Mindre meddelelser.

Volcanic Ash from the Grimsvötn-Eruption in 1903, Iceland.

By

M. L. Mouritzen and Arne Noe-Nygaard

In the collections of the Mineralogical Museum of the University of Copenhagen we have encountered an ash sample collected on a ship off Cape Langanes—the northeastern corner of Iceland—on May the 29th 1903. The place of eruption is on the label stated to be "Skeiðárjökull". From what we now know there can be no doubt that this volcanic ash was produced by the Grimsvötn volcano(es) in Vatnajökull.

Table 1.

Chemical analyses of ash samples from Grimsvötn in Vatnajökull, Iceland.

	1903	1922	1934
SiO_2	49.61	49.80	49.73
TiO_2	2.94	2.83	2.51
Al_2O_3	11.49	13.87	14.80
Fe_2O_3	4.66	1.84	3.10
FeO	11.33	12.38	11.53
MnO	0.26	0.16	0.15
MgO	5.55	4.92	4.92
CaO	9.66	9.75	9.55
Na_2O	2.45	3.17	2.86
K_2O	0.33	0.55	0.52
P_2O_5	0.32	0.22	0.23
S	0.13	–	–
Cl	–	0.02	–
H_2O^+	1.00	0.44	0.40
H_2O^-	0.18	0.07	0.48
Sum	99.91	100.02	100.38

Eruption: 1903 anal. Mouritzen, 1922 anal. Barth, 1934 anal. Barth.

The ash is essentially a homogeneous, brownish glass (sideromelane) the index of refraction of which is

$$n = 1.604 \pm .001$$

About 1% of crystalline material is present, mainly *plagioclase of bytownitic composition*, further a few grains of an almost colourless *Mg-rich olivine*.

Description of volcanic ash from two later outbursts in the same volcanic field viz. in 1922 and 1934 have previously been published (BARTH, 1937, ÁSKELSSON, 1936, NOE-NYGAARD, 1936). The optical data from the three different eruptions are practically identical.

The material from the eruption of 1903 has been chemically analyzed by Miss M. L. MOURITZEN, and the result is shown in table 1 together with two analyses carried out by T. BARTH on ash from the 1922 and 1934 eruptions. The chemical identity is convincing, no chemical changes having occurred from one eruption to another.

The eruption in 1903 has been described by THORODDSEN p. 95–99 (THORODDSEN, 1925).

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Erratic Granite-Pebbles from Morsárdalur in Öræfi, Iceland.

By

ARNE NOE-NYGAARD

From dr. SIGURÐUR THORARINSSON, Museum of Natural History, Reykjavík, I recently recieved two small rounded pebbles for examination. They were found a couple of years ago by Mr. SVERRI SIGURÐSSON, merchant in Reykjavik, in Morsárdalur in Öræfi. The microscopic examination gave as a result that they were regular granites, for which reason these lines are published.

The two pebbles were found on the plain "sandur" in Morsárdalur just below Bæjarstaðarskógur a little to the west of the gate to the enclosed forest area, 120 m above sealevel (fig. 3).

The stones may have been transported from the interior of Morsárdalur, but dr. THORARINSSON thinks it most likely that they came

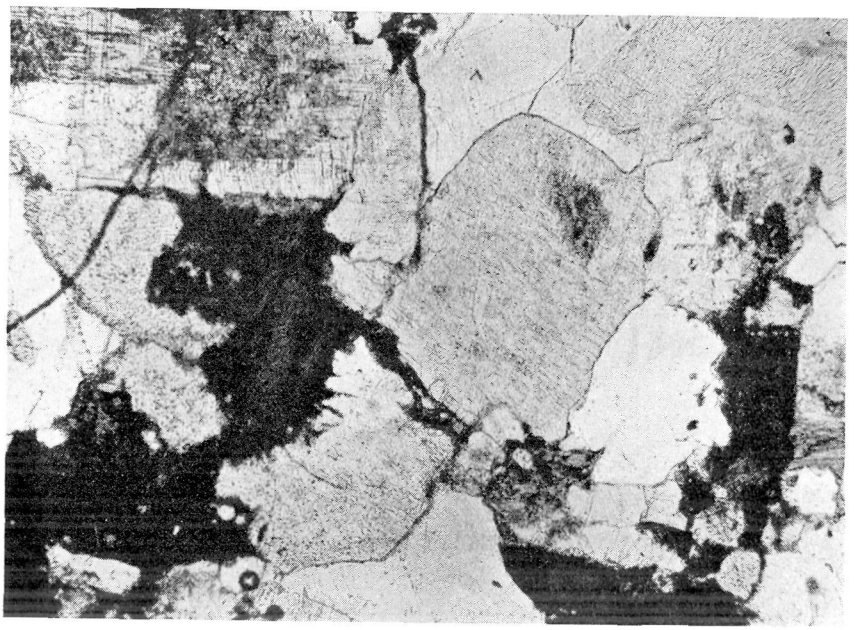

Fig. 1.

