

Otto Fabricius and the Seals of Greenland

Finn O. Kapel



Phoca Groenlandica Fabr.
Phoca oceanica Lapechin.

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Abstract

Finn O. Kapel. Otto Fabricius and the Seals of Greenland. – Meddelelser om Grønland Bioscience Vol. 55. Copenhagen, the Danish Polar Center, 2005. 150 pp.

The life of the Danish missionary, cleric, philologist, naturalist and ethnographer Bishop Otto Fabricius (1744-1822) is reviewed in the first part of this volume. He served as a missionary in Southwest Greenland in 1768-73 and spent his leisure time gaining experience of and collecting information on all products of nature. His work, and his importance as a cleric and as the author of contributions to the study of the Greenlandic language are briefly mentioned: but the greatest importance is attached to his contribution to the sciences of natural history and ethnology. The work that made him famous is *Fauna Groenlandica* (1780), written in Latin and describing 473 animal species from Greenland, of which 130 were new to science. Although his daily duties were related to his ecclesiastical posts, he continued to conduct and publish scientific studies throughout his life. Most of this work was written in Danish, and the distribution therefore limited; however, his ethnographical works have been translated into English (Holtved 1962). Some later writers' evaluations of Fabricius' contributions to the study of natural history are mentioned, and an attempt is made to explore the character of the man behind the work.

The second part of this volume contains a complete, literal translation into English of Otto Fabricius' comprehensive treatise on the seals of Greenland (1790 & 1791). A modern-style list of his references is compiled, supplemented with examples of illustrations found in these works.

Otto Fabricius' contributions to the study of seals are evaluated in the third part of this volume. They enjoy a unique position, since they reflect the intimate knowledge of these animals he was able to obtain by living among seal hunters, as a seal hunter himself. First he established the existence of four seals species in Greenland besides the common seal (*Phoca vitulina*), and provided their names to O.F. Müller (1776); secondly he presented precise descriptions of all five species in *Fauna Groenlandica*. Ten years later he published the treatise on the seals of Greenland; and finally he wrote a detailed description of the seal hunting implements used by the Greenlanders (1810). A comparison with the works of previous and contemporary authors demonstrates that Fabricius' contributions in this field rank high, particularly because of their stamp of personal and direct observation and experience. This was acknowledged by contemporary scientists, and was still recognized well into the nineteenth century; but today the name and work of Otto Fabricius seem to be known only to a few specialists.

Keywords: Otto Fabricius (1744-1822), life and work, Greenland philology, ethnography, natural history, seal studies.

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Preface

This issue of *Meddelelser om Grønland*, Bioscience contains three papers elucidating the contributions of the Danish missionary and scientist Otto Fabricius (1744-1822) to the study of the seals of Greenland: 1) a brief biography of Fabricius, 2) a translation of his treatise on seals, and 3) an evaluation of the preconditions, distinctive features, and significance of his contribution in this field of research.

The key paper is the second one. In March and December 1790 Otto Fabricius delivered two lectures on the seals of Greenland at meetings of the Society of Natural History of Copenhagen, and these lectures appeared subsequently in the publications of that society (1790 & 1791). This treatise implied a significant expansion of the knowledge and information on seal biology and seal hunting presented ten years earlier in Fabricius' main work *Fauna Groenlandica* (1780). While the latter was in Latin, the seal treatise was published in Danish (with a German translation appearing in 1793). With the intention of making this pioneer work on seals more readily available, the present translation has been prepared.

In order to meet the needs of those not familiar with Otto Fabricius' life and work, the introductory brief biography was compiled based on a number of more comprehensive biographical works in Danish, and with emphasis on his contributions to natural science and ethnology.

The final paper is an attempt to put Fabricius contributions to the study of seals into perspective by comparison with the works of previous, contemporary, and subsequent authors in this discipline.

In translating Fabricius' seal treatise I have tried to keep as close as possible to his style and language. It has, however, in many instances proved necessary to adjust the text to present-day language. In this respect, invaluable assistance was offered by James Manley, who also assisted in streamlining the language of the two other papers. I am very much obliged to him for this help.

It has been a major task to identify and find the works that Fabricius has referred to; often his refer-

ences are given in a kind of code which was probably common knowledge for scholars of his time, but today appears a mystery. For help in solving such mysteries I am much indebted to the personnel of the Library of the Zoological Museum of the University of Copenhagen, the Danish National Library of Science and Medicine, and the Royal Danish Library.

The majority of the illustrations in this volume is copied from the ancient works referred to by Otto Fabricius (Figs 6, 8-9, 11-13, 17-24, 27-52). For the assistance in finding and scanning these fascinating pictures I am especially indebted to Torsten Schlichtkrull and Bent Grøndahl of the Danish National Library of Science and Medicine. Also some figures from more recent works (Figs 3-5, 10, 25-26, and 54) were scanned by Bent Grøndahl. Fig. 7 was kindly provided by G. Brovad, Zoological Museum of Copenhagen, Fig. 14 by Peter Lorentzen, Paamiut, and Fig. 16 by the Greenland National Museum and Archives. The two maps illustrating the locations mentioned in the biography



Fig. 1. Map of Denmark and southern Norway showing the localities mentioned in the text.

PREFACE

and the seal treatise were kindly produced by Peter Aastrup, National Environment Research Institute.

Good friends and colleagues provided advice on earlier versions of the manuscripts; I wish to express my thanks to Drs Erik Born, David E. Sergeant, Garry Stenson, and Torben Wolff for their kind and useful suggestions. Similarly, I am thanks due to three anonymous referees who reviewed the final manuscripts critically and carefully, and suggested constructive improvements.

I am deeply grateful for the financial support

offered by Carlsbergfondet, which made it possible to cover expenditures in connexion with the technical preparation and printing of the manuscripts.

Finally, I am grateful to Kis for the patience shown during the many months when old Otto took much of the time and attention that might have been better spent in her company.

Hørsholm, January 2005

Finn O. Kapel

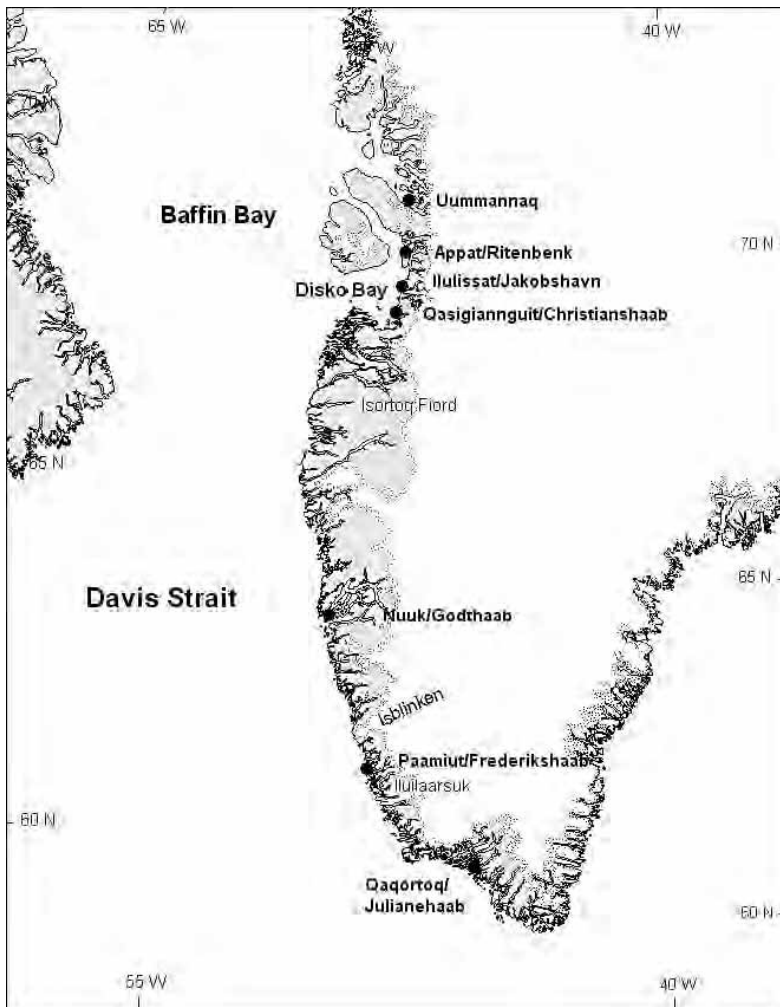


Fig. 2. Map of southwestern Greenland showing the localities mentioned in the text.

**Bishop Otto Fabricius,
a Wide-ranging Scholar of the Late 18th Century**
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Bishop Otto Fabricius, a Wide-ranging Scholar of the Late 18th Century

Introduction

Otto Fabricius (1744-1822) was known to his contemporaries as a prominent cleric, philologist, naturalist and ethnographer, particularly in relation to Greenland, where he served as a missionary from 1768 to 1773.

Otto Fabricius contributed significantly to the success of the missionary work among the Greenlanders – and to research on and exploration of Greenland by compiling and publishing scientific works and short papers, especially in three fields: philology, zoology and ethnology. “With Otto Fabricius the spirit of inquiry already evidenced in Hans and Poul Egede’s ‘Relationer og Perustrationer’ (1741; 1788) was ultimately brought to higher scientific fruition” (Thalbitzer 1962: 7).

Three major biographies of Fabricius are available (Kornerup 1923, Schultz-Lorentzen 1923 and Jensen 1923), and his life and work have been reviewed by several other Danish authors (Gosch 1873, 1878, Helms 1929, Kornerup, Spärck & Ostermann 1935, Fabricius & Fabricius 1937, 1955, Jensen 1944a & b, Knattrup 1944, Wolff 1967, 1980, 1996, Fabricius 1975, Lidegaard 1980, Bakke 1989, Asmussen 1992, Naas 1993); but few biographies are available in English (Jensen 1932, Thalbitzer 1962). The present overview focuses on Otto Fabricius’ role as a naturalist and ethnographer, drawing heavily on the accounts of Jensen (1923), Helms (1929) and Thalbitzer (1962).

The Life of Otto Fabricius

As the twelfth child of the clergyman Hans Fabricius (1696-1755), Otto was born on March 13th 1744, the fourth child of Else Cathrine Ursin (1716-1785), the second wife of this rector of Rudkøbing, Langeland. In the Rudkøbing parsonage Greenland was already a familiar topic. ‘The apostle of Greenland’, Hans Egede

(1686-1758) often came there to see his friend from his university days, and an older half-brother of Otto’s (Christen Fabricius, 1736-86) did missionary work in Greenland (Ritenbenk 1759, Jakobshavn (Ilulissat) 1760-63), returning home in 1764. So in this well-to-do clergyman’s home the boy Otto heard about Greenland at a very early age. He was educated at home by a tutor, a student. Unfortunately, on his father’s death the estate was found to be insolvent and his subsequent years of study were difficult because of poverty.

However, in 1762 he obtained his *examen artium* (school-leaving certificate) and was matriculated at the University of Copenhagen; in both this examina-



Fig. 3. Bishop Otto Fabricius (c. 1820) (Helms 1929: 27).

tion and the subsequent *philosophicum* he gained honours in subjects such as geometry, arithmetic and astronomy, and for a while he considered becoming a surveyor. Fortunately, he was persuaded to follow in his father's footsteps and began to study theology; but he also found time to do a little work on Oriental languages. In 1765 he was admitted to the 'Seminarium Groenlandicum', attending the classes of Poul Egede (1708-1789), who in 1761 had succeeded his father Hans as Professor of Greenlandic.

From Poul Egede he learned that there were two vacant posts in Greenland, whereupon he determined to cut out part of his curriculum – in those days, if time was short a student had the option of confining himself to a short syllabus for a second-class degree; Fabricius relinquished all thought of a 'first', and in late February 1768 he graduated in divinity with an acceptable result (*haud illaudabilis*); a month later he was ordained as a Greenland missionary.

Soon after, in the spring of 1768, at the age of 24, Fabricius was sent out as a missionary to Frederikshaab (Paamiut), the colony that was the most difficult of all to reach by sea. Time after time ships were unsuccessful in their attempts to break through the drift-ice (*sikorssuit*), the polar ice that drifts south around Greenland. This colony lay close to the ill-famed Frederikshaab Isblink, an outlet of the inland ice notorious for its difficult, harsh climatic conditions. The colony had been established in 1742, the year following the foundation of Jakobshavn (Ilulissat). In 1768 no colony had yet been opened up farther south than Frederikshaab (lat. 62° N). Fabricius secured lodgings in the communal house built for the Danes working there, with a room for the storekeeper and his assistant, "a lock-up room for the missionary", a third room "for the sailors", and a kitchen for their common use.

There Otto Fabricius remained isolated for three years. Over the next two summers the ship failed to force the ice. His predecessor as missionary had constantly been at loggerheads with the storekeeper and the seamen, but Fabricius decided on his own course from the beginning, no doubt severely straining his self-control. Things had to go right. There is no record of any complaint being sent home. He liked his work, and by preference frequented the Greenlanders. The books he had were few, but included Linnaeus' *Systema Naturae* and, at least in manuscript copies,

Poul Egede's *Grammatica Groenlandica*, the Greenlandic Bible and Greenlandic translations of catechisms and liturgical books.

In the summer of 1770 Otto Fabricius made his great resolution and took what was an unusual step for a Greenland missionary: to move away from the colony and live among the Greenlanders. He reported the change to the Missions Department the following year when the ship reached the colony: "For the furtherance of the temporal welfare of the Greenlanders I have moved with them to the settlement of *Iluilaarsuk*, four miles [about 30 km] south of the colony, where I have lived in a Greenland house this winter and observed a marked change in their condition."

It has always been detrimental to the free-living Greenlanders to be bound to one place for the sake of trading or schooling. For of course the seals that they hunt do not stop migrating. The natives are made poor and destitute by this artificial arrangement. Fabricius soon recognized this. He worked for their dispersal and untrammelled mobility. He himself felt this to be a deliverance; he was on his own and could do it, subject of course to permission from his superiors in Copenhagen at the Missions Department. The life he had chosen proved to be no easy one. "My sojourn at *Iluilaarsuk* gave me more to do than ever before", he wrote home.

He had a spacious "Greenlander house" built for himself: an *ighlo* [*illu*] of stones, turf and timber. There he stayed for three winters, living like a Greenlander and wearing skin clothes, for he accustomed himself to go out in a kayak catching seals as the others did. It was actually by means of this intimate, primitive life among the Greenlanders and the marine mammals that Fabricius laid the foundations of his unique career as an explorer and scientific writer; the solitude gave his abilities the proper scope to develop. He was able to draw deeply on new sources of experience: partly on his own observations, while hunting at sea, of the animals and the methods of catching them; and partly on the Greenlanders' knowledge of the habits and peculiarities of the animals. He was more familiar now than at first with the language; every day he gained new experience and acquired new information; and immediately after making his observations he could use his hut to record what he had learnt out there on the water (Thalbitzer 1962: 8-9).

According to Professor Adolf Jensen (1923), the



Fig. 4. The settlement Iluilaarsuk; Otto Fabricius' *illu* was situated at approximately the same place as the hut in the front of the picture. Photo E. Lauf 1923 (Helms 1929: 14).

lore about this Danish missionary lived long in these regions of Greenland. "He is still known by the name of *Erisaalik*, 'the man in the water-skin clothes, in the kayak-dress', the costume of the Greenland sealer when out at sea. To this very day the Greenlanders have not forgotten that the minister lived among them, not as a *qavdlunaaq* (European) but as one of themselves, in fact as a seal hunter!"

However, his health suffered from this stern, primitive life. He had to return home after three years in his *illu* at Iluilaarsuk – after spending a total of five and a half years in Greenland (1768-1773). He never saw Greenland again, but the country and its inhabitants remained fresh in his mind, as evidenced by his work.

Back home in Copenhagen, Otto Fabricius continued his studies and research while applying for a post. He was refused several posts in Denmark, but in December 1774 he was appointed rector at Drangedal in Telemark, Norway. However, he postponed his departure, married Anne Dorthe Ziege (1754-1785), and did not take up his new post until August 1775. Until 1779 he stayed in Drangedal, where he compiled manuscripts for a Greenlandic dictionary (not published until 1804) and the work that was destined to

make him famous, the *Fauna Groenlandica*, which appeared in 1780.

For a number of reasons Fabricius did not feel comfortable in the remote valley of Drangedal (Kornerup 1923, Helms 1929, Naas 1993), and in 1779 he obtained a humble post in Hobro, Jutland (where he apparently felt just as isolated), and two years later a more profitable incumbency in Rise on the Danish island of Ærø. In 1783 he was, under very favourable conditions, appointed chaplain and master at *Vajsenhuset* (the Orphanage) in Copenhagen, with special obligation to assist Poul Egede at the 'Seminarium Groenlandicum'. His first wife died in 1785, leaving him with two infant girls, and in 1786 he married Anne Gunilde Heineth (1762-1834), who gave birth to an additional eleven children (six of whom died young).

In 1780, at the age of 36, he was elected to membership of the Royal Danish Academy of Sciences and Letters in Copenhagen, on the recommendation of the famous Danish zoologist O.F. Müller, with whom he had corresponded both from Greenland and from Norway. In 1782 he was appointed a member of the *Berlinerischer Gesellschaft Naturforschender Freunde*, and from 1789 he was a prominent member of the newly formed *Naturhistorie-Selskabet* (the Society of



Fig. 5. Memorial stone of Otto Fabricius and his second wife in the churchyard of Vor Frelser Kirke, Copenhagen (Helms 1929: 26).

Natural History) in Copenhagen, and frequently contributed to the proceedings of these societies.

In 1789 he became a lecturer in Greenlandic and a consultant to the Missions Department, succeeding Poul Egede; and in the same year he was promoted to the rank of ‘pastor’ at Vor Frelser Kirke (the Church of Our Saviour) at Christianshavn, Copenhagen. He retained this post to the end of his days. In 1803 he was appointed a titular professor, in 1813 he became an official member of the Missions Department, and in 1818 he was appointed an Honorary Bishop and Doctor of Divinity.

All through his life, besides attending to his clerical duties, Fabricius continued the studies based on and derived from his years in Greenland. After the publication of *Fauna Groenlandica* few papers by him appeared when he was posted to Hobro and Rise, but after moving to Copenhagen in 1783 he published a constant flow of ecclesiastical, linguistic and scientific contributions resulting from his studies.

Otto Fabricius died on May 20th 1822, 78 years old but still productive. “Even on his death-bed he was correcting proofs of his Greenlandic translation of Genesis (Fabricius 1822). His translation of the New

Testament into Greenlandic – a revision of the one by the Egedes (1766), which Poul Egede had never succeeded in completing or printing – had already been published in 1794” (Thalbitzer 1962: 10).

The Philologist

A brief evaluation of Fabricius’ contribution to the study of the Greenlandic language was presented by Thalbitzer (1962):

“As a missionary Otto Fabricius took up the tasks inherited from Hans and Poul Egede, to be undertaken for the Greenland mission and the instruction of the natives: the translation of the Bible and catechism, hymns and liturgical works, and other textbooks into Greenlandic. The translations of Fabricius were independent works, and he had to face the bitter criticism of the older theologians, including H.C. Glahn, ‘professor of Greenlandic’, Poul Egede’s son-in-law, who would not tolerate seeing Poul Egede’s work ‘scrapped’ by someone who had spent only a relatively short time in Greenland. ‘If dwarfs were to seek to hop upon the giant’s tomb, that would be intolerable to the depart-

ment', Glahn wrote against him. The controversy ended in compromise. Fabricius stuck to his guns, but promised that in the preface Poul Egede would be given the credit due to him. With its clarity and genuine style, his Greenlandic translation marked a great advance.

"His principal linguistic works are two others in which he followed in Poul Egede's footsteps, but amplified his work: a grammar of Greenlandic (Fabricius 1791b), and a Greenlandic dictionary (Fabricius 1804). Both these works were enriched with new opinions and new examples. Looking at them more closely, there is something to be said both for and against them (Thalbitzer 1932).

"For one thing Fabricius did not get as far as to distinguish the uvulars in Greenlandic from the other back consonants – q from k etc. Poul Egede's pioneering work had not made this distinction either. It is strange that Fabricius did not think it necessary. Nor do we notice any interest in the many dialectal differences, either phonetic or lexicographical. He followed the teachings of his schooldays – the design of the Latin grammar. He embarked upon no comparative philology like that of his older colleague, the theological professor and philologist Marcus Wöldike, who after studying Egede's first Greenlandic grammar had written his 'Consideration of the origin of the Greenlandic language and its dissimilarity to other languages' (Wöldike 1745). Fabricius confined himself to the one thing he had studied and taught himself to speak while in Greenland – West Greenlandic – for the purpose of his mission work and for instructing the Greenlanders as well as the younger theologians who intended to go to Greenland as missionaries. He described the tremendously complex system of this language monographically and descriptively, and exhaustively where possible, with all the inner clarity and comprehensive elucidation of which he was capable. Listen to part of his preface (Fabricius 1791b):

'It is now thirty-one years since the appearance of the first *Grammatica Groenlandica*, compiled by the late Bishop Povel Egede, my old teacher, whom I always loved and honoured as my father and whose memory will ever be sacred to me. All who have considered his work with discernment, as the first of its kind, must join me in calling it a masterpiece; for writing a grammar of so difficult and unknown a language, in which there were no national writings for

guidance, and which bears practically no resemblance to any of those previously known, was by no means an easy matter. In it everything had to be taken up from the beginning, the rules thought out, established and arranged for the first time – and all this by a man who himself had not learnt the language according to rules but solely by practising in daily intercourse with the Greenlanders. And who cannot admire the fact that the work succeeded so well? ...'

"Otto Fabricius was quite right in his praise of Poul Egede as the draughtsman of the first fundamental picture of the structure and content of the Eskimo language. Egede's works are unique for their day, the first of their kind in Americanistic science. We know of no philological work of the 18th century that provides as perspicuous and talented a picture of one of America's many primitive tongues as Egede's Dictionary and Grammar, which appeared in the middle of the 18th century [1750 and 1760, respectively]. It is another matter that no pioneer could possibly explore everything, even if he spent ten years in a field as large, as complex and as living as this language. Even during the period of observation, the language will change; observation takes several generations – and science itself develops and acquires new instruments, new tasks, and new angles of approach.

"Fabricius improved and supplemented Poul Egede's observations very considerably – the old books now became twice as thick, or three times as large as the first ones, and simultaneously they gained in accuracy and clarity. Otto Fabricius remained on the safe side: on the solid basis of empirical description. He carried the study of Greenlandic a great step forward. His grammar was not speculative but faithful and methodical in description – a work of the age of Rationalism (Thalbitzer 1962: 12-13)."

However, half a century later, Samuel Kleinschmidt revised Fabricius's results with his *Grammatik der grönländischen Sprache* (1851) and his *Grønlandske Ordbog* (1871), works which in some respects (for example orthography) radically revised the earlier ones. But Kleinschmidt gave due credit to his predecessor in the preface of the first of these works, and in a letter to a colleague in Labrador he wrote that Fabricius "in many respects must have been a genius" (quoted by Asmussen 1992).

Thalbitzer (1962) concluded: "More clearly than Egede, Fabricius distinguishes between possessive *suf-*

fixes and all other forms of appendages, which he calls *affixes*; of these in particular a multitude can be found in the Eskimo language. These include for instance the members which we call *prepositions* but which in Eskimo are not prefixed but suffixed (enclitic) members, form-suffixes called *appositions* (Fabr.): *nuna* 'land', *nuna-mit* 'from land', *nuna-me* 'on land', etc., etc. He attempted to find rules for the varied nature of these affix compounds, of which he gives examples.

"Fabricius himself remarks (1791b: 129): 'Note: One experiences great difficulty in determining the rules for the joining of these *suffixi* with *appositio*, there are so many different forms in the various examples that even those who should best understand the Greenlandic language run the risk of making mistakes in it.

"It is undeniably very complicated, and yet every Eskimo can speak his language and does so faultlessly. A century later S. Kleinschmidt brought some degree of clarity to the rules. But although this language has some rules that function without exceptions, there are probably more rules of the kind that have vast numbers of exceptions and irregularities – curious, old-fashioned forms. So the language presents a strange blend of constancy, invariable regularity – and apparent freakishness with many odd forms" (Thalbitzer 1962: 11-14).

The Naturalist

In his biography of Otto Fabricius as a naturalist, Professor Adolf Jensen (1923) stated: "Otto Fabricius' name and scientific works are known worldwide among zoologists who have studied the Arctic fauna, and he is also known among scientists who have sounded the depths of the historical development of their special subject. He is almost always mentioned with much appreciation, if not admiration ... Fabricius'

thoughts were so far-reaching, his views so wide-ranging that he was often far in advance of his time, and is perhaps not even yet fully appreciated ... Otto Fabricius is one of the most significant and distinctive personalities in the history of Danish science."

Fauna Groenlandica

Adolf Jensen (1923: 334) continued: "To this day *Fauna Groenlandica* remains Fabricius' principal work, written in Latin and published in the year 1780. It is a book of 468 pages and a double-plate with illustrations. In this Fabricius describes 473 species¹ (132 vertebrates and 341 invertebrates), 130 of which were new to science; however, he had given advance notice of many of these, accompanied by short descriptions, to O.F. Müller, who included them in his *Zoologiae Danicae Prodrromus* (1776), some indeed already in his *Historia Vermium* (1773-74).² As a consequence, some of Fabricius' species are often credited to Müller, which in a sense may seem justified, since they were first published by Müller; on the other hand it is rather unjust to Fabricius, who not only found and recognized, but also diagnosed these new species, whereas Müller only published the diagnoses".³

Fauna Groenlandica begins with the mammals – and among these, as the first species, the Eskimo (*Homo Groenlandus*), "which may appear quite open-minded for a clergyman of the time" (Jensen 1923). "By thus placing the Greenlanders, *inuit*, among the animals, the young eighteenth-century theologian revealed the purest enthusiasm for the Linnaean thinking then widespread in Scandinavia. Presumably this was tantamount to a religious enthusiasm for the wisdom of the Creator in nature, the order of Creation and man's place as the first of his kind among living beings" (Thalbitzer 1962: 17).

The procedure in *Fauna Groenlandica* is as follows: the scientific, Latin name of the species is used as a heading. After this comes a short 'diagnosis', a list

1. The last species is numbered 468, but five numbers are doubled, by adding the letter b (34, 97, 296, 297 and 342).
2. That this was of course done with the consent and at the wish of Fabricius can be seen from a statement in Fabricius 1798c (p. 62): "The short description of this species (*Planaria candida*) has also been communicated to Counsellor Müller for inclusion in his *Hist. Vermium*".
3. That Fabricius considered the new species communicated by him to Müller as "his own species" (although he refers to Müller's *Prodrromus* and *Vermes*) appears from the fact that in *Fauna Groenlandica* he marked them with an asterisk, as explained in the preface (p. XI): "*Species hactenus ignotas, vel saltem a scriptoribus classicis, quatenus mihi notum, nondum descriptas, asterisco (*) notavi, quae numero sunt circiter centum et triginta*".

Fig. 6. Title page of *Fauna Groenlandica*. As an author Otto Fabricius generally used a latinized version of his name: Othone or Otho (Fabricius, 1780).



of names used by other authors if the animal has previously been described, and the name in Greenland. Next comes a more detailed description of the species, further information on the distribution in or off Greenland, its food, its reproduction and habits, and in addition the use made of it by the Greenlanders and their methods of catching the animal in question. This systematic method of treating the species is maintained consistently from start to finish. It is evident,

however, that in general the higher animals are given more thorough treatment than the lower ones, particularly as regards their biology.

The descriptions are not taken from other authors, but composed by Fabricius on the basis of the Greenland material collected by himself; only in a few instances has he departed from this approach in making use of material collected in Norway, or referred to another author when he has not himself seen the

species in Greenland, but has reason to believe that it occurs there; or if he considers the species so well known that a new description is not necessary. But as mentioned before these exceptions are few and are explicitly mentioned in each case. In other words, the book is an altogether independent work.

The descriptions are completely adequate, taking reasonable account of all important external characters, and are based on careful examination. When male, female and young differ from one another in appearance, or when seasonal variance occurs, this is accounted for. It is worth emphasizing as one of Fabricius' merits that whenever possible he used live material for the descriptions, so that one obtains knowledge of the real appearance of the animals; he is not describing museum specimens. He roamed the landscape and could obtain his material at first hand; wisely, he made the most of this opportunity. This is of particular importance for the description of many of the lower animals which shrink and become more or less unidentifiable when preserved. The obstacle is often encountered by zoologists, but Fabricius fortunately avoided it; he perceived the risk and warned other investigators; cf. for instance his statements on *Lumbricus cirratus* (*Cirratulus cirratus*) and *Holothuria laevis* (*Chiridota laeve*): '*In spiritu vini mire deformatur, ita ut non pro eadem habeatur*'.⁴ While many authors confine themselves to describing the shells when dealing with mussels, snails, chitons and barnacles, Fabricius waited patiently for the animals to 'open up' or 'creep out of their house' so that he could observe and describe the withdrawn parts. Fabricius took the same approach to other animals that undergo considerable changes in shape at death, such as holothurians, hydroids and worms. The colours, too, were as far as possible described in living or at least newly killed specimens.

It has proved of great importance to posterity that Fabricius' species descriptions are based on Greenland specimens, because this has enabled later authors to check his identifications and correct his species names in cases where he was mistaken; for several reasons it was inevitable that he would occasionally make mistakes. In Greenland, where his material was collected,

he had practically no other sources than Linnaei *Systema Naturae* (Fabricius 1780: vii), a work in which the descriptions are often so lacking in detail that a certain amount of luck is required to come to the right conclusion. Between his return from Greenland and the publication of the *Fauna*, six years elapsed during which Fabricius could have revised his determinations, but four of these years were spent in a place (Drangedal) where studies of the literature were almost impossible. From the preface to the *Fauna* it is evident that Fabricius had consulted a number of other works besides *Systema Naturae*; but the descriptions in the literature of the period were generally not very detailed, especially with respect to the lower animals, and this made precise determinations difficult without access to comparative material. In this sense he was worse off after his return from Greenland than when he was up there. We know from a statement he made in a later paper (Fabricius 1799b: 159) that the majority of his glasses with material collected in Greenland 'were smashed to pieces during the perpetual storms we had to suffer during the return voyage'; and his hope of getting new material collected in Greenland to remedy the loss failed 'because of the great lack of interest in natural history demonstrated by the missionaries'. Other statements by Fabricius show that in comparison with the descriptions by other authors he was usually not in a position to repeat his examination of the animal, so he had to rely on comparisons with the descriptions and drawings made in Greenland.

The result was inevitably a certain number of erroneous determinations. Fabricius himself corrected some of these, partly in later published papers, partly in unpublished manuscripts.⁵ For example, he listed a member of the oxen genus, which he tentatively classed as a yak (*Bos grunniens* L.), adding: "Of this animal I have seen a damaged skull (only one of the horns was left), hoofs, and very long, black hairs with a woolly basis, which once was found on an ice floe at Greenland. It has, however, hardly resided in West Greenland, perhaps not even in East Greenland, but I should rather believe that this specimen has been brought with the drift ice from the coasts of Northern

4. "In alcohol its shape changes surprisingly, so you can hardly believe that it is the same animal".

5. "Zoologiske Samlinger, eller Dyrbeskrivelser, Tid efter anden forfattede efter egen Betragtning ved Otto Fabricius, fra Aar 1786, og her bragte i Samling fra Aar 1808" (Eight notebooks in quarto, kept in the Royal Danish Library, Copenhagen).

Fig. 7. The musk-ox cranium found on the drift ice off South Greenland and described by Fabricius (1780, 1788a, 1818a), a specimen still in the Zoological Museum of Copenhagen. Photo G. Brovad 2005.



Asia, and that the remainder of the animal has been consumed by polar bears” (Fabricius 1780: 28; Helms 1929: 70). This assumption was repeated in the paper on the drift ice (Fabricius 1788a: 82-83), still referred to as *Bos grunniens*, but in a later paper (Fabricius 1818a: 61-63) he identified the species correctly: musk-ox (*Ovibos moschatus* (Zimmermann 1780)) adopting the suggestion of Pennant (1784: 11) that it probably derived from North America. Not until much later in the 19th century it was discovered that a stock of musk-oxen was living in Northeast Greenland, making it most probable that Fabricius’ specimen originated from that region (Muus, Salomonsen & Vibe 1981: 399; Wolff 1980; Meldgaard 1986).

Later authors who have been in a more fortunate position than Fabricius in having access to the plentiful museum collections from Greenland have usually had no difficulty interpreting Fabricius’ species, precisely because his descriptions were so carefully written. Still, to this day this is being acknowledged by a number of specialist studying various groups of animals, e. g. polychaetes (Petersen 1994) and copepods (Damkaer 2002). The fact that Fabricius was exceptionally conscientious in his examinations appears from a remark by himself: “... and I can maintain that I have never examined any animal inadequately, but have repeated the inspection with my modest hand glass for a long time until I was sure of having seen rightly” (Fabricius 1799b: 159).

Adolf Jensen continued his evaluation of *Fauna Groenlandica* as follows (Jensen 1923: 337-339; Thal-

bitzer 1962: 19-21): “With the sole exception of the higher game animals referred to but not actually scientifically dealt with by the missionaries Hans Egede (1741), Cranz (1765) and Glahn (1771), it is possible to say that scientific knowledge of the fauna of Greenland begins with Otto Fabricius. And so we find that all authors writing on the lower animals (invertebrates) start off from his *Fauna Groenlandica*, and that he is quoted again and again as regards the vertebrates. And as it was a very considerable number of animals he described, considering the northern situation of the country and its harsh climate, the fauna of Greenland became well known all at once through this one book, with its exposition of animal life in the Arctic, embracing all classes. I believe I am not wrong in thinking that no single book or paper in the literature of Danish zoology has been quoted so often in international zoological literature as Otto Fabricius’ *Fauna Groenlandica*.”

“But if this in itself was an achievement that would forever secure the name of Otto Fabricius from falling into oblivion, his greatness is nevertheless not founded upon the systematic descriptions. To my mind it is the biology in his work that represents the climax of his zoological authorship.

“In brief, concise terms which the Latin language alone has at its command, for all their brevity, Fabricius gives us a wealth of information about the way of life of almost every single animal. His Greenland Fauna thereby stands in a class of its own and towers high above contemporary faunistic works; for it

is not merely a descriptive inventory of the Greenland animals, but also a book on their biology. And the same applies here as to the descriptive sections: all observations are his own, with the few exceptions expressly mentioned.

“Since scarcely any word is more abused than ‘biology’ – the opinion often being held that it is biology to ramble on about animal habits – it must be stressed that Fabricius records nothing but truly characteristic and important features.

“Under ‘distribution’, for instance, when dealing with the migrating animals, he gives the time of their coming and going and the conditions of their periodic appearance insofar as Fabricius has a well-founded opinion on the matter. For the marine mammals he tells us the depth at which they occur, the nature of the sea-bed, whether they appear singly or in flocks, etc. As regards the many parasites that he describes – fluke, tapeworm, roundworm, echinorhynchus, fish-leech, parasitic crustaceans and parasitic insects – he tells us precisely what animals they attack and in which of the organs of the host they are to be found.

“His knowledge of what food the various animals live on was acquired by watching them when they ate and also very largely by examining the contents of the killed animals’ stomachs.

“Under ‘reproduction’ he states for instance whether the species is monogamous or polygamous, its fertility, its breeding season, its method of reproduction and its breeding grounds, and as for oviparous animals, he gives the hatching time for the young.

“The sections describing the ‘habits’ of the animals are not the least in importance. But it would be quite impracticable to give an idea of all these details, because of the multitude of different features he presents. But in reviewing them all one discovers a remarkable ability to capture the characteristics of each animal and to make the reader see it with a few words, so that it so to speak comes to life before him.

