coincides with the lower boundary of the Rødstaken Member. In the south-eastern part of the area, the Klitdal Member usually rests directly upon the crystalline substratum. Here the lower boundary of the Pingo Dal Formation lies at the bottom of the Klitdal Member (table 3). The upper boundary is characterised by appearance of evaporites (p. 30).

Thickness

About 700 m in Scoresby Land. On Wegener Halvø, up to 450 m estimated by Grasmück & Trümpy (1969) for the Rødstaken Member and Paradigmabjerg Member. At Nordenskiöld Bjerg the Rødstaken Member and the Klitdal Member attain a thickness of over 400 m and in Klitdal, the Klitdal Member measures about 70–90 m.

Distribution

Extensively distributed in the Triassic basin of Scoresby Land, Jameson Land, Wegener Halvø and Liverpool Land, but with widely variable facies.

Age and fauna

Marine fossils are only known from the lowermost part of the unit, i.e. the lower part of the Rødstaken Member. This indicates that the Rødstaken Member may correspond to beds with *Anodontophora fassaensis* of the uppermost Wordie Creek Formation in the type area. Higher parts of the unit are sterile except for trace fossils and algal limestones occurring locally. A Scythian age may be suggested for this unit.

Equivalents

See table 2.

Rødstaken Member

Pl. 2, fig. 3; pl. 3, figs 1–2; pl. 4, figs 1–2; pl. 5, fig. 4; pl. 6, figs 2–3; pl. 17, figs 4–5, 7–8, 14–15, 17; textfig. 8.

The Rødstaken Member comprises, predominantly in sandstone facies, the lowest sediments of the Pingo Dal Formation. It is characteristically developed in the western, northern and north-eastern parts of the Triassic basin of Jameson Land and Scoresby Land (AELLEN in TRÜMPY, 1961: Rødstaken beds).

Name

From Rødstaken (1065 m), Gurreholm Bjerge in Scoresby Land.

Type section

Rødstaken in Gurreholm Bjerge (plate 17, fig. 4; fig. 4/III).

Reference sections

Monte Somma, Werner Bjerge south slope (plate 17, fig. 8); Paradigmabjerg on Wegener Halvø (plate 17, fig. 17).

Dominant lithology

Dark red, fine-grained, often cross-bedded sandstone and subordinately variegated shales and sandstones in the lower part; in the upper and the lower part subordinate pink arkoses occur as intercalations. Conglomerate layers are infrequent; however, a basal conglomerate is present in the vicinity of the type locality.

Boundaries

At the contact of the Rødstaken Member with the Wordie Creek Formation, the dominant lithologies of the two units, red, cross-bedded sandstones and siltstones and green or variegated sandstones and shales alternate. At some localities in the western part of the area, a coarse conglomerate marks the lower boundary of the member. This conglomerate often contains large boulders of algal limestones which at a few other localities occur as small reefs at the top of the Wordie Creek Formation and are overlain by sandstones. In other parts of Gurreholm Bjerge and Werner Bjerge as well as on Wegener Halvø, there is no sharp boundary between the Wordie Creek Formation and the Rødstaken Member. In that area the lower boundary is placed where red, cross-bedded sandstones decidedly predominate over variegated shale-sandstone beds. The upper boundary is characterised by a change in sedimentation to arkoses or conglomerates of the next member (p. 24).

Thickness

About 180 m in the incomplete section of the type locality (no overlying sediments of another formation). 200 to 330 m in Gurreholm

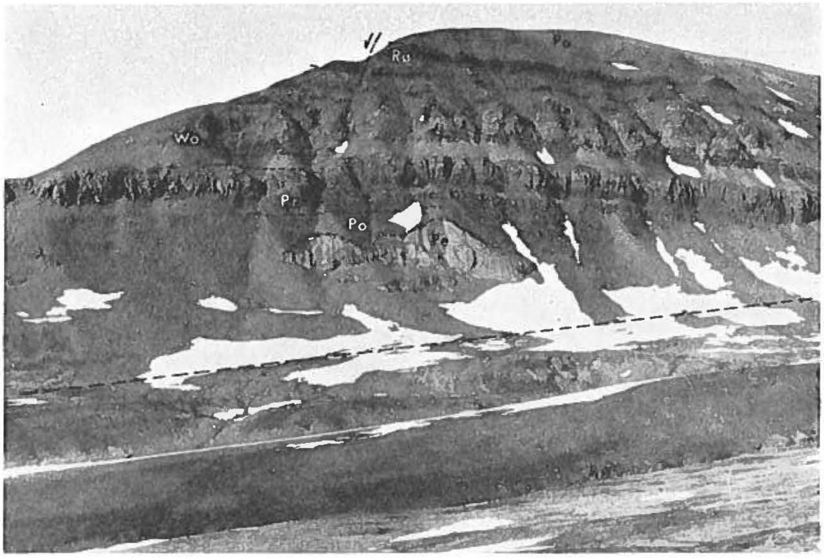


Fig. 8. Paradigmabjerg on Wegener Halvø seen from north-east. Pe = Permian reef, Po = Permian *Posidonia* Shale, Pr = Permian *Productus* Limestone, Wo = Wordie Creek Formation, Rø = Rødstaken Member, Pa = Paradigmabjerg Member. A fault runs between the second river and the mountain parallel to the valley. Type locality for the Paradigmabjerg Member. Photo KPN.

Bjerge and southern Werner Bjerge. Decreasing rapidly eastwards to 30 m on Wegener Halvø.

Age and fauna

Scythian; only poorly preserved bivalves were found in the lower part of this unit, which may correspond to the *Anodontophora fassaensis* beds of the Wordie Creek Formation at Kap Stosch. The upper part of the unit is unfossiliferous, but may still correspond to the Scythian.

Equivalents

See table 2.

Paradigmabjerg Member

Pl. 7, fig. 2; pl. 17, figs 6–13, 17; textfigs 8, 12.

The Paradigmabjerg Member contains the arkose facies of the Pingo Dal Formation characteristic for the north-eastern, northern and western part of the Triassic basin of Jameson Land and Scoresby Land.

Name

From Paradigmabjerg, Wegener Halvø.

Type section

Paradigmabjerg, Wegener Halvø (plate 17, fig. 17).

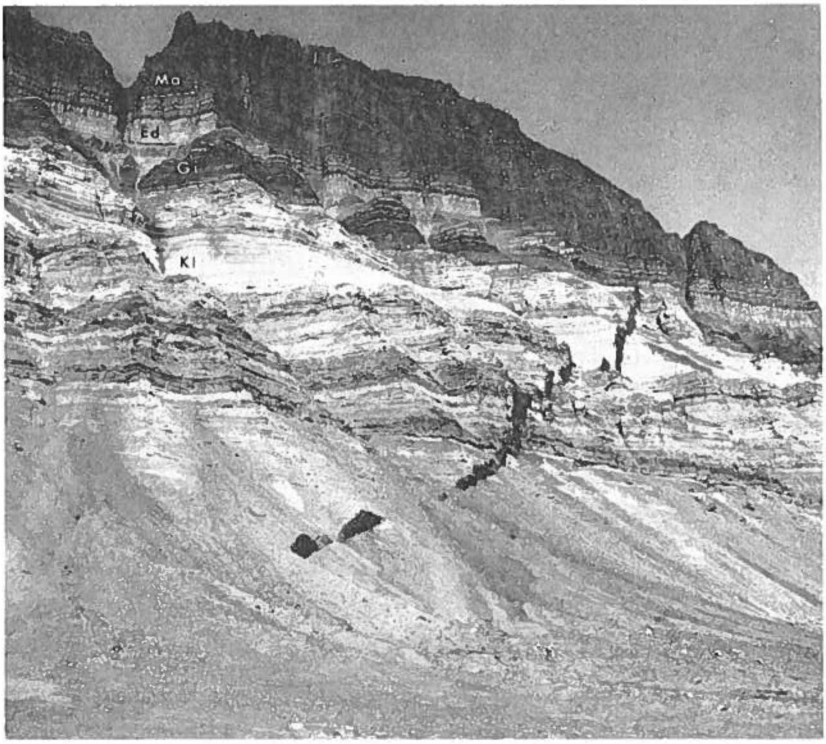


Fig. 9. Dike through the Triassic at Buch Bjerg, in the northern part of Carlsberg Fjord. Kl = Klitdal Member, Gi = Gipsdalen Formation, Ed = Edderfugledal Member, Ma = Malmros Klint Member. Photo W. KEGEL CHRISTENSEN.

Reference sections

Monte Somma, Werner Bjerge south slope (plate 17, fig. 8); ridge between Schuchert Dal and Triaselv, Gurreholm Bjerge (plate 17, fig. 6).

Dominant lithology

Predominantly pink arkoses and arkosic sandstones with subordinate conglomerate intercalations. In the conglomerates the content of pebbles varies, in size as well as in petrographic character. Usually, well-rounded granite and/or quartzite pebbles dominate the assemblage. Large-scale cross-bedding is common.

Boundaries

At the contact of the Rødstaken Member and the Paradigmabjerg Member, the dominant lithologies of the two members alternate. The lower boundary of the unit is placed at the level where arkoses decidedly predominate over sandstones and in places are associated with conglomerates. A sharp lithological boundary occurs in Gurreholm Bjerge, where dark red, cross-bedded sandstones with minor contents of pink arkoses are overlain by yellow and grey conglomeratic arkoses, grey and red sandstones, siltstones and algal limestones. The upper boundary with sandstone of the Sydkronen Member is gradual (p. 28).

Thickness

150 m at the incomplete section at Paradigmabjerg (no overlying sediments of another formation). 285 m were found on the southern slopes of Werner Bjerge in Gipsdalen. Over 500 m in Gurreholm Bjerge.

Age and fauna

Probably Lower Triassic; no fossils other than trace fossils and algal limestones were found.

Equivalents

See table 2.

Klitdal Member

Pl. 8, figs 1–2; pl. 17, figs 15–16, 18–23; textfigs 2, 5, 9–11, 18.

The Klitdal Member includes the arkose facies of the Pingo Dal Formation characteristic of the eastern border of the Triassic basin between Jameson Land and Liverpool Land and Canning Land.

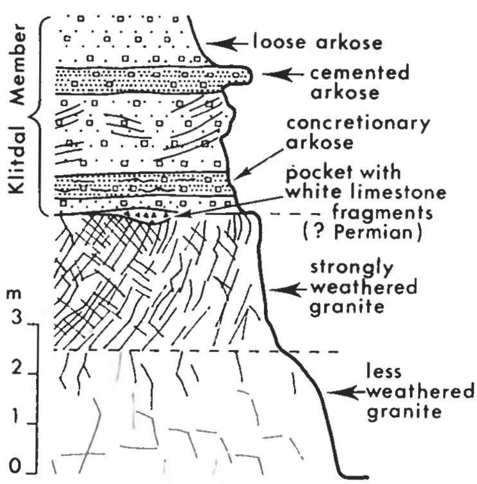


Fig. 10. Contact of the Klitdal Member with the crystalline substratum at Klitdal, entrance to Triasdal.

Name

From Klitdal, between Jameson Land and Liverpool Land (plate 17, fig. 21).

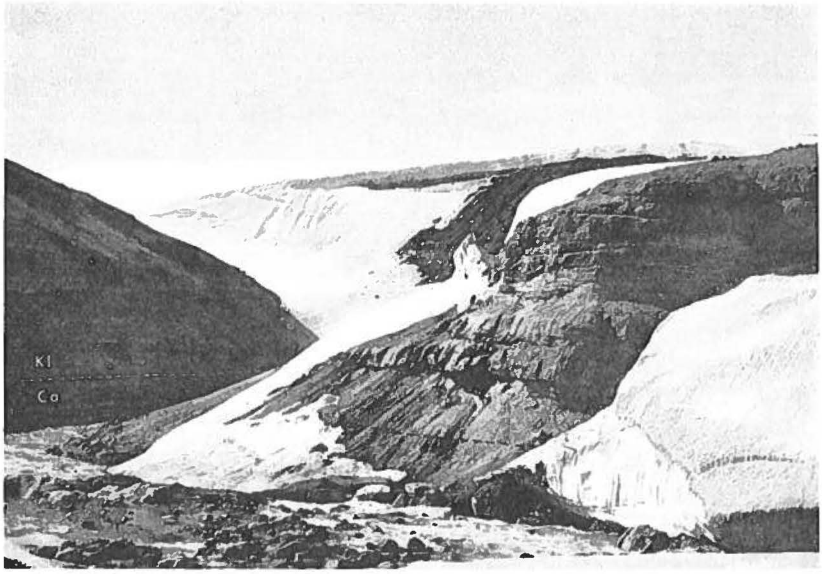


Fig. 11. Sedimentary contact of the Klitdal Member with the crystalline substratum in the river bed near the entrance of Triasdal to Klitdal. Arkose and conglomerate are exposed at the slopes of the canyon (= Kl), the Caledonian (Ca) Hurry Inlet granite in the river bed. Type locality of the Klitdal Member. Photo KB.

Type section

Klitdal, at the entrance to Triasdal (plate 17, fig. 21; fig. 4/VII).

Reference sections

Nordenskiöld Bjerg (plate 17, fig. 19); Dusén Bjerg along Rødeelv (plate 17, fig. 22).

Dominant lithology

Generally loosely cemented arkoses with intercalations of harder arkosic conglomerates and breccias. The coarse material consists mainly of pink to red feldspars and granite fragments. Red, pink, yellow and variegated colours predominate and large-scale cross-bedding is ubiquitous.

Boundaries

The lower boundary is defined to lie below the first arkosic layer resting upon crystalline substratum, which often is weathered, or upon possibly Devonian sediments. At Nordenskiöld Bjerg, the Klitdal Member rests on the red sandstones of the Rødstaken Member, but the contact is obscured by scree. The upper boundary is characterised by appearance of evaporites of the Gipsdalen Formation (p. 30), or, to the south, by the appearance of red shale horizons of the Ørsted Dal Member (p. 43).

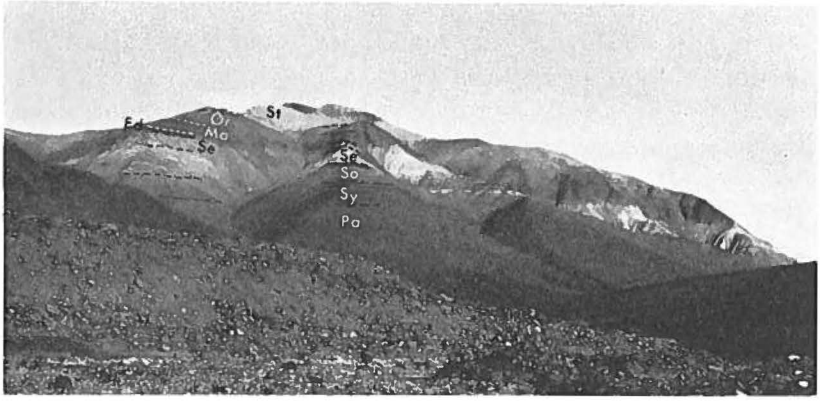


Fig. 12. Sydkronen in Bjergkronerne, seen from Gipsdalen. Pa = Paradigmabjerg Member, Sy = Sydkronen Member, So = Solfaldsdal Member, Se = Kap Seaforth Member, Ed = Edderfugledal Member, Ma = Malmros Klint Member, Ør = Ørsted Dal Member, St = Kap Stewart Formation. Type locality of the Sydkronen Member. Photo KPN.

Thickness

70 m in Klitdal and 90 m at Dusén Bjerg; on Nordenskiöld Bjerg the member measures more than 300 m and on Kap Hope 20–30 m.

Age and faunas

Probably Lower Triassic; no fossils were found.

Equivalents

See table 2.

Sydkronen Member

Pl. 17, figs 10–11; textfig. 12.