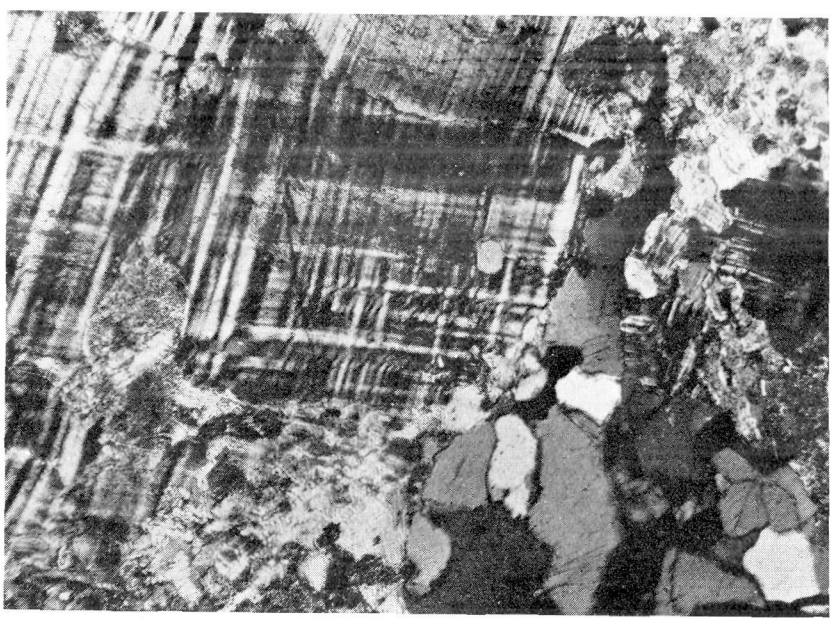

Fig. 2.

pag. 587, linie 13: læs 17 %

to their present place through transportation by the Kjósárlækur (Compare map-sheet 87. Öræfajökull, Copenhagen/Reykjavík). A transport by driftice—say from East Greenland—in a post-Glacial period with higher water level is very unlikely since in all probability we are here above the highest marine level of this part of Iceland. The source of the pebbles is to be expected within the deeply eroded mountain complex of Kjós.

Without being quite identical the two pebbles MM 50/50 and MM 51/50 are very much alike. They consist of a pink biotite-bearing granite with

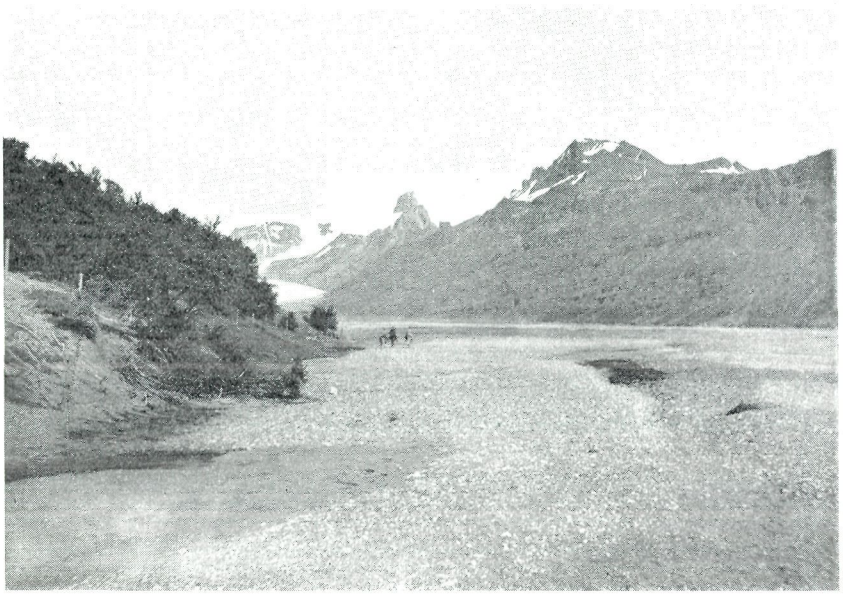

Fig. 3.

ordinary granitic texture (fig. 1). The mineral composition is: *Quartz*, *microcline* with well developed quadrille structure (fig. 2), *perthitic orthoclase*, dirty-greenish *biotite*, *sphene* and *apatite*; MM 51/50 further contains some *plagioclases* of tabular form rather densely crowded with small secondary *epidotes*. The an-content of the plagioclase is 00%.