“The parts dealing with the Greenlanders’ ‘utilization of the animals’ are extremely interesting. From them we learn which animals the Greenlanders eat, and this is a very long list; besides of course mammals, birds and fishes (there are no reptiles and amphibians

in Greenland) it comprises many lower animals, i.e. a large number of crustaceans, snails, mussels, sea urchins and sea anemones.⁶ Moreover we are told what parts of the animals are utilized and what each of the parts (skin, blubber, meat, tendons, teeth, viscera, skeleton) is used for. Taken together, all these small items provide a good picture of conditions at the time when Fabricius lived in Greenland – about 150 years ago; we learn the extent to which the fauna at that time, when the somewhat isolated Frederikshaab district at least was largely untouched by European civilization, supplied what the population needed for food, clothing, houses, tents, household utensils, boats and every form of hunting gear, and also provided it with medicines, ornaments and amulets. Fabricius subsequently amplified this subject in separate papers, in particular in his careful description of how the Greenlanders utilized the animals that were of the utmost importance to them, in fact vital to their existence: the seals. The great benefits to be derived from these animals are shown in the paper on seals (Fabricius 1790 & 1791a). These records by Fabricius shed light upon important aspects of Eskimo culture and he deserves our great gratitude for reporting on all these things and handing them down to posterity; for conditions have changed greatly since his day, European products having invaded the country more and more and corrupted the original style of living.

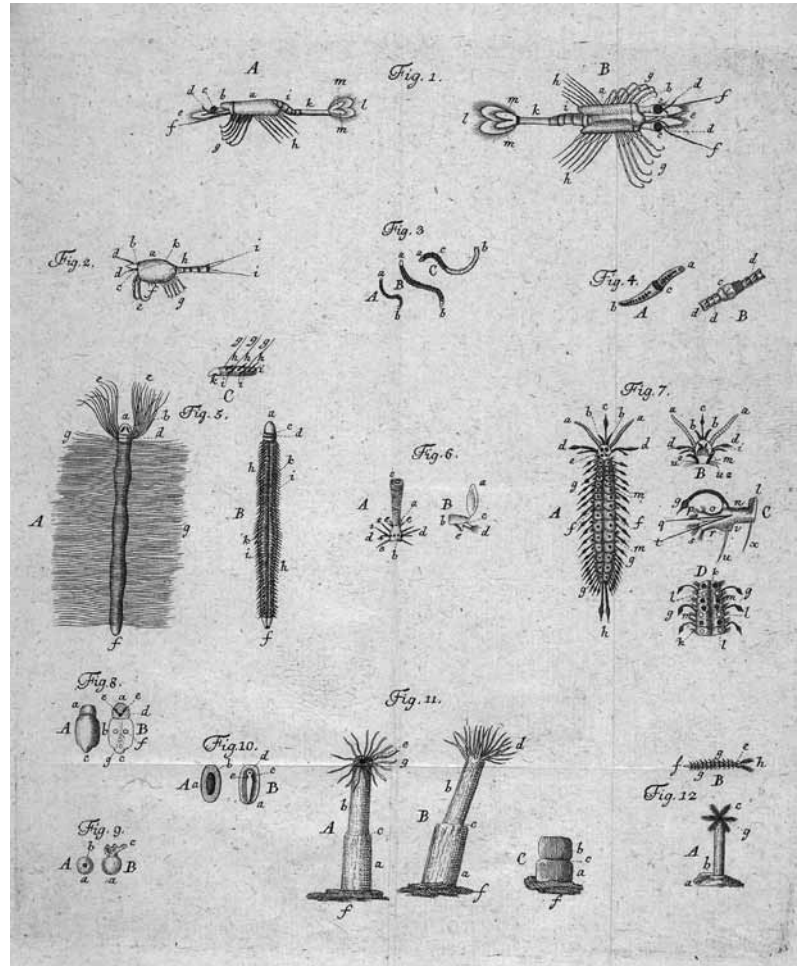
“Regarding the lower animals (the invertebrates), we are also told which of the animals, both lower and higher, they serve for food, all of which provides additional confirmation of our impression that Fabricius devoted much time to analysing the contents of the stomachs of the animals in order to ascertain the nature of their food.

“Finally, as regards the edible animals, Fabricius adds brief accounts of the Greenlanders’ methods of catching them, and gives the names of the weapons and implements used for that purpose: harpoon, bladder dart, lance, bow and arrow, flint, sling, trap, snare, bird dart, fowling net, jig, fishing line, long line, leister, hook spear, scoop, fishing net, fish trap, fish snare, salmon weir.”

This information on utilization and hunting

6. And, as a delicacy, head and body lice (*Pediculus humanus*, Fabricius 1780: No. 182): “*Editur a Groenlandis ut delicautulus, et capitur ramento pellis canini vel ursini sub vestimentis agitato*” (“It is eaten by the Greenlanders as a titbit and is caught by rubbing a piece of dog or bear skin under the clothing”).

Fig. 8. Various invertebrates illustrated at the only plate included in *Fauna Groenlandica* (Fabricius 1780: Pl. 1).



methods was afterwards described in detail by Fabricius, either in separate papers (Fabricius 1810 and Fabricius 1818b) or as separate sections in the papers on the Arctic Fox (Fabricius 1788d), the Seals of Greenland (Fabricius 1790 & 1791a), the King Eider (Fabricius 1793b), and the Humpback Whale (Fabricius 1818a) – and later edited and presented in English by Holtved (1962).

Some examples of the detailed information on animal behaviour and evidence of the Greenlanders' powers of observation, and of Fabricius' vivid descriptions of this, are quoted by Jensen (1923).

On the sea eagle (Fabricius 1780: No. 33) he wrote: "It often sits at the tops of rocky island or coastal mountains, carefully watching for prey, and from the bubbles ascending from diving birds it is perfectly able to deduce where they will emerge, and will swoop down there to catch them almost before they surface. Larger prey is brought ashore by flying back-

wards; but when it has struck its talons into a large seal it is occasionally forced, screaming harshly, to follow it below the surface and perish."

The Greenlanders, too, were able to benefit from the ascending bubbles when they were hunting seabirds. Of the king eider (*Somateria spectabilis*) it was stated: "It is taken by a throwing spear constructed for seabird hunting, several hunters pursuing it when it has submerged for feeding. When it emerges again full of food and is frightened by the yelling of the hunters, it cannot fly but has to escape by diving; but its path through the water is revealed by air bubbles and is followed by the hunters; at short intervals it comes to the surface to breathe, only showing its head above the water, until, exhausted, it has to emerge completely and is easily killed (Fabricius 1780: No. 39)."

Another example of how the Greenlanders learned from an animal is given by Fabricius in a later paper (1818b: 267): "To catch the polar cod (*Gadus*

aeglefinus [*Boreogadus saida*]) the Greenlanders use a clever method which they say they have learnt from the Arctic fox (*Canis* [*Alopex*] *lagopus*), which often comes to the beach to fish in the winter; it then stirs the water among the broken ice with its paws, by which means it lures the inquisitive fish towards the surface – only to be caught by the fox. A similar method is used by the Greenlanders either in the ice cracks along the shore or in a hole cut in the ice, preferably in February when the polar cod is spawning and in the evening, at night or in the early morning; the hunters then stir the water with a small stick, making the fish come quite close to the surface, where it can be taken with the fingers.”

Fabricius’ amazement at the Greenlanders’ knowledge in the field of zoology reaches a climax when he writes about the itch mite (*Acarus siro* [*Sarcoptes scabiei*], Fabricius 1780: No. 193): “It lives in an itchy blister on the Greenlanders, who know how to extract it dexterously with a needle; they did so before my eyes and showed me the animal walking alive. Indeed, the Greenlanders are entomologists!” This is the only exclamation mark in *Fauna Groenlandica*. And it is indeed surprising that the Greenlanders had discovered that the itching disease was caused by an animal – as they must have known since they tried to remove it; that they could find this animal with the naked eye (it is only just possible to see it without a magnifying glass); and that they knew how to pick it out of its ducts in the skin. In other words, it was common knowledge to the Greenlanders that the itching disease was not a constitutional illness but was due to a parasite – the itch mite – digging into the skin, knowledge which did not become the opinion of the scientific world until much later (Fürstenberg 1861: 46, 51–54).

“One might get the impression that the merits of Fabricius chiefly consist of having written down what he was told by the Greenlanders, and thus that the Greenlanders were in fact the true authors of *Fauna Groenlandica* and Fabricius’ other works on the fauna of Greenland. However, this is not the case. The descriptive parts are of course entirely the work of Fabricius. Much of the material on biology is also based solely on Fabricius’ own observations. Even in cases when the experience of the Greenlanders had indicated the direction to take, he constantly made an effort, while using their knowledge, to check their

statements by means of personal inspection; for only by so doing could he achieve a satisfactory result. When Fabricius had to rely solely on the tales of the Greenlanders, he sometimes came to a false conclusion” (Jensen 1923: 347).

A translation into Danish of the sections on mammals and birds of *Fauna Groenlandica* was published by Helms (1929). In view of the vanishing ability in reading Latin a translation into English of the entire work should be considered.

The Treatise on the Seals of Greenland

If one particularly valuable zoological work by Fabricius were to be nominated, next after *Fauna Groenlandica*, the prize would undoubtedly go to his treatise on the seals of Greenland (Fabricius 1790 & 1791a). It is a monumental work, pioneering in its field. In this work, in the form of a monograph with wide-ranging background material, the northern seal species are given extremely comprehensive treatment.

In the introduction Fabricius explains how he has obtained all his knowledge of the natural history of seals by living in close contact with the hunters, gathering information from their experience as well as from his own.

One would think that the professional zoologists of Fabricius’ time, given that sealing in the northern seas had played a considerable role for many years, would have obtained knowledge of the number of seal species occurring in the region; but quite the opposite was true, although Hans Egede (1741), as well as Cranz (1765), and particularly Glahn (1771) had made some attempt to elucidate the question. Fabricius explains the reasons for the poor knowledge of this group of animals among naturalists as follows (Fabricius 1790: 82):

“Among the four-footed animals the seal genus is one of the least accurately described. In the works of most authors one finds a pronounced confusion, of which it is difficult to make sense. The reason is that the seal is a marine animal, and rather unapproachable in its natural environment; it prefers to reside remote from people, most species close to the Poles, where naturalists have rarely had the opportunity to observe them alive, but have had to rely on the accounts of the kind of travellers who were not exactly naturalists, and therefore not the most reliable, often forgetting to report the essentials upon which a distinction between species could be based. Furthermore,

it is necessary to have known the seals through all their age categories in order to make correct distinctions, because, as with other animals, the young ones do not look like the old ones either with respect to colour or in other respects, taking some years to attain their final appearance. Indeed, the habits of some species are so different from those of other species, that this alone could serve for identification, even if they may be similar in shape – but how many professional naturalists get the opportunity to make such observations of a marine animal?”.

In the twelfth edition of *Systema Naturae* (Linnaeus 1766: 55-56) only three species of seals (*Phoca*) were listed, namely *Phoca ursina* (Steller's sea lion), *Ph. leonina* (Anson's 'sea lion', later identified as the southern elephant seal), and *Ph. vitulina* (all seals in European waters, including harbour seal). In Müller (1776: 1-2) only one seal species (*Ph. vitulina*) was mentioned in the main text (with reference to a number of vernacular names pertinent to other species); in the preamble, however, four additional species were listed as reported from Greenland by Otto Fabricius: *Ph. leonina*, *Ph. foetida*, *Ph. groenlandica* and *Ph. barbata*, accompanied by their vernacular names in Icelandic and Greenlandic – but as *nomina nuda*, i.e. without descriptions of the species (*Ibid.*: viii). In contrast to this, the concise descriptions in *Fauna Groenlandica* (Fabricius 1780: 7-17) left no doubt that the species in question were hooded seal, ringed seal, harp seal and bearded seal, respectively. Fabricius' descriptions were almost exclusively based on his own experience from Greenland; in addition to Linnaeus (1766) references were mainly made to some earlier accounts by Nordic writers.

In the treatise on the seals of Greenland, however, Fabricius presented a historical-critical review of views on the identities and numbers of seal species expressed by a number of earlier authors, from Aristotle to the appearance of *Fauna Groenlandica*, including some important works published during the preceding ten years: Schreber (1775-78: 285-316), Erxleben (1777: 579-592), Lepechin (1778: 257-266), and Hermann (1779: 456-509); Fabricius thus expanded our knowledge of all the above-mentioned five species considerably, and added a sixth, new species: *Phoca [Halichoerus] grypus* (grey seal), described on the basis of a Danish specimen (Fabricius 1791a: 164-167, Pl. XIII, 4).

The length of the treatise (177 pages in all) permits very comprehensive treatment. The descriptions are extremely detailed and careful: length measurements are given for the body and its parts. The shape of the animal and of its individual parts is accurately described as well as the form and number of the teeth; the colours and characteristics of the skin and fur are accounted for, etc. The oral cavity and the inner organs are also described. Characteristics of special importance for distinguishing among species are stressed, and remain valid to this day: the number of incisors and the shape of the molars, the relationship between the length of the thumb and the other digits, and the characteristics of the whiskers. Two accompanying plates have excellent illustrations of the crania of harp seal (Fig. 1), hooded seal (Fig. 2), bearded seal (Fig. 3) and grey seal (Fig 4), “in order to demonstrate how distinct they are”.

Fabricius offers no less than 70 pages (1790: 87-157) on the first species, the harp seal (*Phoca groenlandica*). After a historical introduction, he continues with an excellent, detailed account of the appearance of the animal, including the changes in colour that occur with age. In terms of the changes in colour the Greenlanders have a great many names for this seal species, and each stage of development from young to adult has its special designation; but the general term *Atâk [aataaq]* always remains the same, which shows – according to Fabricius – “that the Greenlanders are not misled by the colours alone into creating new species, but make their judgement on safer grounds, as I have had the opportunity to notice on many occasions”.

The internal organs are also described in detail, and although this part contains no essential new information, his information on the anatomy – in many respects peculiar – is correct, with some few exceptions. The characteristic features of the pupil and iris are noted for the first time by Fabricius, and strangely enough these features appear only to have been noted later by F. Rosenthal (1825) who has provided a very beautiful illustration of this phenomenon, whereas other authors who have studied the structure of the seal eye have paid no attention to the matter.

Over the next few pages Fabricius accounts for the occurrence of the harp seal (in southwestern Greenland): “It is the seal species most often encountered in the Davis Strait, far out at sea as well as in the

fiords, but mainly in deep water. Although the water is its true element, it is also seen up on the ice, solitary or more often in large flocks, rarely on single ice floes but rather where drift ice has accumulated." It does not keep breathing holes open in the ice; when the ice covers extended areas, flocks of harp seals may seek openings kept open by the current; but when the sea is completely covered by fast ice, they disappear. Normally, the harp seal migrates away from Greenland twice a year. It disappears first in July, simultaneously with the shoals of capelin heading westward or southward. In September it returns, much fatter than when it departed; along the southern part of the coast it migrates in flocks from south to north through the sounds, gradually spreading along the coast and into the fiords. The second disappearance occurs in mid-March; the females are the first to leave, but soon after this all kinds of harp seals go westward to the drift ice in the Davis Strait; here the pups are born and the moulting takes place. Not only the pups have lost their first soft coat when they arrive; the older seals too have a new pelage. They arrive in late May or even later, followed by their young; they arrive from the west and are seen first far out at sea. They are lean, but pursue the shoals of capelin that arrive at the coast at the same time.

Fabricius reports that the food consists of many kinds of fish, but most of all capelin, shoals of which the seal pursues eagerly; crabs, shrimps and other crustaceans are also frequently found in the stomach. The harp seal itself is pursued by the killer whale; when the latter stay for long periods, the seals leave the area completely. They can also be taken by surprise by the polar bear, particularly when resting on the ice.

The section on the behaviour of the harp seal in the water is remarkable, because it demonstrates how closely the Greenlanders have had to study the habits of the seal in order to secure the best hunting results.

"In the water it has its own behaviour, which I must not fail to mention, since in so acting it gives the Greenlanders better or poorer opportunities to catch it. Since it has lungs, it is sometimes forced to surface in order to breathe, and it is not quite true when Buffon & Daubenton (1770: 183) state that the seal can refrain from breathing at its own discretion when in distress; however, it can endure a fairly long period without breathing, so when one watches out for it after seeing it dive at close quarters, it often reappears

so far off that it is hardly possible to catch up with it, or one sometimes loses sight of it altogether; in other instances it reappears unpredictably quite close to the original spot" ... etc. (Fabricius 1790: 107-111).

The sections on the capture and use of the harp seal can also still be read with pleasure and with profit. As stated by Jensen (1923: 367): "no one has given as superb an account of these issues as Fabricius. And there is even more reason to call attention to this, because it is almost unknown, well hidden in a scientific journal from the end of the 18th century (Fabricius 1790: 122-154). As an illustration of the strength of language and excellent descriptive power of Fabricius, too, it should be reproduced". This was in fact done forty years later (Holtved 1962: 103-117).

Some remarks on the parasitic worms of the harp seal follow, and finally Fabricius refers to the names assigned to the species by earlier authors.

Following a similar design, the other seal species in Greenland are dealt with, although more briefly, with references to the harp seal as far as all the shared features are concerned. Here I will only mention a few items.

In the same way as Fabricius contributed significantly to our knowledge of the occurrence of the migratory harp seal in southwestern Greenland, he also gave a better account than anyone else of one of the non-migratory seals in Greenland, the ringed seal (*Phoca foetida* Fabricius = *Phoca hispida* Schreber). In addition to the hunting methods previously mentioned, he describes the ones peculiar to hunting on the fast ice in the northern areas, for example at Disko Bay (Fabricius 1791a: 74-97). Then come his sections on the utilization of the seals, and on the synonyms for their names.

The common or harbour seal (*Phoca vitulina*), the hooded seal (*Cystophora cristata*), and the bearded seal (*Erignathus barbatus*) are treated in similar great detail (Fabricius 1791a: 98-119, 120-139, and 139-160 respectively).

It will be appropriate to conclude this section by quoting a statement on the importance of seal hunting made in another of Fabricius' works (Fabricius 1810: 129-130); against this background it becomes evident that it was particularly urgent for Fabricius to elucidate the natural history of the seals in every detail.

"The hunting of seals is the foremost occupation of the Greenlanders; without it they could not exist,

and from it they have so to speak everything. It is in their every thought from their earliest childhood, and anyone who fails to acquire some proficiency in it cannot be called a true Greenlander and is considered unfit to become useful to the community; indeed, he must rather become a burden to others, and cannot expect to be held in much esteem by his fellow countrymen; but he who attains to some skill in sealing has also acquired the right to the title of ‘a good provider’ (*Piniarte [piniarti]* or *Angursorsuak [angursuaq]*); it is furthermore remarkable that in the native language a man is called *Angut*, which signifies ‘a means of catching seals’, as if he was actually created for the purpose, indicating that from the very beginning this has been regarded as the most important accomplishment, requiring great masculine intelligence and manly strength; for in truth, other kinds of hunting do not require anything like as much insight and dexterity as sealing, in which one has to deal with a very wary and cunning animal; only when a man becomes the seal’s superior can he provide for himself and his family, dispense with something for trade, and barter his surplus for other necessary or at least pleasing things; and then he is respected and honoured among his fellow Greenlanders”.

Contributions to the Natural History of Whales

In Fabricius’ time there was great confusion about the nomenclature of whales. Linnaeus (1766) and Müller (1776) presented lists of 12 and 14 cetacean species, respectively, accompanied by very short descriptions that make it extremely difficult today to make safe identifications. In *Fauna Groenlandica* (1780) Fabricius mentions five baleen and ten toothed whales, of which four and seven respectively can easily be identified as one of the 16 species known at present from Greenland waters (four of them have, however, only rarely been observed there). One should not be surprised that in some instances Fabricius made doubtful determinations, considering that he may not have had the opportunity to see all of these animals at close quarters (Winge 1902, Helms 1929). One of the ‘missing’ species might be explained by an apparent failure

to discriminate between the fin whale and the blue whale on the part of the Greenlanders.⁷

The descriptions of the various species are as usual accompanied by valuable information on their biology, feeding and behaviour. These items were elaborated in two later papers which were discussed in great detail by Jensen (1923).

“In a paper ‘Om Hvalaaset’ (‘On the whale’s food’), Fabricius (1781: 557-578) sets out to explain what kind of food the ‘proper great whale-fish or baleen-fish’, i.e. the Greenland right whale or bowhead whale (*Balaena mysticetus* L.), feeds on. In *Fauna Groenlandica* Fabricius had only touched briefly on the food of all whale species in Greenland, but he felt obliged to deal with the food of the bowhead whale in greater detail for the following reason: ‘Because the Greenland right whale is of such great importance in trade, it is of interest to know how it accumulates its fat, and on this particular issue authors write with great uncertainty; almost all of them only just mention whale food; a few have added some descriptive features, but not enough to permit any determination of the genus or species of the animals; and here are hardly two authors who have reported the same unless they have copied each other’ (l.c. p. 558).

“Fabricius first reviewed the information that could be found in previous works such as Martens (1675), Zörgdrager (1750), Egede (1741), Anderson (1746, 1748), Ellis (1750), Seba (1734 & 1758), Linnaeus (1758, 1766), Cranz (1765) and Glahn (1771), demonstrating how different the accounts were, and how inadequate, based as they were not on the authors’ own experience, but on ‘tales by such people as have travelled with the whaling ships and were not exactly those most skilled in knowledge of nature’.

“He continued by describing the animals which in his experience serve as food for the Greenland right whale: first and foremost two species of ‘shrimps’ which he calls ‘the many-legged shrimp’ (*Cancer pedatus*) and ‘the large-eyed shrimp’ (*Cancer oculatus*), and next a pelagic snail (*Argonauta arctica*) and a ‘seawing’ (*Clio retosa*). By means of Fabricius’ descriptions and the illustrations these animals can be identified as follows:

7. They seem to call both species *tunnulik [tunnulik]*. Later information indicates that a special name, *tikaagulliusaaq*, is used for the fin whale, at least in some regions of Greenland.

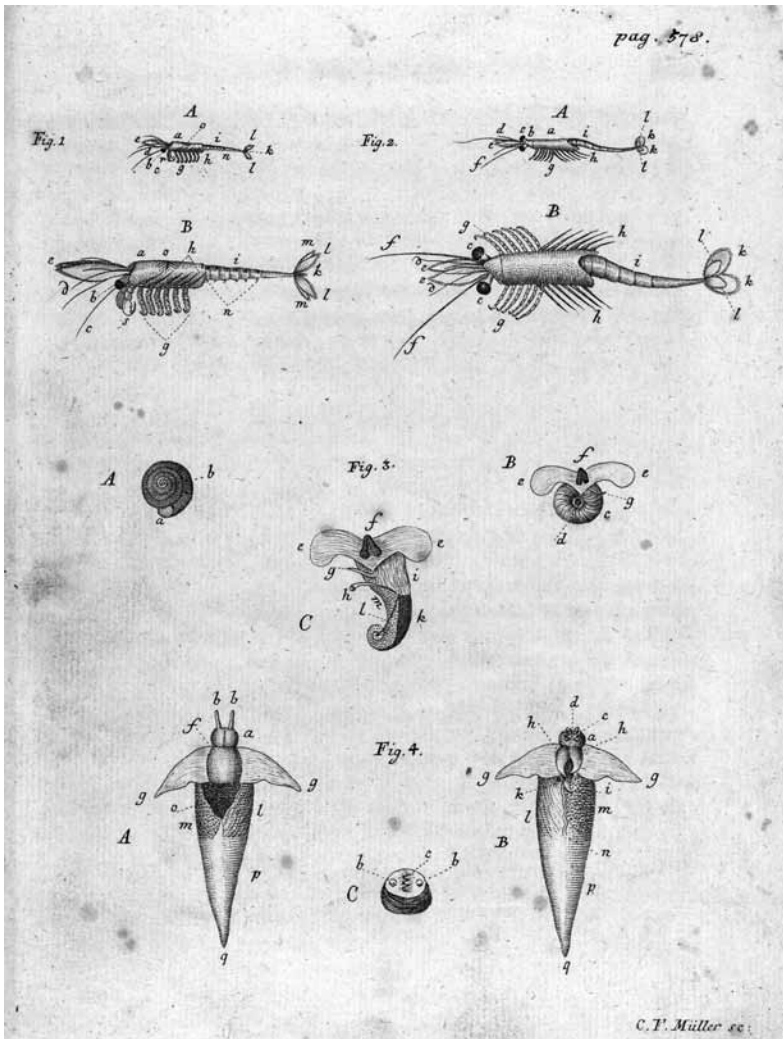


Fig. 9. Whale food: Fig 1. *Cancer pedatus* [*Mysis mixta*]; Fig. 2. *Cancer oculatus* [*Mysis oculata*]; Fig. 3. *Argonauta arctica* [*Limacina helicina*]; Fig. 4. *Clio retusa* [*Clione limacina*] (Fabricius 1781: 578).

Cancer oculatus (Fabricius 1780: No. 222, Fig. 1, A & B; 1781: 565, Fig. 2, A & B) was later identified as a *Mysis* species, and with reference to Fabricius called *Mysis oculata* (Krøyer 1838; Stephensen 1913: 77). Undoubtedly, *C. pedatus* (Fabricius 1780: No. 221; 1781: 561, Fig. 1, A & B) is also a *Mysis* and, since only two species of this genus are known from Greenland, it must be *Mysis mixta* Lilljeborg (1852).

Argonauta arctica (Fabricius 1780: No. 384; 1781: 567, Fig. 3, A-C), the *tulugaasaq* of the Greenlanders, is the shelled pteropod now known as *Limacina* (*Spiratella*) *helicina*, first described by Phipps (1774) as *Clio limacina*, six years before *Fauna Groenlandica* was published. *Clio retusa* (Fabricius 1780: No. 324; 1781: 575, Fig. 4, A-C), the Greenlanders' *aataasaq*, is the naked pteropod now called *Clione limacina*, also described by Phipps (1774).

“Having described these four species in detail, Fabricius suggested that the more or less imperfect accounts of the food of the Greenland right whale given by earlier authors – when they were at all sensible – referred to the two last-mentioned species, i.e. the two pteropods. Fabricius did not deny that these two animals ‘do belong among the food species of the whale’ since they swim close to the surface and are therefore swallowed by the whale, particularly *Limacina helicina*, which is found in the Davis Strait in large quantities and gives the water a genuine black colour when it occurs abundantly; and to a lesser degree *Clione limacina*, which does not occur so abundantly that the whale can eat a great many ‘in one swallow’.

“However, according to the experience of Fabricius, these two pteropods are not its proper diet of

preference. The two crustaceans described by him constitute the essential food of the Greenland right whale and should properly carry the name of ‘whale food’. Of these small crustaceans – measuring about 30 mm or less – Fabricius reports that they are found in large quantities in the northern seas, mostly swimming far out at sea close to the surface, and rarely approaching the coast or shallow water. And since ‘the flesh of these crustaceans is nothing but fat it is becomes understandable that the whale can put on so much fat from this diet, when one also bears in mind that these small shrimps occur so abundantly in the Greenland seas that some places are swarming with them; so the whale can swallow several thousands in one mouthful.’ It only has to ‘open its mouth and suck in water in barrells, whereby they enter in great numbers. Then the mouth is shut and the water leaves through the baleens while the shrimps are kept back as if behind a fence, because the baleens are so close together, plate by plate, and are furnished at the inner edge with long horsehair-like bristles. Afterwards they are easily swallowed’ (Jensen 1923)”.

Adolf Jensen continued by citing two later first-hand accounts of the diet of the Greenland right whale by Scoresby (1820) and Brown (1868).

“W. Scoresby Jr. stated that the food of the Greenland right whale consists of ‘various species of actiniae, cliones, sepiae, medusae, cancri, and helices’ but added: ‘or, at least, some of these genera are always to be seen wherever any tribe of whales is found stationary and feeding’. It is thus only his assumption that all these kinds of animals might serve as food for the whale. However, he then gives the following positive information: ‘In the dead animals, however, in the very few instances in which I have been enabled to open their stomachs, squillae or shrimps were the only substances discovered. In the mouth of a whale just killed, I once found a quantity of the same kind of insect’ (Scoresby 1820: 469). When he examined the oral cavity and stomach of the whale Scoresby only found what he calls ‘squillae or shrimps’, by which he undoubtedly meant small crustaceans.

“Robert Brown, who had the opportunity to examine several Greenland right whales during sealing and whaling cruises to the Davis Strait and Baffin Bay,

wrote (1868: 541) that their diet ‘consists for the most part of Entomostraca and Pteropoda, but chiefly the former, and especially of *Cetochilus arcticus* Baird, *Cetochilus septentrionalis* H. Goodsir, and *Arpacticus kronii* Krøyer⁸, in other words of small crustaceans (copepods) and pteropods, but primarily the former.”

These studies thus conclude that the Greenland right whale, or bowhead whale, feeds chiefly on tiny crustaceans, and that Fabricius was the first to state this clearly. While this fact does not seem to be explicitly mentioned in the literature on whales, the account by Fabricius was known to researchers who studied crustaceans, as reflected in the following reference in Brehm’s ‘Tierleben’ (1918: 671): “The family *Mysidae* is the most widely distributed. As early as 1780, the highly merited priest and missionary Otto Fabricius said in his description of the animals of Greenland that these, together with other small animals, constitute the main food of the large Greenland Right Whales (*Balaena mysticetus*).”

The fin whale family (*Balaenopteridae*) has as a distinctive feature numerous deep, longitudinal grooves on the ventral forepart of the body. Fabricius (1780: 37-38) mentioned these grooves in the humpback whale and the minke whale, and of the former he later wrote (1818a: 70): “from the throat until the navel one sees many deep grooves with protruding interjacent areas running parallel lengthwise along the body”, and that the bottom of the grooves are blood-red while the ventral surface is otherwise white mixed with black. Fabricius, however, not only noted the presence of grooves, but also presented information on their function: “The whale can expand and contract these grooves at pleasure”. And two pages later in the paper he wrote: “When it (the humpback whale, *Megaptera boops [novaeangliae]*) is about to eat, it opens its mouth to swallow a great deal of water with all its contents, and often it is even seen keeping its mouth open above the surface, whereby the throat is distended and the ventral grooves expand, showing the red parts, as well as the clay-coloured tongue in the throat between the black baleens and the white palate – altogether a magnificent sight. Then, when it has swallowed what it wants, it closes its mouth, pressing the water out through the baleens; the fishes and

8. Now called *Calanus finmarchicus*, *C. septentrionalis* and *Harpacticus cronii*, respectively.

snails⁹ are thus kept back because of the narrowness of the space between the baleens and the bristles at their inner edges”.

The fact that the grooves expand was proved to Fabricius when he observed the red colour that appeared on the white and black-marbled ventral surface of the whale. And he was well aware of the function of the grooves in enlarging the oral cavity during feeding in order to fill the mouth with the water and its swarms of small animals.

Apparently, Fabricius’ account of the significance of the ventral grooves was not believed (e.g. Cuvier 1836: 325 and Sars 1865: 14), and it was gradually forgotten, so that Professor Willy Kükenthal could state that, although all researchers who had been able to examine fin whales had drawn attention to the grooves, no examination regarding their function was yet available. Kükenthal (1893: 312) therefore believed that he was saying something quite new when he proposed the interpretation that the grooves could serve to enlarge the oral cavity. Kükenthal based his theory on the observation that the thickness of the epidermis decreases extraordinarily in the grooves, and that the strong gas development in a stranded putrefying fin whale expands the body so that the grooves separate from one another much more than usual. All this may be true enough, but it is by no means true when Kükenthal adds: “For obvious reasons, direct observation is lacking of an enlargement of the throat by extension of the skin and reduction of the groove depth”. As mentioned above, while sitting in his kayak close to the living whales, Fabricius had seen the throat distend and the grooves expand while the oral cavity was being filled with water and the accompanying food, and obviously fully understood the significance of this.

When they surface to breathe, large whales blow a jet high up from their nostrils (‘blowholes’), and for a long time it was a seriously debated question what this jet consisted of. Some authors stated that they had seen the whales blowing jets of water out of the nostrils, which were therefore called ‘spray-holes’. Aristotle already knew that whales are lung-breathing animals, but at the same time he believed that they

swallowed water and blew it out through their nostrils. Pliny contributed considerably to the perpetuation of this belief by mentioning certain examples. It was the prevailing view until well into the nineteenth century that the water masses that entered the mouths of the whales each time they opened them to feed were driven out through the nostrils at full force in the form of a water column; accordingly it was thought that the nostrils served these animals both for breathing and as ‘spray-holes’ (e.g. Faber 1827 and Cuvier 1836: 83).

On the other hand, a number of the nineteenth-century observers of whales in their natural surroundings took the view that the ‘blowing’ was nothing but the warm, moist air from the lungs, which condensed into columns of vapour when it was exhaled into the cold atmosphere; and this gradually became the point of view of all prominent modern authors.

Generally, W. Scoresby Jr. is considered to be the first person to give a correct description of the ‘blowing’ of the whales (Henking 1901: 104, apparently referring to Scoresby 1820: 465), but already in 1780 Fabricius had a correct understanding of the phenomenon with reference to various whale species; in a later paper he explained the phenomenon in detail: “The humpback whale does not blow as powerfully as the fin whale or the Greenland right whale; this blowing of the whales is their breathing through the nostrils, from which from some distance one can see a high jet rising above the head of the whale, like a fountain, for which reason its nostrils are also called ‘water-pipes’ by some authors; however, I must challenge the prejudice of those who believe that the whales blow water through their blowholes. This is not the case; but just as the respiration of a human being looks like steam in cold air, so it is also, and to an even greater extent, in these larger animals; it is nothing but their moist respiration. It is, however, inevitable that some surface water will be blown up into the air during the blowing, because the whale usually blows exactly at the moment of surfacing” (Fabricius 1818a: 77).

A long-standing obstacle to the correct understanding of this phenomenon was the observation of Sundevall (1842: 224-226) that whales were also seen

9. From examination of the stomach contents of the humpback whale, Fabricius found that this whale species, when feeding in coastal waters, lives on capelin (*Salmo [Mallotus] villosus*), sand-lance (*Ammodytes Tobianus [A. lancea]*) and shell-bearing pteropods (*Argonauta arctica [Limacina (Spiratella) helicina]*).

'blowing' in warmer seas. An explanation of this was given by Racovitza (1903: 11-12) and Collett (1911-1912: 577). The air from the lungs of the whales is exhaled in a few seconds through the narrow nostrils under enormous pressure – the proof being that the jet rises to a considerable height. Furthermore the exhalation produces a piercing sound comparable to that of steam pouring out under pressure; the sudden reduction of the pressure leads to an expansion of the exhalation air, whereby heat is consumed, and because of the sudden cooling the moisture of the lung air is condensed into a column of mist or a cloud. The combustion gases from the lungs may contain ions that act as condensation nuclei for the vapour and contribute to the condensation. For this reason the 'blowing' of the whales is also visible in the warmer seas, particularly against a dark cloud or a slightly rippled sea surface forming a dark background. In the colder seas the phenomenon is far more conspicuous because the low air temperature further contributes to the condensation of the vapour. And besides this the jet will stay visible for a longer time before evaporating.

It is furthermore inconceivable for anatomical reasons that water could be sprayed, as pointed out in particular by Racovitza (1903: 9). In all whales the upper end of the trachea is prolonged and is closely connected with the inner nostrils, so that the nasal cavity and the trachea are united and completely separated from the oral cavity; in this way the food can pass on both sides of this air pipe into the oesophagus without the food or the accompanying water penetrating into the trachea; a beautiful adaptation enabling the whales to swallow the food while submerged without getting water in their lungs. Accordingly, the water cannot penetrate the nasal cavity either; by that route only air can pass to and from the lungs; the incoming water is pressed out at the sides of the mouth.

It should be noted that it was Racovitza, the author who treated the issue in question more thoroughly than anyone else, who drew attention to the fact that Fabricius, 'le consciencieux observateur', had been the first, more than a century earlier, to state explicitly that the whales blow out nothing but moist respiration; Racovitza mentions a number of other whale specialists who had later personally observed the same thing: Scoresby (1820), von Baer (1826, 1828, 1836 and 1864), Beale (1839), Holbøll (1849), Scammon (1874), 'et tous les cétologues modernes'. Yet Ra-

covitza's claim for the priority of Fabricius is based only on the few remarks in *Fauna Groenlandica* (1780); to these we could add the above-mentioned detailed statements in the paper on the humpback whale (1818a), which was not known to Racovitza – naturally enough, as it was written in Danish.