The Sydkronen Member comprises the sandstone facies of the uppermost part of the Pingo Dal Formation and is characteristic of the northern to central part of the Triassic basin of Jameson Land and Scoresby Land (table 3).

Name

From Sydkronen, the southern peak in Bjergkronerne, Scoresby Land.

Type section

Sydkronen in Bjergkronerne, Scoresby Land (plate 17, fig. 10; fig. 4/II).

Reference section

North-east slope of Gurreholm Bjerge (plate 17, fig. 11).

Dominant lithology

Red and brown-red, platy sandstones, often cross-bedded. Subordinate intercalations of white to greenish arkoses and red or variegated shales occur, especially in the upper part of the unit. Thin intercalations of algal limestones occur locally.

Boundaries

There is a gradual transition from the Paradigmabjerg Member to the Sydkronen Member. The lower boundary of the latter is placed where platy sandstones decidedly predominate over the cross-bedded arkoses. At the upper boundary evaporites of the Gipsdalen Formation appear (p. 30).

Thickness

90 m at Sydkronen, *c.* 150 m west of Gipsdalen and *c.* 200 m on the northern slope of Gurreholm Bjerge.

Age and fauna

Probably Lower Triassic; no fossils have yet been found in the Sydkronen Member except for trace fossils and algal limestones.

Equivalents

See table 2.

Kap Biot Subgroup

The Kap Biot Subgroup consists of two formations: Gipsdalen Formation and the overlying Fleming Fjord Formation.

Name

From Kap Biot, at the edge between Kong Oscars Fjord and Fleming Fjord, south-eastern Scoresby Land.

Lithology and type sections

See formations.

Thickness

350 to 530 m in Gipsdalen, about 500 m along Fleming Fjord and *c.* 320 m in Klitdal; 400 to 500 m in Gurreholm Bjerge.

Distribution

Eastern Scoresby Land, northern Jameson Land, Klitdal between Liverpool Land and Jameson Land, northern part of the west coast of Hurry Inlet and the Kap Hope area.

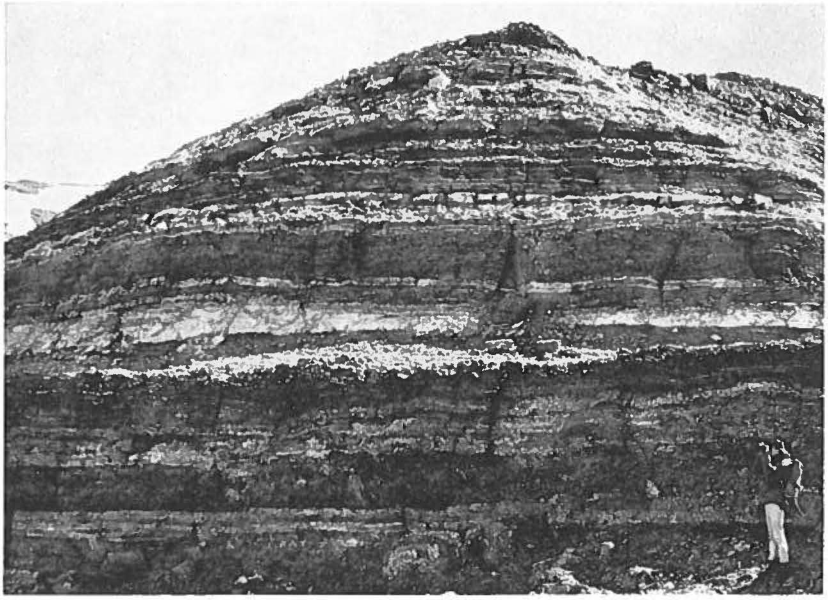


Fig. 13. Alternating sandstone, arkose and gypsum layers of the Solfaldsdal Member at Sydkronen. Photo KB.

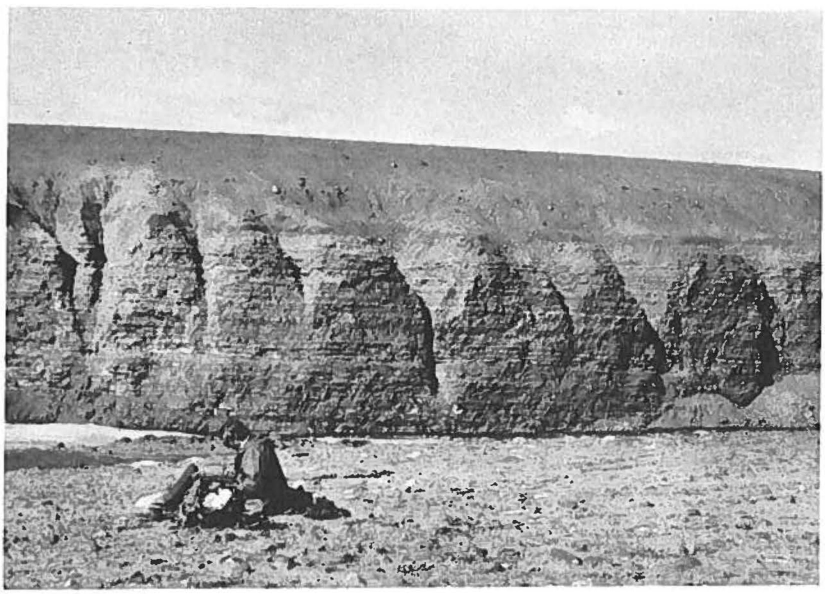


Fig. 14. Alternating gypsum, siltstone and clay layers of the Kap Seaforth Member in Klitdal, near the entrance to Triasdal. Photo KB.

Age and fauna

Middle and Upper Triassic (Anisian? to Norian? and Lower Rhaetian). Sparse marine faunas were found in the *Myalina* limestone (GRASMÜCK & TRÜMPY, 1969) of the Solfaldsdal Member and in the Kap Seaforth Member. In the Edderfugledal Member algal stromatolites occur commonly. Fish remains and bones of reptiles were found in the Malmros Klint and Ørsted Dal Members.

Equivalents

See table 2.

Gipsdalen Formation

Pl. 17, fig. 19; textfigs 2, 5, 9, 22.

The Gipsdalen Formation is the third formation of the Scoresby Land Group. It consists of two members, the Solfaldsdal Member below and the Kap Seaforth Member above.

Name

From Gipsdalen, Scoresby Land.

Type section

Sydkronen in Bjergkronerne, Gipsdalen (plate 17, fig. 10; fig. 4/II).

Reference sections

North-east slope of Gurreholm Bjerge (plate 17, fig. 11), Tait Bjerg at northern Carlsberg Fjord (BIRKELUND & PERCH-NIELSEN 1969, p. 24, section 2); Triasdal in Klitdal (plate 17, fig. 21).

Dominant lithology

Gypsum-bearing silty shales with arkose and sandstone intercalations, often showing cyclic repetition. In the western part of Gurreholm Bjerge the formation is represented by clastic sediments (gypsum-cemented arkoses with siltstones). The *Myalina* limestone intercalation is present over most of the area of northern Jameson Land and Scoresby Land in the lower part of the unit. Thin dolomite intercalations occur in the lower and upper parts of the unit.

Boundaries

The first gypsum layer or the first gypsum-cemented arkose or sandstone above the Pingo Dal Formation marks the lower boundary of the Gipsdalen Formation. The last gypsum layer below the Fleming Fjord Formation forms the top of the unit.

Thickness

150 m at Sydkronen in Bjergkronerne, 225 m on the north-east slope of Gurreholm Bjerge and *c.* 100 m in Klitdal.

Distribution

Scoresby Land, northern Jameson Land, and Klitdal. The Solfaldsdal Member wedges out in a southerly direction 10 km north of 71° N in Klitdal, while the Kap Seaforth Member continues to just south of 71° N. The Gipsdalen Formation is missing in the Kap Hope area.

Age and Fauna

Middle Triassic (Anisian? Ladinian?); bivalves and gastropods were found in the lower part of the sequence of the Gipsdalen Formation.

Equivalents

See table 2.

Solfaldsdal Member

Pl. 3, fig. 3; pl. 9, fig. 1; pl. 17, figs 6, 8–16, 18, 20; textfigs 12–13, 15–16, 18.

Myalina limestone:

Pl. 8, figs 3–4; pl. 9, figs 2–3; pl. 10, figs 1–3; pl. 11, figs 1–2; pl. 12, figs 1–3; pl. 17, figs 13–16, 18, 19, 20; textfigs 2, 16–20, 22.

The Solfaldsdal Member is the lower unit of the Gipsdalen Formation.

Name

From Solfaldsdal, between Fleming Fjord and Ørsted Dal, northern Jameson Land.

Type section

4 km south-west of Kap Seaforth (GRASMÜCK & TRÜMPY, 1969, plate 1, sect. *d*; fig. 4/IV).

Reference sections

Sydkronen in Bjergkronerne (plate 17, fig. 10); north-east slope of Gurreholm Bjerge (plate 17, fig. 11); north of Devondal (plate 17, fig. 15).

Dominant lithology

Gypsum-bearing silty shales with arkose and sandstone intercalations. The dominant colours are brown-yellow, red-brown or orange-yellow.

Within the Solfaldsdal Member, limestone bands and black, marly, sometimes bituminous shales occur in the region around Fleming Fjord and along Nathorst Fjord to the south of Passagen. They were described and called "*Myalina* limestones" by GRASMÜCK and TRÜMPY, 1969, who also pointed out their use as marker horizons in field mapping and on

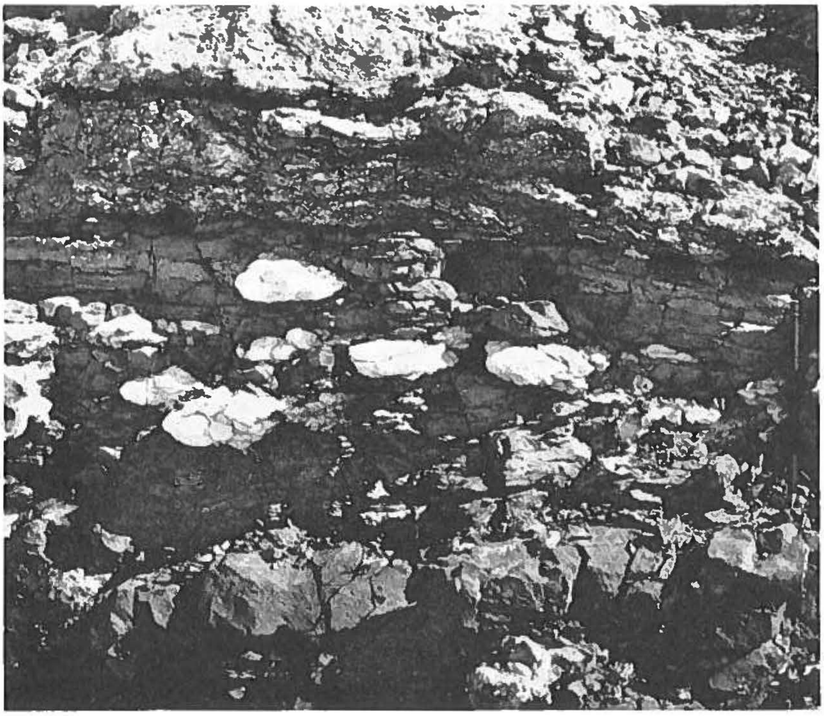


Fig. 15. White gypsum nodules in siltstones of the Solfaldsdal Member. Gypsum mixed with siltstones is seen in the uppermost part of the picture. Ridge between Devondal and Permdal (see fig. 18). Photo KPN.

aerial photographs around Fleming Fjord. In fig. 17 four profiles through the *Myalina* limestone show its upper part to consist of limestones and shales, while the lower part includes sandstone and siltstone (red-beds) with only minor limestone and shale intercalations. This pattern is seen in the Kap Biot region (fig. 17, A, B) and at Solfaldsdal (fig. 17, C). Around Nathorst Fjord the upper part consists of limestones with an algal limestone above (fig. 17, D; fig. 18; plate 12, figs 1–2). These limestones overlie coarse arkoses and sandstones with only a few small lensoid limestone bodies which represent the lower part. Jasper occurs in the sandstone and arkose below the *Myalina* limestone (plate 8, fig. 3) around Nathorst Fjord and in Gipsdalen, where no typical *Myalina* limestone was found. At all localities the *Myalina* limestone is overlain by red shales or siltstones of the Solfaldsdal Member.

Shales from the *Myalina* limestone at the mouth of Nathorst Fjord (fig. 19; plate 12, fig. 3) proved to be good oil source rocks (PERCH-NIELSEN *et al.*, 1972). Source rock analyses on other samples from different localities of the *Myalina* limestone gave poor or negative results.

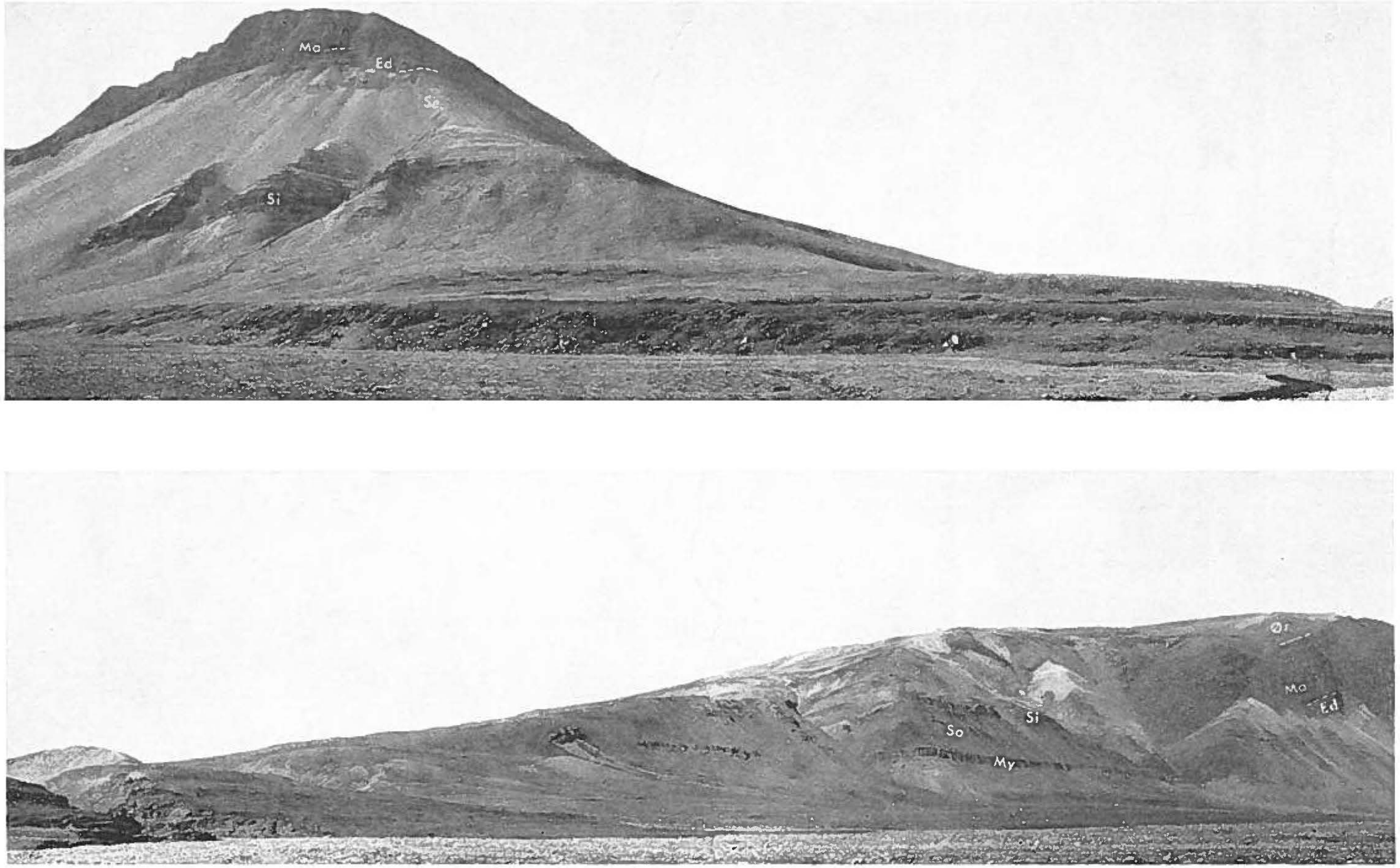


Fig. 16. Mouth of Solfaldsdal into Fleming Fjord. To the right towards Kap Seaforth, to the left Malmros Klint's northernmost part. So = Solfaldsdal Member, My = *Myalina* limestone, Se = Kap Seaforth Member, Ed = Edderfugledal Member, Ma = Malmros Klint Member, Ør = Ørsted Dal Member, Si = sill. A fault downthrows the northern end of the panorama (to the right) so that the *Myalina* limestone is below sea level. Type localities of Solfaldsdal Member, Kap Seaforth Member and Malmros Klint Member. Photo KPN.

