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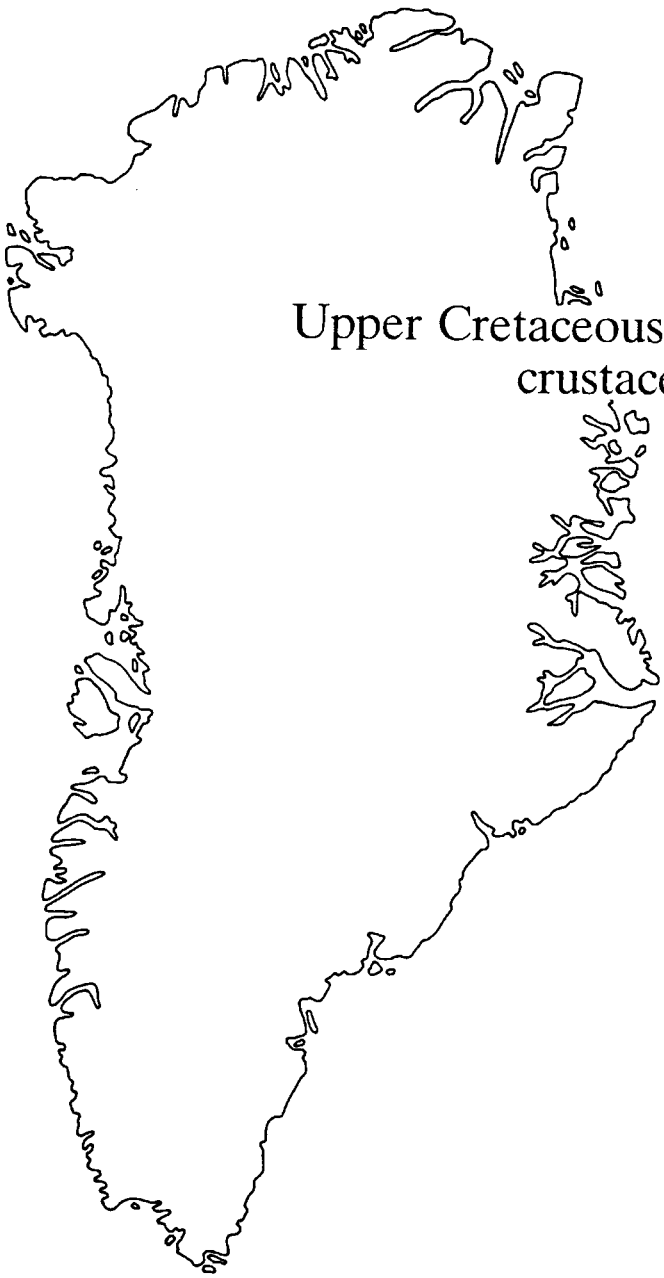

Upper Cretaceous – Lower Tertiary decapod crustaceans from West Greenland

1992

J. S. H. Collins and
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1992

Abstract

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Upper Cretaceous and Paleocene decapod crustaceans are described from Nûgssuaq, West Greenland; 14 genera, 3 of them new, contain 2 new macrurans, 13 new brachyurans and a galathaeid, referable to a previously described species. They form a mixed assemblage, although 7 of the brachyuran taxa and one of the macrurans are of burrowing species. *Homolopsis dispar* Roberts 1962 is transferred to *Eohomola* gen. nov. and a new genus, *Metahomola*, is proposed.

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The Geological Survey of Greenland (GGU) is a research institute affiliated to the Mineral Resources Administration for Greenland (MRA) within the Danish Ministry of Energy. As with all other activities involving the non-living resources in Greenland, GGU's investigations are carried out within the framework of the policies decided jointly by the Greenland Home Rule Authority and the Danish State.

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Contents

Dansk sammendrag

Decapode crustaceaer fra øvre Kridt og Palæocæn i Nûgssuaq, Vestgrønland, beskrives. Fjorten slægter, 3 af dem nye, indeholder 2 nye macruraner, 13 nye brachyuraner og en galathaeid, som kan refereres til en tidligere beskrevet art. De udgør et blandet samfund med hensyn til livsmåde, men 7 af brachyuranerne og en af macruranerne hører til gravende arter. *Homolopsis dispar* Roberts 1962 overflyttes til *Eohomola* gen. nov. og én ny slægt, *Metahomola*, foreslås.

Imaqarnersiuineq

Decapode crustaceaer, uumasut qaleruallit Kalaallit Nunaata kitaani, Nuussuarmi Kridt-ip Palæocæn-illu nalaani, tassa ukiut 70 milliunit matuma siornatigut uumasimasut allaaserineqarput. Ilaqutariit 14-nit, taakkua akornanni pingasut aatsaat siumorneqarsimasut, immikkoortunik marlunnik macruraninik taaguutilinnik, 13-nik brachyuraninik taaguutilinnik ataatsimiillu galathaedinik taagutilimmik ilaqarput, siornatigut immikkoortunut allaaserineqarsimasunut assersuunneqarsinnaapput. Uumasut taakku inooriaasiat assigiinngitsorujussuuvoq, taakkuli ilaat uumasunut assaasartunut ilaallutik. Uumasut siumorneqarsimasut nutaat tunngavigalugit uumasut qaleruallit ilaat ilaqutaariinnut allanut nuunneqarpoq ilaqutariillu nutaat Metahomola-mik atsernissaat siunnersuutigineqarluni.