In the same treatise Racovitza further asserts that Fabricius was the first to give a precise description of the movements of the humpback whale when breathing, resting and jumping; and Racovitza cites the few lines written by Fabricius in *Fauna Groenlandica* on these issues. These observations on the behaviour of the humpback whale are certainly worth calling attention to, but they should preferably be quoted in the more detailed form given in the later paper (Fabricius 1818a: 73):

"When it swims fast without feeding it dives for a short period only, re-appearing quickly several times without showing its tail fluke, but it does blow each time; eventually, when it shows its flukes, this is a sign that it is diving to stay submerged for a longer period; it then dives obliquely towards the bottom and does not come up again until it is far off, and it rises in a similar oblique line from the bottom. From a boat it is a really majestic sight to see the huge animal shooting up from the deep. When feeding, however, it makes prolonged dives, and when it then stops to rest it ceases diving, hardly going beneath the surface. In calm weather it can even often be seen lying quietly at the surface without moving, as if dead or sleeping; in this position it is called *Puksinarsoak* [*pussinnarsuaq*] by the Greenlanders; it is also in this situation that one can attempt to kill it, although it quite often dives down suddenly when one gets close. Sometimes it lies on one side at the surface, slapping itself with its flippers. At other times, both in storm and calm, it jumps completely out of the sea, its entire body being seen above the water, turning around in the air and falling down on its back, again slapping itself with its flippers; this is not often observed in other whale species".

Racovitza (1903) firmly dissociates himself from authors who try to denounce Fabricius and later observers as fabulists when they say that this huge whale (c. 50 feet long) is able to jump completely out of the water. Racovitza has himself seen the humpback whale perform these strange manoeuvres: swimming on its back, turning around its longitudinal axis, even jumping entirely out of the water and falling down on



Fig. 10. Traditional hunting of humpback whale in Greenland (Hansen/Rosing 1971: 57).

its back – on one occasion seven times in a row. Racovitza has illustrated the sight of humpback whales out of the water with pictures made during his expeditions in the Antarctic seas (*l.c.*, Pl. III, Fig. 11A and B). However, Racovitza does not think that the whales carry out these voltes in order to get rid of parasites such as barnacles, gooseneck barnacles (*Coronula*, *Conchoderma*) and whale lice (*Cyamus boopis*), as suggested by Fabricius (1818a: 74, 81) – the parasites stick too fast for that; nor does he believe in the strange motives invented by a certain Rawitz (that the whale is unable to shut its mouth, its lower jaw being too heavy, so that it has to turn on its back to make the lower jaw close under its own weight!). Racovitza believes (*l.c.*, p. 31) that there is no point in seeking bizarre explanations when a natural one seems probable: all higher animals, including man, appear to have a need for relaxation, and to make peculiar movements now and then – so why not baleen whales?

Fabricius has further given a rather exciting account of the catching of the humpback whale by the

Greenlanders, and information on their use of this whale (Fabricius 1818a: 75-79). This primitive and dangerous form of whaling was conducted in Fabricius' time from *umiak* ('women's boats'), particularly by the Greenlanders of the Paamiut (Frederikshaab) area, where it gradually became less important; but the tradition was later renewed and continued on a smaller scale until 1923 (Winge 1902, Anon. 1944, Hansen/Rosing 1971, Helms, Hertz & Kapel 1984).

Professor Lütken published a paper (1887, 'What the Greenlanders know about the birth of cetaceans') based on a diary note by Director Chr. S. M. Olrik concerning the Greenlanders' observations of the birth of whales, particularly the white whale; it is said that the young are born tail first, and that it may take several weeks before they emerge completely. As regards the first point, Lütken draws attention to the discrepancy between the whale researchers Eschricht (1849: 105) and Guldberg (1886: 15-16), inasmuch as the former writes that the whales are usually born tail first, whereas Guldberg thinks that there is every reason to

believe, given the position of the foetus, that it is born head first.

Lütken had to admit that he did not know the ‘evidence’ on which Eschricht based his view, and that he may mainly have used personal communications, verbal or by letter. However, Fabricius (1780: 47) wrote of the harbour porpoise (*Delphinus [Phocoena] phocoena*): “It gives birth to a single calf that follows the mother for a year, submerging and emerging together with her. If it is killed while pregnant, the tail of the calf is usually seen protruding from the sexual opening, perhaps indicating that the mother has tried to give birth during the death struggle.” This appears to be the first time the observation was made that the young of the whale is born tail first.

The white whale (*Delphinapterus leucas* Pall.) has its name from the ivory-white colour of the skin. However, Fabricius made the interesting observation that it is not so from birth. He wrote (Fabricius 1780: 51): “It gives birth in spring to a single calf; before birth the colour is leaden, and the newborn calf is bluish; with age it becomes more and more white.” This observation was first confirmed much later, namely by Kükenthal (1889: 9), who even believed that no one had made this discovery before himself, and who drew the phylogenetic conclusion that the white whale must be descended from darker-coloured cetaceans and comparatively recently acquired the white skin, which Kükenthal regarded as an adaptation to life in the ice-covered Arctic seas: a white whale sleeping and drifting at the surface is not easy to distinguish at a distance from a drifting, snow-covered ice floe.

Fabricius gave important information on the sperm whale (*Physeter macrocephalus* L.) in *Fauna Groenlandica*, and especially in his unpublished manuscript. Apparently it was more common off Greenland in his time than nowadays. He stated that it prefers to stay far out at sea in the Davis Strait, occasionally approaching the coast; this happens more rarely in the northern regions than in the Paamiut (Frederikshaab) area, where it is seen quite often; it is also off the southern part of the country that “the true sperm whaling ships are seen now and then”. In Fabricius’ time even the Greenlanders occasionally hunted the sperm whale, and he has given an account of this primitive whaling (Fabricius 1818b: 254-255), which is of great historical interest now, since this hunting ceased long ago.

Observations on the Biology of other Animals in Greenland

Some of Fabricius’ observations of the behaviour of fish were received with doubt at the time. An example is his account of the care and persistence exhibited by the male common lump-sucker (*Cyclopterus lumpus* L.) in guarding the eggs (Fabricius 1780; 1798a: 32-33). He also reported on roe-guarding in sculpins, for example his *Cottus gobio [Gymnocanthus tricuspis Reinhardt]* (Fabricius 1780: No. 115): “It breeds together with the previous ones. It spawns the white eggs among filament algae. The male guards the eggs of the female, as I have reported for the lump-sucker, and this is also true of the previously-mentioned sculpins” (*Cottus [Myoxocephalus] scorpioides* Fabr. and *C. [M.] scorpius* L.). Many years later, the work of other researchers (e.g. Ehrenbaum 1904: 132-133) confirmed Fabricius’ observations.

He gives a delightful picture of animal behaviour when he describes the love display of the great Greenland crab (*Chionoecetes opilio* Fabr.): “In the mating season it performs a nice display with its mate, where they squeeze their claws together and the male leads the female to the side and forward as ceremoniously as a gentleman his dancing partner. Thus they can be seen walking in the sunshine along the beach” (Fabricius 1788b).

Lieberkind (1921: 121-126) suggested that a Greenland starfish (*Asterias groenlandica* Steenstrup) displays a peculiar form of parental care: its eggs are hatched in the stomach of the female, since nearly all stomachs of adult females that he opened were full either of eggs or of more or less developed young. As regards fertilization and the way the eggs get into this peculiar place, the author was only able to guess, since he had made his interesting discovery by dissecting specimens kept at the Zoological Museum, and had not been able to observe live animals.

However, the very questions that Lieberkind had to leave open were addressed by Fabricius. He wrote of his *Asterias rubens* (Fabricius 1780: No. 362, which includes *Asterias groenlandica* Steenstrup): “It mates in mid-May, with mouths closely joined, one partner lying on its back. At this time I have also seen the hollows of the arms of the larger ones close to the mouth full of white eggs.” Fabricius thus saw the mating as well as the eggs on their way to the entrance of the stomach; in both instances this agrees with the obser-

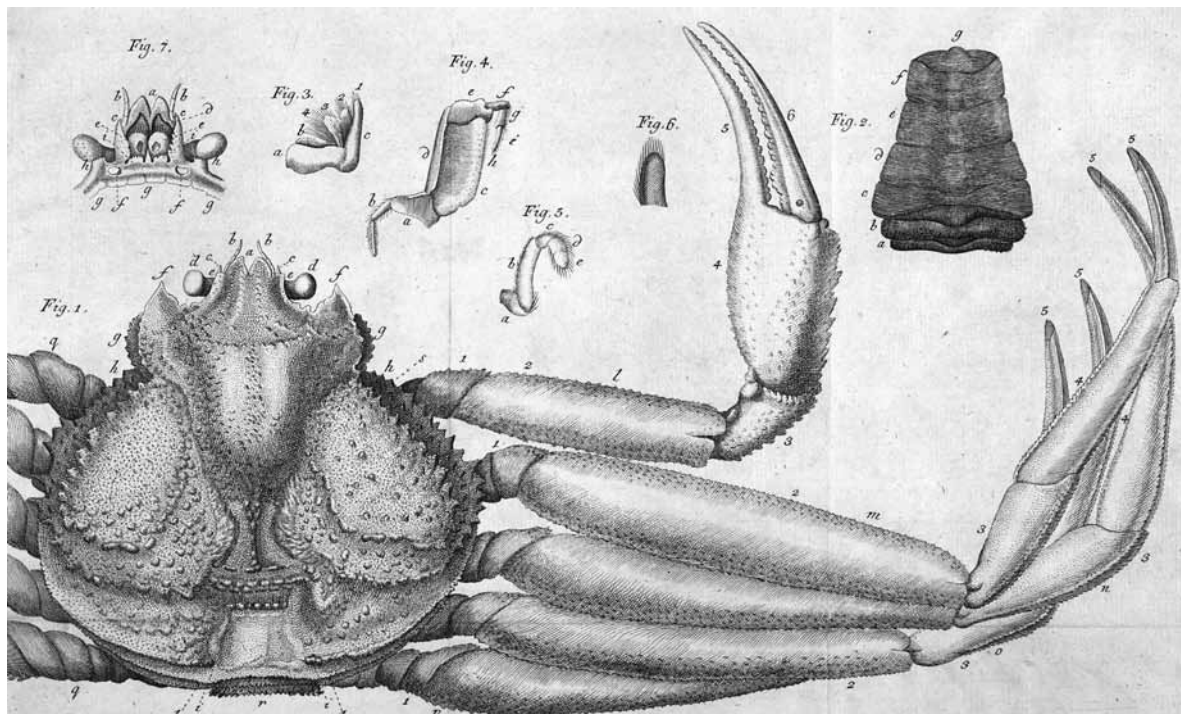


Fig. 11. The great Greenland crab (*Chionoecetes opilio*) (Fabricius 1788b: 190).

vation of Lieberkind, that the sexual organs of both the female and the male open, not in the usual way at the back, but on a small papilla on the underside of the arm. This example shows how important it is, even today, to consult Fabricius before concluding a treatise dealing with the study of Arctic animals.

As regards the food of mussels, authors in earlier times only had vague ideas suggesting that microscopic organisms in the water were their sole nourishment. It is therefore all the more surprising to read Fabricius' observations of the common mussel of the Greenland coasts, which led him to conclusions very similar to those only reached fairly recently by modern researchers. In the first place he reports that, although he had observed live mussels often and for long periods, he has never been able to observe them taking in anything but water; he has seen many small creeping or swimming animals passing just above or in the opening of the mussel, but it had never tried to attract them. Since, furthermore, the mouth organs of the mussel are undeveloped, Fabricius believes it to be certain that it lives on "the slimy foreign bodies in the water and the microscopic animals which it sucks in." Fabricius has two reasons for holding this opinion: that the fattest and biggest mussels were found on a

clayey bottom where the water, when it is made turbid, contains more foreign slimy or clayey substance; and that they are fattest at the full moon, when the water rises higher, producing a better supply of water and accordingly a more abundant supply of foreign substances (Fabricius 1788e: 459).

Observations and Collections in Norway and Denmark

Although the majority of Fabricius' scientific work relates to Greenland, he also spent some of his leisure time in Norway and Denmark making observations and collections which are reflected in a number of his publications.

Several observations and descriptions of insects and other invertebrates derive from his time in Drangedal (Fabricius 1783b: 296-309; 1784b; 1793a: 98-99; 1794a: 26-29; 1818a VI: 121-123; Bakke 1989; Naas 1993), and this is also the case with his demonstration that two kinds of fish then called by different names – 'Blaastal' (*Labrus coeruleus*) and 'Rødsnekke' (*L. carneus*) – are the male and female of the same species, the striped wrasse (*Labrus ossifagus*) (Fabricius 1818a IV: 98-109).

From his time in Hobro and Rise come some

descriptions of parasitic worms (included in Fabricius 1794a), and his demonstration that the ‘measles’ in pork meat were not tumours but a development stage (*Vesicaria lobata* = *Cysticercus cellulosae*) of the tapeworm *Taenia solium* (Fabricius 1783a), one year before the same conclusion was reached by Goeze (1784).

His posts in Copenhagen obviously did not leave him much time for long voyages or excursions; but in the city itself and its immediate surroundings he observed and collected material for new zoological studies. His description of a seal species stranded just outside the city, but new to the scientific world, his ‘hook-snouted’ seal (*Phoca grypus*) – later known as the grey seal (*Halichoerus gr.*) – is mentioned above (Fabricius 1791a: 164-167).

Otherwise it was mainly small invertebrates collected in ponds, moats, ditches, on the forest floor or on the beach, or found as parasites in fish, that were the objects of his discoveries, now with the aid of some of the resources he lacked in Greenland: a powerful magnification device and a talented draughtsman. The result was a series of small, beautiful contributions on these issues presented at the Society of Natural History or the Royal Danish Academy of Sciences and Letters until his 76th year (1820) and published in the proceedings of these societies (Fabricius 1793a, 1794a, 1798c: 64, 1818a VII: 137, 1826 VI: 14-35).

In the last-mentioned contribution, published four years after his death, we find one of Fabricius’ finest discoveries: the observation of the ciliary movement on a living animal (*Planaria excavata*): “Very short transparent hairs are found at least all over the circumference, giving an impression of flowing water in the live animal, and in the dead animal a brilliance that is difficult to depict because of the shortness and transprence of the hairs” (Fabricius 1826 VI: 26).

Topographical Works

In the introduction to *Fauna Groenlandica* (Fabricius 1780: vii-x; Helms 1929: 33-36), Fabricius writes that the chairman of the Missions Department, Count Otto Thott, when he posted him as a missionary to Greenland, imposed the additional task on him that he was to spend his leisure time studying and describing the natural phenomena of the country in which he was going to work. Fabricius explains that he took this task seriously and presented a plan for a comprehensive work, a *‘Historia succincta Groenlandiae’*.

Fabricius outlines a schedule for this work, which he suggests should be in three main parts: 1) a description of the natural history; 2) the geography; and 3) the history of Greenland. He gives details of the individual chapters in each part. He further explains some of the difficulties he faced in realizing the plan for this large work, and says that he therefore decided to start by publishing the result of his zoological studies; the *Fauna Groenlandica* can thus be regarded as the zoological part of the greater work, or rather as a ‘fore-runner’ of it, which would make it possible for him to present a condensed version in the final comprehensive work. The span of life allotted to Fabricius, and his many other activities, did not permit him to complete this work.

He did, however, publish another work which, like the *Fauna*, could be considered part of the great plan: a treatise on the drift ice off Greenland (Fabricius 1788a). His description of this phenomenon is of course primarily based on his own experience and knowledge from his time in southern Greenland, and ‘in the manner of the seafarers’ he distinguishes three types of ice: icebergs, the minor glacier ice-blocks and the flat (multi-year) floe ice that packs around South Greenland and is known there as the *Storis* or ‘Great-Ice’ (Greenlandic *sikorsuit*). He describes each type separately in great detail and offers his explanation of their origin and characteristics in an account which is still worth reading today.

Fabricius published no other contributions to the scheduled topographical work on Greenland; but among his posthumous manuscripts there is one dealing with a geographical or topographical description of Greenland, particularly of the region with which he was most familiar, the Frederikshaab (Paamiut) district. This later came to light and was published (Fabricius, ed. Ostermann 1946). It is a fairly comprehensive but unfinished account, and it is understandable that Fabricius himself did not take it all the way to publication, since it lacks satisfactory contributions from other missionaries who had an equivalent knowledge of other regions of Greenland.

The Ethnographer

As mentioned above, some brief information on the utilization of the animals and on the hunting methods



Fig. 12. Title page of the paper describing the implements used by the Greenlanders for catching seals (Fabricius 1810: 125).

was already given by Fabricius in *Fauna Groenlandica* (1780) and the subjects were later treated in greater detail, either in separate papers (Fabricius 1810 and Fabricius 1818b) or as separate sections in the papers on the Arctic Fox (Fabricius 1788d), the Seals of Greenland (Fabricius 1790 & 1791a), the King Eider (Fabricius 1793b), and the Humpback Whale (Fabricius 1818a).

In the introduction to the treatise ‘A Precise Description of all Implements used by the Greenlanders for catching Seals’ (1810) Fabricius wrote: “Among these unpublished notes of mine there is also a complete description of all the hunting implements of the Greenlanders for hunting seals and terrestrial animals as well as for fowling and fishing. I have often thought about these notes, and intended in one way or another to have them printed, so that my work would not have been in vain, but have then put them away again, considering them of too little importance to publish; but the longer I have considered the matter, the more I have been convinced that it would be of

advantage for others to become acquainted with the great ingenuity of primitive man in devising the cleverest means of meeting his needs – of which the highly mechanical arrangement of the Greenlanders’ hunting implements is undeniably substantial proof, and of which I have been able to procure more solid knowledge than any other by reason of my greater knowledge of the language of the country, and because I also accustomed myself to rowing in their kayaks and thus was able to accompany them on hunts of all kinds and there see, indeed learn for myself, the usefulness of every single contrivance” (quoted from Holtved 1962: 27-28).

Jensen (1923: 339-340 and 374-375, quoted by Thalbitzer 1962: 22) commented on this statement by Fabricius, and gave the following opinion of the importance of Fabricius’ contributions to ethnography:

“Fortunately, Fabricius did overcome his hesitation as regards the publication of this knowledge of the Greenlanders’ hunting implements and their use,

for, although more than a hundred years have passed since these works were printed, they still stand unsurpassed; precisely because Fabricius knew every single hunting tool from personal experience, he could describe them better than anyone else.

“The records must be said to be extremely valuable. With meticulous accuracy Fabricius goes over every single implement, down to the most minute details, describing each part, no matter how small, separately and in relation to other parts of the implement, so that when the author has finished describing the various parts of the harpoon, for instance, the reader understands the appropriateness of the design of each piece and that the implement as a whole must be constructed in just that manner and not otherwise to answer fully to its purpose. Fabricius also describes the hunt exhaustively and indeed in masterly fashion, as well as the manner in which the various implements are used. It is scarcely too much to say that to this day there are no better descriptions of Eskimo hunting gear and its use than those written by Fabricius a hundred years ago. Moreover, his records gain in value year by year, for the reason that some of the implements and hunting methods have fallen out of use and others are about to do so. I can wholeheartedly subscribe to the wish expressed by Morten P. Porsild, that Fabricius’s ethnographical papers, which are little known – especially abroad – may be translated into a world language.”

In the passage cited Porsild (1915: 116) wrote: “Otto Fabricius contributed a series of notes on the material culture of the West Greenlanders, which, as regards accuracy and profound understanding, far surpasses the works of his predecessors and of many later authors. Fabricius’ abilities were especially suited for this work; because, besides his knowledge of natural science and of language, he had, for the accomplishment of his work, the invaluable advantage of being himself able to hunt in the Eskimo manner: to manage his kayak, and to use the special Eskimo hunting weapons. Therefore, as regards this point, no one has been able to distinguish, as he could, between what was essential and what was incidental.

“Fabricius’ works should therefore be the classic for everyone who studies this subject. That they have, unfortunately, not become so is due to several circumstances, and, in particular, to the fact that they are written in Danish and that they occur scattered, in the

form of numerous small treatises, and often even as unimportant supplements to, or parts of, purely zoological works. They are, moreover, very sparingly illustrated, and the drawings are unfortunate, being faulty as regards measurements, etc. It is much to be wished that a complete edition of all Fabricius’ ethnographical papers could be published in a universally current language and illustrated with modern drawings of the objects which he describes, large collections of which are contained in the National Museum in Copenhagen (Porsild 1915).”

H.P. Steensby (1917: 47) also praised the work: “a better ethnographical account of the Eskimo implements and their use than that given by Fabricius is hardly to be found even today.”

In his work on the ethnology of the East Greenland Eskimos, William Thalbitzer (1914: 330) wrote: “The ethnography of the West Greenlanders as a whole is not yet written. The most exact contributions I know are of ancient date, Otto Fabricius’s description of the hunting weapons of the southern and central West Greenlanders (1810 and 1818b), and from recent years the monograph by A. Kroeber (1899) on the northernmost West Greenlanders, the Smith Sound Eskimo”.

Several years later, Thalbitzer in a commemorative speech on the occasion of the bicentenary of Fabricius’ birth in 1944 took up the issue again (Thalbitzer 1962):

“Here I have quoted Professor Ad. Jensen (1923) but could add similar praises from Morten Porsild’s important ethnographic work (1915), from H.P. Steensby’s (1917) and my own books (1914), all harmonizing in the wish that the classic ethnographical works of Fabricius, which are written in Danish, on the hunting gear of the Greenlanders for catching seals, terrestrial animals, birds and fishes, might some day become available in translation to a larger world than the Danish. To international ethnographic science and to archaeology these exact descriptions of the hunting implements and methods, most of which have now fallen into disuse, will be of exceptional value.”

As a matter of fact, Thalbitzer himself took up the task of publishing an English translation of Fabricius’ ethnographical works, but as a result of a variety of circumstances the project was delayed, so that it was his successor as professor of Eskimology and Archaeology at the University of Copenhagen who eventually edit-

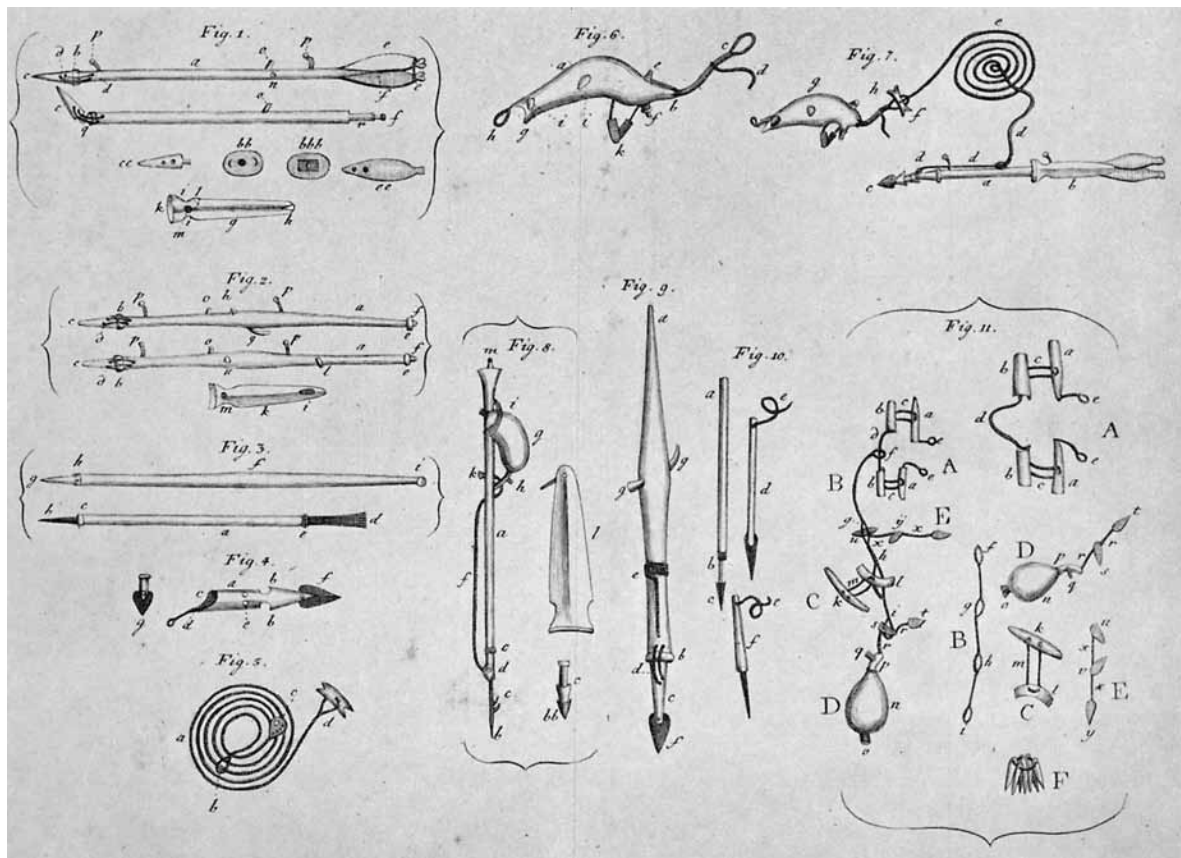


Fig. 13. Seal hunting implements (Fabricius 1810: 178, Pl.1).

ed and completed the publication (Holtved 1962), using Thalbitzer’s commemorative speech as an introduction and adding excerpts from Fabricius’ zoological papers (1788d, 1790 & 1791a, 1793b, 1818a) to his two ethnographical treatises (1810 and 1818b).

The Man behind the Work

All his biographers agree that little is known about the personality of Otto Fabricius. As Thalbitzer (1962: 10) wrote: “We are familiar with the external data of Fabricius. But he rarely says anything about himself. There are no letters, no candid diaries – everything was burnt! It seems evident that he was of a complex nature. From a brief autobiographical account on the occasion of his jubilee we hear that in his youth he could be seized with ‘enthusiasm’ and that he was no stranger to ‘a certain passion for research’. One of his biographers suggested that his personality, like his language, was characterized by a somewhat dry, grey

sensibleness – a cautious nature always preferring to stand on the solid ground of reality, to confine himself to his own experience (Kornerup 1923: 290).

“It is obvious that the style in Fabricius’ works does not bear the impress of either Holberg’s humour or the spirit of romanticism. As regards his standpoint in ecclesiastical affairs, Kornerup rightly calls him a ‘supranaturalist’: orthodox and conservative in questions of religion, true to the ideals of his youth – ready at all times to defend the Greenlanders. ‘As an old man he might still shed tears at the decay into which the Greenland Mission had fallen as a consequence of economies on the part of the State’ (Kornerup 1923). He was stubborn in his ideas and took part in an ecclesiastical controversy against the Chaplain Royal, Dr. Chr. Bastholm, whose liberal views Fabricius was unable to share. On the other hand it is characteristic that his attitude was friendly towards the young N.F.S. Grundtvig, in contrast to many clergymen who criticized Grundtvig’s probational sermon.

“Otto Fabricius was of a serious nature, something

of a collector and scholar, and perhaps something of a character too, like so many Danes who have lived alone among the Eskimos and devoted themselves to the country; he had lived so long over there, placed like a *Lynceus* to guard an outpost, whence his keen eyes observed the native people and animals but focused on certain particular areas. The clarity of his vision illuminated for himself and for us the words of the language and the fauna. He was possessed of unusual ability. Through him European science of those days was given an insight into a new corner of the Arctic world” (Thalbitzer 1962: 10-11).

In the absence of direct evidence of the personality of Fabricius one might try to get a glimpse of the man by ‘reading between the lines’ of the work, as Adolf Jensen did in an attempt to explain how the young missionary gained his insight into the Greenlanders’ acquaintance with nature by approaching their lifestyle as closely as possible (Jensen 1923: 343-345):

“In the introduction to Otto Fabricius’ treatise on the Greenland seals (Fabricius 1790: 79-81) one finds a small item of autobiography, where the author, otherwise so silent as regards his own person, opens up a little and gives the reader an idea of what it was that moved this man – whose mission might seem to lie rather far from natural history – to study this science during his five years’ term of office in Greenland (1768-73) and how he arrived at the wonderful insight into the habits of the Greenland animals that radiates from his writings.

“When Fabricius for once talks about himself, he does it in order to give the reader confidence, by offering this information on his own circumstances, in his account on the Greenland seals, their habits and the Greenlanders’ use of them. A possible question by the reader concerning the origin of all this knowledge is answered in his little preface. ‘I have wished’, he writes, ‘to begin by briefly calling attention to this in order to inspire greater confidence in my account’. By doing so Fabricius, fortunately, happens to unveil just slightly the part of his life that attracts most of our interest, namely his stay in Greenland.

“In the above-mentioned preface Fabricius mentions that he brought to Greenland an interest in natural history and that this inclination was increased more and more ‘by the discovery of so many new things’. In addition, his interest in studying nature was nourished because he ‘was able to get the most

detailed information on these matters from the natives of the country’. Of the Greenlanders’ intimate knowledge of nature he offers the following explanation: ‘In another country one might spend twice the time and have one’s knowledge of nature far less enriched; but the assistance that an uncultivated people can provide is far greater than one might imagine; the reasons being that they must constantly pursue these animals in their hunting and fishing, and that by collecting the plant material generously offered by nature itself they must seek to remedy shortages when hunting and fishing fail, so that not even the minutest product of nature lacks interest for them. Here, the exploration of nature becomes a necessity, whereas another people might believe it could live unconcerned with such matters and leave a few individuals to make provision for all’ (Fabricius 1790: 80).

“The conditions for a fruitful study of nature were thus favourable for him: ‘In such places one therefore has good opportunities to study nature, as long as one’s stay is not too short and one has the understanding and the courage to make the most of the opportunities offered by the country, and is sufficiently prepared in advance.’ ‘As regards the latter’ – Fabricius admits – ‘my inadequacies were many, and I particularly regret not having learned in advance how to make drawings, for which reason I had to pass over many things, being afraid that my raw drawings might confuse rather than illuminate the descriptions.’ But Fabricius adds: ‘Yet in order to benefit from the opportunities as far as was in my power, I spared no pains, and even decided to do what few or none before me had done; instead of staying in the colony I chose to wander with the Greenlanders and to live with them in their tents and turf huts; I even ventured out in the small boats used for hunting by the men [the kayaks] accompanying them some miles out to sea on their sealing, fowling or fishing; and from this everyday intercourse I acquired both a command of their language and much knowledge of nature, particularly with respect to seals, which would otherwise have remained unknown to me’ (Fabricius 1790: 81).

“That Fabricius not only followed the seal hunters in his kayak but also succeeded in harpooning seals himself appears from a statement in a later paper (Fabricius 1810: 130): ‘... a foreigner able to catch a seal wins great respect from the Greenlanders, and having participated in their hunting I can still, after so many



Fig. 14. Monument in memory of Otto Fabricius in front of the church in Paamiut (Frederikshaab). The inscription in Greenlandic and Danish on the memorial plaque reads: “He loved the Greenlanders/Taught them of the living God/Lived together with them in everything/Was equal to the hunters in courage at sea/Taught scholars about the animals and the language of our country”. Photo P. Lorentzen, Paamiut 2005.

years, hear myself being mentioned by them with much esteem.’

“Here we find the key to the understanding of the extraordinary authorship of Fabricius. He arrived in Greenland animated by the desire to study nature. And there he found a simple hunting people whose everyday task it was to investigate nature. In his wonderful one-person craft, the kayak, the hunter rests on the sea surface like a giant bird watching for prey; the

air above him, the water below and the surface itself are explored by him with the sharp senses of the savage man. The hunting of land animals leads him watchfully over the wide open spaces right up to the border of the Inland Ice. From childhood he is brought up to this scouting life, and the sum of the experience obtained by previous generations is passed on to him. A European (a white man) can therefore learn an immense amount about nature from the Greenland hunter if he speaks his language and understands how to gain his confidence. With this in mind Fabricius began an admirable undertaking: he sloughed off civilization. Young (in his mid-twenties) and unmarried, he renounced the pleasant and comfortable life of the colony, wandered with the Greenlanders, lived in their tents and turf huts, even followed them for miles at sea in a kayak hunting seals and birds and fishing. In short, he became a Greenlanders. He then gained a perfect command of the language, and the world of the animals was opened to him.

“So Fabricius makes no secret of the fact that he has received a great deal of instruction concerning nature from the Greenlanders, and his respect for their knowledge in this field is great: ‘Thus I never asked a free Greenlander in vain about any work of nature; he was not only immediately able to give it a name¹⁰, but also to tell a story about it which was usually found reliable’, as he writes in the preface to his treatise on the Greenland seals (Fabricius 1790: 80-81).”

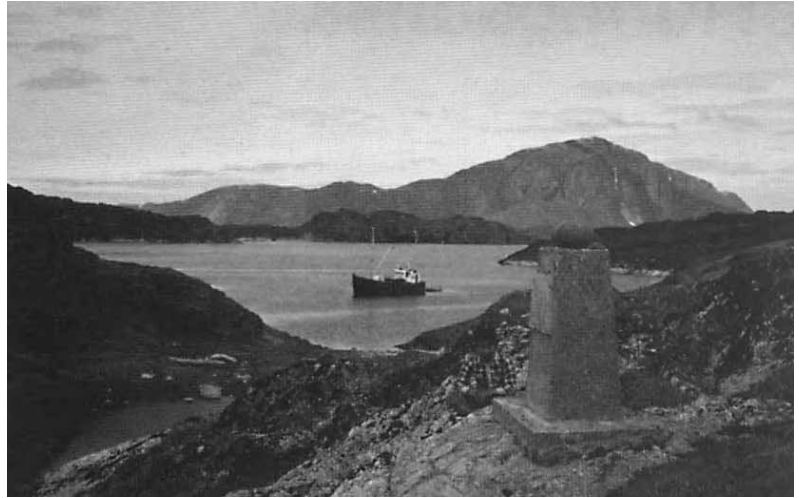
In the conclusion of his biography Jensen (1923: 393-395) offered some comments on the conditions in which the work was conceived, the methods used, and the posthumous reputation of Fabricius in Greenland.

“It would be difficult to imagine more primitive conditions for cultivating the science of zoology than those under which Fabricius worked in Greenland.

“For a work-room he had a Greenland house, an earth hut or a tent, and his artificial light was the faint gleam of a train-oil lamp. The optical equipment that is so extremely important to a zoologist was confined to some hand magnifying-glasses – he had no microscope, nothing but ‘inferior seeing-glasses’ or ‘hand-glasses’ as he calls them himself. He had no aquaria of

10. The fact that the Greenlanders have names for even the lower animals has surprised many scientists; cf. the exclamation by Prof. Dr. H. Pagenstecher in the registration of *Fauna Groenlandica* as regards worms: “Zahlreiche Würmer, merkwürdiger Weise mit eigenen grönländischen Namen” (Pagenstecher 1879-93, 4(I): 133).

Fig. 15. View of the archipelago outside the abandoned settlement Iluilaarsuk south of Paamiut (Frederikshaab) where a memorial stone for Otto Fabricius was erected in 1980. Photo H. Dyssel 1980 (Wolff 1980: 405).



course; he had to make what use he could of things at hand: jars, cups and the like – or empty mussel shells¹¹. His library consisted of one book: Linnaeus' *Systema Naturae*.

“His research vessel, the Greenland one-man boat or kayak, would also seem to be a poor craft for conducting zoological work. In this case, however, I think otherwise – Fabricius can thank the kayak for most of the large number of observations he made in Greenland. The Greenland kayak is as if made for biological research. One travels quickly in it, and it has the great advantage over an ordinary boat that the occupant can easily carry it overland and thus take many a short cut. This means that one can travel far and wide in a kayak. It can be moved almost noiselessly through the water, and is so small in size and lies so low that the paddler can steal almost unseen upon the animal he wishes to observe. And from his low seat, right on the surface of the water, he can observe animal life in the water without disturbing it. Fabricius understood to the full how to exploit all the advantages offered to biological research by this, the world's most wonderful one-man craft.