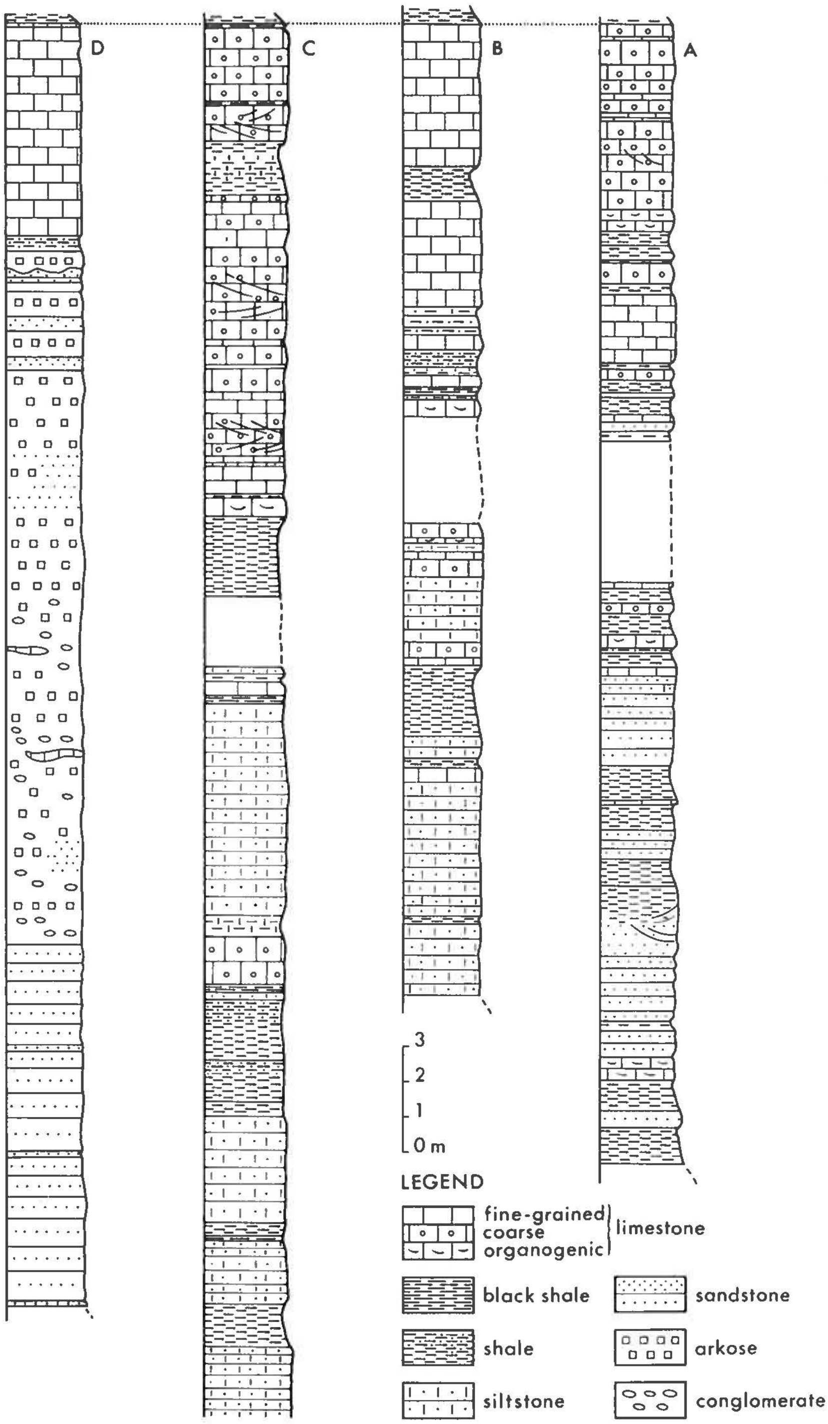


Fig. 17. Profiles through the *Myalina* limestone at Kap Biot east (A) and west of Edderfugledal (B), Solfaldsdal (C) and the ridge between Devondal and Permdal (D).

Fig. 18. Ridge between Devondal and Permdal. In the background Nathorst Fjord and, to the left, Wegener Halvø with Kap Brown, to the right Canning Land. The flat top of the ridge consists of the uppermost limestone of the *Myalina* limestone, topped by a layer of algal limestone (see plate 15) and shales of the Solfaldsdal Member. Kl = Klitdal Member, So = Solfaldsdal Member, My = *Myalina* limestone. Profile D in fig. 17 was taken here. Photo KPN.

The *Myalina* limestone provides evidence for a short marine ingression between the deposition of red-beds and gypsum of partly continental origin. During its deposition less detrital material reached the central part of the basin, around Fleming Fjord, than the eastern border of the basin in the Nathorst Fjord and Carlsberg Fjord areas. At the western border of the basin, no typical *Myalina* limestone was found. The Solfaldsdal Member disappears under the younger cover towards the west, so that no exposures of *Myalina* limestone occur west of *c.* 23°W, and its westward extension remains unknown.

Boundaries

The first gypsum layer or first gypsum-cemented arkose or sandstone above the Pingo Dal Formation mark the lower boundary. A change to grey and light-coloured gypsiferous deposits marks the upper boundary.

Thickness

About 130 m in Solfaldsdal, where the section is incomplete. The complete type section lies 5 km north-east of Solfaldsdal on the west coast of Fleming Fjord. Here, the Solfaldsdal Member is 140 m thick, the

Fig. 19. Bedding plane in the *Myalina* limestone (My) near the head of Nathorst Fjord. In the background the Permian reef (Pe) and *Productus* Limestone (Pr) forming the top of Quensel Bjerg. Photo KPN.

Myalina limestone about 20 m. In Sydkronen, the Solfaldsdal Member measures about 100 m, on the north-eastern slope of the Gurreholm Bjerge about 125 m (with well-developed gypsum layers), 150–200 m in the western part of Gurreholm Bjerge (clastic facies with gypsum cement), and along the west coast of Carlsberg Fjord about 70 m. The thickness in Klitdal is maximum 20 m.

Age and fauna

Middle Triassic (Anisian?); marine fossils, bivalves, gastropods and *Conchostraca* were found in the *Myalina* limestone around Fleming Fjord (GRASMÜCK & TRÜMPY, 1969).

Equivalents

See table 2.

Kap Seaforth Member

Pl. 15, fig. 4; pl. 17, figs 6, 9–13, 15–16, 21; textfigs 12, 14, 16.

The Kap Seaforth Member is the upper unit within the Gipsdalen Formation.

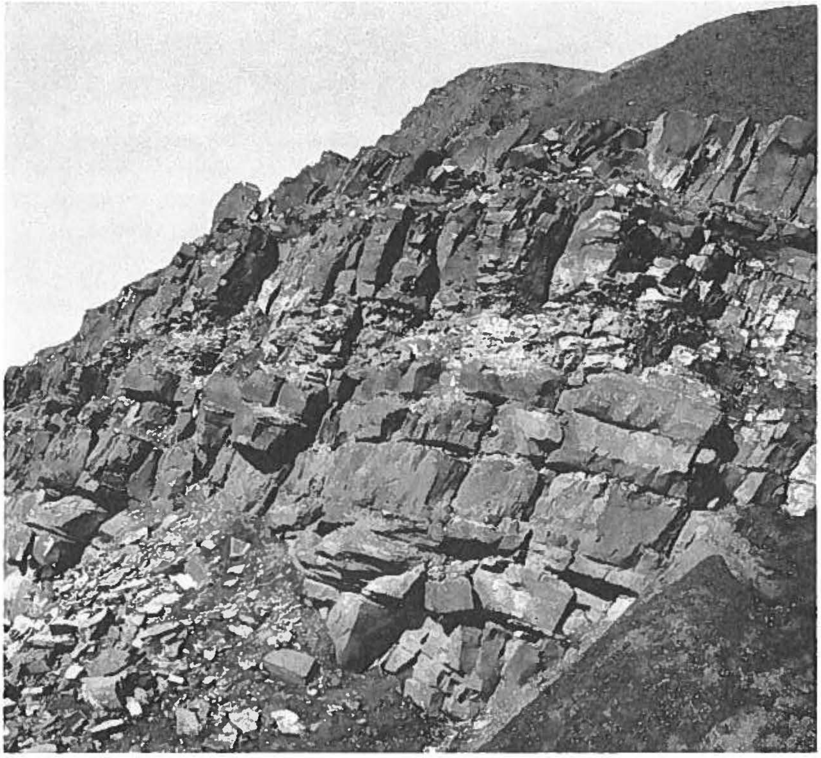


Fig. 20. *Myalina* limestone overlain by siltstones of the Solfaldsdal Member, north-east of Solfaldsdal. Profile C in fig. 17 was taken here. For scale see geologist at the left bottom. Photo KPN.

Name

From Kap Seaforth, at the edge between Ørsted Dal and Fleming Fjord, northern Jameson Land.

Type section

In the cliff 4 km south-west of Kap Seaforth (GRASMÜCK & TRÜMPY, 1969, plate 1, sect. *d*, fig. 4/IV).

Reference sections

Sydkronen in Bjergkronerne (plate 17, fig. 10); north-east slope of Gurreholm Bjerge (plate 17, fig. 11); Triasdal in Klitdal (plate 17, fig. 21).

Dominant lithology

Gypsum-bearing shales with sandstone and siltstone intercalations, often showing cyclic repetition. In contrast to the underlying gypsiferous layers of the Solfaldsdal Member, those of the Kap Seaforth Member are predominantly grey or greenish. Red and brown colours may, however, appear in the upper part of the unit. Subordinate, thin dolomite intercalations may occur in the lower and upper parts of the unit.

Boundaries

The characteristic change of colour in the gypsum-bearing beds from the reddish brown, brownish yellow or orange-yellow layers of the Solfaldsdal Member to grey and light-coloured layers is used as the boundary between the two members. The colour change is often clearly visible, even from a distance. While arkose intercalations are common in the Solfaldsdal Member, the coarser beds in the Kap Seaforth Member consist mainly of sandstones. The upper boundary is characterised by disappearance of the gypsiferous deposits.

Thickness

About 35 m at Kap Seaforth, 50 m on Sydkronen in Bjergkronerne, 80 m on the north-eastern slope of Gurreholm Bjerge, 50 m on the west coast of Carlsberg Fjord and 100 m in Klitdal.

Age and fauna

Middle Triassic (Ladinian?); no fossils were found in the Kap Seaforth Member as defined here.

Equivalents

See table 2. In contrast to the Kap Seaforth Member as defined by GRASMÜCK & TRÜMPY (1969), we include only the lower, gypsiferous part of their member in the Kap Seaforth Member. Their upper part forms the new Edderfugledal Member.

Fleming Fjord Formation

Textfig. 5.

The Fleming Fjord Formation is the fourth and uppermost formation in the Scoresby Land Group. It consists of three members. These are, in ascending order, the Edderfugledal Member, the Malmros Klint Member and the Ørsted Dal Member.

Name

From Fleming Fjord, north-eastern Jameson Land, south-eastern Scoresby Land.

Type section

Malmros Klint, on the west coast of Fleming Fjord, as indicated in figs 3 and 4/IV. All the members are very well exposed, including lower and upper boundary.

Reference sections

Monte Somma, Werner Bjerge, south slope (plate 17, fig. 9); Kolledalen (plate 17, fig. 12). Sydkronen in Bjergkronerne (plate 17, fig. 10); north-east slope of Gurreholm Bjerge (plate 17, fig. 11).

Distribution

The Fleming Fjord Formation is present in Scoresby Land, northern Jameson Land, Klitdal between Liverpool Land and Jameson Land, west coast of Hurry Inlet and the Kap Hope area. It is especially well exposed in the cliffs around Fleming Fjord.

Dominant lithology

Yellow weathering, green and grey or variegated siltstones, thin rippled sandstones, oolitic and algal limestones form the lowermost part of the formation. Red siltstones, mudstones and thin-bedded, often rippled sandstones dominate the middle part of the formation and form steep cliffs around Fleming Fjord and Carlsberg Fjord. In northern Jameson Land and eastern Scoresby Land, the uppermost part of the Fleming Fjord Formation contains light-coloured and greenish, coarse sandstones and arkoses overlain by dolomitic layers forming the top of the formation. Southwards and westwards the sediments are of a slightly more continental type: coarser grained and less cemented, stromatolitic layers disintegrating and wedging out. In southern Klitdal and Kap Hope areas, the Fleming Fjord Formation is represented only by its upper member, the Ørsted Dal Member.

Boundaries

In Scoresby Land and northern Jameson Land the lower boundary is drawn at the bottom of a characteristic yellow-weathering layer of dolomitic mudstone just above the highest gypsum bed of the Gipsdalen Formation. In Klitdal, this boundary is placed below the first band of green or variegated rippled sandstones above the highest gypsum bed of the Gipsdalen Formation, or at the first red shale horizon above the arkose of the Klitdal Member. The upper boundary is characterised by the disappearance of variegated deposits.

Thickness

About 400 m on Malmros Klint, more than 420 m in Henrik Møller Dal, more than 350 m in Edderfugledal, 300 m in Gurreholm Bjerge, 200 m in Sydkronen, 370 m along the west coast of Carlsberg Fjord, 230–250 m in Klitdal and about 50 m at Kap Hope.

Distribution

Extensively distributed in the Triassic basin of Scoresby Land, Jameson Land, Wegener Halvø and Liverpool Land at Kap Hope, but

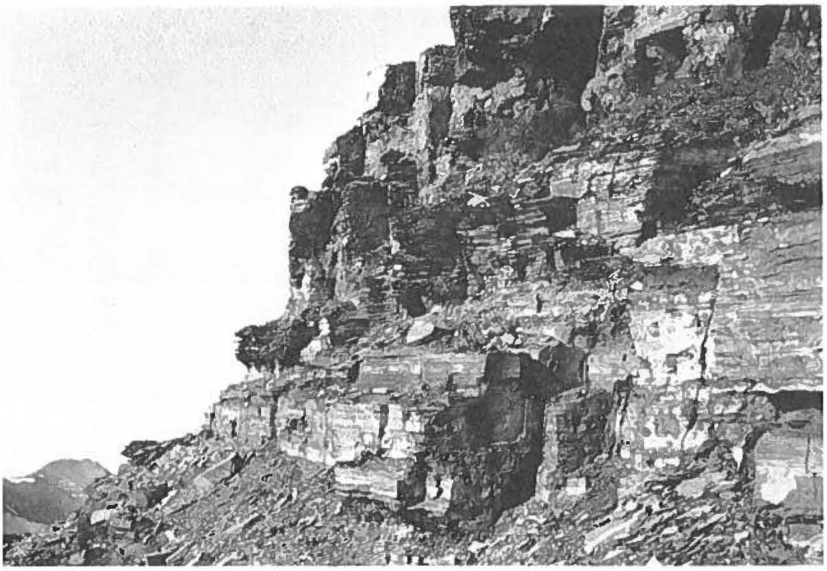


Fig. 21. Edderfugledal Member at the ridge between Claraiadal and Devondal. Photo KPN.

only the Ørsted Dal Member occurs in the southern area of distribution (at Hurry Inlet and Kap Hope).