Introduction

The Upper Cretaceous – Lower Tertiary decapod crustaceans from the Nûgssuaq peninsula, West Greenland (figs 1, 24) described in the present paper, were collected by the late Professor A. Rosenkrantz, Copenhagen and co-workers in the course of 18 expeditions to West Greenland. The earliest expeditions, in 1938 and 1939, were supported by the Carlsberg Foundation, Copenhagen and Den Kongelige Grønlandske Handel (Royal Greenland Trading Company). Sixteen expeditions in the period 1946–1968 were under the auspices of Grønlands Geologiske Undersøgelse (GGU, Geological Survey of Greenland). A summary of the expeditions and their results was given by Rosenkrantz (1970).

Many workers have described fossils from the outstanding collections made by the Nûgssuaq expeditions (see summary by Rosenkrantz, 1970; Henderson *et al.*, 1976; Kollmann & Peel, 1983).

In 1978 the late Dr. H. Wienberg Rasmussen took up the study on the decapod crustaceans; a study which was not finished due to his untimely death in 1980. The present paper is based on the unpublished material.

Regional setting

The Upper Cretaceous – Lower Tertiary rocks of West Greenland include both terrestrial and marine sediments as well as volcanic lavas and hyaloclastites. The sediments occur on a series of islands and peninsulas between 69° and 72°N, from Disko in the south to Svartenhuk Halvø to the north. Together with outcrops

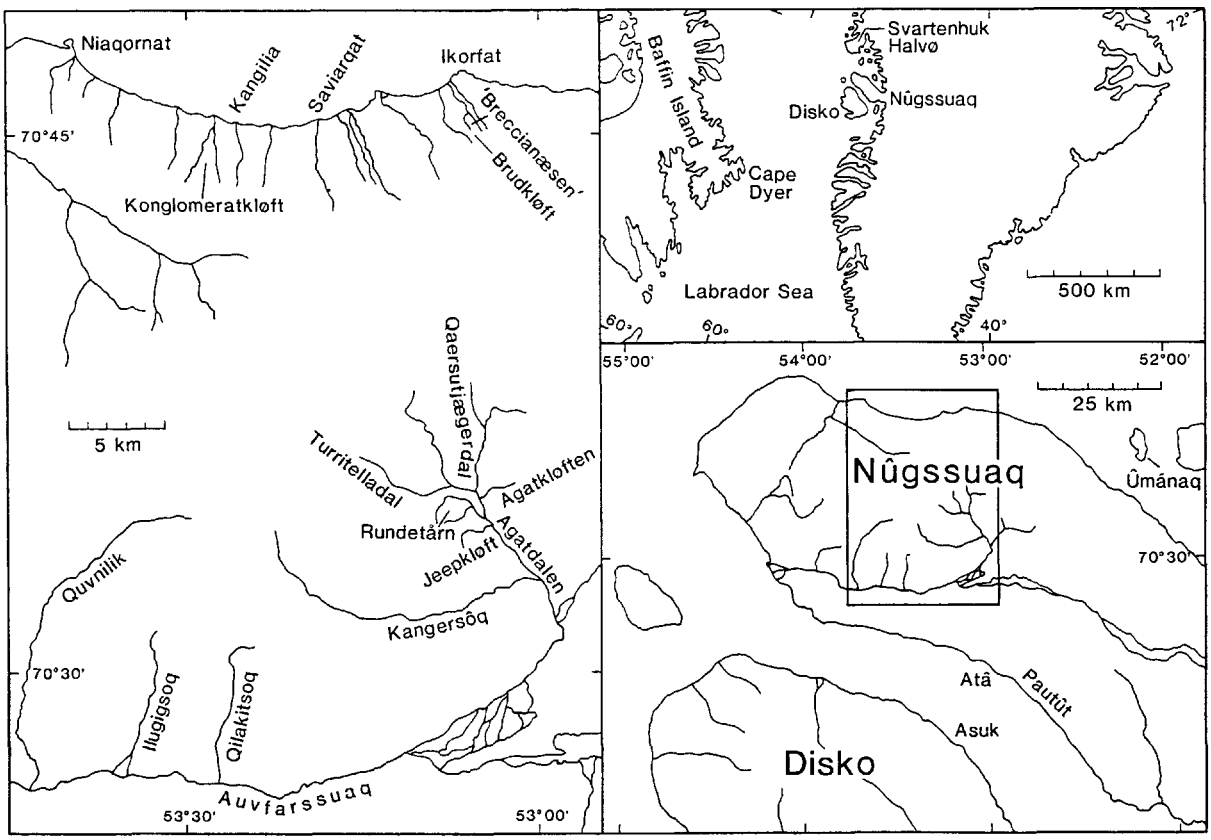

Fig. 1. Localities in Nûgssuaq, West Greenland. Agatdalen includes the 'Sonja lens', Rundetårn and Jeepkløft. Turritellakløft includes Scaphitesnæsen.