“He must have been a clever and brave kayak man, for only such a man can catch a seal from a kayak. Foolhardy, one is tempted to call him when he paddles right up to the giant of the Greenland fiords, the enormous humpback whale (Fabricius 1818a: 79): ‘on one occasion when paddling in my kayak among a flock of

humpback whales, I got the idea of throwing my bird dart into one of them, which was also well hit, as I was pretty close, but because of the barbs the dart stuck to the whale, which escaped with it; after a few days, however, a Greenlander brought back my dart, which had been found in a stranded whale carcass, so the whale must have perished as a result of inflammation in the wound caused by this tiny dart sting’. Fabricius records this experience only in order to report that a sting that might seem harmless to a whale could be fatal to it because of the risk of infection; to us it illustrates, in addition, his daring flitting about in his tiny craft amidst the giants of the sea.

“From the kayak Fabricius spied upon the whales, the seals, the sea birds, and the swarming life at the surface, at the bottom and in the intermediate layers, in short all that gives his writings their special value and makes them interesting and fascinating reading even to this day.”

Adolf Jensen reports that Fabricius was still remembered by the people of the district a century and a half later under the name of *Erisaalik*, i.e. ‘he who wore water-skin clothes’, the dress of the Greenland sealer when sailing his kayak; and he concludes his biography as follows (Jensen 1923: 394):

“If ever a monument were to be raised to Fabricius – and he deserved it – it would be a fine and worthwhile task for an artist to do a relief carving of Fabricius in his kayak, paddle in hand, wearing the cos-

11. Fabricius 1818a: 132: “It (*Ascaris Gadi*) was so tenacious of life outside its natural element that it survived more than 14 days in a mussel shell with seawater”.



Fig. 16. Close-up of the memorial stone. Photo E. Holm 1980, © Greenland National Museum and Archives.

tume of the Greenland sealer so that nothing but the sharp-cut profile and the steady gaze are seen peering intently over the edge of the boat down into the water.”

No such monument has yet been realized, but in 1942 the bicentenary of the foundation of Frederikshaab (Paamiut) was celebrated, and the celebrations included the unveiling of a memorial stone to Fabricius outside the church. And in 1980 – the bicentenary of the publication of *Fauna Groenlandica* – another monument was set up in the now abandoned settlement Iluilaarsuk.

An impression of the young missionary working in Greenland in the early 1770s might thus be compiled indirectly from his scientific writings – not from an autobiography or from descriptions of the man by any of his contemporaries.

The same is true of the rest of his life, in Norway as well as in Denmark. One can find many examples of praise of Fabricius’ work – some of which are quoted in the preceding chapters – but descriptions of the man behind the work are few and insignificant. As mentioned above, all personal letters or diaries were burnt after his death in accordance with family tradition, as documented by his great-great-grandson L. B. Fabricius (1975), according to whom very little has been handed down as family tradition about the personality of Otto Fabricius. An anecdote tells us that his eldest son would never have had the master key to the house entrusted to him during the lifetime of his father – he was 33 years old in 1822 – if this had not been secretly arranged by his mother (Fabricius 1975: 15). The note leaves us with the impression of a strict, austere *paterfamilias* trying to maintain firm domestic discipline, which was however subverted by his eighteen-year-younger wife.

The relation between the spouses was as far as we know good and warm. In his ‘jubilee sermon’ on the occasion of his 50th year in office (1818) Otto thanked her “for her exceptional care in maintaining my spirits and cheerfulness, for her faith and for the support offered in my old age”. On her death Grundtvig praised her in a poem: “Quietly she lived for kind-heartedness, did not love with mouth and tongue, secretly with all her heart no less” (Kornerup 1923: 286).

Otto Fabricius realized that his life and work were coming to an end. Having presented his last ‘Zoological Contributions’ at the Danish Academy of Science and Letters on 1st June 1820, he concluded: “And with these words I will end my talk this time, without being able to promise or expect in future to entertain this Honourable Society with my humble contributions”.

The next year he had to stay in bed for two months, and in May 1822 his long and active life ended. It is succinctly characterized by the inscription on his signet, alliterating with his initials:

“*Otium Fugiens, ora et fida*” – Shun idleness, pray and believe.

Curriculum vitae of Otto Fabricius

		1786	married to Anne Gunilde Heineth (1762-1834); eleven children (six died young)
1744	born in Rudkøbing, the twelfth child of the clergyman Hans F. (1696-1755), the fourth by his second wife Else Cathrine Ursin (1716-1785)	1789	lecturer in Greenlandic
		1789-1822	incumbent at Vor Frelsers Kirke, Copenhagen
1762	matriculated at the University of Copenhagen	1790-1791	<i>Detailed Description of the Seals of Greenland</i>
1768	(February) graduated in divinity; in March ordained as a Greenland missionary	1791	<i>An improved Greenlandic Grammar</i> (Revision 1801)
		1794 & 1799	<i>The New Testament</i> translated into Greenlandic
1768-1773	missionary in Paamiut (Frederikshaab), Southwest Greenland; 1770-1773 living at the settlement Iluilaarsuk	1803	appointed Professor
		1804	<i>Dictionary of Greenlandic, improved and expanded</i>
1773	(autumn) to December 1774 in Copenhagen, applying for a post	1810	<i>A Precise Description of all Implements used by the Greenlanders for catching seals</i>
1775-1779	rector in Drangedal, Norway	1818	<i>A Precise Description of the Hunting of Terrestrial Animals, of Fowling and Fishing by the Greenlanders with the Appurtenant Implements</i>
1775	married to Anne Dorte Ziege (1754-1785); two children (3?)		
1779-1781	rector in Hobro, Jutland		
1780	<i>Fauna Groenlandica</i>	1818	appointed Honorary Bishop and Doctor of Divinity
1780	appointed member of the Royal Danish Academy of Sciences and Letters	1822	died in Copenhagen
1781-1783	rector in Rise, Ærø	1822	(posthumous) <i>Genesis</i> translated into Greenlandic
1783-1789	chaplain and master at Vajsenhuset (the Orphanage), Copenhagen		

Otto Fabricius' Ecclesiastical, Linguistic and Scientific Publications

- Fabricius, O. 1780. Fauna Groenlandica, systematice sistens animalia Groenlandiae Occidentalis hactenus indagata, quoad nomen specificum, triviale, vernaculumque; synonyma auctorum plurium, descriptionem, locum, vicium, generationem, mores, usum capturamque singuli, prout detegendi occasio fuit, maximaque parte secundum proprias observationes Othonis Fabricii Ministri Evangelii, quondam Groenlandis ad Coloniam Friderichshaab, posthac Norvagus Drangedaliae, nunc vero Danis Hopunti Jutiae, membri Societas Scientiarum quae est Hafniae. – Hafniae et Lipsiae, impensis Ioannis Gottlob Rothe, Aulæ atque Univers. Reg. Bibliopolæ: 16 + 452 pp., 1 Pl.
- Fabricius, O. 1781. Om Hvalaaset. – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 1: 557-578, 1 Pl.
- Fabricius, O. 1782-1787. Bidrag til Bibel-Kundskab ved oplysende Anmærkninger over vigtige og vanskelige Steder i den hellige Skrift 1 & 2. – Aalborg & Kiøbenhavn.
- Fabricius, O. 1783a. Tinteormen (*Vesicaria lobata*). – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 2: 287-295, 1 Pl.
- Fabricius, O. 1783b. Beskrivelse over nogle lidet bekjendte Podurer, og en besonderlig Loppe. – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 2: 296-311, 1 Pl.
- Fabricius, O. 1784a. Recension over Zoologia Dania, Vol. I. – Nyeste Kiøbenhavnske Efterretninger om lærde Sager for Aar 1784, 38: 593-602.
- Fabricius, O. 1784b. Beschreibung der Atlasmücke und ihrer Puppe (*Tipula Sericea*). – Schriften der Berlinischen Gesellschaft naturforschender Freunde 5: 254-259, Tab. III (1-5).
- Fabricius, O. 1785. Von dem Spio-Geschlecht, einem neuen Wurmgeschlecht, *Nereis seticornis* und *Nereis filicornis*. – Schriften der Berlinischen Gesellschaft naturforschender Freunde 6: 256-270, Tab. V (1-12).
- Anonymous (O.F.) 1785a. En erfaren geistlig Mands uforgribelige Tanker angaaende Confessionarii Bastholms Forsøg til en forbedret Plan i den udvortes Gudstjeneste. Efter Forfatterens Begiering udgivne ved Jens Winther Bentzen. – Kiøbenhavn: 112 pp.
- Anonymous (O.F.) 1785b. Andet og sidste Tillæg til den erfarne Mands uforgribelige Tanker. – Atter et Par Ord fra en erfaren geistlig Mand angaaende den af Herr. Doct. og Conf. Bastholm udgivne 'Religions-Bog for Ungdommen'. – Kiøbenhavn: 16 pp.
- Fabricius, O. 1787. Fem Taler til Erindring af den kongelige Stiftelse for fader- og moderløse Børn, holdne i Waysenhuus-Kirken i Aarene 1783 til 1787. – Kiøbenhavn: 10 + 131 pp.
- Fabricius, O. 1788a. Om Driv-Isen i de Nordlige Vande og fornemmelig i Davids-Strædet. – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 3: 65-84.
- Fabricius, O. 1788b. Beskrivelse over den store Grønlandske Krabbe. – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 3: 181-190, 1 Pl.
- Fabricius, O. 1788c. Krøl-Nereiden (*Nereis cincinnata*). – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 3: 191-201, 1 Pl.
- Fabricius, O. 1788d. Field-Ræven (*Canis Lagopus*). – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 3: 423-448, 1 Pl.
- Fabricius, O. 1788e. Ueens-Muslingen (*Mytilus discors*). – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 3: 453-461, 1 Pl.
- Fabricius, O. 1790 & 1791a. Udførlig Beskrivelse over de Grønlandske Sæle. – Skrifter af Naturhistorie-Selskabet 1(1) & 1(2): 79-157 & 73-170, Pls XII, XIII & X, Fig. 3. (1793 Germ. transl.: Ausführliche Beschreibung der Grönländischen Seehunde. – Schriften der naturforschenden Gesellschaft zu Kopenhagen 1(1) & 1(2): 73-144 & 69-155, Taf. XII-XII & X; English transl. 2005: Detailed Description of the Seals of Greenland. – Meddelelser om Grønland, Bioscience – This volume.)
- Fabricius, O. 1791b. Forsøg til en forbedret Grønlandsk Grammatica. – Kiøbenhavn: 8 + 322 pp. (New edition 1801).
- Fabricius, O. 1793a. Om nogle sieldne smaa Conchylier. – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 4: 86-101, 1 Pl.
- Fabricius, O. 1793b. Om den pukkelneppede Ederfugl (*Anas Spectabilis*) og Grønlandernes Edderfuglefangst. – Skrifter af Naturhistorie-Selskabet 2(2): 56-83, Pl. IX.
- Fabricius, O. 1793c. Beskrivelse over den punkteerte Tangsprel (*Blennius punctatus*). – Skrifter af Naturhistorie-Selskabet 2(2): 84-96, Pl. X, Fig. 3.
- Fabricius, O. 1794a. Bidrag til Snylte-Ormenes Historie. – Skrifter af Naturhistorie-Selskabet 3(2): 1-45, Pls. I-IV.
- Fabricius, O. 1794b (1799). Nye Testamente [New Testament in Greenlandic].
- Fabricius, O. 1797a. Anmærkning (om *Filaria Chrysomelæ* iagttagen ved Hr. von Holten). – Skrifter af Naturhistorie-Selskabet 4(1): 18-19.
- Fabricius, O. 1797b. Tvende forskjellige Færøiske Bløddyr, en Doride og en Søe-Nelde, opdagede af Sognepræsten Hr. J. Landt. – Skrifter af Naturhistorie-Selskabet 4(1): 38-55, Pl. V.
- Fabricius, O. 1798a. Beskrivelse over 2de sieldne Grønlandske Fiske: Bugte-Tanden (*Kampylodon*) og den tornefulde Rognkald (*Cyclopterus Spinosus*). – Skrifter af Naturhistorie-Selskabet 4(2): 21-33, Pl. IX.
- Fabricius, O. 1798b. Tillæg til Conchyli-Slægterne *Lepas*, *Pholas*, *Mya* og *Solen*. – Skrifter af Naturhistorie-Selskabet 4(2): 34-51, Pl. X.
- Fabricius, O. 1798c. Beskrivelse over 4 lidet bekjendte Flad-

- Orme (*Planaria Angulata, Fuscescens, Candida & Brunnea*). – Skrifter af Naturhistorie-Selskabet 4(2): 52-66, Pl. XI.
- Fabricius, O. 1799a. Anmærkninger ved "Iagttagelser henhørende til Indvoldeormenes og Blød-dyrenes Naturhistorie af J. Rathke". – Skrifter af Naturhistorie-Selskabet 5(1): 149-153.
- Fabricius, O. 1799b. Betragtninger over Nereide-Slægten, og nøjere Beskrivelse over nogle sjældne Grønlandske Arter. – Skrifter af Naturhistorie-Selskabet 5(1): 154-190, Pl. IV.
- Fabricius, O. 1801. Jungerutit tuksiutidlo etc. [i.e. Grønlandsk Psalmebog, med Fortale af Otto Fabricius]. – København.
- Fabricius, O. 1804. Den grønlandske Ordbog/ forbedret og forøget udgivet ved Otho Fabricius. – København: 8 + 795 pp.
- Fabricius, O. 1810. Nøiagtig Beskrivelse over alle Grønlandernes Fange-Redskaber ved Sælhundefangsten, hvoraf vil sees deres mekaniske og ret hensigtsfulde Indretning. – Det Kongelige Danske Videnskabernes-Selskabs Skrifter for Aar 1807 og 1808, 5(2): 125-178, 1 Pl. (English translation in Holtved 1962: 27-66.)
- Fabricius, O. 1818a. Zoologiske Bidrag. I. Om Moskus-Oxen, *Bos Moschatus*; II. Om Stub-Hvalen, *Balaena Boops*; III. Om Hval-Ruuret (*Lepas Balaenaris, Lepas Diodema og Lepas aurita*); IV. Om Blaastaalen (*Labrus coeruleus*), Rødsnekken (*Labrus carneus*) og Berggylten (*Labrus exoletus*); V. Om Strand-Reddiken (*Holothuria Phantapus*) og Skjæl-Sprøjten (*Holothuria squamata*); VI. Om den stoiske Ódebille (*Byrrhus stoicus*) i Sammenligning med Pille-Billen (*Byrrhus pilula*); VII. Om de 8 Indvolds-Orme-Arter, som i Zoologica Danica Vol 2 p. 46 Tab. LXXIV ere anførte under Navnene 1) *Ascaris Phocae*, 2) *A. tubifera*, 3) *A. bifida*, 4) *A. Rajae*, 5) *A. Pleuronectes*, 6) *A. Gadi* 7) *A. versipellis* og 8) *A. Alcae*. – Det Kongelige Danske Videnskabernes-Selskabs Skrifter for Aar 1809, 1810, 1811 og 1812, 6(1): 57-138, 1 Pl.
- Fabricius, O. 1818b. Nøiagtig Beskrivelse over Grønlandernes Landdyr, Fugle- og Fiskefangst med dertil hørende Redskaber. – Det Kongelige Danske Videnskabernes-Selskabs Skrifter 6(2): 231-272, 1 Pl. (English translation in Holtved 1962: 67-96.)
- Fabricius, O. 1818c (1822). Bibelingoak merdläinnut imalonneet: Gutim okauzeesa illèjt kennikæt, náitsunnik kajumiksarnermik illakartut merdlertunnut nalektartunnut. (Bibelsprog for Børn). – Kjöbenhavnime: 68 pp.
- Fabricius, O. 1819. Arkikutsiksak Pellesinut Ajokærsoirsunnudlo etc. (Ritual over Kirkeforretningerne ved den Danske Mission paa Grønland. Omarbejdet ved Otto Fabricius og 2den Gang trykt). – København: 87 pp.
- Fabricius, O. 1820. Okalluktuæt Opernartut Terráuko Bibe-limit Testamentitámidlo (Bibelhistorie for Børn). – Kjöbenhavnime.
- Fabricius, O. 1822 [posthumous]. Testamentitikamit Mosesimaglegej siurdleet [First Book of Moses].
- Fabricius, O. 1824. Nye Zoologiske Bidrag. I. Rettelse af nogle indløbne Fejl ved de Grønlandske Plantedyrs Bestemmelse i min Fauna Grönlandica; II. Om een ny, og 2de lidet bekjendte Flynder-Arter, nemlig 1) Steen-Sueren (*Pleuronectes quadridens*), 2) Den lille Hellefisk (*Pleuronectes pingvis*) og 3) Den grønlandske Flynder (*Pleuronectes platessoides*); III. Om Gronovs *Mya Syrmatophora [Unio]*; IV. Om nogle Linneisk miskjendte Snogepande-Arter [*Cypraea*]; V. Om den norske Jomfrue-Coral (*Madrepora Norvegica*) som en virkelig forskjellig Art fra den egentlige Jomfrue-Coral (*Madrepora virginea*). – Det Kongelige Danske Videnskabernes Selskabs naturvidenskabelige og matematiske Afhandlinger 1: 23-80, Pls. I-II. (1845 Extracts in German. – Isis 1845: 50-54.)
- Fabricius, O. 1826. Fortsættelse af Nye Zoologiske Bidrag. VI. Nogle lidet bekjendte og tildels nye Flad-Orme (*Planariæ*); VII. Tvende lidet bekjendte Iglearter; VIII. Nogle lidet bekjendte Söstjerner nöiere bestemte; IX. Nærmere Oplysninger om nogle Linneiske Conchyliæ-Arter, som de senere Skribenter ei ret have tordet vedkjende sig. – Det Kongelige Danske Videnskabernes Selskabs naturvidenskabelige og matematiske Afhandlinger 2: 13-60, Pls. I-IV. (Extracts in German 1845. – Isis 1845: 63-76.)
- Fabricius, O. [unpublished MS]. Zoologiske Samlinger, eller Dyrebeskrivelser, Tid efter anden forfattede efter egen Betragtning ved Otto Fabricius, fra Aar 1786, og her bragt i Samling fra Aar 1808. – Otte hefter i kvartformat, opbevaret på det Kongelige Bibliotek, København [Eight notebooks in quarto kept in the Royal Danish Library, Copenhagen].
- Fabricius, O. [ed. post. H. Ostermann] 1946. Grønlandsbeskrivelse, 1ste Bog. – Meddelelser om Grønland 129(4): V-VIII, 1-110.
- Otto Fabricius contributed to O.F. Müller *Zoologia Danicæ Prodomus* (1776) with a considerable number of descriptions of new species, and in Müller's *Zoologia Danica* (1788) the following figures with descriptions are due to Fabricius: Pl. XXXIII (Fig. 2-5), Pl. LXVIII (Fig. 1-15), and Pl. LXXIV (Fig. 1-8). Further, Fabricius published the posthumous work of O.F. Müller (1786) *Animalcula Infusoria Fluviatilia et Marina*: LVI + 367 pp., Pl. I-L.(4°).
- Finally, a diary kept by Trade-keeper Peder Olsen 1751-53 was published and annotated by Fabricius 1787 (see references below).

References

- Anderson, J. 1746. Nachrichten von Island, Grönland und der Strasse Davis zum wahren Nutzen der Wissenschaften und der Handlung ... Nebst einem Vorberichte von den Lebensumständen des Herrn Verfassers. – G.C. Grund, Hamburg: 31 + 328 + 7 pp.
- Anderson, J. 1748. Efterretninger om Island, Grønland og Strat Davis, til Videnskabernes og Handelens sande Nytte, med Kobberstykke og et Landkort. Hvortil er føjet en tilforladelig Beskrivelse over Lapmarken. – G.C. Rothe, Kiøbenhavn: 6 + 27 + 574 pp.
- Anonymous 1944. Grønlandernes Fangst af Søpattedyr: Knølhvalen. – Sammendrag af Statistiske Meddelelser vedrørende Grønland III. Beretninger vedrørende Grønlands Styrelse 1: 627.
- Asmussen, J.P. 1992. Otho Fabricius som præst og sprogforsker (1744-1822): foredrag holdt i Videnskabernes Selskab i København 1. december 1980 i anledning af 200-året for udgivelsen af Otto Fabricius' Fauna Groenlandica. – Fisker, Frederiksberg: 19 pp.
- Baer, K.E. von 1826. Die Nase der Cetaceen, erläutert durch der Nase des Braunfisches. – Isis 8: 811.
- Baer, K.E. von 1828. Noch ein Wort über das Blasen der Cetaceen. – Isis 9: 927.
- Baer, K.E. von 1836. Sur le prétendu passage de l'eau par les event des Cétacés. – Bulletin scientifique de l'Académie de St Petersburg 1: 37-40.
- Baer, K.E. von 1864. Noch ein Wort über das Blasen der Cetaceen, mit bildlichen Darstellungen. – Bulletin de l'Académie imperiale scientifique de St. Petersburg 7: 333-341.
- Bakke, T.A. 1989. En drangedal-prest og hans zoologiske oppdagelse. – Det var ein gong – Minner frå Drangedal 12: 24-35.
- Beale, T. 1839. The Natural History of the Sperm Whale; its anatomy, and physiology, food, Spermaceti, ambergris, etc. With a sketch of a South Sea Whaling Voyage. – J.v. Voorst, London: 6 + 393 pp.
- Brehm, A.E. 1918. Brehms Tierleben. Allgemeine Kunde des Tierreichs 1. Niedere Tiere, 4. vollständig neubearbeitete Auflage: 43 + 722 pp.
- Brown, R. 1868. Notes on the History and Geographical Relations of the Cetacea frequenting Davis Strait and Baffin's Bay. – Proceedings of the Scientific Meetings of the Zoological Society of London 1868: 533-556.
- Buffon, G.L. de & Daubenton, L.J.M. 1765. Histoire Naturelle, Générale et Particulière, avec la Description du Cabinet du Roi 13. Quadrupèdes. – L'Imprimerie Royale, Paris: 6 + 441 pp.
- Buffon, G.L. de & Daubenton, L.J.M. 1770. Allgemeine Historie der Natur nach allen ihren besondern Theilen abgehandelt; nebst einer Beschreibung der Naturalienkammer Sr. Majestät der Königes von Frankreich 7(1). Quadrupedes. – A.H. Hallens Witwe, Hamburg und Leipzig: 16 + 248 + 2 pp.
- Collet, R. 1911-1912. Norges Pattedyr. – Aschehaug & Co., Kristiania: 10 + 744 pp.
- Cranz, D. 1765. Historie von Grönland enthaltend die Beschreibung des Landes und der Einwohner, und insbesondere die Geschichte der dortigen Mission der Evangelischer Brüder zu Neu-Herrnhut und Lichtenfels. Mit acht Kupfertafeln und einen Register 1. – H.D. Ebers, Barby und Weidmanns Erben und Reich, Leipzig: 35 + 512 pp. (English edition 1767, Dutch 1767, and Swedish 1769).
- Cuvier, F. 1836. De l'Histoire naturelle des Cétacés ou recueil et examen de faits dont se compose l'histoire naturelle de ces animaux. – Roret, Paris: 52 + 416 + 4 pp., 22 Pls.
- Damkaer, D.M. 2002. The Copepodologist's Cabinet. A Biographical and Bibliographical History. – American Philosophical Society, Philadelphia, Pennsylvania: 19 + 300 pp.
- Egede, H. 1741. Det gamle Grønlands Perustration eller Naturel-Historie, og Beskrivelse over det gamle Grønlands Situation, Luft, Temperament og Beskaffenhed; De gamle Norske Coloniers Begyndelse og Undergang der Samme-Steds, de itzige Indbyggers Oprindelse, Væsen, Leve-Maade og Handtæring, samt Hvad ellers Landet Yder og giver af sig, saasom Dyr, Fiske og Fugle &c med hosføyet Land-Caart og andre Kaaber-Stykker over Landets Naturalier og Indbyggerns Handtæring. – J.C. Groth, København: 12 + 132 pp. (Re-issued L. Bobé (ed.) 1925, Meddelelser om Grønland 54: 458 pp.). (Repr. 1984, Rhodos, København: 12 + 131 pp.).
- Egede, P. 1750. Dictionarium Groenlandico-Danico-Latinum, complectens primitiva cum suis derivatis, quibus interjectae sunt voces primariae à Kirendo Angekkutorum. – Sumptibus & typis Orphan. Regii, Hafniae: 312 pp.
- Egede, P. 1760. Grammatika Groenlandica-Danico-Latina. – Haunia: 255 pp.
- Egede, P. 1766. Testamente nutak, eller Det nye Testamente oversat i det Grønlandske Sprog med Forklaringer, Paralleler og udførlige Summarier af Paul Egede [The New Testament in Greenlandic]. – København.
- Egede, P. 1788. Efterretninger om Grønland, uddragne af en Journal holden fra 1721 til 1788. – H.C. Schrøder, Kiøbenhavn (Re-issued 1998, M. Lidegaard (ed.) – Grønlands Selskabs Skrifter 29: 204 pp.).
- Ehrenbaum, E. 1904. Eier und Larven von Fischen der deutschen Bucht, III. Fische mit festsitzenden Eier. – Wissenschaftliche Meeresuntersuchungen, Neue Folge 6, Abteilung Helgoland: 132-155.
- Ellis, H. 1750. Reise nach Hudsons Meerbusen, welche von zweyen Englischen Schiffen, der Dobbs-Galley und California, in den Jahren 1746 und 1747, wegen Entdeckung einer nordwestlichen Durchfahrt in der Süd-See verrichtet worden, nebst einer richtigen Abzeichnung der

- Küste, und einer kurzen Naturgeschichte des Landes, Beschreibung der Einwohner, auch einer wahren Vorstellung der Umstände und Gründe, welche die künftige Erfindung einer solchen Durchfahrt wahrscheinlich machen, beschrieben von H. Ellis ...; aus dem Englischen übersetzt und mit Anmerkungen aus andern hieher gehörigen Schriftstellen versehen. Mit Kupfertafeln und zwoen neuen Karten von Hudson Meerbusen und den angränzenden Ländern. – A. Vanderhoeck, Göttingen: 45 + 364 + 10 pp., 11 Pls, 2 maps.
- Erxleben, J.C.P. 1777. *Systema Regni Animalis per Classes, Ordines, Genera, Species, Varietates cum Synonymia et Historia Animalium. Classis I, Mammalia.* – Weygandianis, Lipsiae: 48 + 636 + 64 pp.
- Eschricht, D.F. 1849. *Undersøgelser over Hvaldyrene 6. Udbytte af en Reise gjennem det nordvestlige Europa i Sommeren 1846, som Tillæg til de foregaaende Afhandlinger – Kongelige danske Videnskabernes Selskabs Skrifter 5. Række, Naturvidenskabelig og Matematisk Afdeling 1: 85-138.*
- Faber, F. 1827. *Ueber das Blasen der Wale.* – Oken, Isis: 858-860.
- Fabricius, F.B. & Fabricius, L.P. 1937. *Danske Slægter Fabricius. Slægten Fabricius fra Faaborg: 42 + 186 pp.* – 1955. Supplement: 96 pp.
- Fabricius, L. B. 1975. *Træk af dansk Musiklivs Historie etc. Omkring Etatsråd Jacob Christian Fabricius' Erindringer.* – Arnold Busck, København: 603 pp.
- Fürstenberg, M.H.F. 1861. *Die Krätzmilben der Menschen und Thiere.* – W. Engelmann, Leipzig: 5 + 240 pp., 15 Taf.
- Glahn, H.C. 1771. *Anmærkninger over de tre første Bøger af Hr. David Crantz's Historie om Grønland.* – København (Re-issue M. Lidegaard (ed.) 1991. – *Grønlandske Selskabs Skrifter 30: 205 pp.*
- Goeze, J.A.E. 1784. *Neueste Entdeckung, dass die Finnen in Schweinefleisch keine Drüsenkrankheit, sondern wahre Blasenwürmer sind.* – Böhmischer Bibliothek, Halle 2 (1): 477.
- Gosch, C.C.A. 1873. *Otto Fabricius, p. 418-425.* – *In: Udsigt over Danmarks zoologiske Litteratur 2(1).* – København: 602 pp.
- Gosch, C.C.A. 1878. *Otto Fabricius, p. 212-215.* – *In: Udsigt over Danmarks zoologiske Litteratur 3 (Bibliografi).* – København: 8 + 556 + 2 pp.
- Guldberg, G.A. 1886. *Bidrag til Cetaceernes Biologi. Om Forplantningen og Drægtigheden hos de nordatlantiske Bardehvaler.* – *Forhandlinger i Videnskabs-Selskabet i Christiania Aar 1886(9): 56 pp.*
- Hansen, K./ Rosing, J. 1971. *Knølhvalfangst, p. 53-62.* – *In: K. Hansen (ed.). Grønlandske fangere fortæller.* – Nordiske Landes Bogforlag: 207 pp.
- Helms, O. 1929. *Otto Fabricius: Fauna Groenlandica, Pattedyr og Fugle.* – *Grønlandske Selskabs Skrifter 6: 138 pp.*
- Helms, P., Hertz, O. & Kapel, F.O. 1984. *The Greenland Aboriginal Whale Hunt, p. 57-92.* – *In: M.C.Stevenson, A. Madsen & E. Maloney (eds) 1997: The Anthropology of Community-based Whaling in Greenland. Studies in Whaling 4, Occasional Publications 42, Canadian Circumpolar Institute, University of Alberta: 277 pp.*
- Henking, H. 1901. *Über das Blasen der Wale.* – *Zoologischer Anzeiger 24: 103-111.*
- Hermann, J. 1779. *Beschreibung der Mönchs-Robbe.* – *Beschäftungen der Berlinischen Gesellschaft Naturforschender Freunde 4 (19): 456-509, Pls 12-13.*
- Holbøll, C. 1849. *Über das sogenannte Wasserspritzen der Wallthiere, p. 193-194.* – *In: Eschricht, D.F.: Zoologisch-Anatomisch-Physiologische Untersuchungen über Nordischen Wallthiere.* – Leopold Voss, Leipzig: 16 + 206 pp., 15 Pls.
- Holtved, E. (ed.) 1962. *Otto Fabricius' Ethnographical Works. With an introduction by William Thalbitzer.* – *Meddelelser om Grønland 140(2): 138 pp.*
- Jensen, A. S. 1923. *Naturforskeren Otto Fabricius, p. 331-399.* – *In: Biskop Dr. theol. Otto Fabricius. Et Mindeskraft i Hundredaaret for hans Død.* – *Meddelelser om Grønland 62(3): 215-399.*
- Jensen, A. S. 1932. *Otto Fabricius 1944-1822, p. 72-75.* – *In: V. Meisen (ed.). Prominent Danish Scientists through the ages.* – Copenhagen: 195 pp.
- Jensen, A. S. 1944a. *Naturforskeren, Biskop Otto Fabricius. I Anledning af 200-Aaret for hans Fødsel.* – *Naturhistorisk Tidende 8: 17-20.*
- Jensen, A. S. 1944b. *Naturforskeren, Biskop Otto Fabricius. – Dyr i Natur og Museum, Aarvog for Universitetets Zoologiske Museum 1943-44: 67-78.*
- Kleinschmidt, S. 1851. *Grammatik der grönländischen Sprache, mit teilweisem Einschluss des Labradordialekts.* – Berlin (Nachdruck 1968 Georg Olms Verlagbuchhandlung, Hildesheim: 12 + 182 pp.).
- Kleinschmidt, S. 1871. *Den Grønlandske Ordbog, omarbejdet af Samuel Kleinschmidt; udgiven paa Foranstaltning af Ministeriet for Kirke- og Undervisningsvæsenet og med det kongelige danske Videnskabernes Selskabs Understøttelse.* – H.F. Jørgensen, Louis Kleins Bogtrykkeri, København: 10 + 460 pp.
- Knattrup, N. 1944. *Biskop, dr. teol. Otto Fabricius, Grønlandsmissionær, Sprogmand og Naturforsker.* – *Folkung Bladet 6. Aarg. (10): 1-4.*
- Kornerup, B. 1923. *Otto Fabricius' Levned og Betydning som kirkelig Personlighed, p. 217-293.* – *In: Biskop Dr. theol. Otto Fabricius. Et Mindeskraft i Hundredaaret for hans Død. Meddelelser om Grønland 62(3): 215-399.*
- Kornerup, B., Spärck, R. & Ostermann, H. 1935. *Otto Fabricius, 1744-1822, Præst, Zoolog og Grønlandsmissionær.* – *Dansk Biografisk Leksikon 6 (2. udg.): 543-549.*
- Kroeber, A.L. 1899. *The Eskimos of Smith Sound.* – *American Museum Natural History Bulletin 12. New York.*

- Krøyer, H.N. 1838. *Conspectus Crustaceorum Groenlandiae*. – *Naturhistorisk Tidsskrift* 2(3): 249-261.
- Kükenthal, W. 1889-1893. Vergleichend-anatomische und entwicklungsgeschichtliche Untersuchungen an Waltherien 1-6. – *Denkschriften der Medicinisch-Naturwissenschaftlichen Gesellschaft zu Jena* 3: 10 + 448 pp., 25 Pls.
- Lepechin, I.I. 1778. *Phocarum Species Descriptae*. – *Acta Academiae Scientiarum Imperialis Petropolitaneae pro Anno 1777* (1): 257-266, Pls. 6-9.
- Lieberkind, I. 1921. On a star-fish (*Asterias groenlandica*) which hatches its young in its stomach. – *Videnskabelige Meddelelser fra Dansk naturhistorisk Forening* 72: 121-126.
- Lidegaard, M. 1980. Otto Fabricius, 1744-1822, præst, zoolog, missionær. – *Dansk Biografisk Leksikon* 4 (3. udg.): 314-315.
- Linnaeus (C. von Linné) 1758. *Systema Naturae per regna Trium Naturae, secundum Classes, Ordines, Genera, Species, cum Characteribus, differentiis, synonymis, locis I, Regnum Animale*, 10th edit. (Reformata). – L. Salvii, Holmiae: 2 + 824 pp.
- Linnaeus (C. von Linné) 1766. *Systema Naturae per regna Trium Naturae, secundum Classes, Ordines, Genera, Species, cum Characteribus, differentiis, synonymis, locis I(1 & 2), Regnum Animale*, 12th edit. (Reformata). – L. Salvii, Holmiae: 1327 + 37 pp.
- Lütken, C.F. 1887. Hvad Grønlænderne ville vide om Hvaldyrenes Fødsel. – *Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i København for Aar 1887*: 397-401. (1888 in German: *Zoologischer Jahrbuch, Abteil für Systematik etc.* 3: 802-804).
- Martens, F. 1675. *Spitzbergische oder Groenländische Reise Beschreibung* gethan im Jahr 1671. Aus eigener Erfahrung beschrieben, die dazu erforderte Figuren nach dem Leben selbst abgerissen (so hierbey in Kupfer zu sehen) und jetzo durch den Druck mitgetheilet. – G. Schultzen, Hamburg: 8 + 135 pp., 16 Pls.
- Meldgaard, M. 1986. Rensdyr og moskusokser på langfart. – *Dyr i Natur og Museum* 1986(1): 12-15.
- Muus, B., Salomonsen, F. & Vibe, C. 1981. *Grønlands Fauna. Fisk, Fugle, Pattedyr*. – Gyldendal, Copenhagen: 464 pp.
- Müller, O.F. 1773-74. *Vermium terrestrium et fluviatilium, seu animalium infusoriorum, helminthicorum et testaceorum, non marinorum, succincta Historia* 1-2. – M. Hallager, Hafniae et Lipsiae: 135 + 214 pp.
- Müller, O.F. 1776. *Zoologiae Danicae Prodomus, seu animalium Daniae et Norvegiae indigenarum characteres, nomina, et synonyma imprimis popularium*. – Hallager, Havniae: 32 + 282 pp.
- Naas, O.T. 1993. Den verdenskjente vitenskapsmannen Otto Fabricius. Prest i Drangedal 1774-1779. – *Det var ein gong – Minner frå Drangedal* 16: 134-159.
- Olsen, P. 1787 (O. Fabricius ed.). Udtog af en Dagbog, holden i Aarene 1751-53 af Handelsbetient Peder Olsen paa en Rejse i Grønland, som han, efter Missions-Collegii og det almindelige Handels-Kompanies Direktørers Villie, foretog sig til at undersøge de sydligste Egne af Landet, indtil 15 Mile Østen for Statenhuk. – Ugeskriftet "Samleren" 1: 7-18.
- Pagenstecher, H. 1879-1893. *Vermes I. Bronn's Klassen und Ordnungen des Thier-Reichs* 4. – Leipzig: 925 pp.
- Pennant, T. 1784. *Arctic Zoology I. Introduction. Class I Quadrupeds*. – H. Hughes, London: 11 + 200 + 6 + 185 pp.
- Petersen, M. E. 1994. Arctic diversity, well known polychaetes, and Otto Fabricius: A tribute and a request on the occasion of Fabricius' 250th birthday. – E. Skytte & T. Berg (eds): *Arktisk Biologisk Forskermøde 26 February 1994*: 16.
- Phipps, C.J. 1774. *A voyage towards the North Pole undertaken by His Majesty's Command 1773*. – W. Bowyer & J. Nichols, London: 8 + 253 pp.
- Porsild, M.P. 1915. *Studies on the material culture of the Eskimo in West Greenland*. – *Meddelelser om Grønland* 51(2): 111-250, Pl. X.
- Racovitza, E. G. 1903. *Cétacés. – Expédition Antarctique Belge, Résultats du voyage du S.Y. Belgica en 1897-1898-1899, Zoologie*: 142 pp.
- Rosenthal, F. 1825. Über die Sinnesorgane der Seehunde. – *Nova Acta Physico-Medica Academiae Caesareae Leopoldine-Carolinae* 12: 686-687, Pl. LVI, Fig. 4.
- Sars, G.O. 1866. *Beskrivelse af en ved Lofoten indbjerget Rørhval, Balaenoptera musculus*. – *Forhandlinger i Videnskabs-Selskabet i Christiania Aar 1865*: 266-295, Tab. I-III.
- Scammon, C.M. 1874. *The Marine Mammal of the Northwestern Coast of North America, described and illustrated; Together with an Account of the American Whale-Fishery*. – Carmany & Co., San Francisco: 320 + 1 + 5 pp., 27 Pls.
- Schreber, J.C.D. von 1775-1778. *Die Säugethiere in Abbildungen nach der Natur mit Beschreibungen* 3. – W. Walter, Erlangen: 284-590.
- Schultz-Lorentzen, C.W. 1923. Otto Fabricius og den grønlandske Mission, p. 293-330. – *In: Biskop Dr. theol. Otto Fabricius. Et Mindeskrift i Hundredaaret for hans Død*. – *Meddelelser om Grønland* 62(3): 215-399.
- Scoresby, W., jr. 1820. *An account of the Arctic Regions with a History and Description of the Northern Whale-Fishery* 1 & 2. – A. Constable & Co., Edinburgh: 20 + 551 + 82 & 8 + 574 pp., 24 Pls, 1 map.
- Seba, A. 1734 & 1758. *Locupletissimi Rerum Naturalium Thesauri accurata descriptio et iconibus artificiosissimis expressio, per universam physices historiam* 1 & 3. – Janssenia-Waesbergias & J. Wetstenimi, & Gul. Smith, Amstelaedami: 38 + 178 pp., III Taf. & 226 + 212, III Taf.