Age and fauna

Middle to Upper Triassic (Ladinian? to Rhaetian); only very few marine fossils were found in the Fleming Fjord Formation. Algal stromatolites occur at the bottom of the sequence. Vertebrate bones were collected from the middle and the upper part of the sequence. Trace fossils are common in most of the formation.

Equivalents

See table 2.

Edderfugledal Member

Pl. 13, figs 1–2; pl. 17, figs 9–13, 16, 19, 21; textfigs 2, 9, 12, 16, 21–22.

The Edderfugledal Member is the lowermost unit of the Fleming Fjord Formation.

Name

From Edderfugledal, west of Kap Biot, eastern Scoresby Land.

Type section

Edderfugledal, west of Kap Biot (Grasmück & Trümpy, 1969, plate 1, sect. *f*; fig. 4/V).

Fig. 22. Western top of the Kap Biot cliffs seen from south. My = *Myalina* limestone, Gi = Gipsdalen Formation, Ed = Edderfugledal Member, Ma = Malmros Klint Member, Ør = Ørsted Dal Member. Profile A in fig. 17 was taken here. Photo KPN.

Reference sections

Sydkronen in Bjergkronerne (plate 17, fig. 10); north-east slope of Gurreholm Bjerge (plate 17, fig. 11); Claraiadal, near head of Fleming Fjord (plate 17, fig. 13).

Dominant lithology

Yellow-weathering, green-grey and variegated shales and siltstones and thin, rippled sandstones, often with intercalations of dolomitic algal limestones with stromatolites.

Boundaries

The lower boundary is set at the bottom of a characteristic yellow-weathering dolomitic horizon just above the highest gypsum bed of the Gipsdalen Formation in Scoresby Land and northern Jameson Land. In Klitdal, the first band of green, variegated, rippled sandstone or siltstone above the highest gypsum band of the Gipsdalen Formation marks the lower boundary. The upper boundary is placed immediately above the highest intercalation of algal stromatolites in the section. Nevertheless, algal stromatolites still occur within the overlying Malmros Klint Member in north-east Gurreholm Bjerge. The transition to the Malmros Klint Member is often gradual, with reddish brown mudstones appearing between layers of algal limestones in the upper part. From a distance and on aerial photographs, the upper boundary is drawn a short distance above the top of the light-weathering layers of the Edderfugledal Member.

Thickness

80–110 m in Edderfugledal, 60 m in Malmros Klint, 50 m in Gurreholm Bjerge, 40 m in Bjergkronerne, 30 m in Passagen, 15 m south of Wood Bjerg and 15 m in Klitdal.

Age and fauna

Middle Triassic (Ladinian?); algal laminated carbonates with stromatolite horizons occur as intercalations in the shales and siltstones. Only a few bivalves and *Conchostraca* were found.

Equivalents

See table 2.

Malmros Klint Member

Pl. 14, figs 1–2; pl. 15, fig. 3; pl. 16, figs 1–3; pl. 17, figs 9–13, 16; textfigs 2, 9, 12, 16, 22.

The Malmros Klint Member is the middle unit of the Fleming Fjord Formation.

Name

From Malmros Klint, named after the late LONE MALMROS, member of the 1968 and 1969 Scoresby Sund expeditions. Malmros Klint is the conspicuous eastern cliff of Schröter Bjerge along the west shore of Fleming Fjord between Solfaldsdal and Qôroq.

Type section

Malmros Klint, 5 km south-west of Solfaldsdal (GRASMÜCK & TRÜMPY, 1969, plate 1, sect. *b*; fig. 4/IV).

Reference sections

Sydkronen in Bjergkronerne (plate 17, fig. 10); north-east slope of Gurreholm Bjerge (plate 17, fig. 11); Edderfugledal (GRASMÜCK & TRÜMPY, 1969, plate 17, sect. *g*); Tait Bjerg (BIRKELUND & PERCH-NIELSEN, 1969, p. 24, section 2).

Dominant lithology

Red to red-brown mudstones and thin rippled sandstones form the bulk of the beds of the Malmros Klint Member. Mud cracks are common.

Boundaries

From a distance, the lower boundary is set at the base of the predominantly red sequence of siltstones usually forming a characteristic cliff. In sections, the lower boundary is put above the highest intercalation of yellow-weathering algal stromatolites of the Edderfugledal Member. The upper boundary is marked by the first thick sandstone band in the siltstones in Scoresby Land and northern Jameson Land. On aerial photographs and from a distance, the upper boundary can be set where light bands occur increasingly commonly in the red mudstones.

Thickness

190 m at Malmros Klint, 60 m at Sydkronen, 80 m in Gurreholm Bjerge, 20–30 m in Werner Bjerge, 200 m at Kap Biot, 200 m at Tait Bjerg and 10–15 m in Klitdal.

Age and fauna

Upper Triassic (Carnian? to Norian?); trace fossils are common in the Malmros Klint Member, and a few bedding planes are covered locally with *Conchostraca.*

Equivalents

See table 2.

Ørsted Dal Member

Pl. 15, figs 1–2, 5; pl. 16, fig. 4; pl. 17, figs 9–12, 22–23; textfigs 12, 16, 22.

The Ørsted Dal Member is the highest of the members of the Fleming Fjord Formation.

Name

From Ørsted Dal, forming the boundary between Jameson Land and Scoresby Land.

Type section

Malmros Klint, 5 km south-west of Solfaldsdal (Grasmück & Trümpy, 1969, plate 1, sect. *b*; fig. 4/IV).

Reference sections

Sydkronen in Bjergkronerne (plate 17, fig. 10); north-east slope of Gurreholm Bjerge (plate 17, fig. 11); Kolledalen (plate 17, fig. 12); Tait Bjerg (Birkelund & Perch-Nielsen, 1969, p. 24, section 2).

Dominant lithology

In the lowermost part, variegated and reddish brown silty shales dominate the lithology. Hard ferruginous nodules occur in several horizons. In the middle part, reddish and green-grey sandstones and arkoses are interbedded with thin, variegated silty marls. In the northern part of the area limestones and dolomite layers alternating with dark shales form the top of the member. Pink or white nodular limestone intercalations occur in the areas of Gipsdalen, Pingo Dal, Klitdal and Kap Hope.

Boundaries

In the field, the lower boundary is set at the bottom of the first thick sandstone band in the reddish brown shales above the mudstones of the Malmros Klint Member. In southern Klitdal and the Kap Hope area, however, where the Malmros Klint Member is absent, the first thick, red shale horizon above the arkoses of the Klitdal Member marks the lower boundary of the unit.

In the northern area, the upper boundary is taken above the last dolomite or limestone intercalation. This boundary can often be determined in scree-covered sections by the highest piece of loose dolomite or limestone on the talus. Also irregularly shaped ferruginous concretions characterise the talus of the upper part of the sequence. In the southern part of the area, the upper limit is characterised by the last red sediment (clay-shale, marl, conglomerate) underlying light-coloured clastics of the Kap Stewart Formation.

Thickness

200 m in Henrik Møller Dal, 110 m in Solfaldsdal, 100 m in Sydkronen, 170 m in Gurreholm Bjerge, 215 m at Dusén Bjerg in Klitdal and about 50 m in the Kap Hope area.

Age and fauna

Upper Triassic (Norian?) and base of the Rhaetian; bivalves and ostracods were found in the dark shales in the uppermost part of the member. A bone-bed and more sparse vertebrate remains are reported from the uppermost part of the member in the northern part of the area. Trace fossils are abundant in the middle and lower parts of the member (BROMLEY & ASGAARD, 1972).

Equivalents

See table 2.

FAUNA AND AGE

The ammonite faunas of the Wordie Creek Formation of Scoresby Land and Wegener Halvø were described by TRÜMPY (1961, 1969, in GRASMÜCK & TRÜMPY, 1969). In these works he revised the zonal record established by SPATH (1930, 1935) on the basis of rich ammonite faunas from Kap Stosch. TOZER (1967) compared the Greenland succession with the succession in northern Canada and correlated the ammonite zones with Lower and Upper Griesbachian of that area (see also SILBERLING & TOZER, 1968).

TRÜMPY (1960, 1961, 1969) drew attention to "Permian" brachiopods, echinoderms and bryozoans occurring in Lower Triassic beds together with Triassic ammonites. SPATH (1935) and NIELSEN (1935) thought these fossils to be derived from underlying deposits, which at the time were referred to the Carboniferous. With the recognition of *Cyclolobus* of late Permian age in the underlying beds and the presence of very early Triassic in the area, TRÜMPY concluded, on new field evidence, that the "Permian" fossils were not derived but were Triassic forms of Permian aspect which had survived the era boundary, the sedimentation being practically continuous between the Upper Permian and the Lower Triassic in parts of the basin. However, on the basis of new investigations at Kap Stosch in 1967, TEICHERT & KUMMEL (1971) considered it more probable that the "Permian" faunal elements in the lowermost Triassic beds are genuinely reworked. Thus it is doubtful whether a continuous sedimentation between Upper Permian and Lower Triassic occurs in any part of the basin, although an evident hiatus may be difficult to recognise in certain areas.

Some of the *Glyptophiceras* species described by TRÜMPY (1969) from Scoresby Land, were revised by KUMMEL in KUMMEL & TEICHERT (1970).

Other faunas of the Wordie Creek Formation (see TRÜMPY, 1961; GRASMÜCK & TRÜMPY, 1969; BIRKELUND & PERCH-NIELSEN, 1969; PERCH-NIELSEN *et al.*, 1972) include bivalves (*Bakewellia*, *Claraia*, *Myalina* and *Anodontophora*), gastropods, asteroids and fishes (*Bobasatrania* sp., *Birgeria* sp. and *Boreosomus* sp.). Plant remains and algae may also be found. In the upper part of the Wordie Creek Formation the ammonites become rare, while the bivalves (*Anodontophora*, *Claraia*) may continue to appear up to the Rødstaken Member in the basal part of the Pingo Dal Formation.

The marine fauna rapidly disappears with the appearance of red sandstones and arkoses of the Pingo Dal Formation. These predominantly continental red-beds are generally unfossiliferous and their age can only indirectly be determined as a higher part of the Lower Triassic.

The gypsiferous Gipsdalen Formation is usually unfossiliferous except for some thin intercalations of marine limestone or shale known as the *Myalina* limestone in the Solfaldsdal Member. These intercalations yielded a comparatively abundant fauna, not described in detail, of bivalves (*Myalina*, *Myophoria*, and small mytilids), gastropods (*Omphalotycha* sp.), bryozoans, ostracods and fish scales (TRÜMPY, 1961, p. 251; GRASMÜCK & TRÜMPY, 1969, p. 45). The only fossils determined specifically (DEFRETIN-LEFRANC, 1969, see also GRASMÜCK & TRÜMPY, 1969, p. 45) are the conchostracans *Euestheria grasmuecki* DEFRETIN and *E.* cf. *emmonsi* (RAYMOND), and a daonellid bivalve *Halobia* cf. *moussoni* MERIAN. The latter would imply a Middle Triassic age for the *Myalina* limestone and probably for the entire Solfaldsdal Member.

Shallow marine conditions reappear in the lower part of the Fleming Fjord Formation. In the lowermost unit of this formation, the Edderfugledal Member, algal stromatolites occur frequently and are often associated with onkolitic carbonate intercalations. Small bivalves (*Myophoriopsis* sp. and presumably *Anodontophora* sp.) were recorded from this part of the formation (GRASMÜCK & TRÜMPY, 1969, pp. 49–50). The base of the middle unit of the formation, the Malmros Klint Member, has yielded *Euestheria minuta* (VON ZIETEN) determined by DEFRETIN-LEFRANC (1969), which is known from the Keuper (including Lettenkohle) of the German Triassic. This would imply that the base of the Malmros Klint Member was of about Carnian age (GRASMÜCK & TRÜMPY, 1969, p. 53). The Ørsted Dal Member is usually unfossiliferous, but trace fossils resembling those from the Fleming Fjord Formation appear in some sandstone intercalations (especially in Klitdal and Carlsberg Fjord), probably indicating a purely continental environment (BROMLEY & ASGAARD, 1972). Dolomitic bone-beds with black shale intercalations appear in the uppermost part of the Ørsted Dal Member in the area of Ørsted Dal close to Fleming Fjord (see GRASMÜCK & TRÜMPY, 1969, p. 54, plate 1, sections *b*, *c*, *e*). These contain thin-shelled bivalves (*Cardinia* sp.?) and ostracods (*Darwinula* sp.), the latter possibly indicating a Lower Rhaetian age for the topmost beds of the Fleming Fjord Formation. Vertebrate remains include a stegocephalian bone, a plesiosaur tooth and ?*Gyrolepis* (PERCH-NIELSEN *et al.* 1972).

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INDEX TO ILLUSTRATIONS

Ca = Caledonian granite
Pl. 17, figs 21, 23; textfigs 10–11

Pe = Permian
Pl. 17, figs 3–5, 7, 13–17; textfigs 2, 7–8, 19.

Wo = Wordie Creek Formation
Pl. 1, figs 1–3; pl. 2, figs 1–2; pl. 4, fig. 3; pl. 5, figs 1–3; pl. 6, fig. 1; pl. 7, fig. 1; pl. 17, figs 2–5, 7–8, 13–17, 19; textfigs 2, 6–8.

Rø = Rødstaken Member
Pl. 2, fig. 3; pl. 3, figs 1–2; pl. 4, figs 1–2; pl. 5, fig. 4; pl. 6, figs 2–3; pl. 17, figs 4–5, 7–8, 14–15, 17; textfig. 8.

Pa = Paradigmabjerg Member
Pl. 7, fig. 2; pl. 17, figs 6–13, 17; textfigs 8, 12.

Sy = Sydkronen Member
Pl. 17, figs 10–11; textfig. 12.

Kl = Klitdal Member
Pl. 8, figs 1–2; pl. 17, figs 15–16, 18–23; textfigs 2, 5, 9–11, 18.

My = *Myalina* limestone
Pl. 8, figs 3–4; pl. 9, figs 2–3; pl. 10, figs 1–3; pl. 11, figs 1–2; pl. 12, figs 1–3; pl. 17, figs 13–16, 18, ?19, 20; textfigs 2, 16–20, 22.

So = Solfaldsdal Member
Pl. 3, fig. 3; pl. 9, fig. 1; pl. 17, figs 6, 8–16, 18, 20; textfigs 12–13, 15–16, 18.

Se = Kap Seaforth Member
Pl. 15, fig. 4; pl. 17, figs 6, 9–13, 15–16, 21; textfigs 12, 14, 16.

Gi = Gipsdalen Formation
Pl. 17, fig. 19; textfigs 2, 5, 9, 22.

Ed = Edderfugledal Member
Pl. 13, figs 1–2; pl. 17, figs 9–13, 16, 19, 21; textfigs 2, 9, 12, 16, 21–22.

Ma = Malmros Klint Member
Pl. 14, figs 1–2; pl. 15, fig. 3; pl. 16, figs 1–3; pl. 17, figs 9–13, 16; textfigs 2, 9, 12, 16, 22.

Ør = Ørsted Dal Member
Pl. 15, figs 1–2, 5; pl. 16, fig. 4; pl. 17, figs 9–12, 22–23; textfigs 12, 16, 22.