	NORTH COAST OF NÛGSSUAQ	CENTRAL NÛGSSUAQ
PALEOCENE	? AGATDAL FORMATION	AGATDAL FORMATION
		Abraham Member Andreas Member Turritellakløft Member } ? Sonja Member
	KANGILIA FORMATION	KANGILIA FORMATION
	Propeamussium Member	*Propeamussium* Member
	Thyasira Member	*Thyasira* Member
	Fossil Wood Member	
?–	Conglomerate Member	Oyster–ammonite Conglomerate
CRETACEOUS	Undifferentiated Cretaceous shales	Undifferentiated Cretaceous shales
		ATANE FORMATION

Fig. 2. Paleocene lithostratigraphy, Nûgssuaq, West Greenland. After Kollmann & Peel (1983).

at Cape Dyer on Baffin Island, they constitute the only onshore outcrops of sediments that were deposited in a series of rift basins that streches from the Labrador Sea to northern Baffin Bay. These basins formed along the continental margins of West Greenland and Labrador – Baffin Island and are related to the opening of the Labrador Sea in late Mesozoic – early Cenozoic time.

The sedimentary succession in West Greenland is more than 2.5 km in thickness (Henderson *et al.*, 1981). The sediments range in age from Early Cretaceous (Albian) to Early Tertiary (Paleocene) (see summary in Pulvertaft, 1987). The outcrops are bounded to the east by Precambrian basement rocks against which the Cretaceous sediments have a faulted contact (Pedersen & Pulvertaft, 1992).

Cretaceous non-marine strata, outcropping in the eastern part of Disko and eastern Nûgssuaq, are referred to the Atane Formation. The non-marine sediments are fluvial in the southern and eastern parts of the area; westwards and north-westwards there is both a lateral transition in space and an upwards transition in time, through delta plain deposits with coal into delta front deposits with horizons containing typical shallow marine trace fossils and occasional bivalves and ammonites. In the south and east the non-marine sediments are of Albian–Cenomanian age, while to the west and north-west they are younger, in places possibly as young as early Campanian (Pedersen & Pulvertaft, 1992).

Marine deposited, dark laminated shelf mudstones, sandstones and conglomerates of Late Cretaceous to Early Tertiary age are well exposed on the north coast of Nûgssuaq and on Svartenhuk Halvø, and are referred to as undifferentiated marine Cretaceous shales (lower part) and the Kangilia Formation (upper part) (Rosenkrantz, 1970). On the north coast of Nûgssuaq the Kangilia Formation comprises several members of conglomerates and shales (Fig. 2). The Kangilia Formation can be followed across Nûgssuaq and is reported from southern Nûgssuaq at Atâ and from cuesta-like basins at Asuk on Disko (Koch, 1959; Hansen, 1980). Erosional unconformities, coarse channelised conglomerates and sand-dominated units in this formation are reported from several localities (Rosenkrantz, 1970; Pulvertaft & Chalmers, 1990; Christiansen *et al.*, in press). In central Nûgssuaq, the Kangilia Formation is overlain unconformably by the shallow marine Agatdal Formation, comprising several members of sandstones and shales (Rosenkrantz, 1970; Fig. 2). Several beds in these members are rich in marine fossils, in particular a horizon in the Sonja Member, known as the Sonja lens.

The Cretaceous–Paleocene marine strata in the central and northern part of Nugssûaq have been biostratigraphically dated, mainly on the basis of ammonites, dinoflagellates and foraminifera (Birkelund, 1965; H. J. Hansen, 1970; Croxton, 1976; Ehman *et al.*, 1976; J. M. Hansen, 1980) and to a lesser extent by inoceramid bivalves (see Rosenkrantz & Pulvertaft, 1969, table 1). Dating of the non-marine strata is less exact, but some limits can be placed on the ages of these by correlation between the marine and non-marine strata and by fossil plants and pollen.

Gregers Dam

Note on localities

The most important outcrops are shown in Fig. 1. Upper Cretaceous outcrops were described by Birkelund (1965) and Lower Tertiary outcrops by Hansen (1970) and Floris (1972) (see also Rosenkrantz, 1970; Henderson *et al.*, 1976).

Systematic palaeontology

Infraorder Palinura Latreille, 1802
Superfamily Glypheoidea Winckler, 1883
Family Mecochiridae Van Straelen, 1925

Genus *Mecochirus* Germar, 1827

Type species. Mecochirus longimanatus (von Schlotheim, 1820) by subsequent designation of H. Woods, 1927.

Range. Middle Triassic to Upper Cretaceous.

Mecochirus rostratus sp. nov.

Figs 3A-C, 4A-B

Derivation of name. With reference to the rostrum which is larger than in any other species of this genus.