- Steensby, H.P. 1917. An Anthropogeographical Study of the Origin of the Eskimo Culture. – *Meddelelser om Grønland* 53(2): 39-228.
- Stephensen, K. 1913. Grønlands Krebsdyr og Pycnogonider. – *Meddelelser om Grønland* 22(1): 479 pp.
- Sundevall, C.J. 1842. (on the blowing of whales; exact title not known)*. – *Förhandlingar vid de Skandinaviska Naturforskarens 3. Möte*: 224-226.
- Thalbitzer, W.(ed.) 1914. The Ammassalik Eskimo. Contributions to the Ethnology of the East Greenland Natives 1. – *Meddelelser om Grønland* 29: 755 pp.
- Thalbitzer, W. 1932. Fra Grønlandsforskningen første Dage. – Festskrift udgivet af Københavns Universitets i Anledning af Hans Majestæt Kongens Fødselsdag 1932, September. – København: 107 pp.
- Thalbitzer, W. 1962. Otto Fabricius, cleric, philologist, ethnographer and naturalist. Commemorative speech on the occasion of the 200th anniversary of his birth, March 31th, 1944, p. 7-25. – *In*: E. Holtved (ed.). *Otto Fabricius' Ethnographical Works*. – *Meddelelser om Grønland* 140(2): 138 pp.
- Winge, H. 1902. Grønlands Pattedyr. – *Meddelelser om Grønland* 21(2): 317-521.
- Wöldike, M. 1745. Betænkning om det Grønlandske Sprogs Oprindelse og Ulighed med andre Sprog. – *Det Kiøbenhavnske Selskabs Skrifter* 1745 (2): 129-156.
- Wolff, T. 1967. Danske Ekspeditioner på Verdenshavene / Danish Expeditions in the Seven Seas. – Rhodos International Science and Art Publishers, Copenhagen: 325 + 11 pp.
- Wolff, T. 1980. En dansk videnskabelig bedrift. 200-året for Otto Fabricius' Fauna Groenlandica. – *Naturens Verden* 1980 (12): 402-405.
- Wolff, T. 1996. Fabricius, Otto, 1744-1822, dansk teolog, zoolog og sprogforsker. – *Den store danske Encyklopædi* 6: 168.
- Zimmermann, E.A.W. von 1780. Geographische Geschichte der Menschen, und der allgemein verbreiteten vierfüssigen Thieren, nebst einen hieher gehörigen zoologische Weltcharte 2. – Weigandische Buchhandlung, Leipzig: 8 + 432 pp.
- Zorgdrager, C.G. 1750. Beschreibung des Grönländischen Walfischfangs und Fischerey, nebst einer gründlichen Nachricht von dem Bakkelau- und Stockfischfang bey Terreneuf, und einer kurzer Abhandlung von Grönland, Island, Spitzbergen, Nova Zembla, Jan Mayen Eiland, der Strasse Davids u.a. Aus dem Holländischen übersetzt, und mit accuraten Kupfern und Land-Charten gezieret. – G.P. Monath, Leipzig: 4 + 370 + 12 pp.

Detailed Description of the Seals of Greenland
Otto Fabricius

Translated and edited by
Finn O. Kapel

Detailed Description of the Seals of Greenland

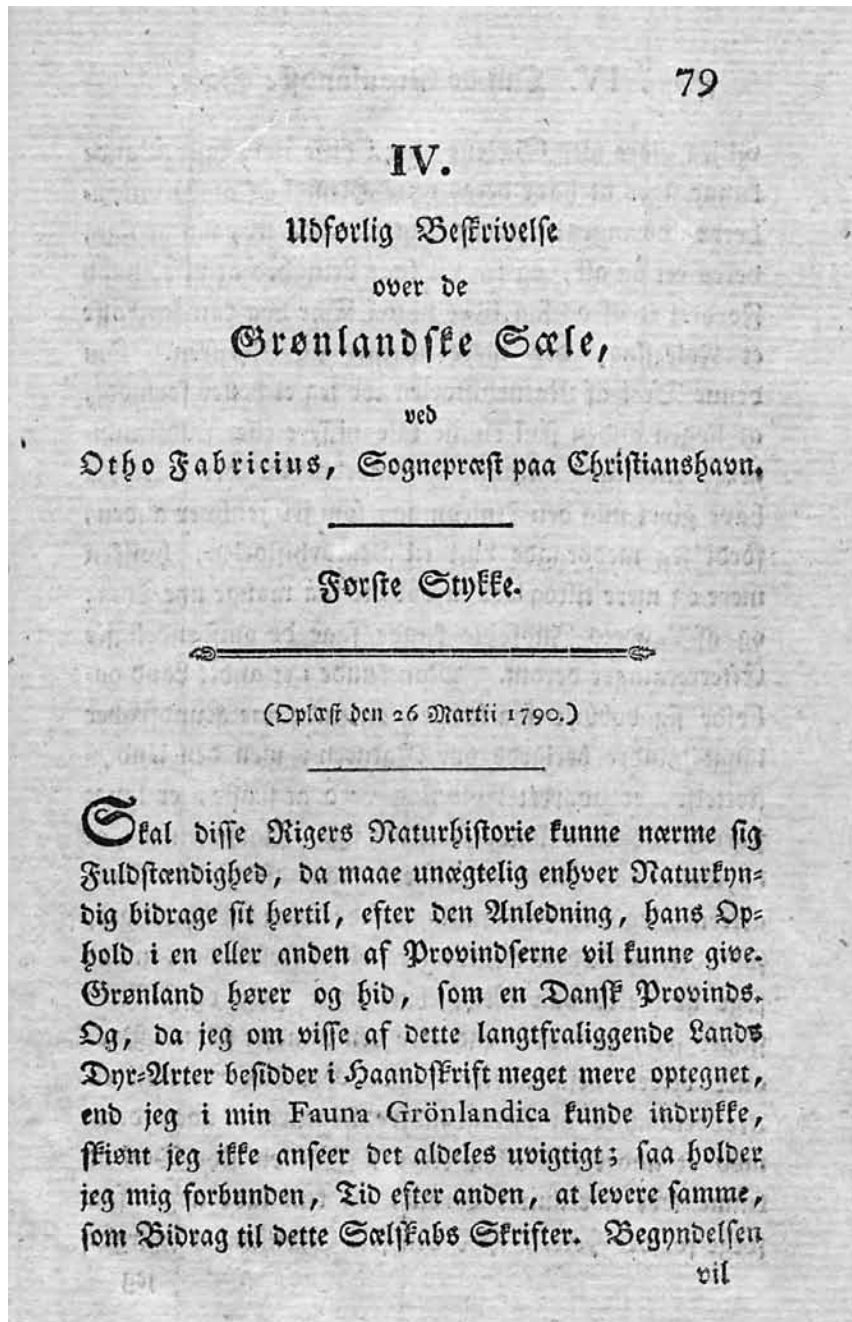


Fig. 17. Title page of the first part of the treatise on the seals of Greenland, presented 26 March 1790 and published in the series *Skrifter af Naturhistorie-Selskabet*, 1st vol., 1st part, No. IV (Fabricius 1790).

Editor's note

In the present translation of Otto Fabricius' treatise on the seals of Greenland an attempt is made to follow the style of the original Danish text as close as possible, but since the language has undergone considerable changes since the time of Fabricius a number of adjustments have been necessary. I owe a great debt of gratitude to James Manley for his professional and indispensable assistance in approaching these intentions.

For convenience, a list of contents have been compiled. In addition to Fabricius' own division of the text in main sections by species, sub-division of each of these are added in order to facilitate the reading and comparison between species.

The sections on Hunting methods and Utilization (p. 68-78, 83-85, 90-91, 98-99, and 104-105) are taken (with some modifications) from: Holtved, Erik (ed:) 1962. Otto Fabricius' Ethnographical Works, with an Introduction by William Thalbitzer. – Meddelelser om Grønland 140 (2): 1-139.

For headings of the main sections I have used a vernacular English name mentioned by Fabricius in his list of synonyms, as well as the scientific name he uses; in some cases alternative or present-day names are added in square brackets. In these cases, as in other connections, square brackets indicate comments or notes by the editor. The scientific names, and other Latin names or quotations are given in *italics*.

Names and terminology in Greenlandic are also shown in *italics*, both in Fabricius' original spelling and in present-day Greenlandic usage, e.g. *Atâk [aataaq]*. Names in other languages (Danish, German, French, etc.) are emphasized using bold types, e.g. **svartside**.

In the original publication, Otto Fabricius presented 67 footnotes in the First Part and 166 in the Second Part; the majority of those were references to previous works which are cited in this translated edition in the main body of the text, in accordance with present-day reference conventions (e.g. Torfaeus 1706: 87-88). Those of Fabricius' notes that contain quotations or factual information are, however, kept as footnotes (a total of 60, with the addition of some editor's notes [# 12, 26, 29, 33, 45, 47, 62, 70, 75 and 77]).

Finally, a list of references is added. It has been something of a task to decipher quite a few of the references given in the original text of Fabricius. With valuable assistance from the employees at the Danish National Library of Science and Medicine and the Royal Danish Library it has, however, been possible to find and examine most of them; a few titles were not identified satisfactorily and are marked with an asterisk (*).

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First Part

Introduction

If the natural history of this country is to approach completeness, everyone versed in natural science must contribute according to the opportunities offered by his sojourn in one or the other of its provinces. This applies equally to Greenland, as a Danish province. Having myself noted in manuscript much more concerning certain animals of this faraway country than could be included in my *Fauna Groenlandica* (Fabricius 1780), even though I consider such material not wholly unimportant, I feel it is incumbent upon me from time to time to submit such items as contributions to the publications of this Society.

I will begin with the seals that might be said to have their true home in these northern waters, and which are put to greatest use by the Greenlanders. These are as it were their one and all, and I shall have occasion to show what benefit an animal so little used by us can afford a people closer to nature. In this area of natural history I presume no one may speak with more assurance and comprehension than myself, my five years in office in this country having offered me opportunities granted no one else, inasmuch as I took with me an interest in natural history which was increased by the discovery of so many new things, and I was able to get the most detailed information about these matters from the natives of the country.

In another country one might spend twice the time and have one's knowledge of nature far less enriched; but the assistance that an uncultivated people can provide is far greater than one might imagine, the reasons being that they must constantly pursue these animals in their hunting and fishing, and that by collecting the plant material generously offered by nature itself they must seek to remedy shortages when hunting and fishing fail; so that not even the minutest product of nature lacks interest for them. Here, the exploration of nature becomes a necessity, whereas another people might believe it could live unconcerned with such matters and leave a few individuals to make provision for all.

Thus I never asked a free Greenlander in vain about any work of nature; he was not only immediately able to give it a name, but also to tell a story about it which was usually found reliable. In such places one therefore has good opportunities to study nature, as long as one's stay is not too short and one has the understanding and courage to make the most of the opportunities offered by the country, and is sufficiently prepared in advance. As regards the latter, my inadequacies were many, and I particularly regret not having learned in advance how to make drawings, for which reason I had to pass over many things, being afraid that my crude drawings might confuse rather than illuminate the descriptions. Yet in order to benefit from the opportunities as far as was in my power, I spared no pains, and even decided to do what few or none before me had done; instead of staying in the colony, I chose to wander with the Greenlanders and to live with them in their tents and turf huts; I even ventured out in the small boats [i.e. the kayaks] used for hunting by the men, accompanying them some miles¹² out to sea on their sealing, fowling or fishing; and from this everyday intercourse I acquired both a command of the language and much natural history, particularly with respect to seals, which would otherwise have remained unknown to me. I have wished to begin by briefly calling attention to this in order to inspire greater confidence in my account.

Among the four-footed animals the seal genus is one of the least accurately described. In the works of most authors one finds a pronounced confusion, of which it is difficult to make sense. The reason is that the seal is a marine animal, and rather unapproachable in its natural environment; it prefers to reside remote from people, most species close to the Poles, where naturalists have rarely had the opportunity to observe them alive, but have had to rely on the accounts of the kind of travellers who are not exactly naturalists and therefore not the most reliable, often forgetting to report the essentials upon which a distinction between species could be based. Furthermore, it is necessary to have known the seals through all their age categories in order to make correct distinctions, because, as with other animals, the young ones do not look like the old ones either with respect to colour or in other respects, taking some years to attain

12. [In Fabricius' time a Danish mile was 24 000 Danish feet, or 7.538 km].

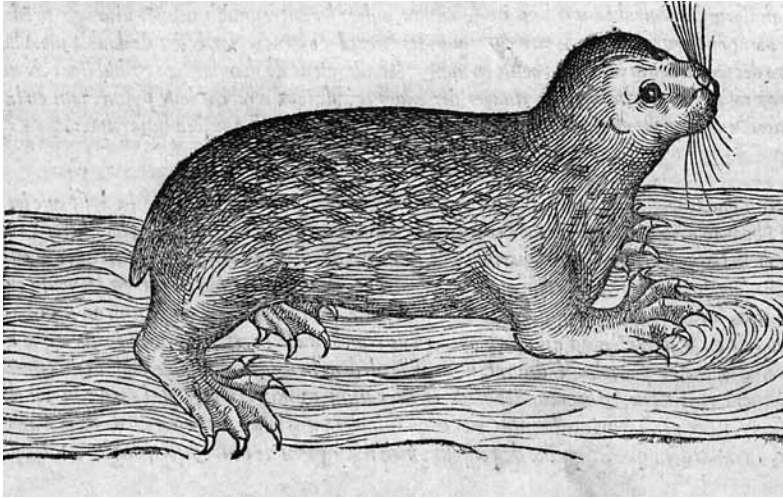


Fig. 18. Belon's illustration of an otter-like creature makes one believe that the author has never seen his *Phoca*, *Vitulus marinus*, Veau ou loup de mer (Belon 1555: 16).

their final appearance. Indeed, the habits of some species are so different from those of other species, that this alone could serve for identification, even if they may be similar in shape – but how many professional naturalists get the opportunity to make such observations of a marine animal?

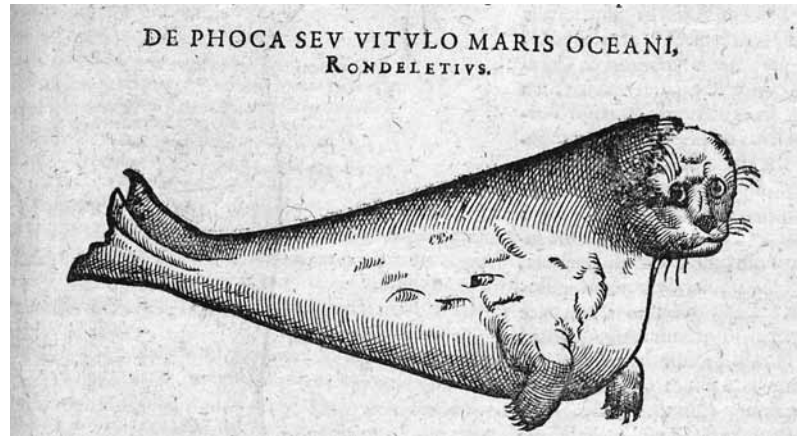
For some time those versed in natural science appear to have believed that the seal genus consisted of just one species, all seals being known by the name *Phoca* or *Vitulus marina*. Aristotle (1533, [c. 340 B.C.]), Pliny (1685, [c. 50 A.D.]), Aelianus (1744 [c. 200 A.D.]), Bellonius (Belon de Mans 1555; Fig. 18) and several other early writers report on no more than one kind. This may well have been more or less correct for the Mediterranean at that time. In the North, however, several kinds were already known in earlier times, as is evident from the *Speculum Regale* (Anon. 1768 [12th Century]: 176-177), Torfaeus (1706: 87-88), and others who have left us the opinions of our ancestors on the natural products of these countries. Their descriptions, however, are so brief and imprecise that one encounters great difficulties when one attempts to relate them to the species now known, as I have nevertheless attempted to do in my *Fauna Groenlandica*. Rondeletius (1554: 453-458),¹³ and following him Gesner (1604: 702-711) and Aldrovandi (1638: 722-728) appear, however, to have established two distinct species, distinguishing justly between *Phoca maris mediterranei* and *Phoca maris Oceani*; but their illustrations are very poor (Figs 19, 44 & 45) and their descriptions do not offer suffi-

cient characters to allow any judgement if one does not know the species beforehand and take its whereabouts into account.

Those who have later attempted to organize and systematize the material have therefore had little to rely on in such accounts, but have had to leave questions of species differentiation for further investigation. Thus Linnaeus is to be excused, in the early editions of *Systema Naturae*, for having only one species of true seal, which he called by the name *Phoca dentibus caninis tectis* to distinguish it from the walrus, which he assigned at that time to the same genus under the name *Phoca dentibus exsertis* (*Ph. Rosmarus*) (Linnaeus 1758); but later he realized this error, and with better reasons referred the latter to another genus. Nor does Brisson (1762: 162) offer more, mentioning besides the common *Phoca* only *Manatus* in this genus, although it belongs more correctly to another genus. It is more surprising that Linnaeus, in the twelfth and last edition of his *Systema* (1766: 55-56) still only has three species, at a time when knowledge of seal species should have been more widespread: Anson's sea lion and Steller's sea bear constitute the two species, whereas all other seals occurring in the Mediterranean, the Baltic and in the 'great Ocean' together constitute the third species, called by the common name *Phoca vitulina*, incorporating all seals having a smooth head, without an earlobe or a bladder on the front; but how many other characteristics could have been considered in addition to these?

13. Rondeletti 1554-55: 341, 343.

Fig. 19. Neither the illustration nor the description of Rondeletti's *Phoca* or *Vitulo Maris Oceani* makes it possible to identify the species (Gesner (1558) 1604: 705).



In his *Fauna Suecica* (Linnaeus 1746: 4, 1761: 2) he was apparently becoming aware of two species in the Baltic; but he did not dare to regard them as anything but varieties. I assume that this great man was misled by Steller (1751: 290), whom he regarded as an eyewitness; although Steller reported three kinds of seals, in addition to his sea bear and sea lion, he did not express himself with sufficient precision on their nature as truly distinct species, apparently only making a distinction as regards size,¹⁴ and evidently confusing *Phoca oceanica* with *Phoca maris Balthici* and *Phoca lacustri*, or simply regarding them as species variations.¹⁵ Buffon (& Daubenton 1770: 182-183) did not come much further, recognizing only three, or four, species. Today we know that all these writers underestimated the number of seal species.

I am afraid, however, that some more recent authors have increased the number too much without sufficient reason. Pennant (1781: 518-535) has gone up to fourteen species; Schreber (1775-1778: 285-316) enumerates only nine, and although he himself admits that he is unsure that they can all be regarded as truly sepa-

rate species, Erxleben (1777: 579-592) has nevertheless listed them as such, expressing his doubts, however, about two of them; Gmelin (Linnaeus/Gmelin 1788: 62-65) is in no doubt, though, recognizing them as true species, without giving reasons for his greater certainty; and he adds an additional one, ending with ten species. Far be it from me to claim that the exact number of species in nature is ten, fourteen or even more; but it is still my opinion that the species known and mentioned by these authors do not amount to that many, since some of them should only be regarded as species variations. In describing the seal species of Greenland, I intend to contribute to the clarification of this matter, and for that purpose I will make my account of each species as complete as possible, including its appearance and behaviour, the numbers caught and its usefulness to the Greenlanders as well as foreigners; and in conclusion I will attempt to organize the *Synonyma* better. It is my plan to begin with the species that are most common and abundant in Greenland, and to end with the rarer species. In accordance with this plan I will now describe the first species.

14. "Distinguo phocas ratione magnitudinis in tres species, in maximam – mediae magnitudinis – & infimae magnitudinis." Steller 1751: 290.

15. Because he writes in the passage just mentioned: "Infimae magnitudinis est Oceanica, quae tam in mari Balthico, quam circa portum Sti Archangeli, in Suecia, Norvegia, America & Kamschatka capitur, et lacustris dulcium aquarum monochroa seu unicolor, ut Baikali, ea coloris argentei."

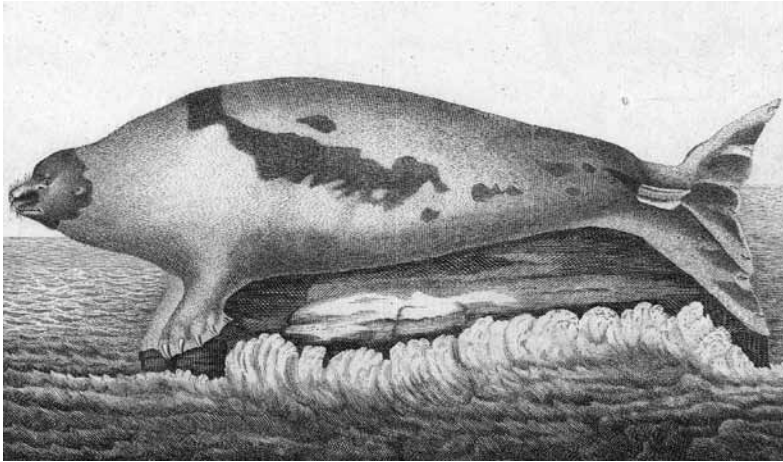


Fig. 20. The illustration of Lepechin's adult *Phoca oceanica* leaves little doubt that it is identical to *Phoca groenlandica* Fabr. (Lepechin 1778: Tab. 6).

First Species. The Harp Seal. (*Phoca Groenlandica*)

Names

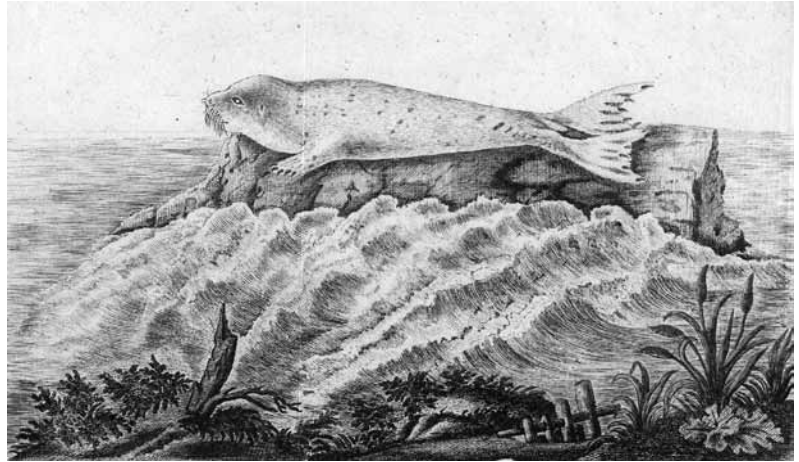
In the Danish colonies in Greenland this seal is usually called '**svartside**' [blackside] from the colour of the fully-grown seals, which have black sides; this Norwegian name, having once been adopted, should be retained, although the correct name in Danish would be '**sortside**'. Right from the outset Egede (1741: 46 with fig.) mentioned it under the name of 'svartside', and following him several other authors, so that Schreber (1775-1778: 310) also calls it **der schwarzseitige Seehund**. In my *Fauna* I have called it *Phoca groenlandica* because as early as Horrebow (1753: 269) it was distinguished from the other species under the Icelandic name '**Grønland-Sele**' [Greenland seal], which it certainly merits, since it is mainly known from the northern seas bordering the eastern and western sides of Greenland, occurring there as the most numerous of all species, arriving in Iceland with the Greenland drift ice, providing the Greenlanders themselves with the greatest benefits and the Greenland **Robben-schlager** expeditions with the richest yield in the Davis Strait as well as at Spitsbergen. It is thus primarily this species that is referred to in Martens (1675), Zorgdrager (1750) and other works that have described the northern sealing without specifying the species in question. On the basis of my written report, O.F. Müller

in his *Prodromus* (1776: viii) has listed it under this name, followed thereafter by Erxleben (1777: 588) and then Linnaeus/Gmelin (1788: 64), and since this name has been adopted by *Systematici*, I will not change it here, although with good reason other authors have called the species *Phoca Oceanica*.

Undoubtedly this is also the species that Steller (1751: 290) meant, as far as one can judge from his brief description.¹⁶ It is true that Schreber (1775-1778: 303) supposes he is speaking of *Phoca Vitulina* and lists his *Phoca Oceanica* as a *synonym* of that species, as did Erxleben (1777: 584) and Linnaeus/Gmelin (1788: 63) without hesitation; but neither do I understand how Steller's statement about the large chestnut spot covering most of the hind part of the body could apply to *Phoca Vitulina*, which is small-mottled all over; nor do I perceive how the name *Oceanica* fits this species, since it does not venture too far from the shore; on the other hand, the descriptions are completely appropriate to the harp seal, both as regards the large spot on the sides, which often approaches the colour of chestnut, and as regards the species occurring most often at sea and on drift ice far offshore. This has also been established by a later Russian traveller, Lepechin (1778: 259-264, Pl. VI-VII), who has given a fairly precise description of this species, accompanied by two good illustrations (Figs 20 & 21), one of a fully-grown adult, another of a young seal, using Steller's name *Phoca Oceanica*. If Schreber had known these illustra-

16. Steller l.c.: 290: "*Phoca oceanica communissima a reliquis omnibus specifice colore distincta, gaudet nempe pilo lutescente, ac in posteriori corporis medietate maculam maximam castaneas colore aemulantem obtinet, quae tertiam partem integri corii occupat*".

Fig. 21. The young *Phoca oceanica* does not look like a new-born harp seal pup ('whitecoat'), rather like a moulted pup ('beater') (Lepechin 1778: Tab. 7).



tions, he would undoubtedly have had them copied, as he did with other less accurate ones; it is stranger, however, that for such a long time afterwards Gmelin knew neither this description nor that of Pennant (Fig. 48; 1781: 525, Pl. 51) who in fact includes this species with an illustration under the name of 'harp seal' – Gmelin does not refer to either of these, only to the name in a previous paper by Pennant (1771: 342) with no illustration.

Among the Greenlanders, the harp seal is called *Atâk* [*aataaq*], which is the specific name¹⁷ distinguishing it from all other species, while the entire genus is called *Puurse* [*puisi*], i.e. 'those coming out of the water',¹⁸ because the seals so frequently emerge from the surface of the sea to breathe and for other purposes.¹⁹ For the name *Atâk* [*aataaq*], however, I know of no etymology; no doubt it belongs to the ancient names brought from the country of origin. In addition, various other names are used that refer to the colours changing with age. I will return to this below, but the principal name always remains the same, showing that the Greenlanders are not misled by the colours alone into creating new species, but

make their judgements on safer grounds, as I have had the opportunity to notice on many occasions.

Appearance and morphology

In general shape, the harp seal has much in common with the common [harbour] seal (*Phoca Vitulina*); for example the smooth head without an earlobe; the eyes, tongue and feet etc. But there are also many characteristics that distinguish it from the latter, such as a longer snout, a shorter neck without any curving at the back of the head, a larger chest, a more conical body, coarser and stiffer hairs lying flatter against the body etc., as will be seen from a closer comparison of the respective descriptions.

The colour does change with age, but always keeps it distinguishable from other species. The unborn young is at first completely naked, as are all early fetuses; but oddly enough, although it has a smooth white skin, when it is dried or immersed in alcohol, the black spots of the full-grown seal usually appear on the skin. The more it approaches birth, the more the hairs begin to appear; first on the body, last at the snout; these hairs are a brilliant white,²⁰ fine and soft

17. Not *Atarsoak* [*aataarsuaq*] as Cranz (1765: 163, 169) writes, which is only applicable to the fully-grown seal.

18. *Pua* [*puaq*], as Cranz (1765: 161), and after him Schreber (1775-78: 285) write, is wrong, since this word means a lung. But *Pûse* or *Pûese*, as Professor Glahn (1771:150) corrects, is not quite correct either. Just as incorrect is *Pusa* in Anderson (1748: 223, par. LV) – from this Scopoli (1777) has probably taken the name *Pusa* given by him to a proposed new genus, which however is most likely just another seal species (see Hermann 1779: 464-465).

19. *Puiok* (*puivoq*), from which this word is derived, means in the Greenlandic language 'to come out of the water appearing at the surface', and is used only of sea animals that mainly live beneath the surface, but not of water-fowl, although some of these are also divers.

20. Thus I cannot conceive why Lepechin (1778: 264) says; "*Phocae Oceanicae ex utero exemtus semper cinereus est, & liturus nigricantibus insignitur*", which in no way agrees with my experience in Greenland.

as wool, and very dense. The [Danish] colonists call it **'Iisblink'** ['ice-gleam'] because its colouring gleams like ice, while the Greenlanders call it *Iblau [illaaq]* (probably from *Iblerpok [ipiiarpaa?]*, 'keeping itself clean', because it looks so silvery-clean). However, this is common to all species, as far as I can tell. When one catches a female in late pregnancy with a fully-formed foetus, no change in colour is observed, from which it is reasonable to conclude that it is born white;²¹ nevertheless such a white pup is never seen in the water, outside the womb of the mother; the change in colour must thus occur in the interval during which, like the adults, it is not seen near the coast; so it is likely that it loses its first white woolly coat at the place where it is born.

In the first year, when it is seen shortly after birth, it is called *Atârak [aataaraq]*, that is 'the young of an *Atâk [aataaq]*', and is usually blackish-grey all over, darkest however on the back and head, lighter under the belly; later in the same summer it gets the name *Atâtsiak [aataatsiaq]*,²² that is 'a middle-sized *Atâk [aataaq]*', and is of almost the same colour, but with some scattered dark spots in the light area; it keeps this name during the first winter. In the second year it is usually called by the same name, but sometimes to distinguish it from the younger ones it is called *Utokâtsiak [utoqatsiaq]*, 'the slightly older', since it has more spots and is larger. This lasts throughout the second winter.

In the third year it is called *Aglektôk [allattooq]*, 'the spotted one', or *Aglektungoak [allattuunnguaq]*, 'the little spotted one', because it is now very mottled, basically whitish-grey with a multitude of black oblong spots here and there; during the following winter it is called *Aglektytsiak [allattuutsiaq]*, 'the middle-sized *Aglektôk [allattooq]*'. In the fourth year it still has the same name, *Aglektôk [allattooq]*, but in contradistinction to the younger ones it is *Aglektôrsoak [allattoorsuaq]*, 'the large *Aglektôk [allattooq]*', as it is much larger and more mottled too; later in the winter and in the spring, however, some people also use another name, *Millaktôk [milattooq]*, 'the large-spotted one' or

Millaktôrsoak [milattoorsuaq], 'the large large-spotted one', because its spots are larger and denser, which makes it darker.²³ Towards the time of this last change, when the oldest seals stay away to give birth, some seals of full-grown size but of the colour of a *Millaktôk [milattooq]* may be seen for a short period instead, their only distinctive feature being a black snout and front, for which reason they are called *Kênaglit [kiinaallit]*, 'those with a face'. All the above-mentioned seals, particularly between the first and the third year, are called **'Blanke-Kobber'** ['White-seals?'] by the trade employees, and their skins **'Blanke-Skind'** ['White-skins'], since they have fewer black parts than those of the adults. The blubber and skin of all these are regarded more or less as of one sort, although the thickness, size and quality may be different.

In the fifth year and thereafter, it is called *Atârsoak [aataarsuaq]*, 'the large *Atâk [aataaq]*'; the colour is then white all over, except for the following parts, which are black: the snout and the front above and just behind the eyes; down to the side of the head over the ears and down below the chin; likewise on both sides of the body there is a large oblong spot almost like the moon in its first and last phase, tips bent towards one other, meeting in front approximately at the middle of the back but separated at the other end; these large, black spots, called **'Buxer'** [trousers] by the colonists, gave rise to the Norwegian name **'svartside'** [black-side]. The flippers are white, those at the back indeed somewhat brownish. On some full-grown seals of this species the 'trousers' are not black but dapple-grey and blackish; from this fact some people have arrived at the conclusion that there is a colour difference between male and female, the black-spotted version being male and the dapple-grey female. I have noticed, however, that this conclusion is false, having seen that both sexes have both colours at random; it is true, though, that one finds more females among the dapple-greys, and this is probably why the opinion has arisen.²⁴ It should not be understood that the colour of the fully-grown seal is as pure as

21. This is also stated by Cranz (1765: 163) of this species, but I have never succeeded in seeing such a new-born white pup.

22. In my *Fauna* (Fabricius 1780: 11) this is misspelled *Attectsiak*.

23. However, this name belongs more properly to another species, the fiord seal, at a certain age.

24. Even more mistaken is Lepechin (1778: 265), who states that only the males have black sides, whereas the females always remain small-spotted. This is contrary to all experience in Greenland.

described here from the very start of the fifth year; even if the 'trousers' are always visible, they are often mixed with so many small spots on the white parts that such a seal almost becomes black all over, and is therefore called *Kernektak* [*qernertaq*], 'the one who has become black'.²⁵ It is thus difficult to determine with absolute certainty when they are completely full-grown, and the age at which they take on the above-mentioned final colour.