In Iceland real granites have not previously been found under such circumstances that they cannot be considered alien, whereas granophyres and gabbros have been recorded from several places in the east as well as in the west of the country. As boulders these rocks have been recorded also from the neighbourhood of Morsárdalur (S. Thorarinsson, 1936, Náttúrufræðingurinn p. 80). Intrusive liparitic rocks were found as dykes in Rauðhellar in Morsárdalur by the author in 1936.

The available data are still too scarce to show whether the granite, described here, belongs to a deeply eroded plutonic rock mass, intrusive into the basalt plateau, or whether it is possibly of pre-basaltic origin.

An Oligocene Asteroid from Denmark.

By

H. Wienberg Rasmussen.

Material.—About thirty asteroid marginals which possibly belong to a single individual have been found in the Middle Oligocene clay at the brick-works at Branden in Denmark. A few remains of a similar but less well-preserved asteroid have been found in the Middle Oligocene clay at Faarup brick-works.

A new species is based on the specimen from Branden.

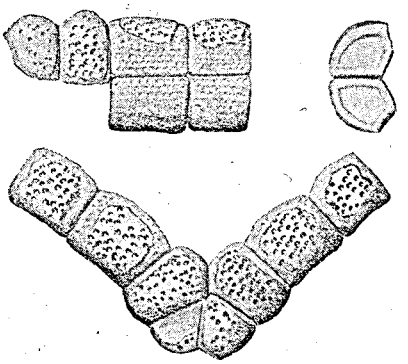

Fig. 1. *Ceramaster brandenensis*, n. sp. Lateral view, profile and dorsal view of reconstructed arm. × 1 1/2 Oligocene, Branden, Denmark.

Ceramaster brandenensis n. sp.

Diagnosis.—A *Ceramaster* whose compact median marginals are as long as they are broad, the height being distinctly less. The ultimate superomarginal is smaller than the median superomarginals; it may correspond to more than one inferomarginal. The two most distal superomarginals from each side of the arm have met in the mid-line of the arm. The outer surface of the marginals has shallow, closely placed pits which have borne setae. The central part of the surface is slightly elevated and bears scattered somewhat deeper, circular pits. This specially ornamented central area is strongly reduced on the median superomarginals and is quite absent on the inferomarginals.

Type.—The median superomarginal shown in the right side of the figure is the holotype. Collection of the Mineralogical Museum, Copenhagen.

Description.—The ossicles found do not make a full reconstruction of the animal possible. The outline is pentagonal. The sides are straight or slightly concave. The shape of the marginals indicates that there have been at least four superomarginals in each side of the arm. The

median marginals are as long as they are broad, and of a compact appearance. The outer surface is evenly curved, and only slightly tumid.

The distal superomarginals are short and tumid. The ultimate superomarginal is smaller than the median marginals. Three ultimate superomarginals are present among the ossicles from Branden. Two of these ossicles indicate that there have been two inferomarginals corresponding with the ultimate superomarginal. The third of the ultimate superomarginals is smaller and has corresponded with only one inferomarginal and the single terminal ossicle.

A single worn adambulacral ossicle is present. It is of the shape normally found in species of *Ceramaster* and *Metopaster*, but permits no further description.

Affinity with other species.—In the shape and ornamentation of the marginals *C. brandenensis* is reminiscent of the genus *Metopaster*. It differs from *Metopaster*, however, in not having a large ultimate superomarginal corresponding to several inferomarginals. In this character it is reminiscent of the genus *Ceramaster* and specially the recent *C. placenta* (MÜLLER & TROSCHEL). *C. placenta* has six superomarginals and seven inferomarginals, two inferomarginals corresponding to the small ultimate superomarginal. Also the ornamentation of the marginals in *C. placenta* is similar to that of *C. brandenensis*.

The genus *Ceramaster* is known recent and from Cretaceous deposits but has not previously been found in the Tertiary. A single Tertiary *Metopaster* is known. This is the Miocene *M. duvergieri* VALETTE. This species is based on a single superomarginal, which differs from the marginals of *C. brandenensis* in being shorter than broad.