Fl = Fleming Fjord Formation
Textfig. 5.

St = Kap Stewart Formation (Jurassic)
Pl. 17, figs 9–12, 22–23; textfig. 12.

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Færdig fra trykkeriet den 12. februar 1974.

PLATES

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Fig. 1. Flaser bedding with dark shale and lighter siltstone in the Wordie Creek Formation in the upper part of Gipsdalen. Photo KPN.

— 2. Imprint of ammonite on bedding plane with mud cracks. Wordie Creek Formation on Wegener Halvø. GGU 146965.

— 3. Flaser bedding in Wordie Creek Formation from the upper part of Gipsdalen. The specimen was baked by the Werner Bjerge Intrusion. GGU 100589.

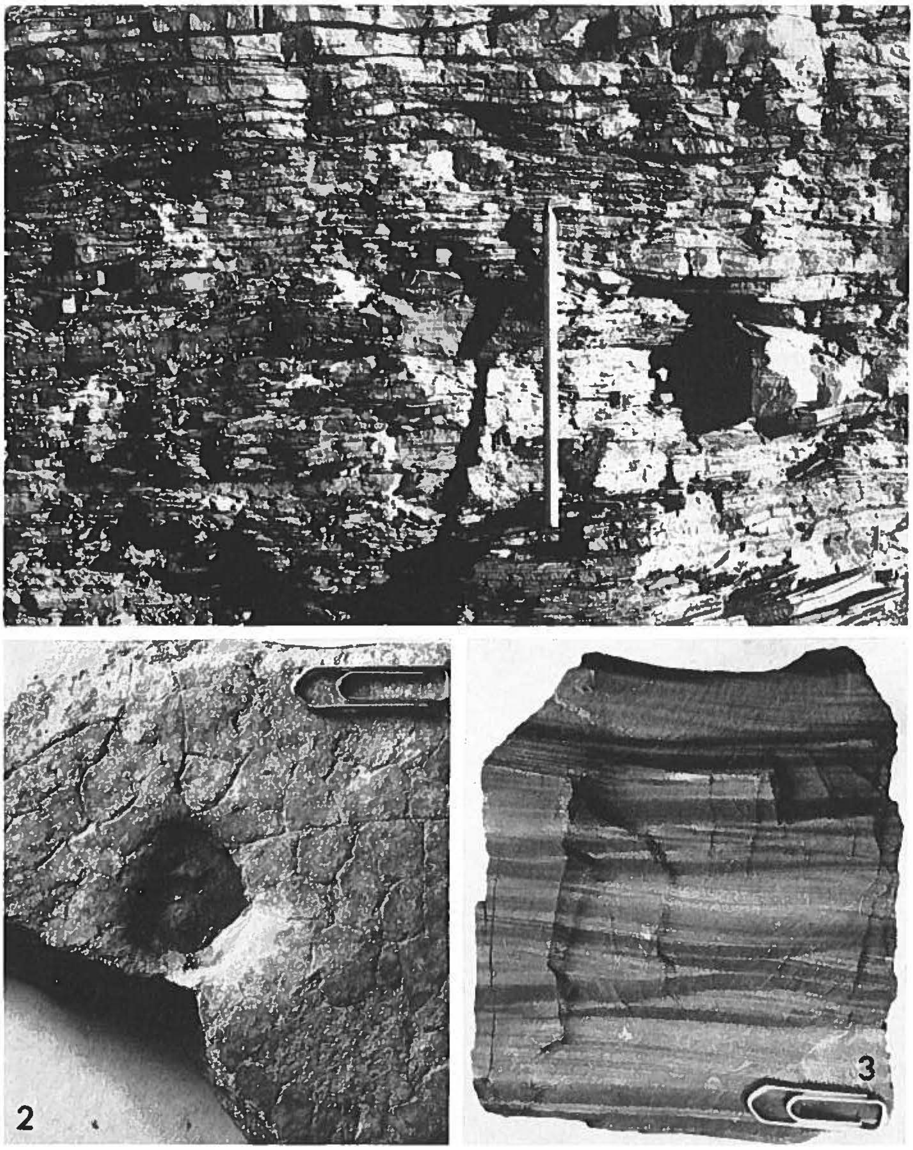
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Plate 2

Fig. 1. Large flute casts from the upper part of the Wordie Creek Formation in the upper part of Gipsdalen. Photo KB.

— 2. Flute casts from the Wordie Creek Formation in the upper part of Gipsdalen. Photo KPN.

— 3. Load-casted ripples in sandstone of the Rødstaken Member south of Paradigmabjerg, Wegener Halvø. Photo KPN.

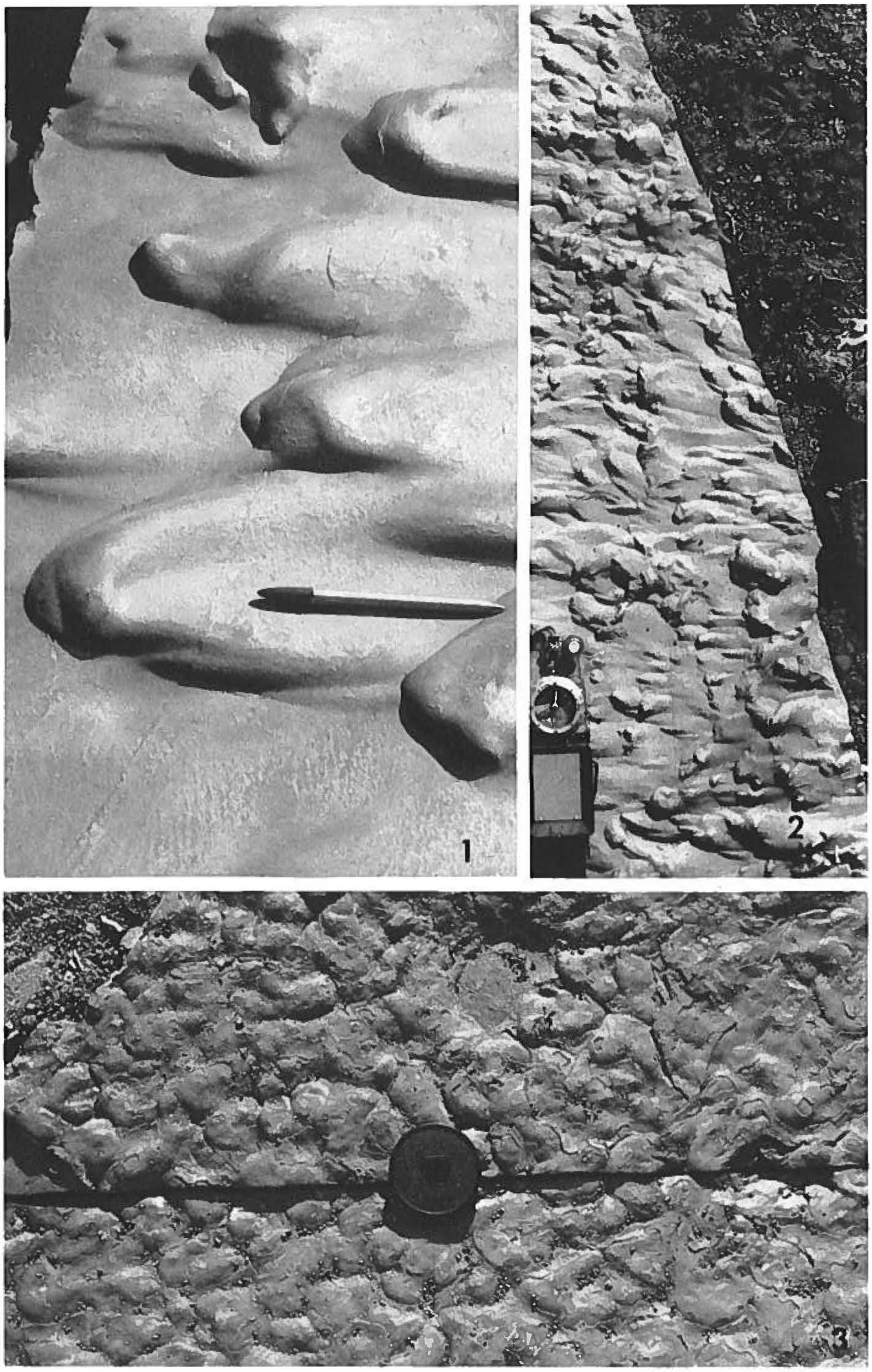
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Fig. 1. Marks after gas bubbles (?) in sandstone of the Rødstaken Member south of Paradigmabjerg, Wegener Halvø. Photo KPN.

— 2. Reduction halo around organic material, Rødstaken Member, upper part of Gipsdalen. Photo KPN.

— 3. Marks after gas bubbles (?) in sandstone of the Solfaldsdal Member in Edderfugledal. Photo KPN.

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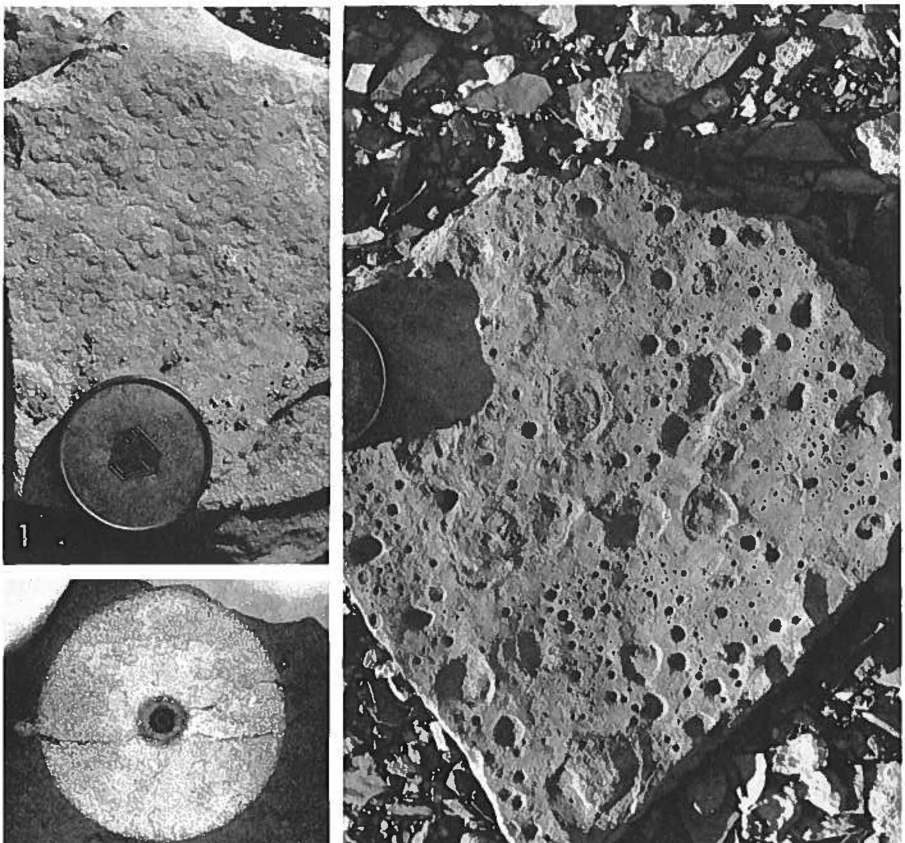
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— 2. Parting lineation in sandstone of the Rødstaken Member in the lower part of Gipsdalen. Photo KPN.

— 3. Load casts in rippled sandstone of the Wordie Creek Formation on Wegener Halvø. Photo KPN.

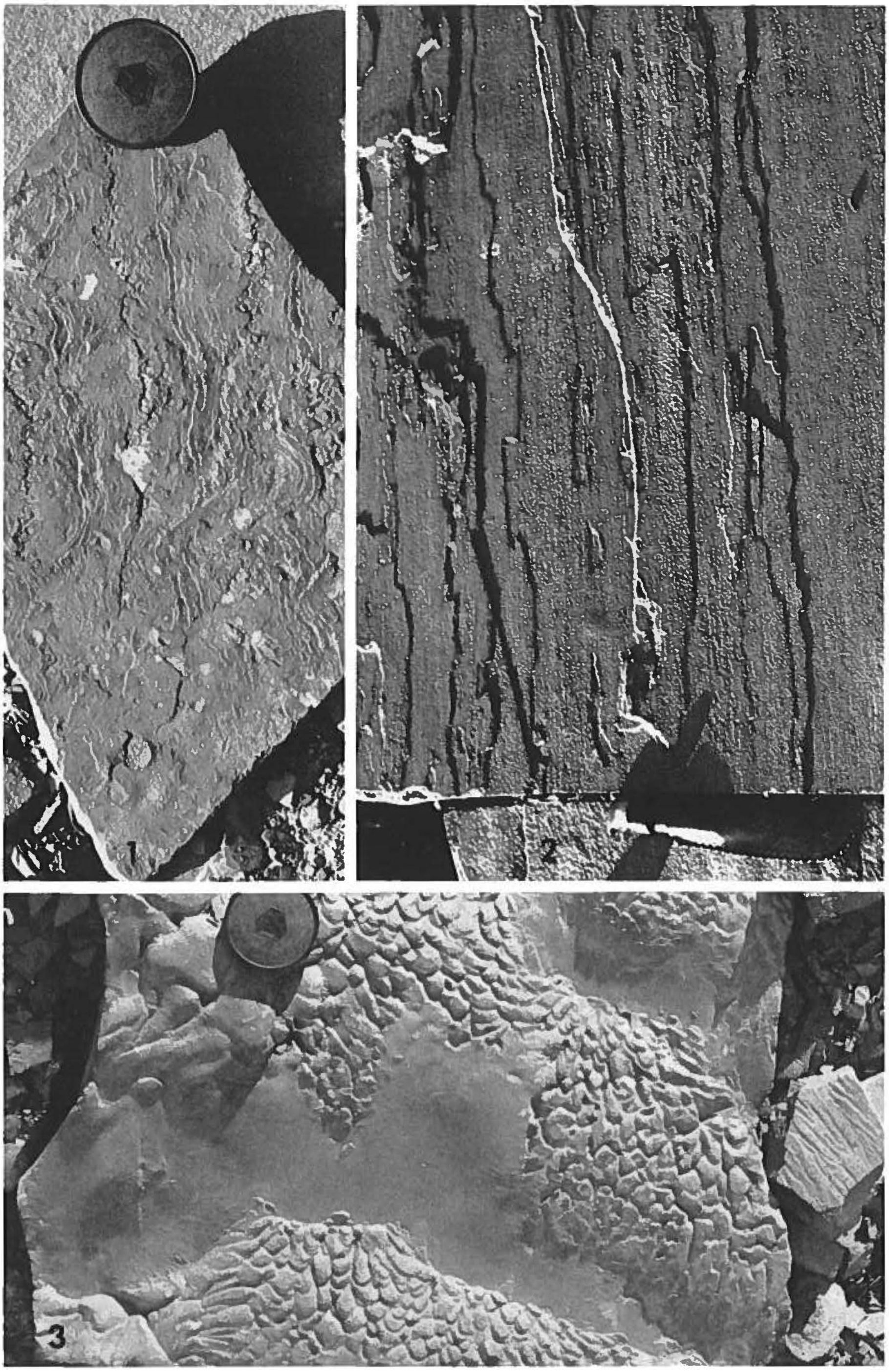
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Plate 5

Fig. 1. Slump structure in sandstone of the Wordie Creek Formation on Wegener Halvø. Photo KPN.

— 2. Shales of the Wordie Creek Formation on Wegener Halvø, folded and baked by a 4.5 m thick sill (upper right). Photo KPN.