A full-grown harp seal may not be the largest, but it is not the smallest species of seal either; one could call it medium-sized. The largest I have seen was:

Length from tip of snout to end of hind flippers	6 ft. ²⁶ [188 cm]
– but most specimens only	5 ft. [157 cm]
and, related to the last-mentioned length, the greatest width across the front flippers	1½ ft. [47 cm]
and the girth at the same position	4 ft. [126 cm]
Length of head from tip of snout to 1st cervical vertebra	6 in. [16 cm]
and to corner of mouth	3 in. [8 cm]
Width of head	3½ in. [9 cm]
and girth	17 in. [45 cm]
Length and width of upper jaw	3 in. [8 cm]
Length and width of lower jaw at corner of mouth	2 in. [5 cm]
and width at outermost end	1⅓ in. [3½ cm]
Length of tongue	2 in. [5 cm]
Longest whiskers	4¾ in. [12½ cm]
Length of the neck, until the front flippers	15 in. [39 cm]
Length of the body from the front flippers to the tail	27 in. [71 cm]
Width at tail	7½ in. [19½ cm]
and girth at same position	19 in. [50 cm]
Length of fore flippers	8 in. [21 cm]

and width at root	3 in. [8 cm]
and after the outermost slope	4 in. [10½ cm]
Length of hind flippers	12 in. [31 cm]
and girth at root	9 in. [23½ cm]
and width between the two outermost toes	9 in. [23½ cm]
Length of tail	5 in. [13 cm]
and width at root	2 in. [5 cm]

The head is rather long, not clumsy but slender, and tapers into a long snout which constitutes half the length of the head, resembling a dog's head with the ears cut off or laid back. The tapering of the head is mostly on the vertical axis, since the width remains almost the same, particularly in front at the eyes, but slightly plumper behind the eyes; the height, however, decreases markedly forward to make the circumference far less, with the front abruptly pressed down into a long snout; the back of the head is ball-shaped, not high-necked.

The mouth is rather big, enabling it to swallow a fairly large fish. The upper jaw, ending in the blunt snout with hanging lips on the sides, protrudes in both dimensions over the lower jaw and is approximately the same width throughout. The lower jaw is shorter, more slender and more pointed.

In the jaws a total of 38 teeth can be counted: 1) ten front teeth, with a) six in the upper jaw,²⁷ all small, conical, slightly curved and pointed, the two middle ones close together, the others more widely spaced and at the same distance from one another; the two outermost largest, the next two smaller, but those in the middle smallest; b) four in the lower jaw resembling the two central ones in the upper jaw; 2) four canine teeth, long, inward-curving and pointed; in each jaw there are two of these, one on each side;²⁸ the two in the upper jaw are farthest back and outside the other two in the lower jaw; 3) the molars amount to

25. The same name is used for 1) the narwhal (*Monodon Monoceros*) and 2) the dark Arctic fox (*Canis [Alopex] Lagopus coeruleus*). See Fabricius 1788b: 433.

26. [In Fabricius' time a Danish foot was 31.4 cm, an inch 2.6 cm].

27. Lepechin (1778: 261) however, says "In maxilla superiori incisores IV"; but no doubt this is a misprint for VI, as I conclude from the following: "in maxilla inferiori incisores modo IV", this *modo* [only] otherwise being inappropriate if the jaws were equal in this respect.

28. At this point in my *Fauna* (Fabricius 1780) there is a printer's error, *Lan.* 5, which is a completely absurd number, and should be corrected to *Lan.* 1.

29. [Editor's remark: During examination of hundreds of harp seal jaws, I usually found five molars in each half (and a total of 20), as also shown in Fabricius 1791Pl. XII, Fig. 1].

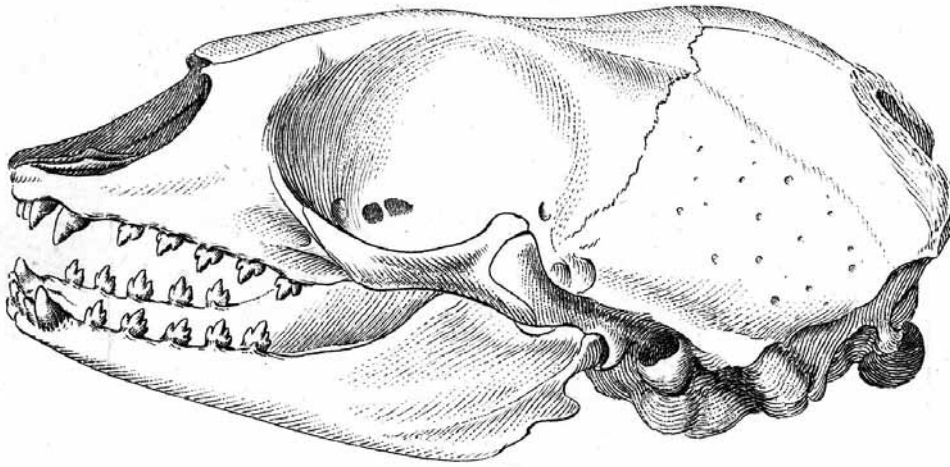


Fig. 22. The first illustration of a harp seal cranium (Fabricius 1791: Tab. 12, Fig. 1).

24, and are slender and laterally compressed, ending in a sharp pointed top with a small additional pointed tip at the back; in each jaw there are twelve of these, six on each side.²⁹ [Fig. 22; Fabricius 1791: Pl. 12, Fig. 1].

The tongue is slender, cloven at the tip, somewhat rough and wrinkled, thickest at the root, narrower and thinner at the tip, and just as long as the lower jaw; above the tongue the palate is provided with jagged transverse fringes, as if frayed in successive layers, all turning towards the pharynx, and possibly helping to channel the food into it.

The snout is large, thick, broad and long, extending well outside the lower jaw; it is furnished with many whiskers (*vibrissae*) or bristles, which are slightly curved and pale grey in colour; on two sides these are flat-rounded and highly compressed, but on the other two sides they are undulating with low, long inward curves, particularly at the middle of the whisker, for this is less pronounced at the root and at the outer end they are regular and smooth. Some of them are pointed, others blunt; they are all dark and opaque; on some of them a thin red stripe can be seen centrally, which can be regarded as the marrow of the bristle; the outermost and hindmost whiskers are

longest, the others grow progressively shorter towards the front. The nostrils are long, narrow, deep fissures at the front of the snout, the middle part of which is cleft by a low narrow groove.

The eyes are middle-sized, and in themselves not particularly prominent, but the surrounding skin is somewhat elevated into round swellings. They are situated just above the corners of the mouth, high on the head and close together, hardly two thirds of an inch [1.7 cm] apart. Their colour is pale brown; in the centre one sees a narrow black stripe or pupil orientated obliquely to the sides, around which is a bright undulating cross from which many branches radiate further to the sides. The skin surrounding the eye is black and naked at the edge, with the front corner slanting up towards the snout and the back corner towards the sides. The eyes are usually rheumy. At some distance above the eyes, closer in on the head, are the eyebrows, consisting of five small bristles³⁰ with the same characteristics as those at the snout.

The ears are situated at some distance behind the eyes, and are no more than tiny naked openings with a black ear duct and no sign of an earlobe.³¹

The neck is short, consisting of six segments, and

30. Lepechin 1778: 262 only saw two, but the others might have been rubbed off or have moulted from his specimen.

31. In this case, and for some other species, the generic characteristic given by Linnaeus 1766 ("*Auriculae nullae*") applies, but not to all species (he himself has among his three species one with an earlobe, namely *Phoca ursina*) for which reason it might have been better to omit it, unless, like Erxleben 1777, one uses the definition *Auriculae nullae plurimis*. Wisest, however, is Schreber 1775-78 in not taking it into account at all, because a generic characteristic should apply to all species. Gmelin 1788, however, follows Linnaeus blindly.

the seal has a thick chest increasing in thickness and width as far as the fore flippers, thus almost forming a conical figure.

The body is oblong, low-rounded and tapers backwards: the under-side is almost flat, while the back is more arched; the part between the fore flippers and the navel is of almost uniform thickness, but behind the navel it decreases markedly towards the tail, where it is narrowest.

The fore flippers are flat, extending sideways and situated low, close to the underbelly. At the front they are rounded, at the end they slope in a long curve round to the back, which is almost straight; the end slope is formed by the five toes, which are spaced closely together and are not easily seen; the foremost toe is the longest, the others progressively shorter towards the rear, and all are joined together by a densely-haired web that also covers the remainder of the flipper and is similar to the skin of the body. At the end of the toes five long, black, curved claws can be seen above the skin.

The hind flippers stretch horizontally towards the rear of the body parallel to the tail. The shanks are joined as far as the lower legs and are completely hidden under the skin, but at the ankles the two hind limbs part. This free part is thick and round at the root, but at the outermost end the flipper is flat, the five toes being joined by a thick, well separated, short-haired web that completely covers the toes, in fact even extends beyond their ends and can be distended to a considerable width between the innermost and outermost toe. On top of the skin a claw can be seen at the end of each toe, but these claws are much shorter than those of the fore flipper. The outermost and innermost toes are the longest, and are equally long, the next two are also equally long but much shorter, and the central toe is the shortest; the skin is adapted to this by notches in the outer edge. From the sides of the shanks to the tail the skin also curves down, forming a separate lobe, all of which may be of assistance during swimming.

The tail hardly reaches the ankle joints of the hind flippers, resembling a small, narrow tongue or cleft cone, broadest at the root but with a rounded point at the end, but otherwise rather thick.

The skin of this seal is rather thick and strong, covered all over with short hairs, hardly one inch long, pointed and shining. These are not too dense to prevent one, by separating them somewhat, from seeing the outer skin, where the hairs, although not completely absent (it has some short, curly hairs, finer than those of the outer layer, like down compared with feathers), are rather sparser than on other seal species. The hairs lie smoothly against the skin, pointing to the rear and in no way raised; but they are so firmly attached that they are not easily pulled out. Beneath the hairs there is first a thin black epidermis in which the hairs are fixed and which can be removed together with the hairs from the innermost, white skin [the dermis].

This seal species is extremely fat, and even at certain times of the year when it is lean, blubber is always found between skin and flesh. The layer is thinnest in summer, usually only $\frac{3}{4}$ of an inch [2 cm] thick; in the winter, however, it is often 2 inches [5.2 cm] thick. The blubber of such a seal yields a large quantity of train oil, and when rendered down, most of it becomes pure oil, leaving very little greaves.³² When it is given time to drain off by itself, without the use of fire, one obtains the purest train oil, almost pure oil; the blubber of other seal species, however, is more highly esteemed by the Greenlanders. The Trade Department estimates that the blubber of twelve full-grown harp seals yields one cask.³³

The sexual organs are between the navel and the hind flippers. The male organ lies hidden in a small hollow entrance, and consists of a curved, strong bone with a tube on the side, surrounded by a gut-like skin that can be inflated to the thickness of an ox-gut; its *testiculi* are not seen either from the outside or from within, as they are hidden deep in the blubber, almost in the flesh of the thigh, and are very small. The

32. I think, however, that Cranz (1765: 164) goes a little too far in saying “that one can drain two jugs more of melted train oil from a barrel than the blubber which one has filled in”; perhaps the draining referred to was done in springtime, when sailors visiting the country have experienced that the train oil rises; this is something that they know they should allow for when purchasing and selling.

33. [In Fabricius’ time the Danish cubic measures used in the train oil trade were: ‘**fad**’ (cask) equal to two ‘**tønder**’ (barrels), or c. 263 litres].

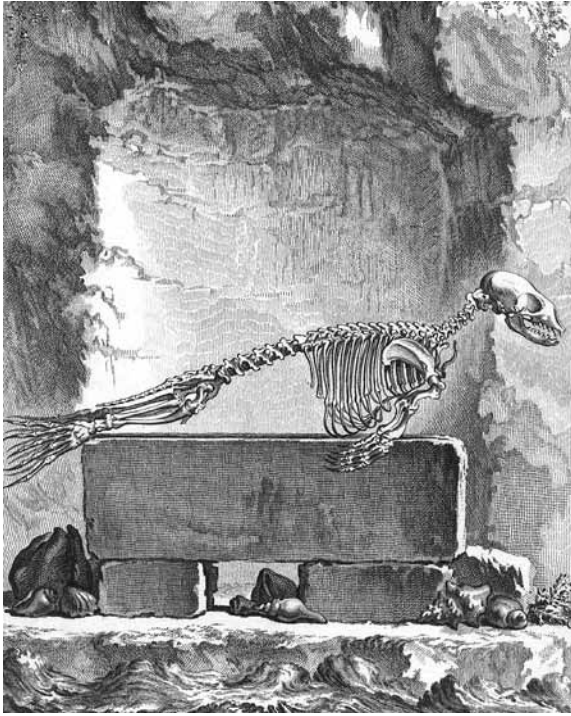


Fig. 23. Daubenton's exhibition of a seal skeleton (Buffon & Daubenton 1765: Tab. 52).

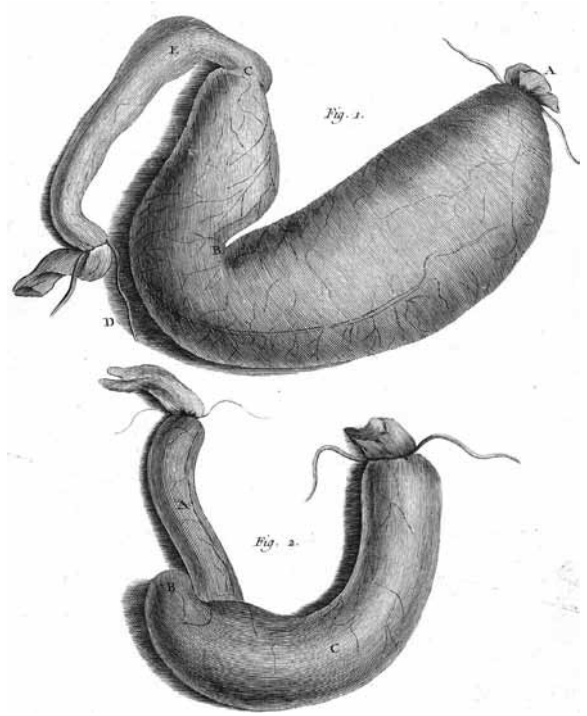


Fig. 24. Daubenton's illustration of a seal stomach and intestine (Buffon & Daubenton 1765: Tab. 47).

female organ is a long spacious longitudinal fissure with no protruding clitoris. Some distance from the navel two teats can be seen, one on each side, hidden beneath the hairs and not conspicuous.

There are fourteen ribs,³⁴ of which the ten foremost are the largest, while the hindmost four are smaller, thinner, and more curved at the rear.

The heart is whole, without a cleavage in front, and is rounded at the back. Inside it has three cavities or ventricles, whose three branches unite in a main opening at the pharynx.

The lung consists of two rounded, oblong parts with a duct to the pharynx at the centre, which meets them at two ingoing side tubes; the two lung parts are otherwise completely separate, and are flat on the surface facing the heart but rounded on the surface facing back; on the surface turned in towards the intermediate septum it is straight, whereas it is slightly indented on the outer surface.

The diaphragm is a thin red flake of flesh, extending into two wings or panels, one on each side, with a median opening in front.

At the very bottom of the hind part of the body the intestines lie wrapped together, almost of the thickness of a pig's gut; extended, the length is about 80 feet [c. 25 m] besides the rectum, which is two feet [c. 63 cm] long, much thicker than the rest, and at the end has a small appendix or caecum.

The liver is greenish, and consists of three lobes. The median lobe is largest, with two clefts at the bottom. The side-lobes are not as wide, but almost triangular; all are rounded on the bottom surface, but flat on the top surface, except the middle one, which is triangular at the bottom; the right side-lobe is much thicker than the left one and above it further has a smallish prism-shaped extra piece; the foremost borders of all the lobes curve inward, making the middle part extend farthest to the rear over the intestines. In

34. I have not noticed more, but Buffon & Daubenton (1770: 224) state that the common seal has fifteen; since the foremost one is said to be very small, I may have failed to see it.

front it is joined to the diaphragm, and a small egg-shaped gall-bladder is embedded on top of the rear part of the middle lobe.

The stomach is curved and bent double at the foremost and hindmost ends, broader at the former, narrower at the latter, but narrowest in the middle. The spleen is oblong, rounded, thin, tongue-shaped, and one foot [31 cm] long, four inches [10 cm] wide, with a white glandular root. The mesenteries around the intestines are completely devoid of fat, which is surprising considering the external fatness of the animal.

The kidneys are of the usual shape: dark red, much furrowed by many small circular grooves as if composed of many glands; they are united by an intermediate septum in the middle of which is a duct with a branch into the kidney on each side. They are rather large, five inches [13 cm] long and four inches [10 cm] wide.

Occurrence

The harp seal is the seal species most often encountered in the Davis Strait, far out at sea as well as in the fiords, but mainly in deep water. Although the water is its true element, it is also seen up on the ice, solitary or more often in large flocks, rarely on single ice floes but rather where drift ice has accumulated. There they sometimes lie so fast asleep that with caution one can approach quite close to them, and some of them will not even wake before the harpoon is thrust into their body. One does not find them on ice when the drift ice is close to the shore, since the seals then stay outside it; but when the drift ice is far from the shore they keep to the inside of the ice, often taking the opportunity to climb on to it. Thus when no harp seals are seen near Greenland at the usual times and the drift ice is plentiful, the Greenlanders usually say that the seals are outside it, where they cannot be pursued; but when there is no ice within sight they believe that much ice is nevertheless present far out in the Davis Strait, where the seals stay and are unwilling to leave, and where they can rarely be pursued because of the distance and the danger involved.

One rarely finds this seal species climbing out on land, although this sometimes happens at the sand banks that reach far out into the sea in front of ice-tongues; but when it is avoiding its enemy, the killer whale, it usually stays quite close to the shore, and in such circumstances one may drive it unwillingly ashore, which indicates that this is no rare occurrence for it. I have never observed it to make holes, like other species, in the solid ice for breathing, or for climbing up to lie on the ice; but in large holes in the ice kept open by the current it is often found in large numbers so that it can breathe or feed under the ice.

Behaviour

The harp seal rarely raises its voice except in large flocks on the ice, or in the water when it may howl almost like a dog,³⁵ either because the seals encounter one another in small sounds and other narrow places, or because they are wrangling over food, or in the mating season over the females; or in order to call other individuals swimming alone into a flock, as one sometimes sees; and when a seal is caught and finds itself beaten it may also sometimes growl.

It is a swift swimmer, and swims by pushing the water to the rear with the fore flippers that project sideways, and pressing it together with the hind flippers so that it is washed up over its back to achieve forward speed. It swims either alone or in large flocks, often a few score in number, as it is more likely to do than other species. Such a school of harp seals is called *Amisut* by the Greenlanders. In such a school one sees only large seals, which flock sometimes for mating purposes, sometimes to travel together on their migrations, and sometimes again in order to pursue large shoals of fish and feed together.

In the water it has its own behaviour, which I must not fail to mention, since in so acting it gives the Greenlanders better or poorer opportunities to catch it. Since it has lungs, it is sometimes forced to surface in order to breathe; and it is not quite true when Buffon & Daubenton (1770: 183) state that the seal can refrain from breathing at its own discretion when in distress;³⁶ however, it can endure a fairly long period

35. Cranz (1765: 162) says of seals in general that they squeal like wild boars, for which I will take his word, having myself neither seen nor heard a wild boar.

36. Buffon & Daubenton (1770: 183): "Diese Thiere haben den Vortheil, dass sie nach Gefall Luft holen, und, wenn es Noth thut, sich des Luftholens enthalten können".

without breathing, so when one watches out for it after seeing it dive at close quarters, it often reappears so far off that it is hardly possible to catch up with it, or one sometimes loses sight of it altogether; in other instances it reappears unpredictably quite close to the original spot.³⁷

When it surfaces for breathing purposes alone, and wants to take in a large amount of air, it raises its head all the way out of the water as far as its fore flippers; in this position the Greenlanders call it *Napparsok* [*napasoq*], that is ‘the erect’; in this position it inhales so powerfully through wide-open nostrils that it can be heard from afar off; but when it has finished (and sometimes even between breaths) it withdraws its head so deftly that the water closes above it without motion or sound; and it does not thrash around unless disturbed, in which case it may do so with considerable noise, in which case it is called *Ordlursok* [*orlusoq*], that is ‘tumbler’.

In the first situation it is sometimes possible to steal upon the seal from behind, although this is by no means the most advantageous situation, since the seal is not distracted but highly alert, such that it often hears the hunter before he comes within range; then it is also very careful to turn its head around, and is called *Kennertok* [*qinertoq*], that is ‘peeper’; if it catches sight of the hunter it is called *Irsigirsok* [*isigisoq*], ‘gazer’; and if it is much inclined to do so it is called *Takpiksok* [*tappissoq*], ‘great watcher’, in which case the chance of catching it is slight, except with a throwing-dart [bladder dart] from far off. Sometimes, however, one may encounter such a seal eating a fish above the surface, and because it is occupied with this, or because the prey is in front of its eyes, it may be possible to approach the seal, which is then called *Nerrirsok* [*nerisoq*], ‘eater’.

At the time when the capelin³⁸ are near the coast, large flocks of these seals can be seen eagerly pursuing them, keeping their heads above water, looking straight ahead, breathing heavily and surging ahead with their fore flippers making a great deal of noise; and when they dive they throw themselves forward in a mighty leap; in this situation they are called *Misartut* [*misartut*], ‘jerkers’; these can be taken by surprise by

the hunters because, as a result of their own noise, they do not always hear the approaching boat; often, however, one of the seals looks around and gives the others a signal, doing its best by diving very noisily to get the others to follow it when there is danger; nor do the hunters like to attack entire schools of seals, because when one of them is hurt some of the others may come to its rescue by biting the line in two; but it also happens that one animal in the flock, less wild than the others, stays at the surface longer and can be attacked more easily.

At other times, too, a single animal may swim with its head above the surface, breathing quickly, pitching forward and diving, then reappearing shortly afterwards, and so on, like a whale, and it is then called *Katigârtok* [*qatigaartoq*] ‘back-archer’ because it regularly shows its back as it dives; in this situation it is possible to approach it from behind, since it is slow to submerge completely. When it is searching for food below the surface and is fully occupied with this, it does not change its location very much, only raising its snout to breathe, closing its eyes and moving its head a little to and fro; it is then called *Terdliktok* [*terlitoq*], ‘the secure one’ or *Terdligârtok* [*terligaartoq*], ‘the distracted/preoccupied one’, for it then feels so secure that one can sometimes get close to it with the fore-end of the boat; even if it submerges to continue eating, it often comes up again a short distance away and most often in the same position.

At other times again it may be lying motionless on its back, bending head and feet towards each other, staying in the same place either to rest, bask in the sun or sleep, closing its eyes so that it does not see if it cannot hear anything, and in this position it is called *Nudluartok* [*nulluartoq*] (which according to the etymology appears to signify ‘one that displays its behind’, although I dare not say this with certainty); sometimes it is possible to get so close to it that, if one so desired or dared, one could grasp it with one’s hands; so the Greenlanders consider this the most advantageous of all situations for hunting.

Finally, it sometimes plays in the water, as if confused, surfacing belly up, moving forward this way, turning around, and making various strange move-

37. Cranz (1765: 162) says that it must surface every quarter of an hour, but this interval is probably too long, as I have never known it wait so long; the half of this is a more likely interval.

38. *Salmo arcticus* [*Mallotus villosus*] Fabricius 1780: 177.

ments; now and then it seems to look at the hunter, but appears so preoccupied with its tricks that it is not frightened by the boat, but rather gradually approaches it as if examining it – until it eventually realizes the danger; such a seal is called *Nellarsok* [*nillarsoq*], ‘one that casts itself on its side’; in this situation the seal is often taken, and this would happen more often if one could foresee where it would reappear, since it sometimes does so in front of, sometimes behind, and sometimes alongside the boat, and it is not easy to judge its behaviour. These are the most important features of its behaviour in the water, and a Greenlander who catches sight of a seal at sea knows immediately how to identify it accordingly and deduce whether he has any hope of approaching it.

As its hind flippers extend straight out behind its body, it will readily be understood that it is not suited to ordinary walking on land; however, this does not mean that it is completely unable to move forward there,³⁹ for the contrary is clearly the case when one encounters it on the ice or driven ashore, in which case it can make considerable leaps using its flippers and a man can hardly catch up with it.

Variation in occurrence and movements

Common as this seal species is, there are certain times of the year when it is not seen off Greenland. From September until mid-March, and again from late May until late July, are the usual seasons for seeing it there; but when the drift ice is distributed offshore such that it neither reaches quite into the bays nor is it too far away, this kind of seal is sometimes seen all through the summer, at least in the southern part of the country; but this is far from being the case every year or to an equal degree in all places, since it partly depends on the fish shoals being pursued, so that the Greenlanders at one locality may have it in abundance while others one or two [Danish] miles [7-15 km] away, or an even shorter distance away, may suffer a great scarcity; this is partly due to its being hunted either by the killer whale or by man, since it has been observed that in places uninhabited by human beings for some years, the seals occur in greater numbers and are more fearless than elsewhere, so that people who settle again at such places usually have profitable hunting for the first winter. In these circumstances it is natural that

the Greenlanders do not wish to live together in too great numbers in one place, but prefer to live rather scattered. For because of its many predators the seal would never have any peace and could hardly stick its head up without being surrounded by numerous hunters, so it will either flee completely or become very shy and difficult to catch. Since an incredible number of these sea animals, sought after even more than other species, are now killed annually, one may wonder greatly at the large number of survivors, and it appears to be an inexhaustible food supply for the poor inhabitants who have little else to survive on.

From the above-mentioned it will be evident that the harp seal normally leaves Greenland twice a year. They disappear for the first time towards July, returning in September; but it is not yet certain what route they take, where they go, and why. At the latitude of the colony of Frederikshaab [Paamiut] they all suddenly disappear, apparently heading west, while at the same time the South Greenlanders say that they head south, which indeed appears most likely, because when they return, they come in large flocks from the south, and some of them head rapidly north at great speed through all the outermost lying sounds, while others stay behind, spreading into the fiords and the offshore fishing banks. It has been observed that it is mostly the adults and only a few of the young seals that come to the far north. In the winter when there is ice cover in Disko Bay it is said that this seal species is not to be seen there either, indicating that it is mainly adapted to open water. As reasons for the first disappearance I believe two are most plausible: first, that they find a better and more plentiful food supply in the other regions to which their nature leads them, since they return much fatter than they left; and since the disappearance of the capelin occurs at the same time it is likely that the seals, pursuing large shoals of these, are led far out to sea or to the south depending on the routes followed by the capelin; secondly, that they seek a more suitable and safer place for mating, since the female is pregnant when they return. This last supposition of mine may also be supported by the observation mentioned above that the seal does not leave the country when drift ice is present nearby, because it can then expect to find a hiding place within it and the tranquillity necessary for the mating.

39. As Linnaeus (1766: 55) appears to believe, remarking: “*Phocae genus vix incedit ob pedes anticos retractos, & posticos unitos.*”

The second disappearance takes place in March, after which they return in May; and one may again wonder about the reason for and direction of the disappearance. This much has been observed: that the females leave first to give birth to their young, which at the latitude of Frederikshaab happens in mid-March, and that the birthplace cannot be far away we can deduce from the reappearance of some females a few days later, even before the other seals have left, while those that are caught have no young in the womb or accompanying them; but they do not stay long before they disappear again together with the males and all the others of both sexes, large and small; and they are all said to go west. When they go away, some others of a wilder nature arrive in their place for a few days, the so-called *Kênaglit* [*kiinaallit*] (see p. 58), but finally these too disappear, and the harp seal is not seen until late May or even later. Then for the first time the new-borns are seen accompanied by the adults and the adolescents – the young seals are so foolish and easy to approach compared with the older ones that the Greenlanders kill many of them at their most tender age. They all come from the west and are first observed far out at sea, and they have not been seen migrating north in flocks, as during the first reappearance.

Since this seal species does not moult while it is close to the shore, as other species have been seen to do, it is my opinion that this last disappearance takes place in order to find a suitable place of tranquillity during moulting; for when they return not only has the newborn pup lost its first woolly coat and grown new hairs, but many others, not previously full-grown, have also changed colour, from which the conclusion can easily be drawn for all of them. At this time they may stay on the drift ice far west in the Davis Strait,

which their leanness on their return would seem to confirm, as it has been observed that when the seal is on ice it usually stays there, apparently forgetting to seek food; eventually they arrive inshore again, all the hungrier, simultaneously with the capelin, which they greedily pursue, seeming destined by Providence to satisfy their long-lasting hunger. Then again their leanness may simply be the result of their moulting, since several other animals also become rather enfeebled and thin during moulting; in that case they might just as well have stayed in the open sea, and one might even be tempted to the conclusion that the true habitat of this species is far out at sea, where it migrates in spring, but later comes inshore towards the capelin shoals for a short period, then follows them out to sea again (later in the year); but when the winter is approaching they apparently seek shelter inshore, as it has been observed that when a northerly wind is blowing in the winter and it is bitterly cold, most seals are seen inshore, whereas when a southerly wind is blowing and it is mild they stay farther out at sea.

Of the two opinions I consider the first most likely to be true; that is, that on their last migration in March they make for the drift ice, which is the most convenient place to whelp and to moult, particularly given the fact that at exactly the same time of the year the ‘Robbenschlägere’ [seal-cullers] find a large number of these seals with their young lying on the drift ice between Spitsbergen and the eastern side of Greenland.⁴⁰

Breeding

As for the breeding of the harp seal, the mating-time is beyond all doubt in August, because on the reappearance of the female in September she is pregnant with a foetus the size of a mouse; the pup is born around late

40. See Adelung (1768: 372), Martens (1675: 83-84). What Cranz (1765: 169) has to say about this second disappearance is so confused that for my part I cannot make sense of it; and he seems to confound it with the first one. For example, when he says that the seals arrive from the south going north this fits best with the first-mentioned migration. Furthermore, as for the account of the “Robben” hunting by the vessels on the ice at Spitsbergen at the same time, I do not deny this, having in fact just mentioned it above; I do not believe, however, that it can be concluded that the seals found on the eastern side of Greenland have necessarily arrived from the west, because some of them could be those that usually frequent the coast of East Greenland, others could be from around Spitsbergen proper. That vessels at sea do not observe seals in open water at this time of the year is not universally true, since during my voyage to Greenland, both in open water and on the drift ice, I saw seals which were evidently of this species; furthermore, two Greenlanders of Frederikshaab [Paamiut] District who were piloting a vessel to Godthaab [Nuuk] in the month of April 1771 have assured me that they saw seals in the open sea so far offshore that the coast was out of sight. In addition, the Davis Strait travellers usually avoid the ice as much as possible, for which reason they will rarely meet the seals.

March, and accordingly the length of pregnancy can be calculated as between 29 and 30 weeks. Where and how they mate has not been ascertained. The Greenlanders claim to have seen them together in the open sea, erect and belly to belly, a posture indeed likely given the position of the sexual organs; nevertheless, the mating takes place so rarely in the presence of humans that the statements of a few Greenlanders cannot be taken as sufficient evidence; for that reason I have referred to its disappearance in the month of July as a consequence of the tranquillity sought at mating-time, if not on the ice itself then in among the drifting ice floes; and I am inclined to believe the latter, because when the drift ice is distributed inshore such as to prevent the seals leaving (as mentioned above), the seal still becomes pregnant without being encountered [by humans] on the ice. It is most likely that a male mates with several females at random, as one observes no particular intimacy between pairs, but entire flocks keep company together.

Only the fully-grown seals (*Atârsoit* [*aataarsuit*]) are sexually mature; at all events no half-grown female has ever been found pregnant; this must be why in the large flocks one finds mostly fully-grown adults; on the other hand one very rarely finds a fully-grown female that is not pregnant. From what is stated above it will be evident that it breeds once a year. Usually only one pup is born, and it happens very rarely that twin foetuses are found; during the time I was in the country I only observed this once, and these twins were so positioned in the womb that the head of one of them faced the hind quarters of the other, so that at parturition one would have to follow behind the other. It cannot yet be determined with certainty where the pups are born, but this much is known: at the time in question the seal goes west, where it is most likely delivered of its burden on drift ice some distance out at sea; and that it cannot be so far away either may be concluded from the fact that some females reappear inshore after just a few days, having given birth and having milk in their teats; such a seal is called *Erninérksoak* [*erninersuaq*] by the Greenlanders, that is 'the big one that has given birth'. One might deduce from this that the female does not nurse the pup for a long time, since she leaves it so quickly; but it is also

possible that the pup is not far away, and that she can return to it the same day; furthermore, since not all females reappear so quickly, those that do may have lost their pup to cold or predators, and other females may thus nurse their pup for a longer period than suggested; however, when at last they return in May with their young there is no sign of nursing, so the pup cannot be suckled for more than a month at most.

How the pups are carried along at sea I do not know; some authors claim that the seals carry their young on their backs, others say in their mouths, something I have never heard from the Greenlanders or observed myself; I believe rather that after staying a few days on the ice and probably losing its first woolly coat there, the pup is able to swim alongside its mother, as it has all the limbs required for this.

Feeding

This seal's food is all kinds of fish, such as cod (*Gadus Callarias*, *Morrhua* and *Barbatus*), redfish (*Perca Norvegica* [*Sebastes marinus*]), halibut (*Pleuronectes Hippoglossus* [*Hippoglossus hippoglossus*] and *P. Cynoglossus* [*Reinhardtius hippoglossoides*]), sculpins (*Cottus Scorpius* [*Myoxocephalus scorpius*]), herring (*Clupea Harengus* and *Encrasicolus* [*Paralepis sp.?*]), but most of all capelin (*Salmo Arcticus* [*Mallotus villosus*]), shoals of which it pursues very eagerly as its greatest delicacy. Crabs (*Cancer Araneus* [*Hyas araneus*] and *C. Opilio*⁴¹ [*Chionoecetes opilio*]), shrimps (*Cancer Squilla* [*Pandalus sp. ?*]), and other 'sea insects' are also frequently found in its stomach; however, one does not find that it attacks other, larger sea animals. although it might seem to have adequate weapons in its excellent teeth.

Predators

However, it does have a dreaded enemy of its own in a kind of toothed whale called *Ardluk* [*aarluk*] by the Greenlanders, and by the Norwegian **Staurhynning** and **Kobbeherre** (Strøm 1762: 298-299), and by myself *Physeter Microps* [*Orcinus orca*] (Fabricius 1780: Spec.27) [the killer whale]. It strikes into the body of the seal with its sickle-shaped teeth and overcomes it very rapidly; it is also a swifter swimmer than the seal and thus even more dangerous, and the harp

41. The Spider-crab which I have described in detail elsewhere (Fabricius 1788a: 181-190), and which was formerly called *C. Phalangium* in my *Fauna* (Fabricius 1780: 234).

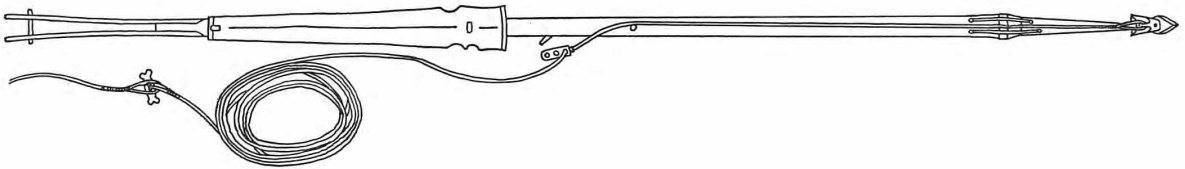


Fig. 25. The winged harpoon (Hansen/Rosing 1971: 21).

seal flees before it, either into the clefts of the ice floes (where it is then easily caught by man) or close to the shore where the killer whale cannot follow because of the shallow water; or when the killer whales stays for a long time in an area, the harp seals avoid that area completely by taking short cuts through narrow straits. One may sometimes catch such seals that have been in the teeth of the killer whale; I have for example particularly noticed one that had a wound across its back deep into the blubber, which was almost split, but because the wound had not reached the inner flesh the seal had survived, and part of the wound was already healed.