Occurrence.—Middle Oligocene. Branden and Faarup in Denmark.

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Preliminary Report on the Geological Field Work Carried Out by the Danish Peary Land Expedition in the Year 1949—50.

By

K. ELLITSGAARD-RASMUSSEN.

As a member of the Danish Peary Land Expedition party that worked in the north of Greenland 1949-50 I had occasion to study two areas in Peary Land, viz., the western part of the fold system in northern Peary Land, and the area of intrusives in southern Peary Land.

In the early part of spring I traveled by dog sledge from the base at J. Brønlunds Fjord through Wandels Dal to Nansens Land in the northwest of Peary Land. After having finished my field investigations in the fold system I worked through the early part of summer in Sydpasset and in Independence Fjord.

In I. P. Kochs Fjord, the fold system of northern Peary Land is first encountered around the southernmost of the large islands at the center of the fjord. The folding is here developed as weak monoclinal and homoclinal folds. It is not until north of the portion of I. P. Kochs Fjord that runs east and west that the intensive folding appears. Here the fjord seems to be paralleled by zones of heavy deformation with strongly disturbed strata.

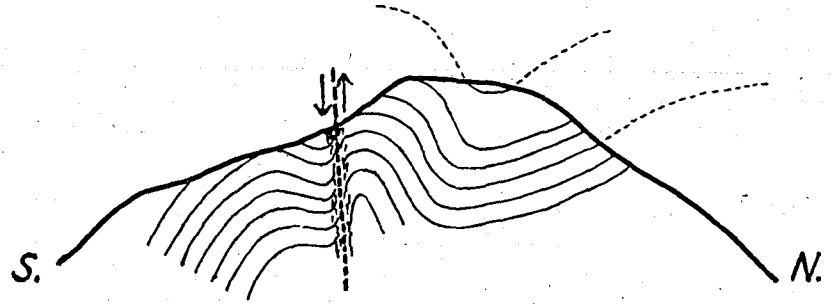


Fig. 1. The broken line indicates an incipient shear thrust plane in a composite anticline in the southern part of Elisons Ø. The arrows indicate the direction of movement. Copied from a notebook sketch.

I succeeded in measuring a structural section, about 40 kilometers in length and running across the regional axial strike of the zone of folding. The section was compiled from several smaller sections and will be published in a coming paper on the petrology of the folded rocks. On Elisons Ø, Sverdrups Ø and Nansens Land the folds are very closely crowded. A total of 18 synclines and anticlines were observed with certainty. With a very few exceptions all the folds are asymmetric ones. Minor folds of monoclinal, chevron or slightly recumbent types were observed in several localities. *A common feature of all the asymmetric folds is that their axial planes dip steeply south, which may be taken as an indication of an overthrusting from the south toward the north.* This is remarkable inasmuch as the foreland of the North Greenland geosyncline lies to the south of the fold system. In Lemming Fjord I thus observed, on the limb of a major fold, a minor fold with pronounced tension joints. The orientation in space of the fold indicates the presence of a thrust plane with a southerly dip.

Only in a single case, traces of a movement in the opposite direction was observed. In a composite anticline in southern Elisons Ø, a vertical shear thrust exists between the southern limb of a minor anticline and the northern limb of a minor syncline (fig. 1). This indicates a tendency toward overthrusting from the north or underthrusting in the opposite direction.

This phenomenon may have some connection with the above-mentioned zone of deformation along I. P. Kochs Fjord.

Within the examined area, the regional strike of the zone of folding is around N. 80°W., and the fold axes plunge 3°–10°W.

Traces of post-orogenic faults striking about E.–W. were discovered in several places. Only in a few instances, however, could the presence of the faults be definitely established, and in these cases the faults dipped steeply south.

The field work indicates that the metamorphism accompanying the folding has predominantly been of the dynamic type. Macroscopically, the resistant, coarsely clastic sandstone members appear almost unchanged, while the shale members, which are less resistant to mechanical influences, have lost their primary structures and have acquired new metamorphic features. Only in a few instances has the change been so thorough that the original character of the rock is no longer discernible, as for instance in chlorite schists and talc schists. The metamorphic structure, which is particularly strongly developed in the above-mentioned zone along I. P. Kochs Fjord, show interesting features which, on closer examination, may give us additional information on the zone. Weak recrystallization occurs in connection with the metamorphic structure.

Closely connected with a very pronounced system of joints and fissures are prominent fissure fillings of quartz and calcite.