— 3. Conglomerate within the lower part of the Wordie Creek Formation in valley north-east of Paradigmabjerg, Wegener Halvø. Components include green shales from the Wordie Creek Formation (two dark pieces upper left) and boulders of limestones with brachiopods from the Upper Permian (behind pencil). Photo KPN.

— 4. Slump structure in sandstone of the Rødstaken Member in the upper part of Gipsdalen. Photo KPN.

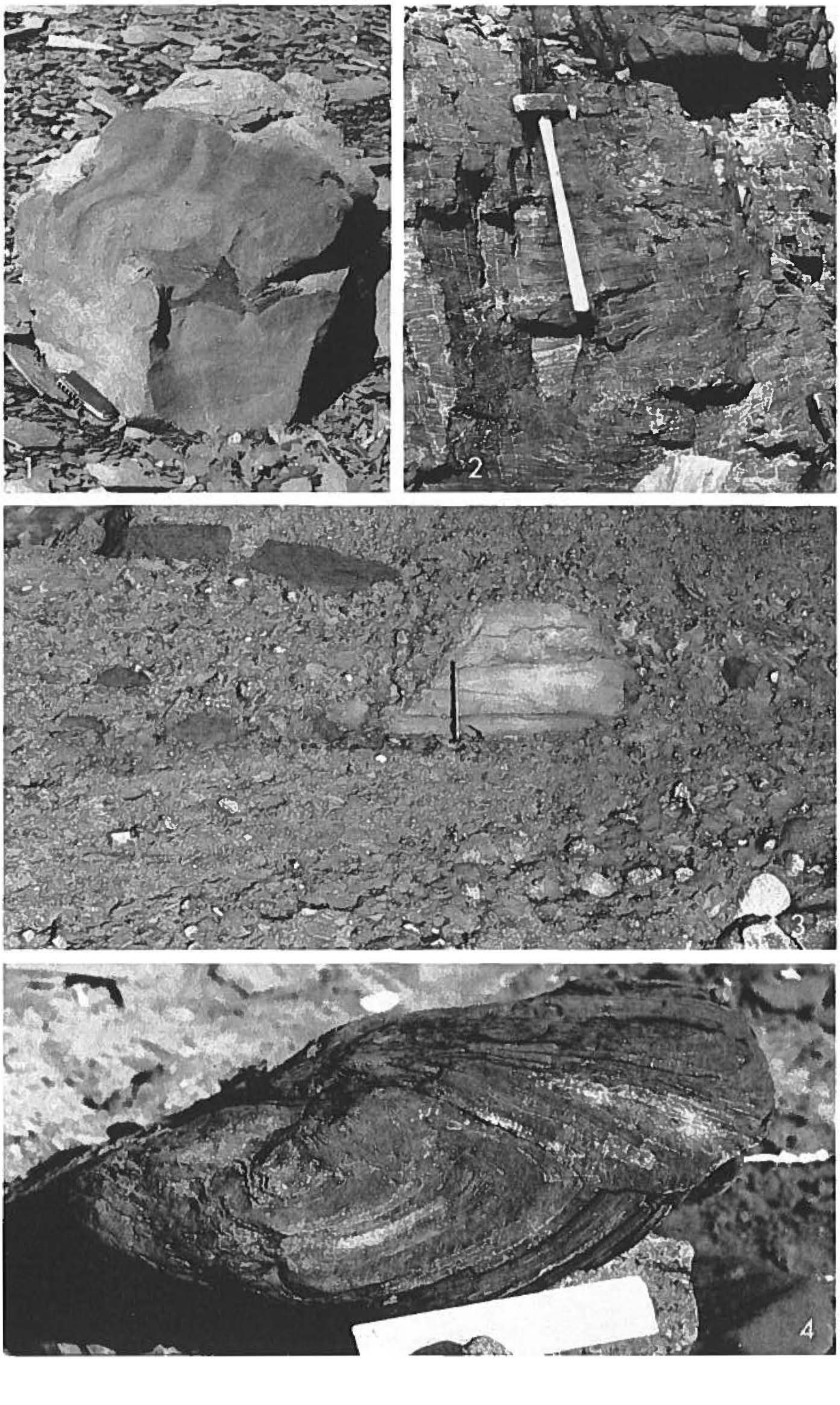
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Plate 6

Fig. 1. *Claraia* and flute casts in sandstone of the Wordie Creek Formation on Wegener Halvø. Photo KPN.

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— 3. Cross-lamination in sandstone of the Rødstaken Member on Wegener Halvø, Photo KPN.

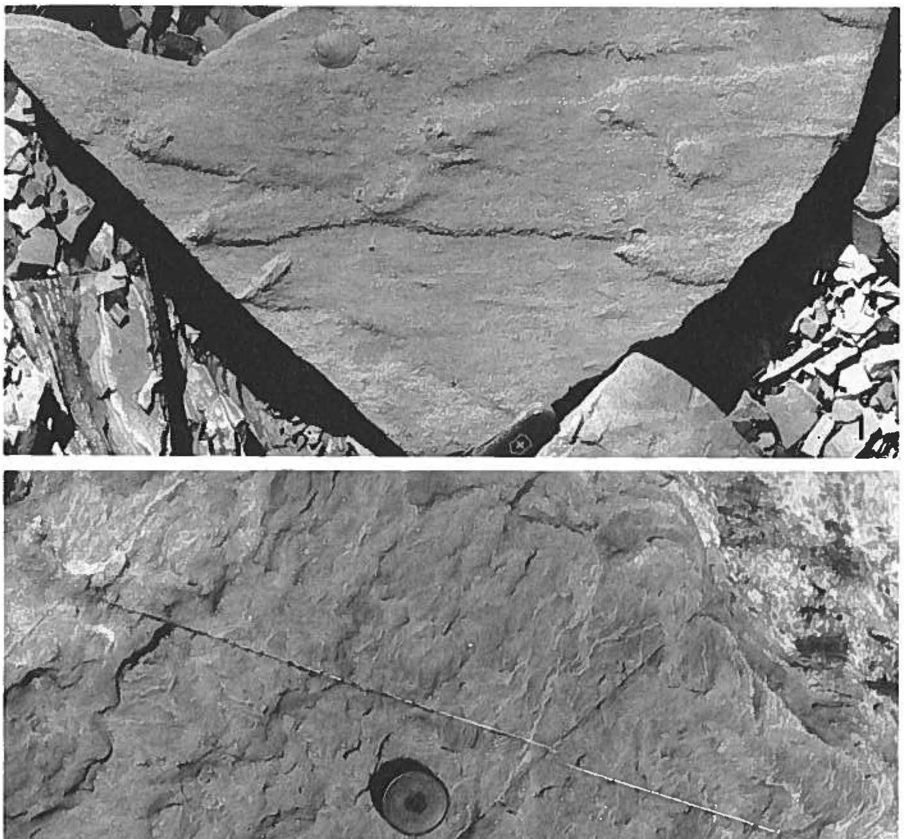
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Plate 7

Fig. 1. Cross-bedding in sandstone of the Wordie Creek Formation in valley north-east of Paradigmabjerg, Wegener Halvø. Photo KPN.

— 2. Cross-bedding in arkose and conglomerate of the Paradigmabjerg Member north of Devondal, Wegener Halvø. Photo KPN.


1

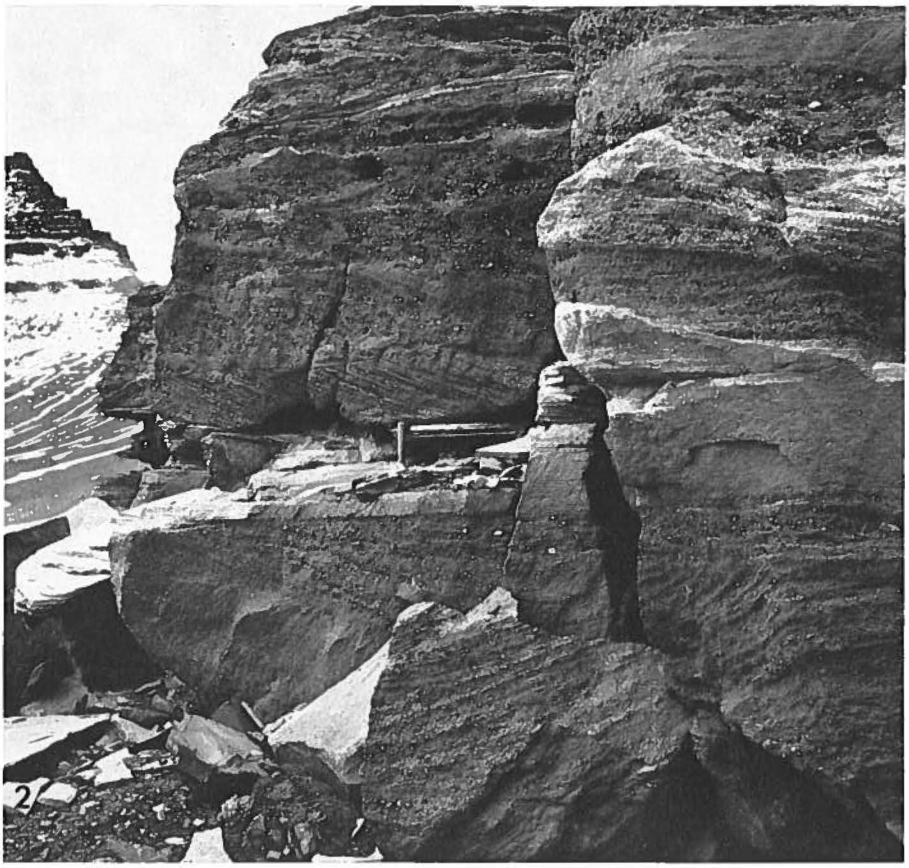
2

Plate 8

Fig. 1. Bedding plane of conglomerate of the Klitdal Member from the ridge between Devondal and Permdal. Photo KPN.

— 2. Bedding in conglomerate of the Klitdal Member from the ridge between Devondal and Permdal. Photo KPN.

— 3. Alternating light and dark, wine-red sandstone with a red jasper lens to both sides of the point of the pencil. Solfaldsdal Member in the ridge between Devondal and Permdal. Photo KPN.

— 4. The hammer is standing on a layer of red sandstone which is overlain by softer red silty shales. The thick, coarse arkose layer eroded some of the silty shale and is overlain by other layers of red, silty shales and grey limestone. Solfaldsdal Member on the ridge between Devondal and Permdal. Photo KPN.

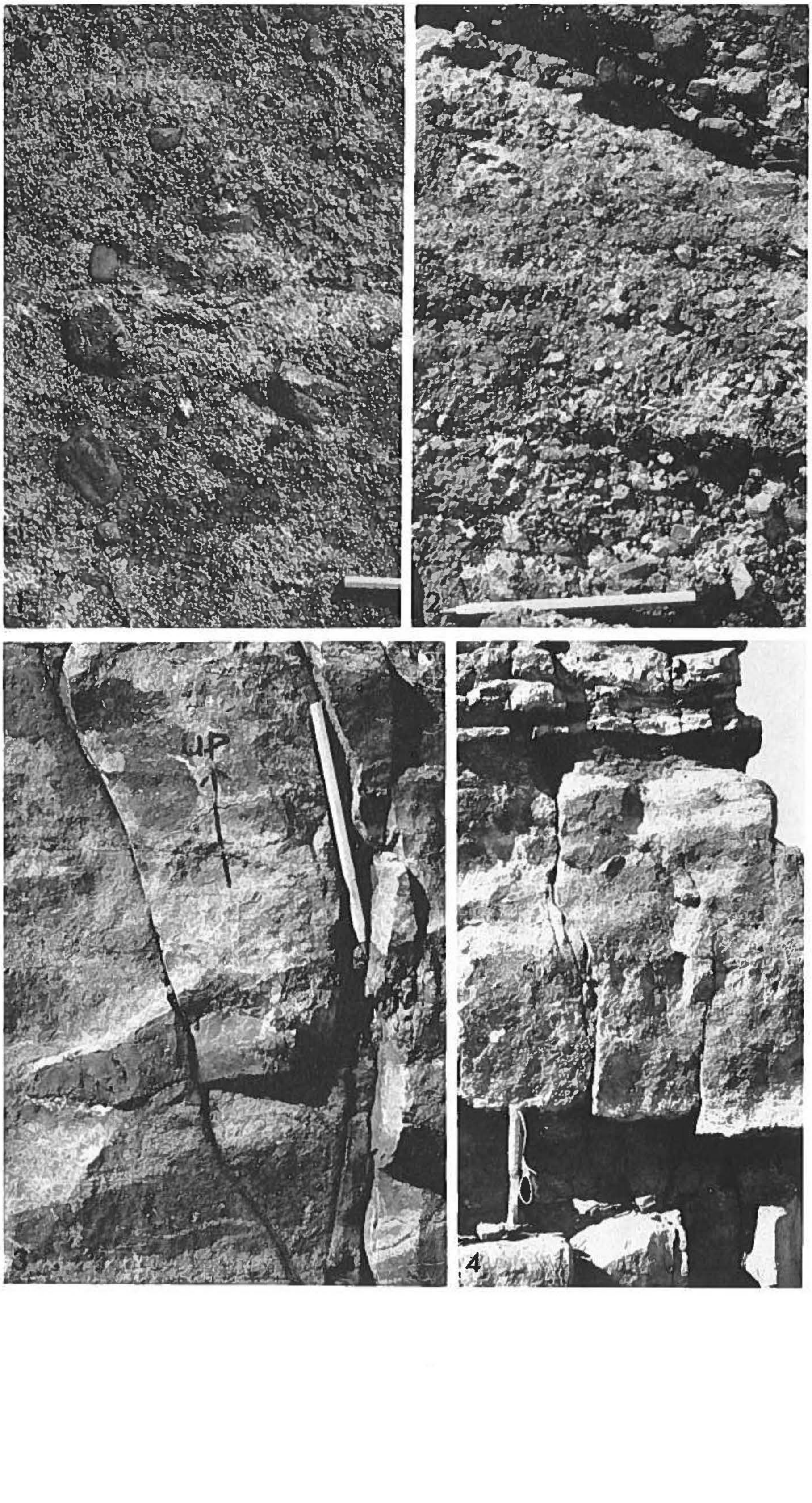
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Plate 9

Fig. 1. Shale-flake conglomerate layer on sandstone of the Solfaldsdal Member north of Permdal. Photo KPN.

— 2. Mud flakes on sandstone of the Solfaldsdal Member. In the lowermost part of the figure the parallel bedding in the detritic *Myalina* limestone of the Solfaldsdal Member, north of Permdal. Photo KPN.

— 3. Parallel bedding and cross-bedding in the sandy *Myalina* limestone, Solfaldsdal Member, north of Permdal. Photo KPN.


1
2
3

Plate 10

Fig. 1. Irregular bedding in silty *Myalina* limestone of the Solfaldsdal Member in Edderfugledal, see profile A in fig. 17. Photo KPN.

— 2. Organogenic *Myalina* limestone of the Solfaldsdal Member in Edderfugledal, see profile A in fig. 17. Photo KPN.

— 3. Irregular bedding in the *Myalina* limestone of the Solfaldsdal Member in Edderfugledal, see profile A in fig. 17. Photo KPN.