The Greenlanders therefore catch few harp seals in places where the killer whale stays for a long time, because it usually 'clears the table' either by driving the seals away or by eating them, however much the seals use their ingenuity trying to escape. I have been told of instances of several harp seals taking refuge on an ice floe while the killer whales exercised all their cunning and strength to get them into the water again, which they eventually succeeded in doing when a number of the whales, uniting the strength of their backs, lifted the ice floe on one side, causing the seals to fall off on the other side, and thus easily got them into their power. When it is not capable of doing something like this, it may lie still beneath the ice floe in order to reassure the seal and thus lure it into the water.

In addition to this, its most dangerous enemy, the harp seal has yet another enemy to contend with in the polar bear (*Ursus maritimus*) (Fabricius 1780: Spec. 13) when it comes on to the drift ice and takes the sleeping seals by surprise. The Greenland shark

(*Squalus Carcharias [Somniosus microcephalus]*) is not to be relied on, either, particularly in the case of the seal pups; one often see them approaching these as they rest quietly in the water; but this happens primarily to seals that have been killed already and carcasses floating on the water; whereby the shark often snatches a Greenlander's catch from under his very nose.

Hunting methods

The Greenlanders catch the harp seal in several ways:

1. Chiefly with the harpoon, which differs from the other throwing weapons in that a loose head (*Túkak [tuukkaq]*) is placed on the end of a shaft (*Erneinek [ernannaq]* or *Unak [unaaq]*) which can be thrown only a short distance. To the harpoon a line is attached (*Allek [aleq]*), which lies neatly coiled like a ship's rope on a small stand called a kayak stand ['line rack'] (*Assellut [asallut]*) in front of the hunter on his small craft, the kayak (*Kajak [qajaq]*); one end of the line runs back and is attached to an inflated seal-skin (*Auatak [avataq]*) which lies secured to the stern of the kayak. When one goes out on this kind of sealing one must also have more accessories, especially a lance (*Angoviak [anguviaq]*), a killing knife (*Kapput, [kapuut]*) and towing gear (*Kallivtit, [kalitsit]*), all of which, together with other throwing implements, are called *Sakotit [saaqutit]*.

For this purpose the hunter looks for the seals either in the open sea or up on the drift ice. If in the open sea, the hunter sets out in his 'man's boat', which holds only a single person and is called kayak (*Kajak [qajaq]*), and on which he has secured all his hunting gear; then at some place in the sea he will try to stalk

42. One need not make this word sound as dangerous as Cranz (1765: 204) does by deriving it from *Kammipok [qamippoq]*, 'being extinguished' because the hunter's life is in danger and is therefore as easily extinguished as a candle (an explanation he no doubt borrowed from the Greenlandic dictionary, p. 63, which says the same); for the word is also used of pursuit on shore, where there is no danger, and ordinarily means lying in wait or on the lookout for something; I would derive it rather from *Kamma [qamani]*, 'outside'.

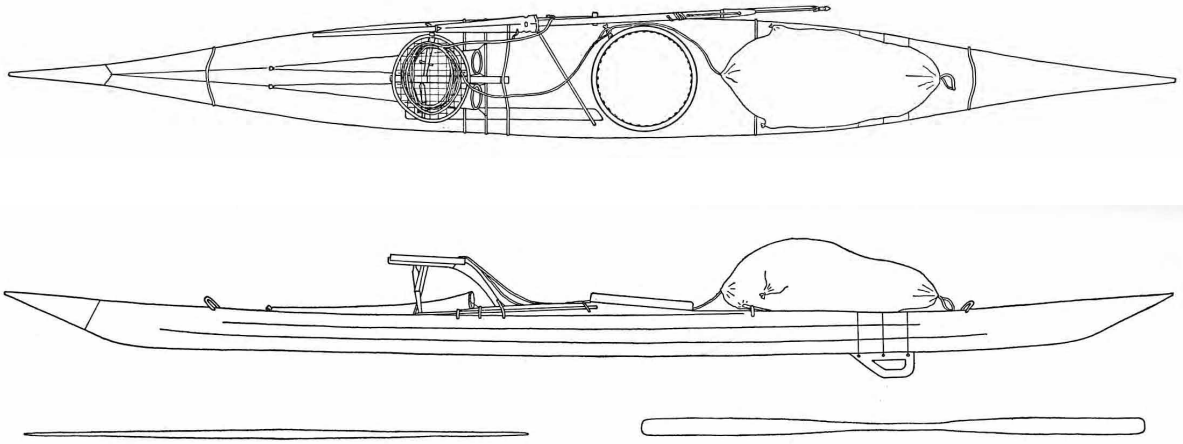


Fig. 26. West Greenland kayak, showing the position of the harpoon, the kayak stand, and the float (Hansen/Rosing 1971: 122-123).

the seals. This form of hunting is called *Kammavok* [*qamavoq*].⁴² Usually several hunters start out together from the shore; but on arriving at the haunts of the seals, and especially when they observe one with its head above the water, they spread out in order not to get in one another's way; but usually such that they can see one other and get help if needed; with the exception of a few daredevils and eccentrics who, relying only on themselves, sail far away from the others. Then each hunter remains quietly at his post, waiting for the seal to emerge. In sunshine he keeps the sun behind him, so that the seal, looking into the sun, will not easily become aware of him. If it is windy he stays before the wind in order not to make too much noise. He makes just as much movement as is required to wield the paddle so deftly and gently that it makes scarcely a sound, an art of which the Greenlanders are complete masters.

Then when a seal bobs up, the hunter studies its behaviour in order to decide whether he has any hope of catching it and how to attack it. If it seems confident, he does all he can to approach quite close in order not to fail, his sole care being to prevent either his paddling or the approach of the kayak from making much noise, which would disturb the seal's tranquillity. This however requires no little dexterity and routine, which he accomplishes partly by using long, deep strokes of the paddle, partly by urging the kayak forward with his body alone; many hunters are so adept at this that they can get the seal alongside the kayak without its knowledge. But if it is one of the cau-

tious kind that looks around, it is more difficult; yet the hunter does not abandon hope but watches for the seal to submerge its head, at which point he hastens forward; but while the head is above water he remains still and bends down or lies back in the kayak so as to be mistaken for something dead drifting on the water; in such cases he will not approach as closely as in the former instance, but must throw the harpoon at it from as far away as the line can reach.

If the seal thrashes in the water and seems playfully confused when looking at the hunter now and then, the latter whistles in order to reassure it, for then the seal listens to his whistling; if it nevertheless dives before he gets within range, he observes the course it takes, shifts his position slightly, constantly looking around for the place where it emerges again, and other such things which would be too circumstantial to enumerate here.

Finally, when he has come within striking distance in one way or another, he throws the harpoon at the seal, having previously attached the head; the line, which has lain coiled on the line rack, runs out with it; since the harpoon head is barbed, the hunter can see at once whether the seal has been hit or not, for if it has the seal cannot easily get free of it but is compelled to pull more and more of the line out. Then there is no time to be wasted; as soon as he sees that the seal is hit, the hunter must at once throw the float overboard, as otherwise it would receive a hard jerk when the seal has run the line out, and the kayak would be liable to capsize; this might also happen if the line became tan-



Fig. 27. Seal hunting from a kayak (Cranz 1765: Tab. 8).

gled and caught on something on the kayak. These two cases are critical to the life of a Greenlander, for once the seal gets him in tow and no other hunter is close enough to come to his aid, there is rarely any hope for him; but if he gets the float away and the line runs out without becoming entangled, his greatest danger is over. Sometimes, however, a man encounters a seal brave enough to turn against the thin-skinned kayak and bite a hole in it, so then he is in danger of sinking. Thus in many respects this may be called a risky form of hunting, one upon which not many Greenlanders venture out without careful consideration.

If the harpooned seal gets the float in tow – it is rarely able to drag it below the surface – the hunter watches the direction it takes, follows it and tries to kill it with the lance; for the lance has no barbs, but slips out of the wound and floats up again every time it is thrust into the seal; in the end it has to succumb to the repeated wounds, for it has also become exhausted by dragging the large, inflated float. When at last the hunter gets close enough he gives the seal the death blow by hitting it on the snout with his fist, which stuns it immediately; and if necessary it is stabbed with the killing knife.

After that it has to be made fast for the tow home; first of all the wounds are closed with wooden plugs to prevent blood from going to waste (for the blood is also useful); at the same time air is blown in between skin and flesh to make the carcass more buoyant. If the seal is only small, it is laid aft in the kayak, with a small

bladder at about the navel to keep it afloat if it should fall off. But if the seal is a large one, it has to be towed in the water alongside the kayak with a float so large that the carcass can be left to drift without risk in case the hunter sees another seal he can catch; if several are caught, they are made fast to the first ones, and thus a lucky hunter may paddle home with four or five seals in tow at once.

When there is drift ice some way out from the shore, on to which seals may have crawled, the hunter makes his way to it and searches among the floes, where whole schools of harp seals may sometimes be found, quite unsuspecting and not infrequently sleeping. The hunter then disembarks on to the drift ice and moves towards the seals, stealing in upon them, and with less risk than when at sea, he harpoons and lances one after another, often making a rich catch. This method is called *Kaksimarsulliarpok* [*qassimasulliarpoq*], that is to say ‘looking for sea animals which have crawled up on to the ice’.

When the harp seal is fleeing from the killer whale (which happens especially towards winter) and for that reason comes close inshore, there are some narrow straits through which it seeks to escape and save itself, but which may be dry at ebb tide. There the hunters try to drive the timid seals ashore, inasmuch as many hunters together, with their small craft, alarm it so much with their howling and shouting and splashing in the water that at last it goes up on land; in fact it will sometimes do this just to escape the killer whale. When it has come ashore the hunters leave

their kayaks and pursue it with dart and lance until it is killed, which can be done on land without risk. This form of sealing is called *Kakkirsarpok* [*qqqisaarpoq*], that is, 'driving ashore'.

In the season when large schools of harp seals chase the capelin along the shore, it is possible, at some places where the beach is convenient, to stand on land and harpoon them, dragging them ashore later. This is also done from the firm ice in the fiords when large schools of them appear at the holes. A seal is then called *Særpsak* [*sassaq*] and the form of hunting is called *Særpsiarpok* [*sassiarpoq*], 'chasing sea animals in the ice-holes'.

2. More rarely, this species is caught with the bladder dart called *Akligak* [*alligaq*], which is a light dart with a small bladder on the side of the shaft in which the actual barbed dart is set, and which can be thrown a fairly long distance with the aid of a throwing-board. This is sometimes done by a solitary hunter who may unexpectedly come across a harp seal at such a distance that he is unable to reach it with the harpoon but can do so with the bladder dart, which is then called *Agligarpok* [*alligarpoq*], and he keeps the seal for himself.

But when the intention is to conduct an organized seal hunt with bladder darts, this is done by several hunters together; this is called *Mallersorpok* [*malersorpoq*], 'chasing (jointly)', and has much in common with a battue; for the moment a seal is seen to peep out from the water the entire company of hunters begins to shout and cry with all their might, beating their kayaks, pushing the ends of their paddles down into the water and emitting hollow howls at them to make the sound travel under the water, and more such measures to scare the seal and make it dive without breathing much air, and then come up again all the sooner; in this fashion they continue to chase it whenever they see it reappear, by which means it is bound to become shorter and shorter of breath and more exhausted. Nor do they forget to throw darts at it; in the end one will strike its mark. Because of the attached float it is hard for the seal to pull the dart below the surface when it dives; and while it is trying to escape from it, the seal is struck by more and more of them and has to give up. This method is preferably used to catch young seals when they have just come inshore in May; the larger ones, especially the fully-

grown seals, are not so easy to tire and may easily escape with such a small dart, which will then be lost.

According to the Greenlandic custom, no one may keep for himself what he catches on such a hunt; it must be divided among all those taking part; the first man to put a dart into the seal may pull it to him and secure it with a short thong under the chin, but afterwards he hands it over to the others to be skinned and parted; his share is the head, the breast and the entire skin, and these are indeed never refused him. The remainder is shared among the others, not quite equally, for those who are closest take care to get the shoulders and hindquarters, which form four whole pieces and are never subdivided. The others have to content themselves with one or more ribs or pieces from the back, or perhaps some of the internal organs; indeed, if there are many hunters, the more backward or young ones may get nothing at all, with which they are usually content. On the whole, this sharing-out proceeds quite amicably and rarely leads to such animosity as will make them fight over the spoils; at the most there can be some bickering, especially when powerful, arrogant Greenlanders want to push a poor fellow Greenlander aside; on the other hand, such a man is more likely to yield than expose himself to something worse. It only rarely happens that the man who puts the first dart into the seal has the courage to take it all for himself – this will mainly be when he wants to have the skin intact for use as a float; the others may give in to him but will have plenty to say about him later.

3. The Greenlanders have also begun to hunt this seal as well as other species with the gun (*Auleit* [*aallaat*]). For since the gun has become known in Greenland and can be bought from the trading post, the natives use it not only on shore but also at sea; but not to any great advantage, for more animals are driven off than are killed, and more are killed than are retrieved. For this form of hunting the hunters lie in wait for the seals by narrow channels where they are in the habit of passing through in schools on their migratory journeys, or up at the places where the seals come in pursuit of the capelin shoals; or they watch for them from the ice and shoot when they see them peep up from the holes; sometimes a Greenlander will crawl up on to an ice-floe at sea and wait for a seal to come within shooting range. On all these occasions care is taken to shoot it in

the head; partly so that it will not die at once but have so much life in it that the hunter can get to it with his boat and other darts. For if it should die at once from a shot that leaves a large hole in its body for the air to escape, it will usually sink before the hunter reaches it. Another reason for shooting at the head is to make the seal dizzy and thus prevent it from determining to get under the ice or down to the bottom and bite hold of the seaweed roots, which it is said to be apt to do when it thinks it is mortally wounded; in either case the hunter loses his game.

4. They have also learnt to catch seals with nets (*Karksut [qassutit]*), a method mainly employed in the northernmost regions where the nets are spread in narrow channels close to the shore, or under the ice; it is said that they sometimes make good catches in this way.⁴³

It is also known that off Spitsbergen the so-called 'Robbenschlägere' [seal-cullers] make good catches, especially of this kind of seal, when they encounter large numbers of them lying on the drift-ice and can get close enough to them to club them over the nose, killing them by the score.⁴⁴

Utilization

I have earlier pointed out that the seal is of the greatest benefit to the Greenlanders; in some respects it may even be called indispensable, particularly the harp seal. They know how to utilize it to the utmost. No part is thrown away except the excrement from the guts, the hair and some of the bones; the rest is used for food, for fuel, for clothing and for boat sheathing, etc. I shall endeavour to show what each part is used for, in order to make it clear how much use can be made of one species of animal.

1. To the Greenlanders, seal meat is highly nourishing food. They eat it boiled, fermented or dried. To boil it they use fresh water with a slight admixture of seawater. The process is not particularly clean; for if the meat has been lying on the ground and is rather dirty, they merely scrape the outside a little – or sometimes not at all; nor is it allowed to boil so long that the meat

comes off the bones – they like it half-boiled, and if they want it cooked quickly they put a little blubber in.

'Fermented' is what I call the meat that the Greenlanders store away until it is half putrefied; indeed sometimes it is almost rotten and stinking, for it is rarely so bad that they have to throw it away completely. In order to get it into this condition they put the meat in blubber pits in summer and cover it with a little blubber; or they leave the blubber on the meat, whereby it quickly becomes tender. In winter, however, the process is not so simple, for then the meat will usually freeze and thus be prevented from putrefying; so they have deep storage pits in the ground, down to the depths of which the frost cannot penetrate so easily; thus what lies deepest becomes tender first. If they want it ready earlier they store it inside the house under the foremost platform. They consider a whole seal prepared in this fashion the finest dish they can serve to visitors from the outside; especially if it has been frozen after becoming tender, it is considered the greatest delicacy. This fermented or semi-rotten meat is called *Mikkiak [mikiaq]*, a name also associated with fish similarly treated.

Dried meat is called *Nivko [nikku]*. For drying purposes it is cut into flat slices, as far as this can be done without removing the bones, which are allowed to remain; the slices are then laid on the bare rocks in the sun and wind in the summer; a small amount of blubber is also left on to enhance the taste, and afterwards they use this wind-dried meat for winter supplies; good housekeepers collect as much of it as they can in summer. They also fill bags made of seal stomachs with dried and boiled meat and blubber; the mixture is eaten thus and is called *Akkuglit [akullit]*, that is to say 'mixtures'.

2. The guts are either eaten or used for windows and clothing. If they are to be eaten, the excrement is at once pressed out between the fingers; this is repeated a second time and then they are rinsed, but they are not turned inside out, so the process is not exactly a clean one. They are then eaten boiled or fermented, for which purpose they are wrapped in blubber; or they may be dried and then plaited into a kind of

43. Hunting the seal with nets has previously been known in other countries, as can be seen from Strøm (1766: 45), Olafsen (1772: 531, 704), Mohr (1786: 3), and other works.

44. An account of the actual method may be read in Adelung (1768), Martens (1675), Aphelen (1770:17) and Olavius (1780: 11-12).

chain, a task at which the Greenland women are very dexterous; afterwards they are also used for mixing in the blubber-bags.

If the guts are to be put to other uses they must first be prepared; while still fresh, the guts are laid aside for some days, packed in blubber; then they are chewed between the teeth in order to peel off the outer and inner fleshy coatings, leaving nothing but the fine membrane. To make this process easier they pour melted blubber into the guts. When all the fleshy parts have been chewed off they are laid in seawater to stiffen, then they are inflated and hung out to dry; in winter they are pegged out on the snow to make them white and clear. They are then split, rolled close together into round bundles and stored away until required. Guts prepared in this manner are used for windows and for curtains in tents to let the daylight in, although they are never as transparent as glass windows. Moreover, the men use them for a kind of outer garment called a gut-skin coat (*Kapisek* [*kapiseq*]), which they wear over their bird-skin coats to keep the water out when they are at sea; for although the gut-skin coat may get wet, the water never permeates it. For this purpose, however, several strips of gut have to be sewn together side by side, and the coats are therefore very fragile; they have to be patched often.

3. The throat, like the guts, is used for windows and clothing, and an overcoat of this type is called *Ikiak* [*iggiaq*]; but there is some difference in the preparation; for in this case they scrape only the outermost covering off with their teeth, since the inside is not soft; then they split the throat, which is double in itself, so that from one they get two, which are then laid in urine to soak and afterwards stretched on a piece of wood to dry. For windows they prefer the throat to the guts, for it is more resistant to the winter gales, whereas they prefer the guts for tent aprons, because they are thinner and more transparent. The throat is also used for the little float on the side of the bladder dart (*Auataeksak* [*avataassaq*]), but in that case after being scraped it has to be soaked in seawater and afterwards inflated so that it will dry without splitting.

4. The stomach is either eaten like the guts, or is used for filling with blubber, blood, crowberries (*Empetrum nigrum*), cochlearia [scurvy-grass, *Cochlearia groen-*

landica], angelica [*Angelica archangelica*] etc. instead of bags, for which purpose they inflate it and cut gashes in its fleshy coat. It is also used for towing floats (*Auatâursak* [*avataasaq*]); then all the fleshy parts must first be cleaned off inside and out with a knife, then it is soaked in seawater, inflated and dried, like the throat.

5. The heart, kidneys and spleen are put to the same uses as the flesh.

6. So is the liver, but this is eaten raw with blubber, fresh out of the seal. This is the men's preferred dish on returning home from hunting, when it is handed to them straight from the seal that has been caught; in fact the women are not very keen to join them in eating this. Otherwise it is eaten after being frozen raw.

7. The lungs are also eaten like the flesh, but they have another use, inasmuch as they can be inflated and filled with the blood of the seal for winter supplies.

8. The blood, mixed with seawater, is boiled, and then is either eaten as soup or is allowed to freeze in winter, when it is eaten with greater relish; or they roll the boiled, coagulated blood into round balls and dry them in the sun; these they keep for hard times, to be eaten like bread with a little blubber as fleshy substance; but the Greenlanders are not very partial to this dish. The blood, stored in the inflated lungs or in small stomach bags, is eaten in winter just as it is, quite stinking, or it is used as dripping in which to dip rose-root (*Rhodiola rosea*). The boiled blood is also used for mixing with crowberries and eating as a side dish.

Finally, the fresh blood is also used for smearing on the flesh side of black skins and sole-skins, as well as the kayak skins when they have just been stretched over the boats; for when this blood dries it serves as a proofing medium, guarding these skins from being quickly saturated with water.

9. Of the bones, the ribs are used for pegs for stretching skins out on the ground, as well as for the skin coverings of the houses in winter, and for making rivets for the bone mountings of wooden implements of various kinds. Shoulderblades are used by the women instead of spades or scrapers for house building and

cleaning. When a seal has fine white bones (which is rarely the case) they are also used for small studs on the hunters' lines, towing gear, etc., and on the thongs of their watertight kayak suits. For these purposes, however, the teeth are more suitable when they are not hollow.

10. They pull the sinews from the tail, hind flippers and forelimbs, separate them from the flesh, stretch them out and dry them for later use as thread for all kinds of sewing. For this purpose the dried sinews are split and used either singly or plaited according to requirements. However, the sinew thread obtained from seals of this sort is hardly adequate for household use and is regarded as the most inferior thread, as it is so short and not as fine or strong as other kinds.

11. The blubber is used principally as fuel for their lamps, for heating, lighting or cooking; for this purpose it is either chewed and then spat out into the lamp (usually a task for the old women) or packed into stomach-bags, where it melts by itself and leaves hardly any greaves [residue], but also stinks; or it is rendered down over the fire, a process that produces more residue and also wastes some of it; in winter, when it is frozen, it is pounded on a stone and then scraped up. This is the most economical method of all, as little is wasted and the oil becomes both clear and odourless.

With blubber, fresh or melted, they also smear their boats and tent-skins to preserve them from sun and rain. They eat it too, either in the fresh state attached to the skin that is being chewed, or melted, but mostly as a sauce for crowberries, leaves of bog bilberries (*Vaccinium uliginosum*), angelica, cochlearia, etc., but never in any great quantity. Finally, some blubber is put into the cooking pot if they want the food to become tender quickly.

The blubber of this seal is a great trading commodity; at the time when I was in Greenland a barrel of blubber was reckoned at an average price of 2 Rdlr⁴⁵ in the colonies, with prospects of a good profit in the mother country, since it is as full of oil as I have stated. So the Greenlanders sell as much of it as they can

spare, although they sometimes get little for it. Furthermore, when one considers that most of the seal blubber brought home from the colonies in the Davis Strait is from this species of seal (that of the other kinds is neither as economical nor is it found in such quantities), and that this kind represents the bulk of what the 'Robbenslågere' bring home from Spitsbergen, it is easy to understand how useful this seal is, merely on account of its blubber, to both natives and foreigners.

12. The same may be said of its skin, which is prepared in various ways, each method having a name of its own and each having its own purpose. The first kind is:

a. Hair skins (*Merkolik [meqqulik]*), where the hair is allowed to remain and is not scraped off. These are prepared in the following manner. When the skin has been removed from the seal and the blubber has been separated from it, some thin, slimy blubber still remains on the flesh side, and this the women very neatly scrape off with their curved knives (*Ullo [ulu]*) over a board resting obliquely on two legs; this makes the skin thinner and frees it of blubber. Out of what is thus removed they make a special dish called *Mammit [mamit]*, boiling it in salt water until it is quite rendered down, whereafter it is scooped out on a tray where it stiffens and looks like a pancake (for which reason the colonists in fact call it 'Greenland pancake'); but in its nature it is like glue and quivers like jelly. When the skin has been scraped it is placed in the urine tub for part of the day⁴⁶ to remove any oiliness that may remain in the hairs; this urine is afterwards scraped off with a mussel shell, whereupon the skin is folded over against the flesh side and hung up to dry on the hair side. Finally it is stretched out, either on the ground in summer with the flesh side up, pegged down with seal ribs or small pegs which are pushed through the edge of the skin down into the ground; or in winter inside the houses under the ceiling, between four long bars above the platform with the flesh side down, and sinew-thread is employed to stretch it on all sides around the bars. So that the skin may not be spoiled, before it can be stretched out it must have a

45. ['Rigsdaler', old Danish monetary unit, 'rix-dollar'].

46. Not for 24 hours, as Cranz (1765: 218) says, for then the hairs would loosen and produce another kind of skin, to which I shall revert later.

strip of thick 'sole-skin' [see **d** below] sewn round the edges, pierced with many holes for the pegs or the sinew-thread.

If they want the flesh side smooth (this is required especially of skins used for tent-sheeting or for sale to the trading post) it is best to stretch them in winter, so they are allowed to lie shrunken and dry throughout the summer, then soaked again slightly later when they are to be stretched out. This is how skins of this kind are first prepared; but when they are to be used they are softened by rubbing them between the hands, sprinkling them with a little water or urine and working them with pumice or some other rough stone, of which they have more than one kind.

The hair-skin of this species of seal has various uses according to whether it is large or small. From the skins of fully-grown seals they make their inside tent sheets, placing many skins side by side with either the hair or the flesh side inwards if the latter is a good white colour, and thus with the opposite side facing the outer sheet, which is usually made of another kind of skin, because hair-skins are useless for keeping water out. In the north of the country, where little rain falls, they also use a double hair-skin sheet for the tents without a proper watertight skin on the outside, which is warmer. For a complete but simple tent-sheet between 18 and 20 of these skins may be needed. They also use the same skin sheeting to cover the inside walls of the house in winter. These large skins are further employed as platform coverings over the straw as a kind of mattress, though they are not very soft and serve almost solely to hold the straw together. From the skins of the medium and smallest-sized seals they make a kind of men's coat called *Kappitek* [*kapitaq*], and a kind of women's coat named *Illuitsok* [*iluitsoq*], with the hair in both cases next to the bare human skin without a bird-skin or other garment beneath it; when it is new or newly washed, and has a good white colour on the flesh side, such clothing does not look at all bad. The poor also have to use skins of this kind for trousers and for a kind of jacket called *Neitseq* [*natseq*], which is worn with the hair on the outside and over an undergarment, but does not look as good when made of this kind of skin. Otherwise it is used for

stockings with the hair on the inside, and for gloves for use ashore, with the hair on the outside; skins of unborn seals, prepared in the same way, are used similarly.

It is also this kind of skin that is mostly traded in the colonies. In my time a quarter to half an ell⁴⁷ of Dutch tobacco was paid for a skin, or a little more for the largest ones; and if we calculate what such a skin is worth in Denmark we shall find that this trade is extremely profitable. Here and elsewhere in Europe these skins are mainly used as covering for travelling trunks and for tobacco pouches; they are all the more serviceable for the former use as the hair lies so flat against the skin and keeps the water out all the better if care is taken to keep it lying downwards on the trunk. From this, as from the large black spots on the sides, this kind of skin can easily be recognized when one sees it on trunk coverings. The Greenland women are very skilful at making tobacco pouches from this and the skins of other species, and the illicit traders make use of them for the purpose. It might therefore provide a livelihood for these impoverished people and help towards the prosperity of the country if these and other hand-sewn skin objects could be sold at the colonies, which as far I know is not yet being done; and as the cost of making them would then not be very much, these things would be cheaper than if they were made here [in Denmark]. I therefore submit for consideration whether this does not deserve the attention of the Trading Administration or perhaps the Agricultural Society.

b. Boat skins (*Amiksak*, [*amissaq*]) are another kind of skin obtainable from this species, and only the largest are used for this purpose. They are prepared as follows. A small amount of blubber is allowed to remain on the flesh side, then the skin is rolled up and stored in the winter under the front platform in the house, or in the summer in the blubber-hole, exposed to the sun and covered with blubber. The heat in both places loosens the epidermis after a few days⁴⁸ so that it can be peeled off completely; the skins are then brought out to dry in the air or the sun and are then ready for use when required. There are two kinds of boat skin: one is called *Igdloartak* [*illuartaq*]; when

47. [A Danish ell, 'alen', was a measure of length 'two feet' 0.6277 m; in the 17th and 18th century tobacco leaves were often spun into cords or robes so that quantities could be measured by length].

48. 'Some weeks', as Cranz (1765: 219) says, would be much too long and would certainly rot the skins.

the seal is being skinned the pelt is cut diagonally from one shoulder to the hind flipper on the other side, down around this, then along the back to the tail. This kind is preferably used for the women's boat (*Umiak [umiaq]*), which requires 14 to 20 skins. The other kind is called *Seeksinnægak [siiginnagaq]*, where the pelt is skinned off by cutting in a straight line along the belly. This kind is preferred for the man's boat (*Kajak [qajaq, kayak]*), which requires 3 to 4 skins; but it is sometimes used for the end of the umiak too; the difference is perceptible when the boats are being covered, in that one kind is better than the other for stretching and fitting to the different structures of the boats. One more precaution must be taken: the skin must not be allowed to freeze, for then the epidermis will not be easy to scald off.

When the time comes for such a boat-skin to be used, it is left to soak for some days on the beach until it is soft enough to be handled; afterwards it is scraped with mussel shells, then covered with earth. And little by little they sew together as many of the stored skins as may be required to cover the boat. This assemblage is then stretched with straps over the woodwork of the boat as tightly as possible to prevent the skin from slackening when dried; for this purpose the thongs are crossed and recrossed inside the woodwork of the boat, and on the kayak the skins are stitched together over the deck, so that the man will have no more than an opening in the middle in which to insert his lower body; the women are masterly at helping with the stretching, biting and pulling at the skin with their teeth; and it is truly a source of wonder that a skin that has been exposed to such fermentation and soaking can afterwards be tough enough to tolerate such great tension and stretching. But this demonstrates that by virtue of his natural inventiveness the Greenlander has been able to hit upon exactly the right method of preparation, and how a human being, by heeding the hints of nature, may serve his ends by means of a few humble expedients. Once the boats have been covered, the seams in particular are rubbed with old, tough blubber collected from the blubber pits; but the entire cover is also rubbed with fresh blubber or boiled oil long enough to produce a sort of glaze on the outside; both these processes serve to keep the water out

and harden the skin against it; thus such a boat cover will not leak or slacken unless it is used too much and the renewal of its greasing is neglected.

Old boat covers that have been removed are used as outside tent sheets, called 'outer skins' or 'water skins', since many such boat covers are laid over one another like roofing, the upper one overlapping the next downwards, causing the water to run down and preventing it from penetrating to the inner skins. Six of these umiak covers may be required for a complete, large tent. When these tent sheets are judged to have become useless on account of age they are used to lay over the roofs of the winter houses, then afterwards for capelin-bags and boot-sole patches. Indeed, in times of famine they are eaten. When a new boat cover is being made, there are usually some pieces left; the smallest are eaten with relish by the women who do the stitching; the larger ones are cut into thongs for grommets for the paddles of the umiak (serving instead of rowlocks), or for other purposes in tents and houses.

c. 'Black skins' (*Erisak [erisaaq]*) are a third kind also obtained from this species of seal, usually from those of moderate and smallest size. They have this name because the hairs have been pulled out, leaving only the black epidermis. These skins are prepared in this way. When they have been scraped on the flesh side, like the hair skins, they are laid for a day in the urine tub until the hairs loosen, then they are taken out and the hairs are pulled out with the aid of a knife, but such that the epidermis remains. They are then pegged out to dry like the hair skins.⁴⁹

The uses of such skins are various; shoes and boots are made of them for both sexes; as is all the men's clothing such as waterproof coats, half-jackets, sea mittens and whaling costumes, for which purposes they are excellent, keeping all water out as long as the epidermis is not worn off. Naturally, rain and seawater make them wet and damp, but without penetrating to the undergarments. So they can be worn to great advantage by all seafaring people. Those who sail in the Davis Strait have in fact recognized their usefulness, as have the colonists in Greenland, and they use them often on their travels. There is one point to be observed here: if they are to keep water out they must not be rubbed or softened between the hands. It is true

49. Cranz (1765: 219) is wrong in saying that they are prepared in the same manner as 'sole skins', which are treated quite differently, as will be seen later.

that for a certain kind of man's coat, called the land coat (*Ervak [erfaq]*),⁵⁰ the skins are softened before being made up, but these are not intended to be water-proof.

d. 'Sole skin' (*Attungeksak [atungassaq]*) is the fourth kind of skin, obtainable only from the largest harp seals. Its preparation differs from that of the preceding kind in that it is not scraped on the flesh side, so that it can retain some of the blubber and be thicker; after the hairs have been pulled out the skin is laid in fresh water – preferably running water – to soak for three or four days, often longer, the idea being that it will later be able to resist decomposition so much longer; some people also smear it with blood on the flesh side. When the time comes to use it, it is first soaked in water so that the needle can pierce it.

These skins are used for soles in shoes and boots and are rather thick and stiff, and last longer than one might think. In the north they also use them instead of the proper boat skins. In times of famine the Greenlanders even eat old, worn-out soles.

e. 'White skins' (*Unnek [unneq]*), which have the appearance of parchment, are the fifth kind of skin from the harp seal and are taken from both large and small seals. They are prepared in this way. When the flesh side has been scraped, they are put in storage like the boat skins to lose the hair as well as the epidermis. Thus the white cuticle underneath becomes visible. They are then hung out to dry, and in the winter on the snow they turn pale as if bleached; later, after being slightly moistened and rubbed, they are stretched out, which makes them even whiter and often very beautiful.⁵¹

These skins are used to make white 'best' boots and shoes of beautiful appearance for both sexes. The men also have a kind of sea-clothing made of them, extending only from the shoulders to the waist. These they use in the summer, especially in the fiords, to deceive the seals when they come out among the drift ice, for the seals then mistake them for lumps of ice. They are also used to make a sort of curtain in the tent, as well as for small white bags that are placed on both sides of the tent, partly as ornament and partly to hold various things. Finally they are used to make all kinds

of decorative lines and borders on clothing, boots and shoes.

f. They know how to dye white skins to make red skins, which can thus be accounted the sixth kind. To do so they make use of the small quantity of red bark on the roots of the red-pine logs that are sometimes to be found, fresh and undecayed, among the driftwood. For this purpose they stitch all the edges of the skin together, but with the flesh side out, making as it were a bag with a small opening. The bark is then chopped fine and put into the bag along with some old urine; it is then laid on the ground long enough for the dye to soak into the skin. This gives it a pale red colour, which does not last long, however. Some people now also know how to give it a better, longer-lasting red colour with Brazil-wood and alum, which can be bought from the ships, and by brushing the white skin a few times with a mixture of both boiled in water; but this dye will not endure rain either. They have begun to dye things violet with another kind of West Indian wood that can be brought from Denmark with the ships. These red and violet skins are made up into fancy boots and shoes, and used for ornamental lines on garments, tent curtains and tent bags and so on; as well as for the lining of tobacco pouches. However, the red skins are not very popular among the Greenlanders and, like the violet ones, are almost solely to be seen among the wives and servants of the colonists.

g. Finally, from the youngest harp seal skins they make their floats for sealing with the harpoon, as already reported (p. 68-70). For this purpose they peel the skin off the seal in one piece, cutting it only at the head and around the toes, then with a long knife on the inside they contrive to loosen the skin from the carcass and take the flesh etc. out piece by piece. When the skin has been turned out they scrape off most of the blubber from the flesh side, and otherwise the treatment is the same as for boat skins and white skins if the float is to be white (see **12.b** and **e** above), or as for black skins if black is required (**12.c**). Then the openings at the head and the two hind flippers are closed. At the location of the anus and at the places where wounds have caused openings in the skin, they put in small wooden plugs with concave sides around

50. Cranz (1765: No.4) claims not quite correctly that this is a separate kind of skin; any kind of skin can be used for the purpose.

51. What Cranz (1765: 220) states about this and the following type of skin preparation is by no means sufficient and in some places incorrect.