Diagnosis. – A *Mecochirus* with very long, pointed rostrum with dorsolateral spines. Carapace thick, strongly calcified and distinctly sculptured with more or less forwardly directed spines on anterior and dorsal areas. The postorbital ridge is weakly developed. The cardiac region is divided by a depression into anterior and posterior parts. The postcervical and branchiocardiac furrows run closely parallel from a nodose elevation near the dorso-posterior margin. The antennal exopod has a large scaphocerite with a long distal and small lateral spine. All pereiopods long and slender with a long, slender, curved dactylus; no chelae and not typically subchelate. First pereiopod with very long propodus.

Material. 2170 cephalothoraces from two horizons. Holotype MGUH 21.580 and 1862 additional specimens are from Maastrichtian concretions found as boulders in the Late Danian 'oyster-ammonite conglomerate' at Agatkløft, 405–410 m; 299 are from the same conglomerate at western side of Agatdalen, 510–530 m; four from above the river plain near Agatkløften; one from the Kangersôq river bed; one from a profile on the south side of Turritellakløft; one from the Maastrichtian of Ikorfat, 980–985 m; and one from the Upper Campanian of Brudkløft at Ikorfat, 550–625 m on the north coast of Nûgssuaq (Fig. 3).

All specimens are found in dark grey to black calcareous concretions. Most of them are fairly complete with carapace, abdomen and legs, but the very long first pair of pereiopods are incomplete in almost all specimens, only the proximal part being included in the concretions. It appears that all specimens are broken along the dorsal midline and the rostrum is broken off, although the parts are generally not much disturbed – as such, they may well represent exuviae.

The carapace was exposed and measured from frontal to posterior margins (rostrum excluded) in 687 specimens and showed a size range from 9.3 to 32.9 mm. The size-frequency distribution shows a simple symmetrical bell-shaped form with a mean of 22.1 mm and standard deviation 3.4 mm. There is no indication of separate size groups which could be age classes or successive exuviae. If most specimens are exuviae, the ecdyses are not bound to distinctly separate common size groups within the population.

Description. Carapace subcylindrical, length excluding rostrum about twice the dorso-ventral height, or slightly less, with the greatest height close behind mid-carapace length. Neither the carapace nor rostrum undergoes any allometric change of form during growth.

The dorsal midline is almost straight, entrenched at the cervical furrow and rather less between the anterior and posterior parts of the cardiac region. Anteriorly the ventral margin curves gradually upwards towards the front, but has a slightly bulging pterygostomial area. The posterior margin has a prominent, finely granulated ridge, bounded behind by a smooth depressed rim, projecting backwards in a lobe near the top of the branchial region and the dorsal part of the margin forms an embayment along the cardiac region. The slender rostrum equals about half of the carapace length measured between the frontal and posterior margins. As preserved, it is in all instances fractured at its base from the carapace, although generally not much disturbed. It is directed straight forward, although slightly undulant and gradually tapers distally to a blunt point; deeply V-shaped in section, it is sulcate above, ridged below, the width and depth of the sulcus increasing proximally until on reaching the carapace it flattens and is divided by a low median ridge starting just behind the frontal margin. The dorso-lateral edges of the rostrum are provided with sharp forwardly and outwardly projecting spines that continue onto the carapace as carinae on either side of the dorsal midline almost to the cervical furrow where they curve towards the midline and, becoming obsolete, delimit a narrow lanceolate dorsal area which is divided by a low, narrow median ridge lined with small spines and granules. The total number of spines on either side of the rostrum varies from six to