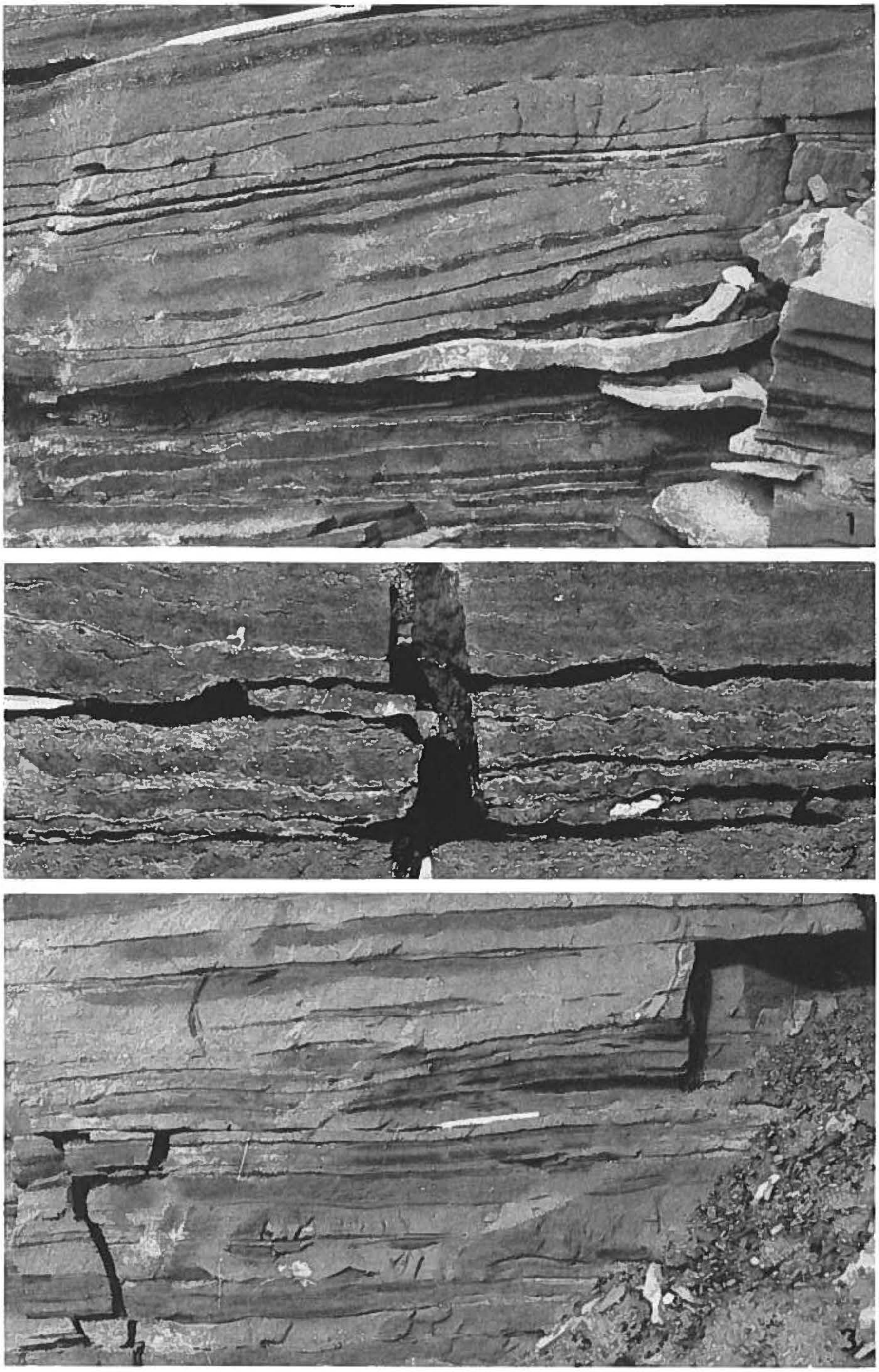
1
2
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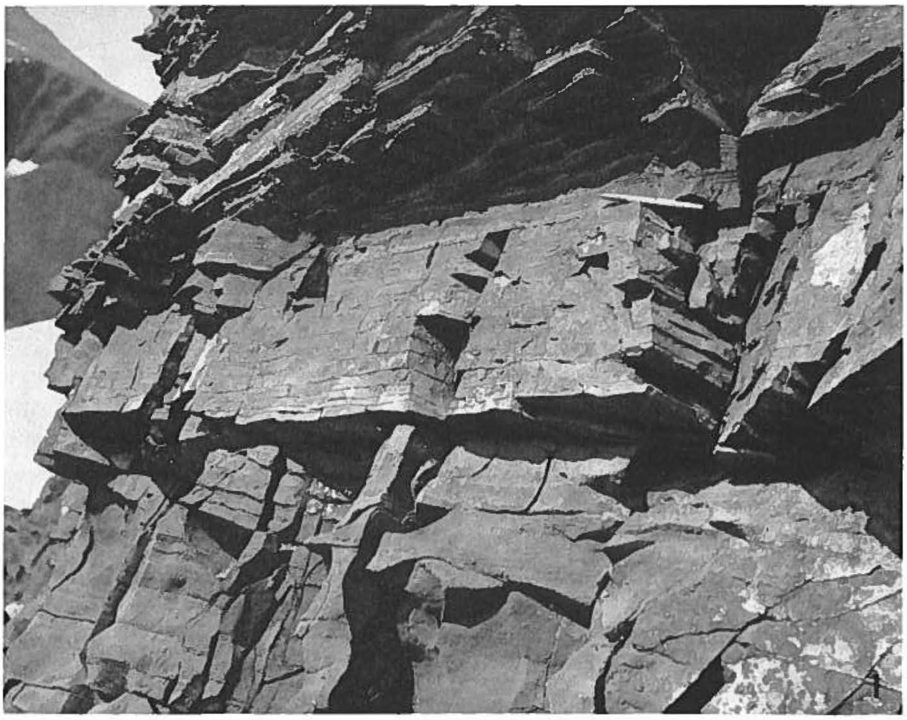
Plate 11

Fig. 1. Bedding in dark, platy limestone overlying lighter grey, thicker bedded, more massive limestone. See profile A in fig. 17. *Myalina* limestone of the Solfaldsdal Member in Edderfugledal. Photo KPN.

— 2 Bedding in sandy, light-grey *Myalina* limestone of the Solfaldsdal Member in Edderfugledal. See profile A in fig. 17 Photo KPN.



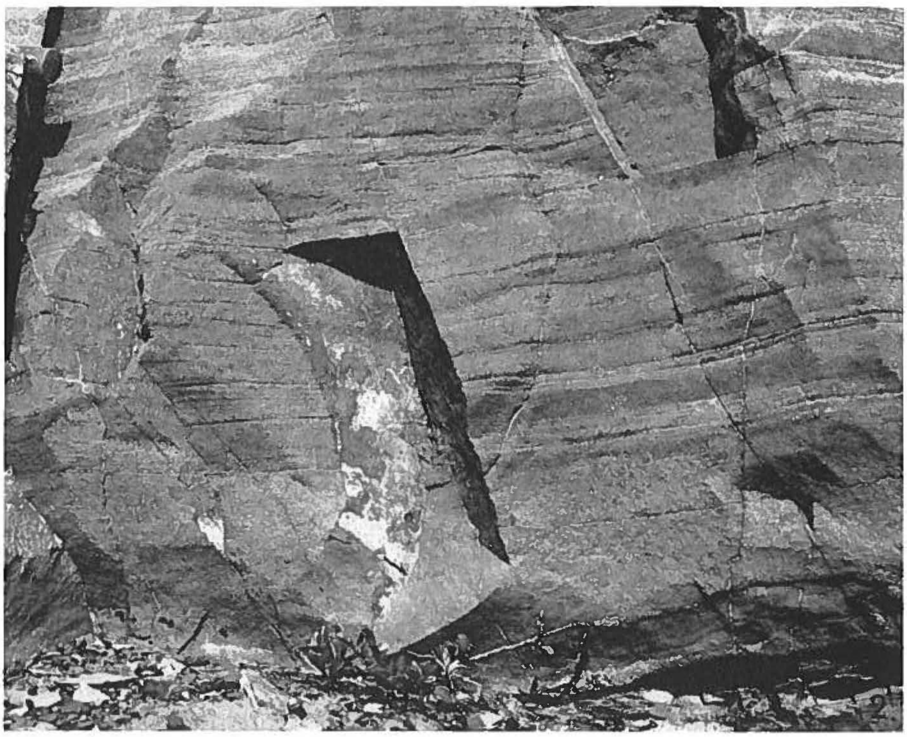


Plate 12

Fig. 1. Top of the *Myalina* limestone on the ridge between Permdal and Devondal. The dark layer on top consists of the algal limestone shown in fig. 2. Photo KPN.

— 2. Bedding plane of the algal limestone forming the top of the *Myalina* limestone of the Solfaldsdal Member on the ridge between Permdal and Devondal. Locality also shown in fig. 18 in the text. Photo KPN.

— 3. Bituminous marl of the *Myalina* limestone near the mouth of Nathorst Fjord, between Permdal and Devondal. Photo KPN.

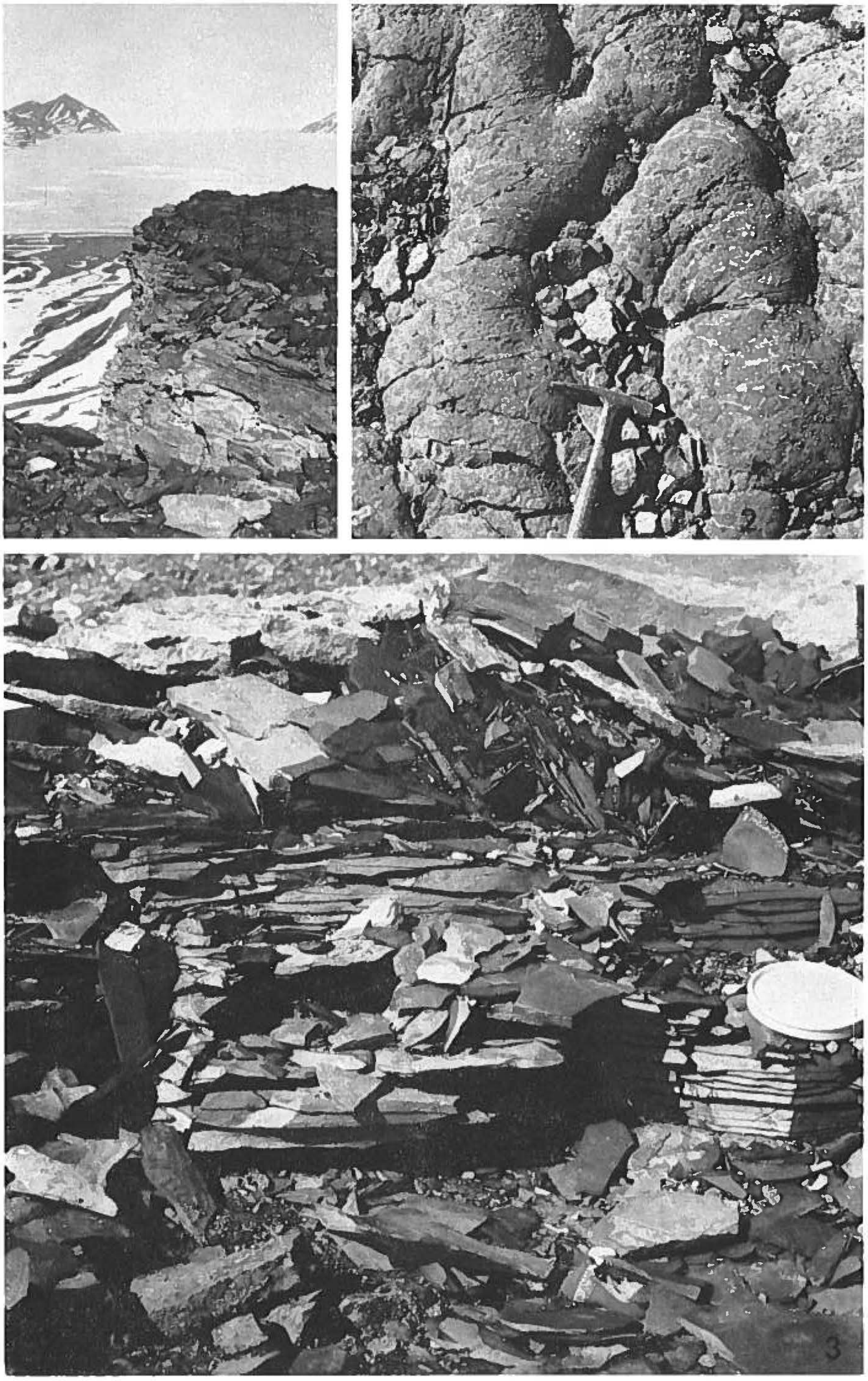

1
2
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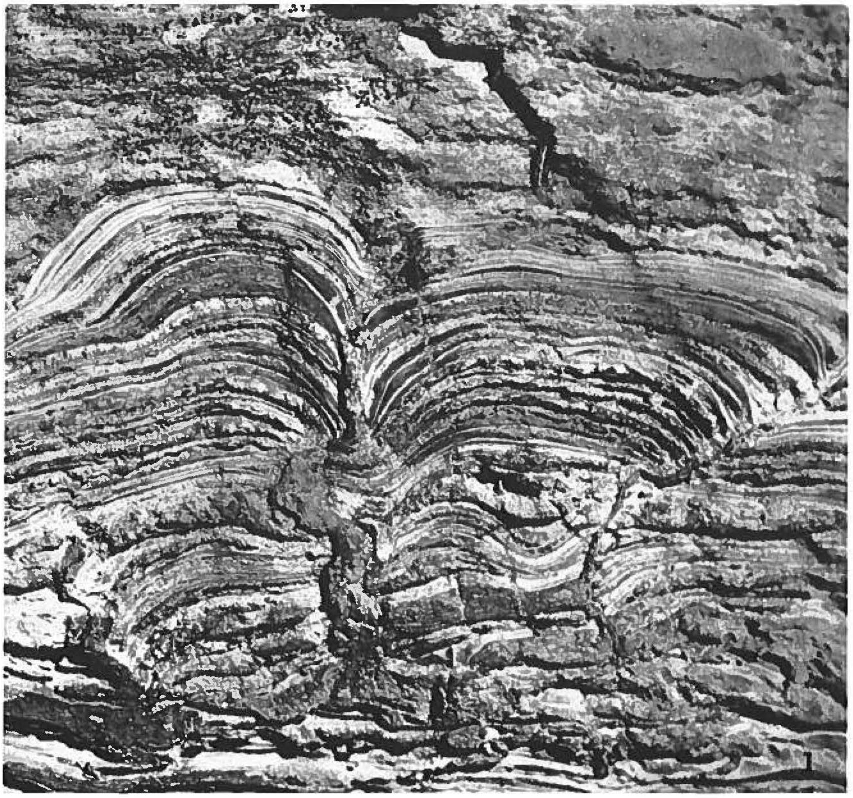
Plate 13

Fig. 1. Stromatolitic dolomite showing several stromatolite columns. Edderfugledal Member in Horsedal. About natural size. Photo TB.

— 2. Stromatolitic dolomite and limestone from the Edderfugledal Member along Carlsberg Fjord. Photo KPN.