To sum up, dynamic metamorphism appears to be more dominant than regional thermal metamorphism. If, however, laboratory investigations should show that the latter type is present, the degree of metamorphism will probably turn out to be increasing from the south toward the north. This would be in agreement with the view held by L. Koch, who on the Bicentenary Expedition in 1921 found garnetiferous mica schists at Kap Morris Jesup on the north coast of Peary Land.

Also some post-orogenic (or possibly syn-orogenic) basic intrusives were studied. Three lithologic types could be distinguished, two of which that occurred in a composite dike were of different age.

Difficulties arising from the conditions of traveling prevented me from examining the central and eastern portions of the orogen. When Mr. E. Knuth traveled by dog sledge in this part of Peary Land, he was kind enough to collect specimens according to methods suggested by me. In this way I obtained a collection of rock types fairly representative of the above-mentioned parts of the fold system. Besides rock samples collected *in situ*, Knuth brought home samples of sand from the rivers that flow down the Roosevelts Fjelde. In this material, the degree of metamorphism agrees with that of the rocks of Nansens Land, described above. It is, therefore, difficult for me to understand or believe in the presence of a high-metamorphic core in the interior of Peary Land, the existence of which L. Koch assumed after his return from the Bicentenary Expedition in 1921. An examination of the samples of sand may, however, change my opinion on this point.

After his flight over Peary Land in 1938, L. Koch reported that Mt. Vistar in the Nordkronen Mts. in central Peary Land was crowned by

towering peaks and pinnacles, which according to KOCH had been produced by erosion acting on an area cut by resistant dikes. On a reconnaissance flight over the Nordkronen Mts. I came so close to Mt. Vistar that I could observe with a high degree of certainty that the peaks were built up of stratified sediments. The modeling of the peaks appears to have been conditioned by a strongly developed joint system, reminiscent of that present in Nansens Land.

In the best preserved sediments I looked in vain for fossils, and no other observations permitting a stratigraphic dating of the folded strata were made. Thus, apart from Pleistocene marine terraces, no postorogenic sediments were observed. A comparison of heavy mineral analyses of unfolded, stratigraphically dated sediments with similar analyses of the folded rocks may, however, yield some evidence as to the age of the strata involved in the folding.

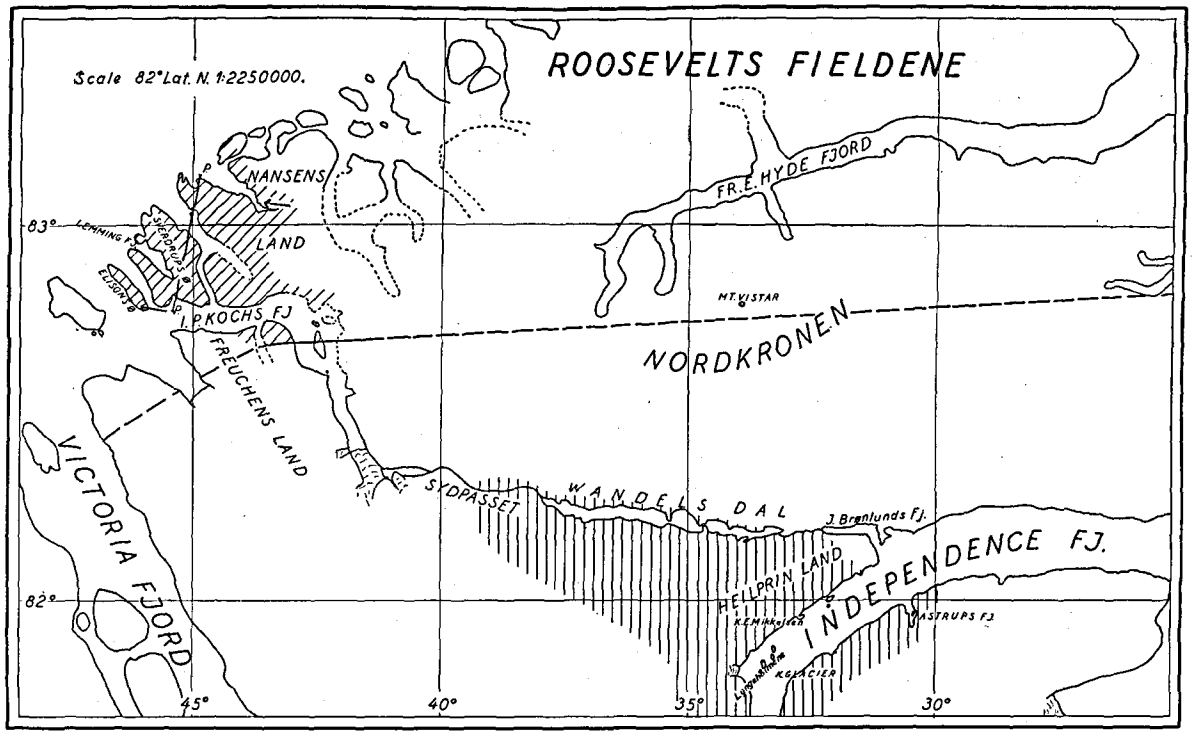
Another subject that I had occasion to study in some detail was the numerous doleritic intrusives in Sydpasset, Astrups Fjord and the interior of Independence Fjord. Besides in these areas, intrusives are also very abundant along Lake Midsommersø (in Wandels Dal) and in the country south of the lake. Mr. THORKILD NIELSEN has informed me that there is a great abundance of intrusives in the region west of Heilprin Land.