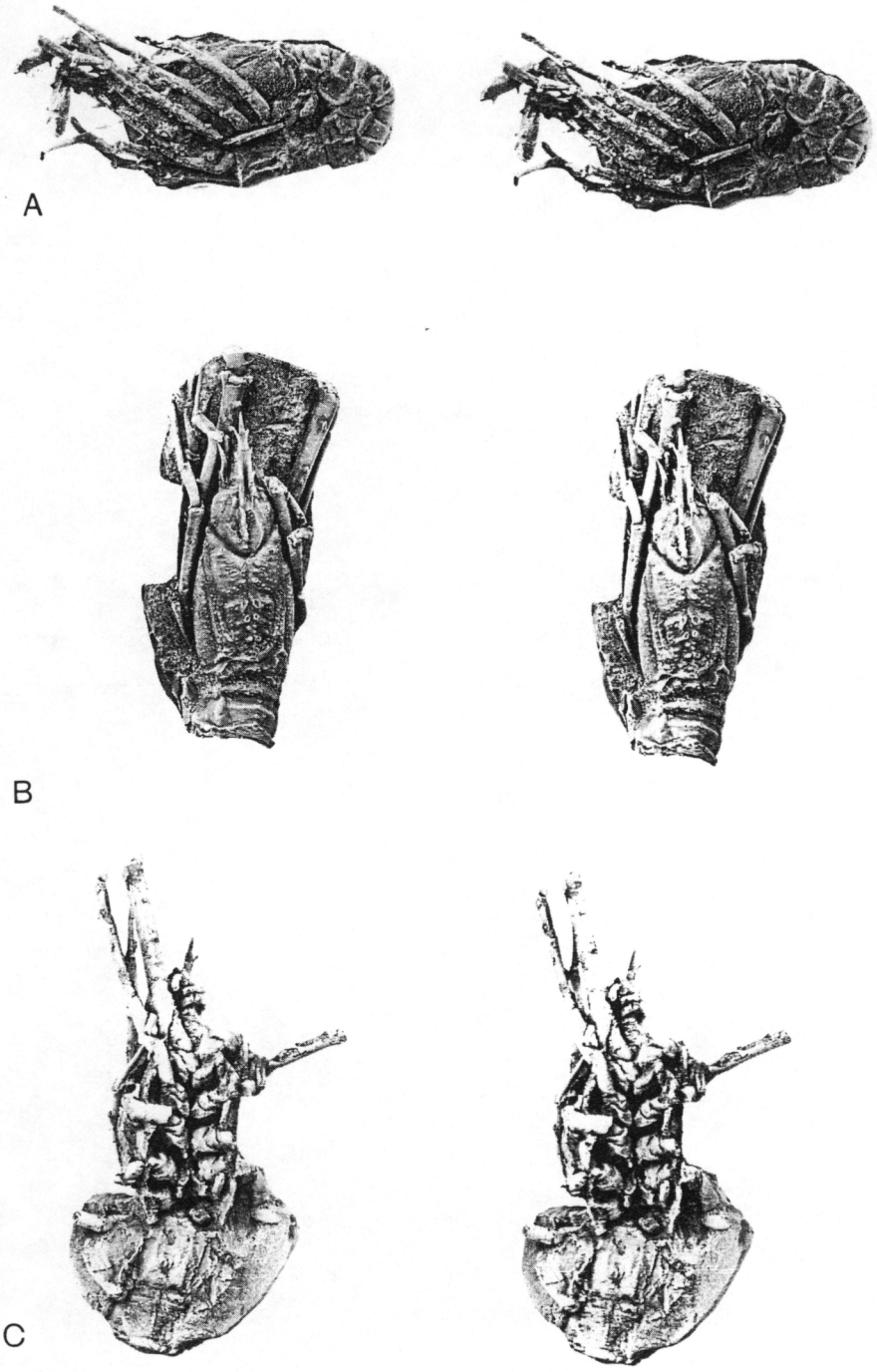

Fig. 3. *Mecochirus rostratus* sp. nov. from the Maastrichtian at Agatkløft, × 1. A: holotype, MGUH 21.580, side view; B: paratype, MGUH 21.581, dorsal view; C: paratype, MGUH 21.582, ventral view.

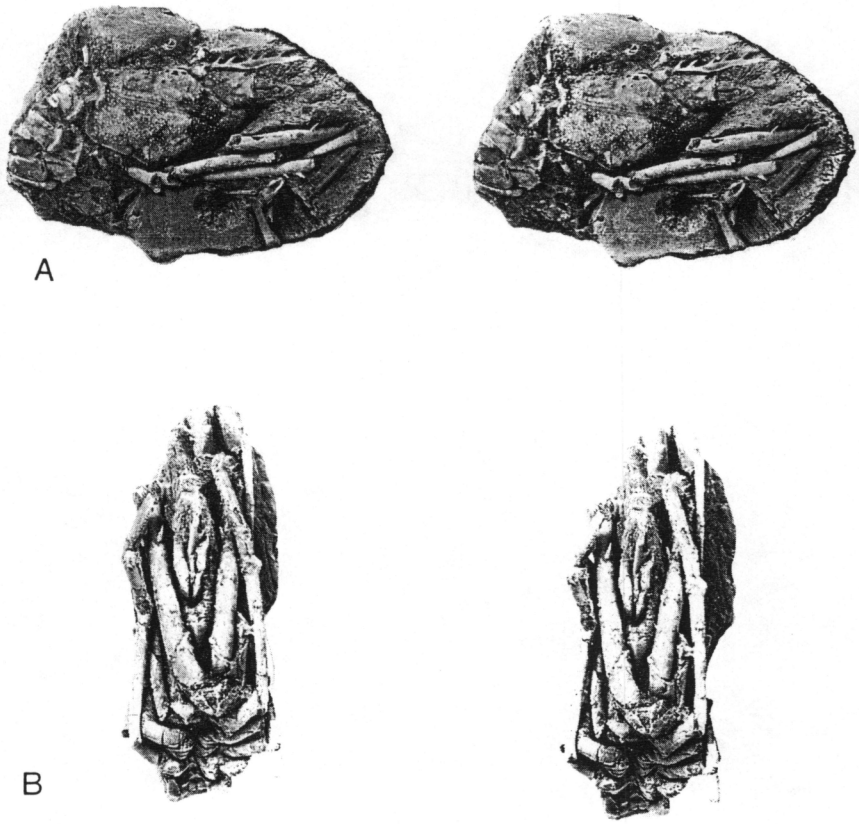

Fig. 4. *Mecochirus rostratus* sp. nov. from the Maastrichtian at Agatdal. × 1. A: paratype, MGUH 21.583, side view showing details of the rostrum; B: paratype, MGUH 21.584, ventral view showing details of maxillipeds.

