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## Cambrian–Silurian studies in Washington Land, western North Greenland

John S. Peel

The geological programme commenced in Washington Land during 1975 (Henriksen & Peel, 1976) was continued at an amplified level during July and August 1976 when parties from the Geodetic Institute and the Institute for Surveying and Photogrammetry, Technical University of Denmark, joined three groups from GGU in a combined operation. The natural landing strip at the eastern extremity of Cass Fjord (fig. 10) again served as a base camp, but parties worked throughout Washington Land with support from a Greenlandair Charter Bell 204 helicopter periodically travelling north from Thule Air Base.

The party from the Geodetic Institute, Copenhagen, were primarily engaged in conventional triangulation and the establishment of positional coordinates using satellite-Doppler instrumentation, as a preliminary to possible remapping of North Greenland. The group from the Institute for Surveying and Photogrammetry, led by Keld S. Dueholm spent the

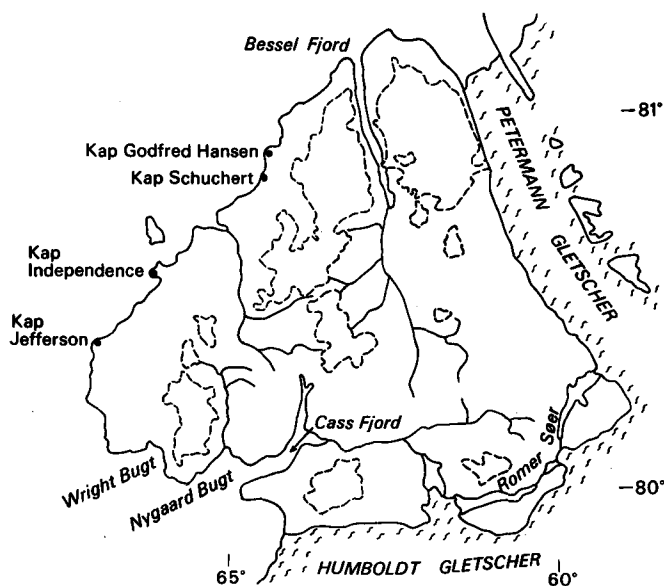


Fig. 10. Washington Land, western North Greenland.

season measuring height and other ground control points in association with Dueholm's Danish Natural and Technical Science Research Councils' (SNF & STF) sponsored project for photogrammetric/geological mapping.

*John M. Hurst* (GGU) studied sections in the Silurian exposed along the north-west coast of Washington Land (fig. 10), in order to elucidate the relationship between previously described, but poorly known, stratigraphic units. The presence of major unconformities representing periods of intense erosion between successive Silurian formations, originally postulated by Koch (1929a) and restated by Poulsen (1934), had been largely discounted during the last decade with the recognition of rapid and large-scale facies changes associated with Silurian carbonate mound complexes (see summary in Dawes, 1976). Consequently, Hurst returned to localities originally visited by Lauge Koch near Kap Jefferson, Kap Independence, Kap Schuchert and Kap Godfred Hansen to try and clarify Koch's concept of the stratigraphy.

A lower unit of crinoidal calcarenites, dark limestones and graptolitic shales (the Cape Schuchert Formation *sensu* Koch, 1929a, but not Norford, 1972) was recognised at the three southern localities and may represent a continuous mappable unit. Overlying strata, variously referred to the Offley Island and Cape Tyson Formations by Koch (1929a), consist of a complex of carbonate mounds with associated breccia beds, and laterally equivalent shales, thin dark limestones and chert beds, with conglomeratic pulses derived from the mounds.

The sequence, as currently known, is considered by Hurst to be probably of Middle-Late Llandovery to Early Wenlock age.

*Hans F. Jepsen* (GGU) spent the months prior to the field season in photogrammetric interpretation of the geology of south-east Washington Land. Two pale marker horizons were followed throughout much of the area and several vertical faults with displacements of up to about 120 m were recognised.