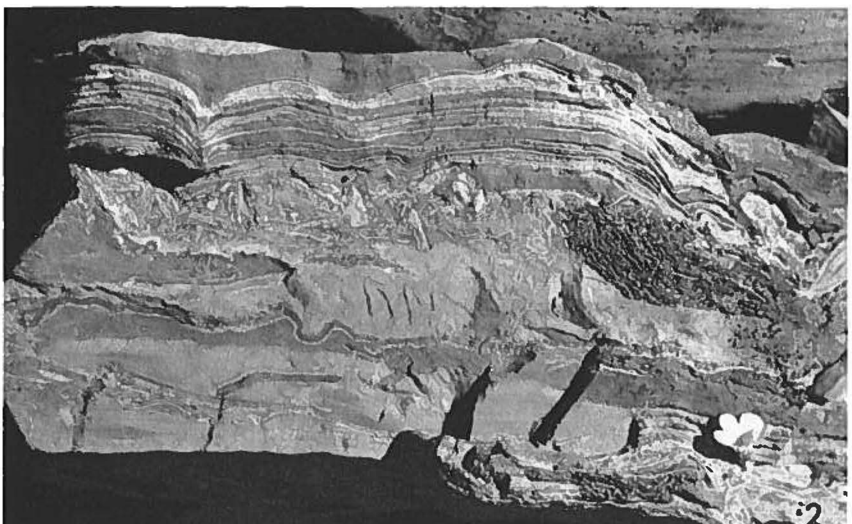
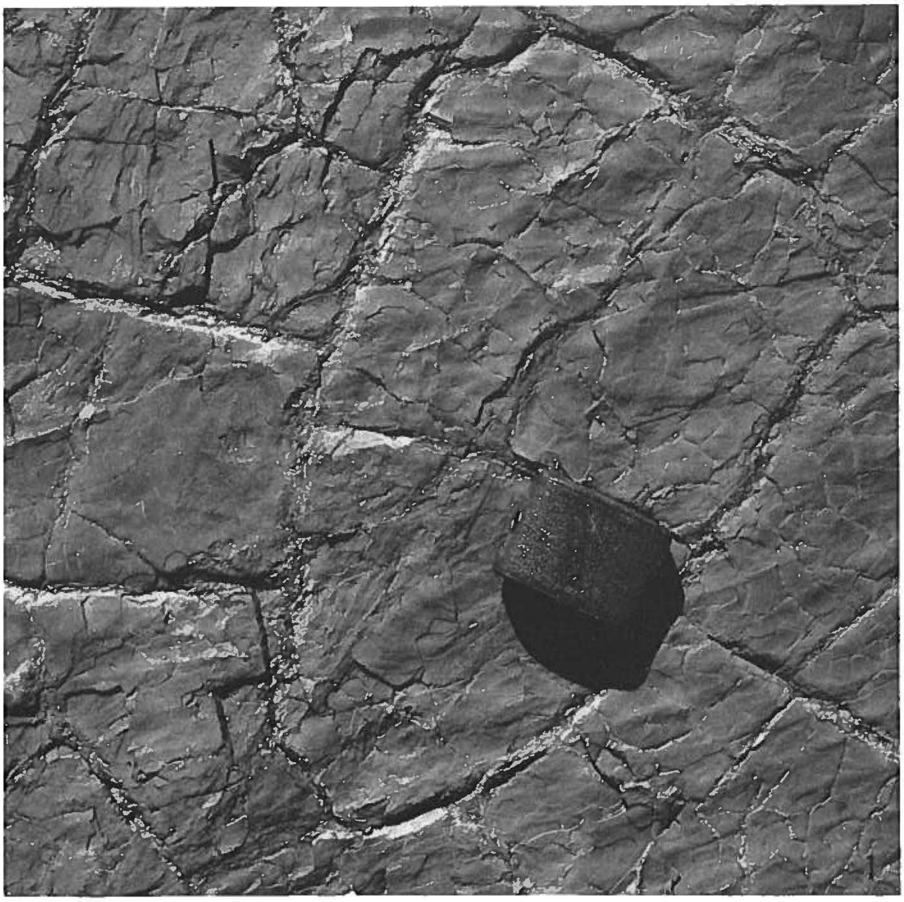

2

Plate 14

Fig. 1. Mud cracks on the bedding plane of siltstones of the Malmros Klint Formation in Flexurdal. Photo TB.

— 2. Side view of mud cracks in the Malmros Klint Member in Edderfugledal. Photo KPN.



1

2

Plate 15

Fig. 1. Ripple marks in the Ørsted Dal Member near the head of Fleming Fjord. GGU 100910.

— 2. Varicoloured shale-flake conglomerate showing graded bedding. Ørsted Dal Member, near the head of Fleming Fjord. GGU 111713.

— 3. Ripple marks in two directions and mud cracks. Fleming Fjord Member near the head of Fleming Fjord. Photo KPN.

— 4. Cast after salt crystal in siltstone of the Kap Seaforth Member, near Solfaldsdal. GGU 111276.

— 5. Brecciated dolostone from the top of the Ørsted Dal Member near Solfaldsdal. GGU 147069.

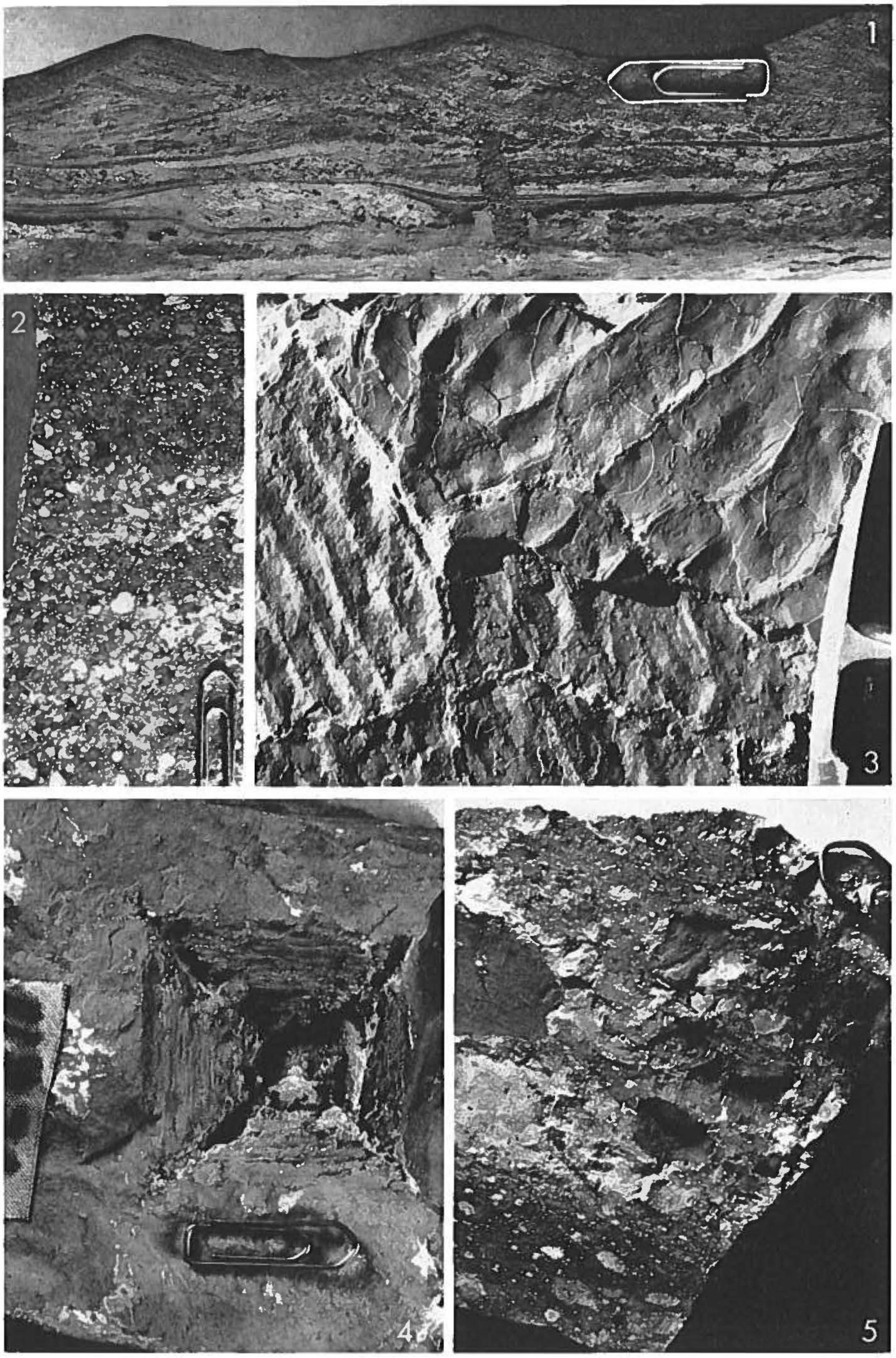

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Plate 16

Figs 1–3. Mud cracks influenced by ripple marks. From a widespread grey sandstone horizon 5 m above the base of the Malmros Klint Member on the west coast of Carlsberg Fjord, south of Passagen. Photo R. G. BROMLEY.

— 4. Typical sole surface of thin ripple marked siltstone horizons within the lower half of the Ørsted Dal Member on the west coast of Carlsberg Fjord. The surface is dominated by prod marks and minor mud cracks. The finest detail of the fabric is probably biogenic. Photo R. G. BROMLEY.


10 cm
1


2
10 cm


3
10 cm

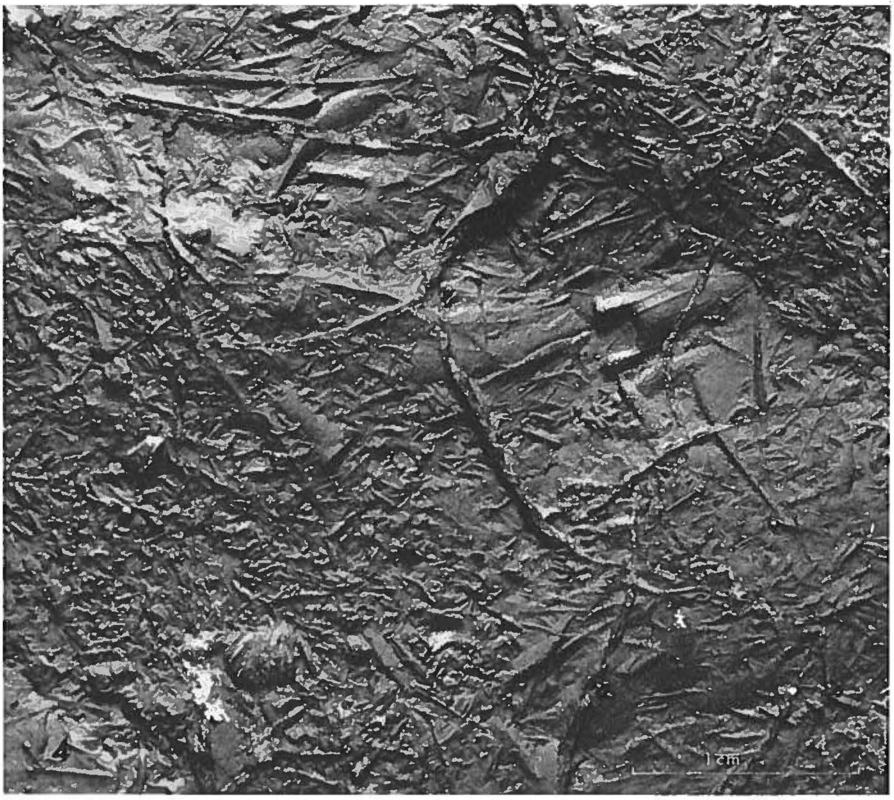
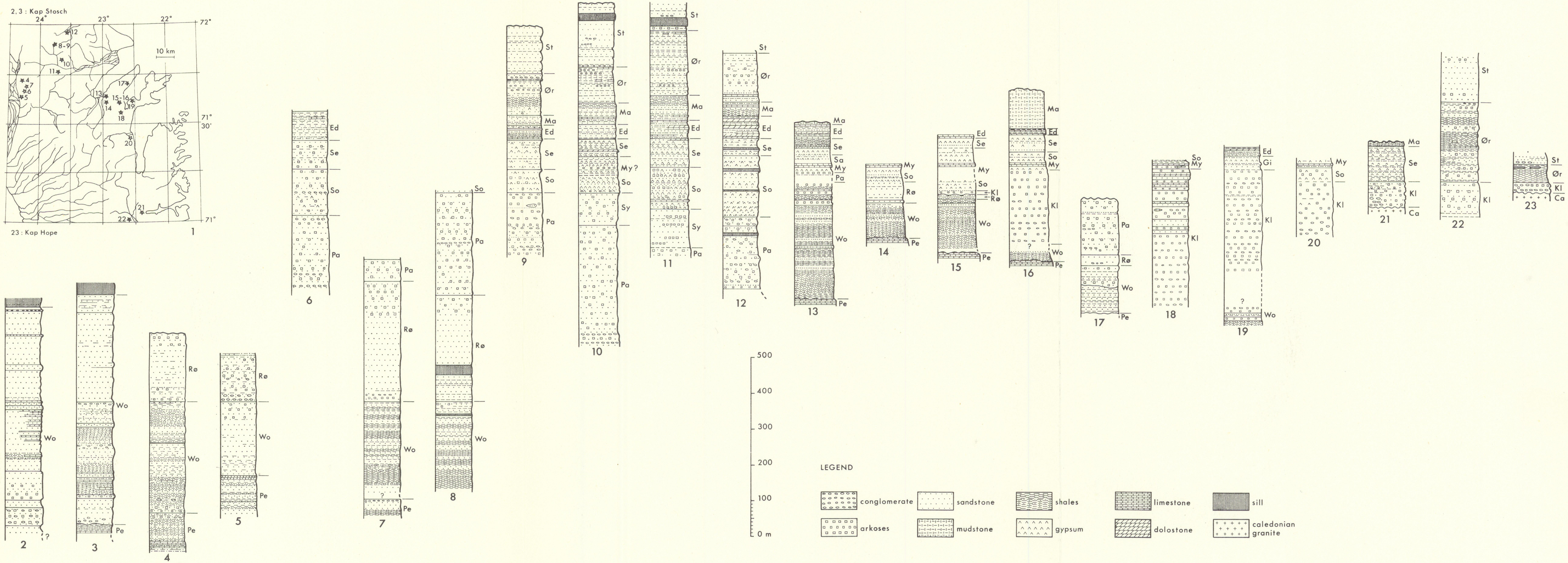

4
1 cm

Plate 17

Fig. 1. Key map to show the location of the sections on this plate. Fig. 2 and fig. 3 lie to the north, fig. 23 to the south of this map (see fig. 1 in the text).
— 2. River 7 at Kap Stosch.
— 3. River 16 at Kap Stosch.
— 4. Rodstaken in Gurreholm Bjerge.
— 5. Ridge between Triaselv and Schuchert Dal.
— 6. Ridge between Triaselv and Schuchert Dal.
— 7. Ridge between Triaselv and Schuchert Dal.
— 8. Monte Somma, Werner Bjerge south slope.
— 9. Monte Somma, Werner Bjerge south slope.
— 10. Sydkronen in Bjergkronerne.
— 11. North-east slope of Gurreholm Bjerge.
— 12. Kolledalen towards point 1140.
— 13. Claraiadal, near head of Fleming Fjord. Towards point 810.
— 14. From Devondal to the ridge between Devondal and Jameson Elv.
— 15. North of Devondal.
— 16. South of Devondal.
— 17. South-east ridge of Paradigmabjerg, Wegener Halvø.
— 18. Ridge between Permdal and Devondal, from the head of Nathorst Fjord.
— 19. Nordenskiöld Bjerg from north-north-east.
— 20. Ridge between Passagen and Carlsberg Fjord.
— 21. Triasdal in Klitdal.
— 22. From Klitdal towards Dusén Bjerg, along Rødeelv.
— 23. Kap Hope area (combined).

		My	*Myalina* limestone
St	Kap Stewart Fm	Kl	Klitdal Mb
Ør	Ørsted Dal Mb	Sy	Sydkronen Mb
Ma	Malmros Klint Mb	Pa	Paradigmabjerg Mb
Ed	Edderfugledal Mb	Ro	Rødstaken Mb
Gi	Gipsdalen Fm	Wo	Wordie Creek Fm
Se	Kap Seaforth Mb	Pe	Permian
So	Solfaldsdal Mb	Ca	Caledonian granite


2, 3 : Kap Stosch
23 : Kap Hope
10 km
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11
12
13
14
15
16
17
18
19
20
21
22
23
500
400
300
200
100
0 m
LEGEND
conglomerate
sandstone
shales
limestone
sill
arkoses
mudstone
gypsum
dolostone
caledonian granite