eight, of which three occupy the projecting part; they are normally arranged opposite one another although alternating exceptions occur. The ventrolateral parts of the rostrum, are almost smooth, or have low tubercles at midlength and a short oblique ridge or row of tubercles may run from the sides into the frontal margin. The orbital margin is almost straight and the upper orbital spine immediately under the rostrum is followed by two or three small spines forming an inconspicuous ridge running back onto the carapace at a diverging angle from the rostral carina; the suborbital spine set immediately below has a smaller spine behind.

The cervical furrow forms a deep, rather broad depression with a steep posterior wall sloping very obliquely downwards and forwards, to unite with the antennal furrow which is distinct and reaches the front just below the antennal spine. The postcervical and branchiocardiac furrows are very shallow and oblique; running forward almost parallel from in front of the elevation bounding the posterior margin, they unite with the hepatic furrow, the area enclosed by the furrows is depressed and a faint groove passes upward from the postcervical furrow to the dorsal margin.

There is a row of three large, forwardly directed spines decreasing in size and distance apart posteriorly on the anterior part of the cardiac region, with additional smaller spines and granules scattered over the surface, and often there are faint irregular wrinkles which, radiating from the dorsal midline, follow the posterior margin. The branchial region is covered with small more closely crowded granules, irregular in form and size, but generally in the nature of clusters of very small granules between larger irregular ones or granulated elevations. Fine densely crowded granules cover the slightly tumid pterygostomian area and there is a tendency for a single row of coarse granules to border the antennal furrow.

In some specimens where the branchiostegite has been removed and the branchial epimeres are seen as a fan of four folds forming the inner wall of the branchial chamber. The anterior fold is oblique and follows the cervical furrow, while the steep posterior fold follows the posterior margin.

The eyestalk is preserved and identified in only a few specimens. The antennule has a large, almost pyriform but flattened basal segment with a globular swelling on the presumed ventral side of the broad proximal part containing a small cavity – apparently the statocyst – opening on the flat dorsal side. There is a rounded ridge and a row of well separated pits for the attachment of

setae along the inner and outer edges, and a distal spine in continuation of the inner edge. The two succeeding elements are apparently smaller and subcylindrical; the flagellae have not been seen.

The antenna, and especially the very characteristic large, bifurcate and pointed scaphocerite, is well preserved in many specimens. The coxa is rather short and wedge-shaped with a large ventral tubercle for the antennal gland. The large basis is triangular in section, the outer side forming a rounded ridge ending in a spine; the segment is a little wedge-shaped with the ventral side projecting. The first segment of the endopodite is strongly wedge-shaped and attached along the inner edge of the basis. The second segment is long, subcylindrical, the third is similar, but shorter. Part of a long flagellum is seen in a few specimens; the first segment of the exopodite is a small scale, seldom observed, but the second, or scaphocerite, is large and forms a very long slender, slightly curved, forwardly directed spine with a shorter lateral spine near the base. The spine is triangular in section with a row of pores for setae along the sharp convex edge.

The mandibles are retained more or less *in situ* in several specimens where the anterior part of the carapace is broken or was removed during preparation, they form club-shaped elements with a strongly calcified tumid outer surface. There is a hemispherical lower end with the gnathobase, separated from a pointed shaft by an oblique furrow where the palp was attached. The ischiognath of the rather large maxillipeds is stout, triangular in section with sharp margins, the inner of which is dentate and there are numerous setae pores along the ventral edge. The merognath is large, broad, elliptical and much flattened with one to four spines along the ventral edge. The carpus is conical, subtriangular in section and curved, the proximal end almost perpendicular to the rest of the segment. The propodus is straight, subcylindrical to subtriangular with a flattened inner side. The dactylus is smaller and rounded distally.

All the pereiopods have slender terminal segments, or the first two pairs may be considered slightly subchelate. The first pair is longer and has a larger diameter than the succeeding pairs; the length is about three times that of the carapace (rostrum excluded) and the distal end is generally not preserved within the concretion containing the rest of the animal, the diameter is about twice that of the other limbs. The coxa is stout with an almost flat, rhomboidal ventral surface divided by a narrow furrow near the distal margin. The fused basis and ischium has a distinct suture along which the specimens are often broken; the segment is rather short, subcylindrical and wedge-shaped, longer along the inner side with a distinct distal inner spine, the surface is granulated. The merus is long, about 0.7–0.85 of carapace length and about 3–4 mm in diameter, a little compressed and elliptical in section; spines along the lower edge may form a single row or alternate in a double row of 4–10, there are a few on the upper edge decreasing in size distally and a few granules are scattered mostly on the outer side. The carpus length is about half that of the merus, in section rounded to subquadrate with four blunted edges, each with one or two spines, its surface is granulated. The propodus is very long, generally a little longer than the merus, but the distal end is seldom preserved, it is similar in diameter and section to preceding segments, with a granulated surface and a row of spines along the upper, lower and outer edges. A ventral spine distally does not reach beyond the distal end of the segment nor does it constitute an opposing spine or fixed finger. Thus the first pereiopod is not typically subchelate. The long dactylus is slender, compressed and curved with a median row of closely placed setae pits on the outer side; it is as long, or a little longer than the carpus and between a third to a half the length of the propodus.