As the intrusive rocks have not as yet been worked up, only field identifications of the rock types can be presented. The rock sequences show great variation from one sequence to another and also within the same sequence. I shall, therefore, confine myself to characterize the rocks as dolerites, this term to be understood in its widest possible sense.

All the mountain sides of the interior of Independence Fjord are densely shot through with intrusive bodies. Apparently the intrusives are sills grading into dikes, but it is commonly difficult to distinguish between the two types as the same intrusive body may show all degrees of conformity or nonconformity with the pre-Cambrian sandstones that constitute the wall rock. In "The Geology of North Greenland" (1925) L. KOCH mentions four large laccoliths on the south side of Independence Fjord, but my own observations have not convinced me of their presence. Many sills reach a considerable thickness, in several places about 200 meters. As at the same time their extent in the horizontal direction is very great (many sills may be followed for 20–30 kilometers), the presence of these numerous intrusives means a very large influx of material.

In many places, unusually beautiful columnar structures have been observed. On one of the islets of the Lyngeholme group in Independence Fjord I measured regularly developed columns of a height of about 120 meters and of a diameter of 3–4 meters. Columns of a similar order of magnitude occur in several other localities.

In the course of the field work I succeeded in distinguishing between seven different sequences of intrusives. The relative age of several of these was determined by means of observations on intersections. The age of the intrusives relative to stratigraphically dated sedimentary formations could, however, not be definitely determined, as all of the observed intrusives penetrate the pre-Cambrian sandstones without



Sketch map of Peary Land after L. Koch: "The Physiographical Map of Pearyland", 1938, with some corrections by the writer. Heavy broken line, running across Peary Land from east to west: boundary between the folded region to the north and the unfolded region to the south. Vertical hatching: main area of intrusives. Diagonal hatching: the portion of the fold system examined by the writer.
PP: location of the composite section. Arrows: direction of fold axes.

involving the younger formations. I hope, however, to find agreement between the stratigraphically dated intrusives collected by J. TROELSEN during his stay in Peary Land 1948–49 (Dr. TROELSEN has kindly promised me to let me have this material for study) and the post-orogenic ones from the fold system that I have examined. Even if no such agreement exists, the material on hand will give a picture of the magmatic processes that have taken place beneath the orogen and its foreland.

One of the intrusive members from Kap Glacier in Independence Fjord has been described as a quartz dolerite by K. CALLISEN (1929). Also another sample was determined by A. NOE-NYGAARD (TROELSEN, 1949) to be a quartz dolerite.

One of the intrusives, a flow breccia from the vicinity of Kap E. Mikkelsen in Independence Fjord, is quite different from the rest. A brick-red fine-grained matrix contains sandstone fragments, which presumably have been transported from the depth over a rather considerable distance. In connection with the breccia some hybrid rocks occur. Otherwise, products of contact metamorphism are rare within the examined area, although interesting phenomena have been observed in a few localities, as f. inst. in Sydpasset.

Because of the insufficiency of the maps and the lack of time in the field, my investigations may in the main be characterized as a petrological survey with special reference to rock types and the occurrence of differentiates, aplites, contact phenomena, etc. The larger structures and their arrangement in space were given a more subordinate place in the survey. The final publication of the data must be deferred until the investigations in the laboratory have been completed.

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Résumé.

Foreløbig meddelelse om det geologiske feltarbejde under overvintringen 1949—50.