During the first part of the field season Jepsen visited this region, in the vicinity of the Rømer Søer (fig. 10), and was able to satisfactorily correlate the marker horizons with beds in the Kastrup Elv Formation and Cass Fjord Formation recognised in the Cass Fjord area during the previous year. In addition, clastic sediments with *Scolithus* and *Cruziana* were located under the dolomites of the Kastrup Elv Formation, the latter having been the oldest stratigraphic unit recognised during 1975.

In the second part of the field season Jepsen measured sections and mapped in the area south of the head of Bessel Fjord, readily recognising all the Ordovician formations established in the Cass Fjord area, up to the base of the Gonioceras Bay Formation (Middle Ordovician).

John S. Peel (GGU) started the season together with Jepsen in the Rømer Søer area and made collections of trilobites from the well developed Telt Bugt Formation. Subsequently, Peel examined Lower Ordovician – Upper Ordovician strata exposed along the north shore of Cass Fjord at Nygaard Bugt and Wright Bugt, continuing the cumulative section compilation of the previous year (Henriksen & Peel, 1976).

Good collections were made from the Nunatami Formation, including previously unrecorded specimens of the gastropod *Ceratopea* which promise to be useful in terms of correlation between rocks of Late Canadian (late Early Ordovician) age in Washington Land, Peary Land and central East Greenland (Yochelson, 1964; Yochelson & Peel, 1975). Evaporites, comparable to the anhydrite located in the Poulsen Cliff Formation (Early Ordovician) during 1975, were found in the lower beds of the Cape Webster Formation (Middle Ordovician) at Nygaard Bugt, although the greater part of the formation consists of pale weathering dolomites with siltstone partings. A single section measured through the Gonioceras Bay Formation – Cape Calhoun Formation at Wright Bugt promises to help unravel the somewhat involved stratigraphic nomenclature of Koch (1929b). Unfortunately, deterioration in the local weather prevented continuation of section compilation up into the Silurian, and the chance of a possible overlap with the Silurian sections measured by Hurst was temporarily lost.

### Acknowledgements

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## Developments in petroleum exploration offshore West Greenland during 1976

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The first exploration well to be drilled within the concession areas granted offshore West Greenland in April 1975 reached its final depth of between 3500 and 4000 m in August 1976 and was abandoned as a dry hole. The well, Kangâmiut no. 1, was drilled in concession area 34 by the TGA-Grepcu group with Total Grønland Olie A/S as operator using the dynamically positioned drill ship *Pélican*. The well was located about 120 km west of the mouth of Søndre Strømfjord and its coordinates were 66° 09' 00.92" N, 56° 11' 24.28" W. The water depth was 179 m. This is the northernmost well to have been drilled in the marine areas between Canada and Greenland.

GGU was closely involved in the assessment of the application for permission to drill the well. During the drilling phase GGU representatives visited the location on several occasions. The Survey was also represented in the group under the Ministry for Greenland that followed the daily progress of the well. A full series of cuttings, samples and splits of the cores were sent to GGU and processing of these was started on receipt. After the drilling stopped the material and information received were evaluated in close collaboration with the operator.

Since this was the first well in a completely new area the results are of more than usual scientific and economic interest. All sample material, reports and interpretations stemming from the activities of the oil companies are confidential on receipt, but the concession agreements place certain limits to confidentiality. Concerning wells the relevant section in the concession agreement (subarticle 5803 d) allows the Ministry for Greenland "to publish summaries of well data, including information on lithostratigraphic and chronostratigraphic boundaries and on zones which contain hydrocarbons, always provided that the publication shall not take place until 2 years after the completion of a well". This means that the first data on Kangâmiut no. 1 will become available in August 1978.

Only three of the six groups of concessionaires undertook deep-penetration seismic surveys in 1976, and the number of kilometres shot (under 1000 km net) was much less than in