The second pereiopod is a little smaller and more slender than the first, there is a scattered surface granulation; the large subtriangular coxa has a flattened ventral face subdivided by a curved transverse furrow. The short basis is wedge-shaped. The ischium is subcylindrical and obliquely terminated. The merus is slender, its length about 0.8–0.9 of that of the first pereiopod and in diameter a little more than half, it is elliptical in section with 4–5 spines equally spaced along the ventral edge. The carpus is about one third of meral length or less, strongly curved proximally, elliptical in section with the greater diameter distally where the joint with the propodus is almost perpendicular, there is a spine at the upper and lower angles of the joint. The propodus is almost twice the length of the carpus, or half that of the merus, distinctly flattened with the greater diameter equal to that of the merus and twice the small diameter; there is a distal ventral spine and a row of closely placed setae pits on the inner side of the rounded dorsal and narrow ventral edges. The dactylus is somewhat shorter than the propodus of the first pereiopod.

In contrast the coxa of the third pereiopod has a rounded, less angular surface, as does the wedge-shaped basis; the ischium is a little less oblique at the distal joint; the merus is a little shorter and has a single ventral row of 4 or 5 equally spaced spines increasing in size distally contrary to the granules which decrease in size distally; the propodus is almost smooth and the dactylus lacks setae pits.

The fourth pereiopod is closely similar to the third, but the merus is slightly shorter and has a row of 3–5 closely spaced spines along the distal part of the ventral side, the median ones the largest.

The fifth pereiopod is somewhat shorter and much more slender, diameter of merus *c.* 0.5–0.7 mm, and propodus less. The surface is smooth or maybe slightly granulated in proximal segments; there are no spines except for distal ones on the carpus and propodus. The dactylus is about half the length of the propodus.

The abdomen is long and subcylindrical, each somite has the tergum transversely divided by two furrows into a smooth anterior area, a more or less elevated median area and a triangular posterior area; a low granulated ridge flanked posteriorly by an articulating boss separates each tergum from the pleura. The first somite has the anterior furrow curved backwards along the projecting lateral (pleural) ridges and uniting with a chevron-shaped posterior furrow; on each side of the lateral edge is a slight incision. There are granules along the bilobate anterior ridge of the elevated median area and a spine on each side of the midline; less prominent granules and a pair of smaller spines occur along the leading edge of the posterior area. The second somite has a smooth frontal area before a prominent transverse furrow bounded behind by a ridge with a pair of small dorsal spines; a second furrow and ridge curve back to the articulating boss. The third and fourth somites are essentially similar, but the fourth has in addition to the median pair of dorsal spines a few median – or a double row – of granules or small spines along the midline, and this arrangement is emphasised on the fifth somite in which the anterior transverse ridge becomes obscure and the median area is longer. The sixth somite has the anterior areas small and depressed, the median area is long with scattered granules and the anterior ridge is replaced by a mid-dorsal row of tubercles.

The elongate pleura of the first somite are separated not so much by a ridge as an entrenchment from the tergum. The pentagonal second pleura are the largest and partially overlap the margins of the first and third pleura; the third-fifth become rounded in outline, while the sixth is much narrower and foreshortened by an embayment for the uropods. The second-fifth pleura have a median lingulate area bounded by a depression which is somewhat wider and shallower on the anterior side, there is a strong, granular marginal rim and a few scattered granules on the hinder part of the median area and posterior margin, leaving the depression relatively smooth. On the sixth pleura a ridge takes the place of the marginal granules.

The large rectangular telson has straight lateral margins and a convex posterior margin; a node on either side of the dorsal midline is bounded by a furrow followed by a granulated ridge, pendant from this ridge lower, much shorter ridges are united medially by granules then become almost obsolete as they curve towards the posterior margin. Laterally, a much stronger ridge extends from the middle of the curved ridge to the posterior angle which is often armed with a small spine. With the exception of the two ridges the surface has scattered granules on the posterior area and there are closely spaced feeble ridges radiating to the posterior margin. The uropodites are attached to the pleural embayment of the sixth somite by short, rounded undivided protopodites. The endopodite and exopodites are broad, leaf-like, slightly oblique-elliptical in outline. The endopodite is strengthened by a single median rib, the exopodite has a median pair of blunt ribs and the inner one continues across the diaresis, which forms a dentate furrow, to the distal margin.