Der gives en kort oversigt over opbygningen af det nordlige Pearylands foldekæde i Nansens Land. Opbygningen er asymmetrisk med næsten alle akseplanerne hældende stejlt mod syd. Foldningens regionale strygning ligger omkring n. 80° v. og foldningsaksen hælder svagt mod vest.

En mekanisk deformationszone synes at løbe langs den øst-vestgående del af I. P. Kochs Fjord. Bevægelsesmekanikken har sandsynligvis været med overskydningstendens fra syd mod nord. Metamorfosen, der har ramt bjergartsmaterialet, er overvejende af dynamisk natur. Rekrystallisation optræder kun sparsomt. Dette materiale og det ganske lignende materiale som E. KNUTH indsamlede i Fr. E. Hyde Fjord bevirker, at forfatteren ikke deler L. KOCHS opfattelse om tilstedeværelsen af en gnejskerne i det centrale Pearyland. Foldekæden rummer mindst tre dykeserier af postkinematisk alder.

Foruden undersøgelser i foldekæden omtales undersøgelser i de mange intrusiver, der findes i Sydpasset og det indre Independence. Ikke mindre end syv bjergartsforskellige serier var det muligt at holde ude fra hinanden. Bjergarterne rummer både basiske og sure led. De er intruderet som sills og dykes i den prækambriske sandsten (Thuleformationen).

Om lagerföljden inom Sveriges äldre mesozoikum.

Av

G. TROEDSSON.

ANGELIN indelade Skånes äldre mesozoiska bildningar i Kågeröds- och Höganäs-formationerna.

Kågeröds-formationen är äldst. Den har fått sitt material från ett ökenvittrat urbergsområde med hög relief, ett område som åt SV. begränsas av den stora NV–SO-förkastning, vilken än i dag skiljer urberget från SV-Skånes sedimentära berggrund. Kågerödsbildningarna är fossilfria, röd- och grönfärgade, grova breccio-konglomerat med en högst 30 m lerig avdelning överst. Deras förnämsta utbredning är i området SV om Kullen-Söderåsen, där de når en mäktighet upp till åtminstone 300 m. Men spridda, tunna förekomster av samma facies förekomma på urberget från Skälderviken till Hörby samt på silurén vid Tosterup. Huruvida alla dessa äro samtidiga är ovisst. Med säkerhet tillhöra de dock den ökenperiod som i stora delar av Europa sträcker sig igenom perm och trias.

Höganäs-serien, vanligen kallad rät-lias, tillhör en humid klimattyp. Den är i sin nedre del kolförande och består av leror och sandstenar, här och var impregnerade med järn- och kalciumkarbonat.

Underst kommer rät med de 2 förnämsta kolflötserna, de enda som brytas numera, och den rika rätiska floran, karakteriserad av *Lepidopteris Ottonis*. I den basala delen, vallåkraavdelningen, har nyligen träffats marina fossil, tillhörande *Avicula-contorta*-faunan, förut okänd i Sverige.

Helsingborgsetagen inleder lias och börjar med en kaolin och arkosavdelning, boserupslagren. Denna har i sin bas floran med *Equisetites gracilis* och avslutas med z. m. *Thaumatopteris Schenki* (= z. m. *Dictyo-*

phyllum acutilobum eller hälsingborgsfloran). Till Helsingborgsetagen hör vidare hela serien från Pålsjö, Gravarna, Sofiero och Laröd med pålsjöfloran (z. m. *Dictyophyllum Nilssoni* och *Nilssonia polymorpha*), mytilusbanken, slipsandstenen med *Cardinia follini* (Cardiniabanken) och z. m. *"Cyclas" nathorsti*; vidare pullastrabanken, träffad vid Ramlösa, Hälsingborgs ångtegelbruk, Esperöd (S. om Höganäs) och i flera borrhål; kvarnstenen, sandstenen, och floran vid Höör; en yngre slipsandsten vid Ingelsträde, Brandstorp och Täppeshusen; samt ostreabanken vid Kulla Gunnarstorp, Dompäng och i borrhål. Hela mäktigheten är ca. 200 m. Närmaste motsvarighet är α_{1-2} i det tyska schemat eller hettangien. Hälsingborgsetagen har en utpräglat cyklisk sedimentering, bestående i en upprepad växling av supramarina och marina sediment.