Discussion. Mecochirus rostratus differs from most species in this genus in having a long pointed rostrum with lateral spines, relatively weak orbital and antennal ridges and a depression between the anterior and posterior parts of the cardiac region. The postcervical and branchiocardiac furrows run back at a very low angle towards the posterior margin, apparently not meeting the dorsal line. The pereiopods are not distinctly subchelate, although in having a small distal spine on the propodus opposing the long dactylus, the second pair only may be described as slightly subchelate. The flattened propodus of the second pereiopod is 3–4 times as long as wide and the propodus length of the first pereiopod is less than the carapace length. Only the Upper Jurassic *M. marwicki* Glaessner, 1960 from New Zealand has a similar rostrum, but this species differs in the ornament of the carapace, the almost smooth abdomen and the stout first pair of pereiopods.

A single somewhat fragmentary cephalothorax of *M. crofti* (Ball, 1960) from James Ross Island, Antarctica, the only other known Campanian species, is readily distinguished from *M. rostratus* by the arrangement of its major furrows. The two species represent the youngest known members of the genus. *Meyeria? harveyi*, established by Woodward (1900) from unspecified Upper Cretaceous of Hornby Island, British Columbia, Canada, is presumably a *Mecochirus*, but the species is considered a *nomen nudum* by Förster (1971). According to Whiteaves (1903) it comes from the Nanaimo group, equivalent to the Upper Chalk of England and the Senonian of France.

Ecology. It was demonstrated by Förster (1971, p. 412) that out of 32 species of *Mecochirus* for which informa-

tion regarding the sediment was available, 25 are found in clay or mud either dark shales or clayey concretions. Förster considered most of these specimens to be dead individuals rather than exuviae since pyrite along fissures, openings and ventral surface of the fossils indicates decay of organic tissue. Also, the fossils are generally preserved with the pereiopods directed forwards not irregularly in all directions and the abdomen is bent forward below the cephalothorax. This was taken by Förster as indicative of preservation after death, although there is little information regarding posture in dead bodies or exuviae among Recent macrurans for comparison.

The thin carapace was taken as an indication of a burrowing habit, although the very long first pereiopods were considered to preclude life in a burrow. It is generally considered that most macruran decapods may excavate and take shelter in simple, short burrows, even if they show no morphological adaptation for a burrowing life, as was demonstrated by Rice & Chapman (1971) for Recent *Nephrops*. Bromley & Asgaard (1972) referred complicated systems of thalassinoid burrows from the Lower Jurassic of East Greenland to the activity of *Glyphaea rosenkrantzi* Van Straelen, 1929, which appears quite unfit for life in narrow 'tubes', considering the rigidly calcified skeleton, the thorny ornament and the long pereiopods.

The specimens of *Mecochirus* from Nûgssuaq are generally preserved without pyrite and there is no indication whether they were dead bodies or exuviae, but the antennal scale, pereiopods and abdomen are generally preserved in almost natural position suggestive of dead individuals. There is no indication whether they were burrowers or not, but they are more strongly calcified and have larger spines on the carapace and rostrum than other species of *Mecochirus*, and the first pair of pereiopods, although not extreme for the genus, seem long enough to exclude a life in burrows.

Fig. 5. *Linuparus (Podocrates) spinosus* sp. nov. from the Upper Campanian of Ikorfat. Holotype, MGUH 21.585, dorsal view of the carapace, × 1.

Superfamily Palinuroidea Latreille, 1802
Family Palinuridae Latreille, 1802

Genus *Linuparus* White, 1847
Subgenus *Podocrates* Geinitz, 1849

Type species. Podocrates duelmense Geinitz, 1849, by monotypy.

Linuparus (Podocrates) spinosus sp. nov.

Fig. 5

Derivation of name. With reference to the stout spines on the carapace.

Diagnosis. A *Podocrates* with large, stout supraorbital and postorbital spines followed by two median spines and two pairs of spines close to the midline: there are three equidistant spines on each suborbital ridge. On the branchial region the median ridge is strongly spinose and the marginal spines decrease in size and distance apart posteriorly.

Material. The holotype (MGUH 21.585) and only known specimen is in a small calcareous concretion from the dark bituminous shales, Upper Campanian, of Brudkløft at Ikorfat, 550 m above sea-level on the north coast of Nûgssuaq.

Description. The specimen shows the dorsal surface of the carapace between the supraorbital ridges, and part of the branchial region. The portion of the carapace anterior to the postcervical furrow is weakly convex in side view. Large supraorbital spines are united by a low semicircular ridge and each spine is continued back as a slightly divergent ridge with a concave space between. Behind the supraorbital spines the stout postorbital spines continue the diverging line and between them is a median spine with a larger one immediately behind. Then follow two pairs of bluntly pointed, ridged spines; the first pair set very close to the midline, curve backwards and outwards and gradually taper to obscurity in a shallow depression; the hinder pair, slightly wider apart anteriorly, are longer and curve towards the midline posteriorly, terminating at the postcervical furrow where they are separated from one another by a sulcus. Together the spines enclose a narrow fusiform area. The anterior margin to either side of the supraorbital spines is missing. External to the base of the supraorbital