Nästa avdelning är Döshult-etagen. Den är helt marin, uppbyggd av de grova döshultsandstenarna, som träffas både norr och söder om Helsingborg, avicula- och ammonitbankarna i norr samt ammonit- och homomya-bankarna i söder. De båda senare tillhöra Gantofta-delen av den för några år sedan tillfälligtvis blottade serien vid Gantofta och Katslösa. Döshultetagen börjar alltså med grovsandiga lager, ofta järnrika, inneslutande aviculabankens närmast estuarina fauna, som representerar transgressionsstadiet. Därpå kommer ammonitbankens högmarina fauna under transgressionsmaximum och till sist den "sarmatiska" pleuromyabanken med tunnskaliga musslor, massvis anhopade (påminnande om postglaciala skalbankar i Östersjöområdet) och tillhörande regressionen. Mäktigheten är vid Gantofta ca. 170 m, vid Oregården (SV om Engelholm) 70 m. Döshultetagen motsvarar α_3 eller undre sinemurien.

Lagerserien vid Katslösa, S. om Helsingborg, blottades i ett större dike år 1945 men är nu alldeles otillgänglig. På en sträcka av 400 m syntes en nästan oavbruten lagerserie, ostörd av förkastningar, men med en stupning av 30° nästan i dikets längdriktning, NO–SV. Den 175 m. mäktiga lagerserien består av leror och sandstenar i mer eller mindre tät växling. Vid 60 m, räknat nedifrån, är en rödaktig lera, som bildar en markant gräns mellan en undre järnfattig avdelning (med homomyabanken) och en övre järnrik. Den är 0,24 m mäktig, innehåller förkolnade, vertikala växtdelar och täckes av en fin sand, 7 m, varpå kommer ett konglomerat, 0,4 m, av 1–2 cm. stora, väl rullade kvartsstenar, det grövsta konglomeratet ovanför Kågerödsbildningarna. Leran tydes som ett markskikt, sanden är möjligen en flygsand, och konglomeratet inleder Katslösa-etagen. Dessa tre lager markera en lucka i den marina serien, motsvarande lias β eller övre sinemurien.

Katslösa-etagen har lämnat en rik fauna bestående av 90 arter, varav flertalet musslor. Denna överensstämmer i stort sett med Cardiumbankens i SÖ Skåne och Myoconchabankens på Bornholm. Bergarten är lera med inlagrade bankar av oolitisk siderit-sandsten. Med hjälp av faunan kan denna etage delas i 3 avdelningar, en undre, 20 m, med *Passaloteuthis alveolatus* som viktigaste ledfossil, en mellersta, 29 m, med *Grammatodon cypriniformis*, och en övre, 65 m, med *Pseudopecten aequivalvis* och *Ptychomphalus expansus*. Hela avdelningen tillhör undre pliensbachien eller lias γ; den undre zonen tycks ej ha någon motsvarig-

het i SÖ Skåne och på Bornholm, den mellersta motsvarar i stort sett cardiumbanken i Fyledalen, den översta däremot anknyter närmare till myoconchabanken på Bornholm och cardiumbanken i Tosterupsområdet.

Några av fossilen i de lösa blocken vid Brandsberga och Kolleberga, nära Ljungbyhed, tyda på en nivå något högre än Katslösaetagen.

Lagerföljden framgår närmare av tabellen.

Tabell över Skånes äldre mesozoikum.

Hängande (SÖ Skåne): Supramarin jura? — wealden.

Höganäs-serien	? Brandsbergablocken?			Pliensbachien sup., Lias δ
	Katslösa-et. 115 m	*aequiv.-expansus*-zonen		Pliensbachien inf., Lias γ
		cypriniformis-zonen		
		alveolatus-zonen		
		[Hiatus]		[Sinemurien sup., Lias β]
	Döshult-et. 70–170 m	Homomyabanken		Sinemurien inf., Lias α_3
		Ammonitbanken		
		Aviculabanken		
	Helsingborgsetagen (med *Thaumatopteris*-floran) 200 m	Ostreabanken		Hettangien, Lias α_1–α_2
		Övre slipsandsten		
		Fleningelager		
		Pullastrabanken		
		Undre slipsandsten	Höörsandsten	
		Mytilusbanken		
		Pålsjöfloran	Höörfloran	
		Helsingborgsfloran		
		Boserupslager	Kvarnstenen	
	Rät (med *Lepidopteris*-floran 30–50 m	Flötsavdelningen		Rhétien
		Vallåkraavdelningen		
		m. contortafaunan		
Kågerödsformationen	Röda och brokiga leror			
	sandsten, arkos, kongl.			

Liggande: urberg eller kambrosilur.