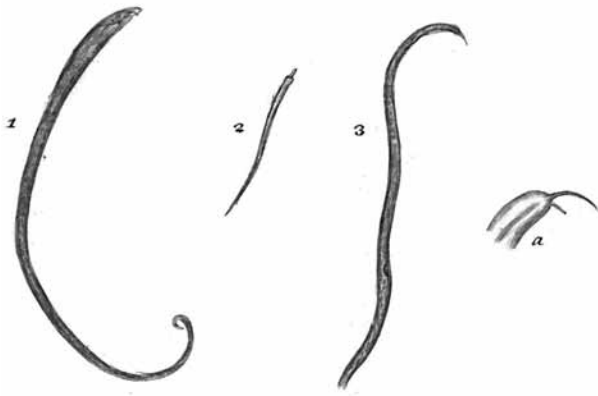


Fig. 28. Parasitic nematodes found by Fabricius in seal stomachs: Fig 1. *Ascaris Phocae*; Fig. 2. *A. tubifera* [in *E. barbatus*], and Fig. 3. *A. bifida* (Müller 1780: Tab. 74, Fig 1-3).

which the skin is tied tightly so that neither water nor air can get through. A thong is made fast to the foremost, puckered end, after which the skin is turned over the openings left by the fore flippers; a mouth-piece is then inserted in one fore flipper and the other is tied up outside. The skin is inflated, stretched over a device made for the purpose in order to give the float the proper curvature and shape, in which position it is then dried and is ready for use.

Parasites

In this seal species I have found no parasites other than two kinds of roundworms which I have called *Ascaris Phocae* and *Ascaris bifida* in my *Fauna* (Fabricius 1780: Spec. 250 & 252). These are also described in detail with illustrations in *Zoologia Danica* (Müller 1779-1780: Pl. 74, Figs. 1 & 3; pp. 101-102, ed. Prior 8vo (pp. 46-47 ed. Post. Fol.)), as far as I was able to observe them using a magnifying glass and in accordance with the ideas I had about roundworms at that time, following the guidance of Linnaeus. Since I have not been fortunate enough to preserve any of these worms intact in alcohol or to see them alive again, I have nothing to add to my previous description. However, I have no doubt that they were in fact roundworms, although I will agree with Müller (1779-1780: 106 ed. 8vo (49 ed. Fol.)), that I may have taken the

fore-end for the tail-end, as the analogy of my later observations of intestinal worms suggests.⁵² I also believe that the *Synonymon* cited as *Ascaris Phocae* by Goeze (1782: 73, Pl. 2, Fig. 9) belongs here; but his specimen has become so deformed by breaking-up in alcohol, and the illustration drawn from it has become so unrecognizable, that nothing can be determined on this basis.

Synonyms

Finally, I shall mention the *Synonyma* for the harp seal that I believe I have found in the literature:

- Phoca Grönlandica*: Fabricius 1780: 11-13; O.F. Müller 1776: viii; Erxleben 1777: 588; Borowski 1780: 9; Mohr 1786: 3; Linnaeus/Gmelin 1788: 64.
- Phoca Oceanica*: Steller 1751: 290; Lepechin 1778: 259, Pl. VI & VII. (good illustrations, the best available).
- Svartside**: Egede 1741: 45 with a small (poor) illustration; Hammer 1775: 4.
- Fletti-Selar** and **Opno-Selar**: Anon. 1768 [*Speculum Regale*]: 177.
- Hafselr, Vadluselr, Flekuselr** and **Oppnuselr**: Torfaeus 1706: 87.
- Grønlands-Sele**: Horrebow 1753: 269.
- Seehund mit einer schwartzzen Seite**: Ellis 1750: Pl. 7 (poor illustration) [Blackside seal: Ellis 1748; Veau marin marque de noir: Ellis 1749].
- Atarsoak**: Cranz 1765: 163.
- Atak**: Glahn 1771: 152; Stauning 1775: 143.
- Grønlandsk Sæl**: Aphelen 1770: 16.
- Dælja, Dævok** and **Aine**: Leem 1767: 212, 214.
- Vade-Sæl, Hav-Sæl**: Olafsen 1772: 520, 531, 696; Olavius 1780: 79.
- Seehund, Robbe**: Martens 1675: 75, Pl. P, Fig. a. (poor); Adelung 1768: 372, Pl. XV, Fig. 4. (Martens' illustration).
- Meerkalb**: Zorgdrager 1750: 192, 193.
- Die dritte Sorte Seehund**: Steller 1774: 108.
- The Harp-Seal**: Pennant 1771: 342; 1781: 525, Pl. 51
- Schwarzseitige Seehund**: Schreber 1775-1778 III: 310.

52. With regard to two of the *Ascarides* illustrated in the above-mentioned plate in Müller 1779-1780, namely *Ascaris Gadi*, Fig. 6, and *Versipellis*, Fig. 7, I can now provide the information that the narrow end of the former is in fact the fore-end, having three knots, whereas the latter is in reality *Echinorynchus candidus* Mülleri.

Second Part

Introduction

In the first part of my dissertation (to be found in the first fascicle of these publications) I described just one seal species, the harp seal (*Phoca groenlandica*), in which account I had to be somewhat circumstantial and report much to which I can refer in the following. It is now my duty to keep my promise to describe the remaining species.

Second species. The Fiord [or Ringed] Seal (*Phoca hispida*)

Names

Next to the harp seal, this is the most abundant seal species in Greenland. I have used the Danish designation **Fiordsæl** [fiord seal] because the seal occurs mostly in the fiords and is more rarely found far out at sea. In my *Fauna Groenlandica* (Fabricius 1780: 9-11) I have called it *Phoca foetida* because it is characteristically more foul-smelling than the other species. On the basis of my report it was formerly referred to under this name in O.F. Müller's *Prodromus* (1776: viii). At that time it was treated as a new species because I did not find it in Linnaeus (1766); either he knew nothing of it or he did not consider it distinct from the common seal (*Phoca vitulina*), having at most regarded it as a variety of the latter under the name of **Grå-Sjæl** ['grey seal'] (Linnaeus 1761: 2, Spec. 4). However, Pennant (1771: 341, #261) classed it as a distinct species under the name **the rough seal**, following which Schreber (1775-1778: 312) called it **der rauhe Seehund** in German and Erxleben (1777: 589) latinized this to *Phoca hispida*, a name which Linnaeus/Gmelin (1788: 64) has retained. This name does suit this species very well because of its bristling hairs, and although this also applies to the hooded seal (*Phoca Leonina* Linnaei), I have not hesitated here, as the latter has other characteristics, to prefer the name *Hispida* to *Foetida*, especially as it is only the oldest individuals that have a marked stench.

No illustration of the fiord seal is available, except the one given by Schreber (Fig. 49; 1775-1778: Pl. 86), which is by and large fairly good, although it appears a

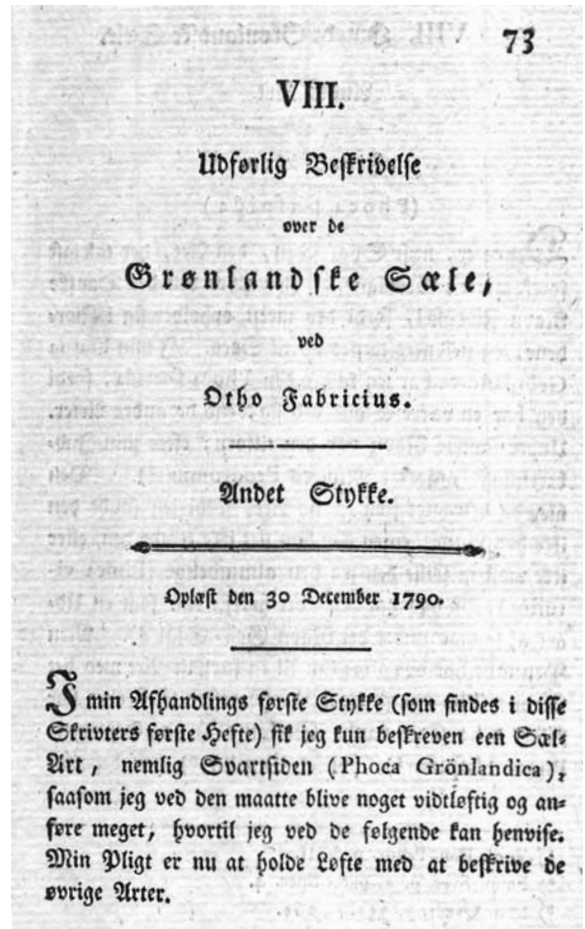


Fig. 29. Title page of the second part of the treatise on the seals of Greenland, presented 30 December 1790, published in the series *Skrifter af Naturhistorie-Selskabet*, 1st vol., 2nd part, No. VIII (Fabricius 1791: 73-169).

little too long, and the hind flippers have been made to look unnatural inasmuch as they have been given fringes at the edge and the toes and web have been separated too much, while in reality they are as much joined in this as in the common seal. The black spot around the eyes is also unknown to me, unless this is an old seal with naked skin in that place, for otherwise I have never seen a specimen with such a spot. For that reason it is a pity that Schreber does not state the origin of the animal depicted, so we might know whether it was a Greenland specimen or not. Erxleben (1777) also mentions such a spot, but it is evident that he is quoting Schreber, so together they constitute only a single witness.

I will reserve my considerations concerning more *synonyma* for the conclusion of the description, in

order to compare them with statements by other authors and thus myself speak with all the more certainty.

The Greenlanders call this seal species *Neitsek* [*natseq*], and since they use the same name for a certain kind of fur worn with the hair on the outside (see p. 75; Fabricius 1790: 144) made by the women, preferably from the skin of this seal species, then either the seal has taken its name from the clothing or the other way round. I incline most to the latter explanation, but in general cannot give the *etymology* of the name. The largest and oldest specimens are called *Neitsidlek* [*natsillak*], ‘the full-grown *Neitsek*’, a younger one is called *Millaktôk* [*milattooq*], ‘the spotted one’ or *Millaktôrsoak* [*milattoorsuaq*], ‘the large spotted one’, depending on the degree to which the spots run together.⁵³ A half-grown seal is called *Neitsitsiak* [*natsitsiaq*], ‘the middle-sized *Neitsek*’, and the smallest size is called *Neitsingoak* [*natsinnguaq*], ‘the small *Neitsek*’ or *Neitsiak* [*natsiaq*], ‘the young of a *Neitsek*’; but a newborn pup is also called *Keviulik* [*qiviulik*], ‘the downy one’ as long as it still has its soft foetal coat.

Appearance and morphology

The fiord [or ringed] seal has much in common with the harp seal (*Ph. Groenlandica*) as well as with the common (or harbour) seal (*Ph. Vitulina*), but also much that distinguishes it from these as a separate species. From the harp seal it can be distinguished in particular by a rounder head and a shorter, snub-nosed snout, and from the common seal by the absence of any neck depression, making the neck look shorter in the fiord seal. From both it can be distinguished by the elliptical shape of the body and the bristling hairs, and by other characteristics that will appear from the description below.

In this species too the colour varies with age, although not as much as in the first species. The oldest seals, especially the males, are naked and brown at the snout as far as the eyes, the remainder of the back being brownish-grey with large white waves, while the underbelly is white with some brownish-grey spots. The younger the animal is, the smaller and less pronounced are these spots on the underbelly and waves at the back; so the youngest ones are completely white on the underbelly and the back is not brownish-grey

but rather bluish-grey – in some specimens even blackish-blue with indistinct waves. I have in fact seen some specimens that were white all over except for a faint bluish or greyish tinge along the back; but such examples are rare and the Greenlanders call them *Ukaleriak* [*ukaleriaq*] or (more correctly spelled) *Ukalerajek*, i.e. ‘one that is almost like a hare’, because a hare is called *Ukalek* [*ukaleq*] and is always white in Greenland. Although the underbelly is white in this species, the upper surfaces of the flippers and the tail are generally of the same colour as the back, but slightly paler, and only white below.

In size this may justifiably be called the smallest of all the seal species known in the country, since the oldest fiord seals are an estimated 4½ feet in length [141 cm], a size hardly ever exceeded and itself rarely seen; the most common ones, those of middle age, are only 4 feet long [126 cm], and the youngest ones are less than 2 to 3 feet long [63-94 cm]. The width is greatest between the fore flippers, about 10 inches [26 cm] in the most common ones.

It has a small, short, round, smooth head without earlobes, with the back of the head rounded, and an even lower snout which makes up less than a third of the length of the head, and is blunt in front but rounded at the sides. At the end, the snout is cloven by a low furrow, which it has in common with the harp seal, as well as the nostrils, which are crescent-shaped with the ends turned outwards, the lower part rounded, the upper part more pointed.

The mouth is rather small. The upper jaw is longer than the lower jaw, and wider because of a hanging lip which, like the snout, is densely covered with many pointed whiskers that are flattened on two sides, but on the other two sides undulating from the root almost to the tip. The larger or lower ones are whitish-grey, while the smaller and upper ones are almost black, and in the middle part all have a bright white stripe indicating the marrow of the whisker. The lower jaw is shorter and almost conical.

The teeth amount to 34, namely: 1) ten front teeth, all conical, small and sharp, consisting of a) six in the upper jaw, the outermost two of which are longest and curved, the next two shorter and straighter, as are the two middle ones, which are also the widest; b) four in the lower jaw, in character like the four middle ones in

53. This name is also used, however, for the first species at a certain age. See p. 58, Fabricius 1790: 93.

the upper jaw; 2) four canine teeth, exactly like those in the harp seal; 3) 20 molars, five on each side in the upper and lower jaw;⁵⁴ those in the upper jaw are largest and are all divided by two clefts such that they have three small points, the midmost of which is largest and somewhat curved. Moreover, all the molars are very sharp and almost uniform; the only difference I have found is that the outermost two in the upper jaw lack the foremost little point, and the next-outermost four in the lower jaw have yet another little addition on the inside towards the pharynx.

The eyes are a short distance from the snout at the top of the head, not far from each other, and are of middle size, not protruding as much as in the harp seal, with a pale white pupil with a brown circle, but otherwise resembling those of the harp seal.

The neck is short and broader than the head, such that the two increase together in width from the snout to the fore flippers; but the neck is flatter and placed lower than the head and the body. The body is elliptical in shape, and particularly at the back somewhat ball-shaped, with the underbelly flatter, especially between the fore flippers. From the fore flippers back the body becomes more and more rounded towards a slimmer rear end, which is however proportionally not as slender as in the harp seal, because the blubber and skin of the body continue to fill out a good part of the hind flippers, almost hiding the legs, and giving the seal a rather square-built shape.

The fore flippers are short, have five toes with black, curved nails that are gull-shaped below. The hind flippers too are short (since the legs, as mentioned before, are mostly hidden by the blubber of the body), and also have five toes hidden in a hairy web protruding at the end, at the top of which are five whitish-grey claws, less protruding and less powerful than those of the fore flippers, but narrow and more pointed. In other respects these parts, as well as the tongue, ears and the tail, are as in the harp seal.

The seal has a medium-thick skin, more suitable for clothing than that of other seal species. It is covered all over with many hairs, more loosely attached but longer, finer and more numerous than those of the harp seal; but they are less pointed and sharp, and feel softer. They also look less glossy, more coarse, and do

not lie smooth against the body but bristle obliquely up from it because of the large number of curly whitish-grey woolly hairs at the base, which keep the true hairs upright and in addition make these furs far warmer than those of the harp seal, which have almost no wool.

This seal yields little blubber, partly because the body is small, partly because it does not grow as fat as the other species, so that the blubber layer is thin by nature. It has therefore been customary to account the blubber of a full-grown fiord seal as equivalent to that of a medium-sized young harp seal, and two or three of those of middle age are required to make up this much. Although inferior in quantity, its blubber is clearer and more suitable for certain uses in Greenland than that of the harp seal.

Of the internal organs I will only note that 1) the intestines are very narrow and thin, and stretch to a length of almost 60 feet [c. 18.8 m] besides the rectum, which adds almost two feet [c. 62 cm] to this; and 2) the lung has two clefts at about the middle of the sides, which constitute a special small lobe of the lung. Otherwise this and all other internal organs are as in the harp seal.

The ringed seal is remarkable in having a foul smell that adheres to the meat as well as the skin, although to a greater or lesser degree according to age; the oldest ones stink so unbearably that one is almost driven out of a house by the smell of the skin or meat of such a seal; in the young ones this is less noticeable.

Occurrence

This seal species occurs mostly in the large, deep fiords. The oldest seals (*Neitsidlek [natsillak]*) hardly ever go out to sea, and are therefore rarely caught, except by settlers at the heads of the fiords; but the young ones and those of middle age are seen in the winter at the mouths of the fiords and along the coast, which they leave again in the spring to make for the fiords where they moult – some sooner, some later, but generally in April and May. But they stay in Greenland throughout the year, and undertake no real migrations like the harp seal (see p. 65-66; Fabricius 1790: 112-113).

54. I have not been able to count more in all the specimens I have seen of this species. However, the number of molars is not quite certain, since I have seen only 20 in some harp seals, but 24 in most of them.

The reason for its preference for the fiords appears to be that the solid ice forms in these earlier in the autumn and remains longer in the spring, for ice is the true element of this species, and it prefers to live among it. 'Ice' here must be understood to mean the fast ice – the frozen sea surfaces, not the drift ice, on which the seal is rarely found except on ice floes that drift out of the fiords. For this reason this seal species is more common in Disko Bay, the Uummannaq Fiord, and other such northern fiords as are frozen solid for most of the year; and it is particularly common in fiords that connect with glaciers that protrude from the Inland Ice, which runs like a mountain ridge throughout the country.

Behaviour

This species has certain kinds of behaviour that distinguish it from other species. When it is under the solid ice, it uses its claws to make a small hole in the ice, through which it pokes its snout to breathe; these holes are kept open and free of ice as permanent breathing-holes. But it also comes up on the ice through a larger opening, mostly through cracks or other holes made by the currents, and stays near these in order to be ready to dive quickly into the water when disturbed. Such a seal resting on the ice is called *Outok* [*uuttoq*] by the Greenlanders. It does this to sleep, rest or bask in the sun, sometimes singly, sometimes several seals together, in which case the large males in particular fight and quarrel, which leaves unmistakable marks on their skins.

In the water it has almost the same behaviour as the harp seal, but it rarely occurs in flocks, and is less inclined to look around it; in all respects this is the most incautious of all seal species, and therefore easy to come within range of, whether on ice or in the water; it can even sometimes be found lying on the surface sleeping as if dead; however, it can stay submerged without breathing for a long time. It hardly goes ashore of its own volition, but when pursued and exhausted it may occasionally take refuge there.

It is rather fierce and ill-tempered, and when it realizes it has been caught it often attacks its enemy, but is not capable of much, as long as one remembers to hit it on the snout.

Its voice is feebler than that of the harp seal; but otherwise I have nothing special to add about this, or about its walking or swimming.

Breeding

I am unable to say with certainty at what time of the year it mates and becomes pregnant, because a pregnant fiord seal was rarely caught at the locality where I stayed, and among the several hundreds I saw myself, not a single one was carrying a foetus, which supports my conclusion that the small and medium-sized specimens occasionally seen at the coast are all young seals which have not yet reached full size, whereas large ones, the so-called *Neitsidlit* [*natsillit*], are the really old ones, although some people believe that these belong to a separate species, distinct from *Neitsit* [*natsit*] (Glahn 1771: 158). It is quite likely that all seal species have similar breeding behaviour, pregnancies and numbers of pups. So much is known: this species give birth on the solid fiord ice in late February, March or April, from which I conclude that it may have become pregnant about June or July.

If the time of birth coincides with bad weather with no sunshine to alleviate the cold, many pups perish, and the Greenlanders know how to profit from this, setting out for the fiord ice to search for pups frozen to death or dying. However, nature has protected them well against the cold, providing them with really warm fur; they are born with compact, soft, woolly hairs, so that they can endure extremely severe frost as long as snow drifts and storms do not force the mother to leave them hungry. The pups grow slowly, as a result of their inclination rather to stay on the ice and starve than to leave it, and often the stomach and intestines are completely empty; many ringed seals encountered during the winter are therefore as small as if newly born.

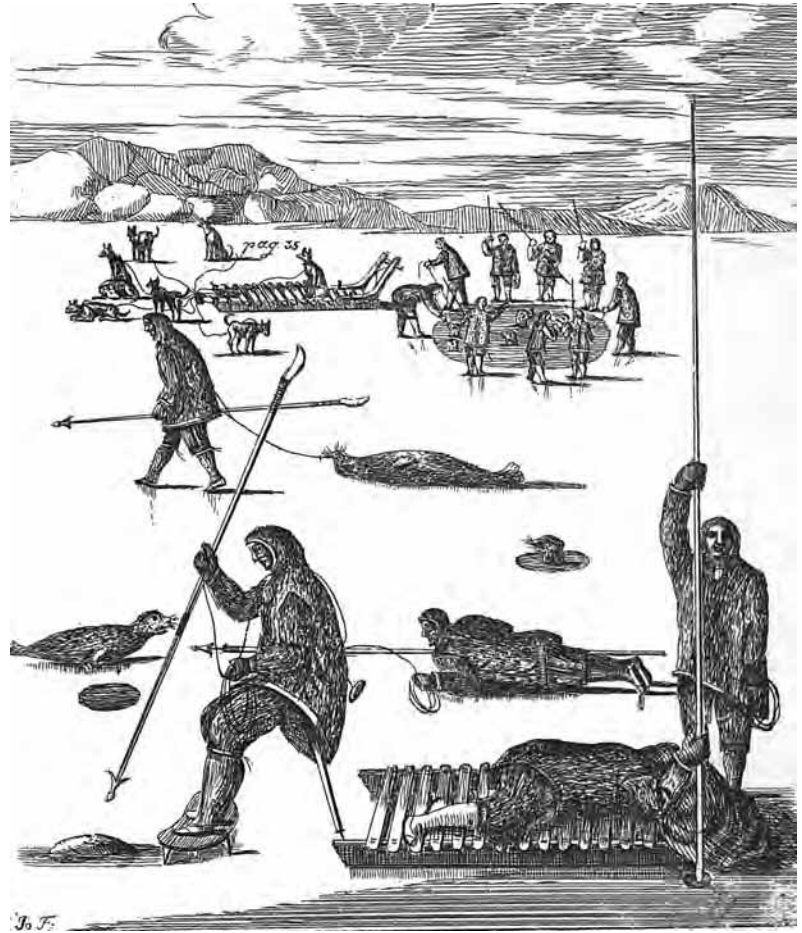
Feeding

The food is all kinds of small fish and the fry of larger fish, but the seal particularly prefers shrimps and other small, crustacean-like 'sea-insects' that are common in the fiords, and these are what is most frequently found in the stomachs.

Predators

This species has its enemies, too. As the seals rarely go far out to sea, they are probably not much exposed to the killer whale (see p. 67-68; Fabricius 1790: 120), but they are more likely to fall prey to the polar bear (*Ursus maritimus*), which takes them by surprise, partly when they are sleeping on the ice and partly by wait-

Fig. 30. Seal hunting methods used on the fast ice; the species involved is almost exclusively ringed seal, although this does not appear clearly from this illustration (Egede 1741: 59).



ing for them at holes in the ice, attacking them as soon as they approach in order to come out. The Greenland shark (*Squalus Carcharias [Somniosus microcephalus]*) is also more successful with this kind of seal because it is so small and easy to take by surprise when found sleeping in the water.

But the greatest enemy of the fiord seal is the sea eagle (*Vultur [Haliaëetus] albicilla*) (Fabricius 1780: Spec. 33), which hovers over the water and spots the seal either emerging or resting quietly (on the ice), swoops down on it and, grasping it with its claws, spreads its wings to prevent the seal from submerging. If the seal is large, it can sometimes draw the eagle down below, where the bird will perish unless it quickly gets its claws free; but a small seal can be kept at the surface by the eagle, which uses its wings to row backwards towards land or an ice floe; if these are too far

away the eagle will scream miserably out of fear of exhaustion and will die itself. If it loosens its grasp and the seal escapes its enemy, the seal may survive if the wound is only superficial, but often a large inflamed abscess is formed at the place, and the seal will eventually die. These incidents of failed eagle predation may be the reason why one finds many carcasses of this seal species floating in the water.

Hunting methods

The Greenlanders catch this species in several ways:

- i. In the same manner as the harp seal:
 - a. With the harpoon (see p. 68-70; Fabricius 1790: 122-128) when it is encountered in the sea, or on a detached ice floe, or in large holes in the ice.⁵⁵
 - b. With the bladder dart (see p. 71; Fabricius

55. The procedure for sealing in the ice holes was illustrated by Superintendent Egede (1741: 59) in a plate, and can be seen in the top right illustration.

1790: 128-131), either by a single hunter or in a battue hunt.

c. With a gun when it has crawled up on the ice.

2. But in the Disko Bay and other places where it mostly occurs, it is also caught in a curious manner with a kind of harpoon called *Sekko* [*sakku*],⁵⁶ which is only used on the ice. There are four ways of doing this:

a. When the seal has crawled up on the ice and is lying tranquilly a short distance from its hole, a Greenlander will come on to the ice wearing his hairy sealskin coat, which is mostly made of the skin of this species, lie down, creep on the ice and by imitating the manner of a seal will try to approach it and take it unawares; in order to increase the resemblance he often moves his head up and down, growls and scratches the ice with a small imitation seal flipper made of bone. To begin with, the seal of course looks round, but thinking the hunter is one of its own kind, it feels secure and allows him to get quite close; in the end he thrusts the harpoon into its body by means of the shaft and, the harpoon head being barbed, he holds on to the seal with a line made fast to the harpoon head and held in the left hand or tied round his waist, thus preventing the seal from plunging into its hole. He then kills it outright with a blow on the nose. This method is called *Aurpok* [*aarpok*].⁵⁷ The Greenlanders may also use the same method when trying to approach a seal on the ice to shoot it.

b. The second method is called *Maupok* [*maap-pok*] and is used when the hunter searches out the little breathing hole that the seal has made on snow-covered ice, sits down by it on a special one-legged stool and rests his feet on a small three-legged stool, partly on account of the cold and partly in order not to creak too much in the snow or on the ice, which might make the seal shy; for this purpose he even scrapes all the snow off the soles of his boots. Then he waits for the seal there, having his harpoon (*Sekko* [*sakku*]) in his right hand and the line attached to the harpoon head in his left. The moment the seal arrives to draw a breath through its breathing hole and pokes its nose

out, the hunter thrusts the harpoon into it, and holding it firmly by the line, reverses the harpoon shaft, because on its other end there is an iron spike or sharp bone. With this he makes the hole larger to enable him to drag the seal up through it; then he kills it with the usual blow on the nose.⁵⁸

c. When the ice is smooth the hunter has a piece of hairy skin (fox or dog tail, or bear skin) under his feet to deaden the sound of walking. Then he stands and listens to hear where the seal is taking a breath (which usually happens a few times in succession). Then he goes to the spot quickly and harpoons it, the remainder of the procedure being as described above. This is called *Koeitsiarpok* [*quasasiarpok*] (from *Koeissak* [*quasak*], i.e. smooth).

d. The fourth method is to seek out the large openings in the ice through which the seal crawls out; there the hunter lies slightly elevated over the ice on a long, low staging resembling a ladder, with a hairy skin over his head extending above the large opening through which he has to watch for the seal, this being easier when it is dark above him. At the side of this hole a smaller one is hewn, and through it another hunter holds a long shaft fitted with a harpoon head, mainly called *Itsoartout* [*itsuartuut*]. Now when the first-mentioned hunter lying in wait has attracted the seal by whistling, he watches until it is directly below the smaller hole and the harpoon and then says 'Kæ [*qaa*]' (i.e. 'let go, strike!'), at which signal the other immediately thrusts the harpoon into the seal. If the hunter is alone he has to guide the harpoon shaft himself. Afterwards the procedure is the same as described above. This method is called *itsoartorpok* [*itsuartorpok*], from *itsorpok* [*itsuarpok*], 'peeps through something'.⁵⁹

When a seal has been caught on the ice it is either dragged home or drawn on a sledge with a dog team – the latter only in the north.⁶⁰

3. It is also this species of seal that is caught in the greatest numbers in nets laid under the ice.

56. This Greenlandic name is given to every kind of weapon, but is preferably and more accurately applied to this kind of hunting weapon.

57. It is illustrated by Superintendent Egede (Fig. 30; Egede 1741: 59) in the above-mentioned plate, towards the bottom.

58. See the illustration on the above-mentioned plate (Egede 1741: 59), at the bottom left.

59. See the same plate (Egede 1741: 59), at the bottom right.

60. This too is illustrated in the plate (Egede 1741: 59) in the two top left illustrations.

Utilization

The useful parts of the fiord seal are:

1. The meat, which is eaten by the Greenlanders, especially boiled but sometimes preserved (described under the harp seal, p. 72; Fabricius 1790: 133-134). The meat of the oldest fiord seals, which is so foul-smelling, is not eaten by many Greenlanders; but the meat of the young animals, which smells, but not so strongly, is eaten by all, by some even with great relish because it is more tender and red and is therefore considered to be more luscious than the meat of the harp seal, which is both coarse and black.
2. The internal organs are treated and utilized in the same manner as those of the harp seal. From the intestines they can also make a kind of sewing-thread by splitting them with their teeth.
3. The blubber is also used in same ways, and it is considered better for greasing boats. At the trading post it takes up little space in the barrels; but as this small quantity is good, and payment for it is adjusted accordingly, it means no loss, because the number of seals will make up for it.
4. The skins of the largest seals are used for the boats (see p. 75-76; Fabricius 1790: 146-149), their smell preventing any other use. The skins of the medium-sized animals, and especially those of the smallest, which are the more handsome, become hair skins (see p. 74-75; Fabricius 1790: 141-146), from which the women make most of their fur coats, called *Neitsek* [*natseq*], which they have for daily wear and, when they are fine skins (with a pure white belly and not too spotted on the back), for their 'best' clothes. On such coats the hairs are usually on the outside, in which case it is usual to wear a bird-skin coat underneath as a shirt, next to the skin; but these are not willingly worn when the weather is hot if one has something to change into, for they are very warm. From these too the men get most of their *Kapitekker* [*kapitat*] (or *Neitsekker*, [*nat-sit*], as they are called in the south), on which they wear the hair on the inside when they are at home, without any undergarment, but on the outside when they are out in the cold, in which case they are worn over bird-skin coats as in the case of the women. In the absence of better material these hair skins are used for

the inner sheet of a tent, and they are also used for making trousers, stockings and fur gloves for both sexes.

Many of these skins are also delivered to the trading post; in the colonies they are called work skins or common skins, presumably because they are most commonly worn for the daily work; afterwards they are made up into tobacco pouches and trunk covers, but apparently they are not so good for the latter purpose as those of the harp seal, because the hairs bristle so much, so that in the rain the moisture can more easily penetrate to the leather and is thus harder to keep out, although the fleece underneath may help to reject it.

They are also made into black and white skins (see p. 76 & 77; Fabricius 1790: 149 & 151), especially in the moulting season, when the hairs are loose so that they cannot be used for other purposes. Most harpoon floats are also made from this seal species (see p. 77-78; Fabricius 1790: 153-154), that is to say the young ones, which are more suitable for the proper size of a float, which should neither be too large to carry nor too small to resist the pull of a seal during hunting.

Parasites

In a specimen of this seal species I once found the heart spoiled by an old wound and almost completely devoured by worms, so that I was very surprised to find it still alive; nevertheless the hunter assured me that it had shown considerable stamina when he had tried to kill it, as if in good condition; this appeared strange to me, considering that to be sure of killing an animal one tries to hit it exactly in the heart. These worms were the same kind of roundworms as are reported in the harp seal under the name of *Ascaris Phocae* (see p. 78; Fabricius 1790: 155-156).

Synonyms

Finally, I should now specify the many *synonyma* that have been assigned to this species, as far as one can deduce from the stated characteristics as compared with the present description. I consider the fiord seal to be identical to the **Skemming** of the ancient Norsemen (Anon. 1768 [*Speculum Regale*]: 178), because it is said to be smaller than the others, and to have a habit of making holes through the flat ice, which conforms exactly to the behaviour of the present species. For the same reasons, the **Hauskar-Gubbo** of the

Lapps (Leem 1767: 215, not. 66) must be a pup of this species, since it is said to be just two feet long and to resemble a bailing scoop or to be more square-built than the other species; and thus corresponds with the elliptical shape of this seal. The **Hringanor** of the Icelanders (Mohr 1786: 5) is also no doubt a pup of this species, since it is said not only to go up on the ice in the inner fiords, but also to be small and to have its name from the numerous rings seen all over its back; these could quite well correspond to the light-coloured waves on the back of the fiord seal, which sometimes converge into ring-like figures.

It is more difficult to determine whether the Icelandic **Utselur** (Olafsen 1772: 488, 529, and other passages) belongs to this species. In my *Fauna* I have mentioned it among dubious *synonyma*, and I have not since become more certain in this matter. Mohr (1786: 5) seems to assign it to this species, apparently simply on the basis of my own statements, since he gives no evidence of his own for this, admitting that he has neither seen it himself nor has any clear information about it. What can be found in other authors' work is equally inadequate as a basis for any judgement. When Olafsen (1772) reports that it gives birth in winter, and that the meat, particularly of the old ones, is not very delicious to eat, this indeed fits this species, whereas it is inconsistent with reality to state that it is larger than the common [harbour] seal; this does not hold true unless one compares a full-grown fiord seal with a half-grown common seal. As long as we do not have a good description of the **Udsæl**, nothing can be determined with certainty; but I must admit that if it does not belong to this species, I am unable to assign it to any other of the Greenland seal species – unless it should be the *Urksuk* [*ussuk*], and I will discuss this further under that species (see below, 5th species, p. 107).

However, the more I consider what is reported of the **Grå-Sæl** of the Swedes (Cneiff 1757: 177; in Germ. transl.: 171), particularly that it is dark grey, sometimes yellowish in colour and has a broader snout and longer claws than the common seal; that it gives birth on the ice in winter, after which the pups do not go into the water before being forced to do so by the breaking-up of the ice; that it makes holes in the flat, solid ice in the Gulf of Bothnia; that it is not as shy as the common seal; and that the meat is more foul-smelling – the more my conviction is strengthened

that it is the same species as the *Neitsek* [*natseq*] of the Greenlanders. It should, however, be noted that the Swedes make a distinction between **Grå-Skælar** and **Grå-Vikare-Skælar** (Ödman 1784: 83; in Germ. transl.: 82), and if these are indeed distinct species, it is probably the latter that belongs here.

Furthermore, Erxleben (1777: 589) appears to suggest that the **long-necked seal** of Parsons (1753: 120, Pl. VI) belongs to this species; however, I consider this by no means reasonable, since the long neck and the lack of toes on the fore flippers are to me sufficient to distinguish it from the present species.

Thus the *Synonymie* of the fiord [ringed] seal becomes as follows:

Phoca foetida: Fabricius 1780: 13; O.F. Müller 1776: viii; Mohr 1786: 5.

Phoca hispida: Erxleben 1777: 589; Linnaeus/Gmelin 1788: 64.

Phoca Bothnica: Linnaeus/Gmelin 1788: 63, 3, ?.

Neitsek: Cranz 1765, I: 164; Glahn 1771: 154; Stauning 1775: 144.

Neitsitlek: Glahn 1771: 158; Stauning *l.c.*: 146 (an adult).

Okilleriak: Glahn 1771 *l.c.*; Stauning *l.c.* (the white variety).

Skemming & Selakong: Anon. 1768 [*Speculum Regale*]: 178; Torfaeus 1706: 8; Leem 1767: 215, not. 66, n. 2.

Hauskar-Gubbo: Leem 1767 *l.c.*, n. 1; Hammer 1775: 4, n. 13.

Havkat, Sælkonge: Leem 1767 *l.c.*, n. 2; Hammer *l.c.*, n. 14.

The Rough Seal: Pennant 1771: 341; *Ibid.* 1781, II: 524.

Der rauhe Seehund: Schreber 1775-1778, III: 312, Tab. 86; Ph. Müller 1776: 26.

Hringanor: Mohr 1786:5; Olavius 1780: 346 (a pup).

Grå-Sjæl: Linnaeus 1761: 2 (with *Phoca vitulina*); Cneiff 1757: 177 (German transl.: 171).

Grå-Wikare-Skæl: Ödman 1784: 83 (German transl.: 82).

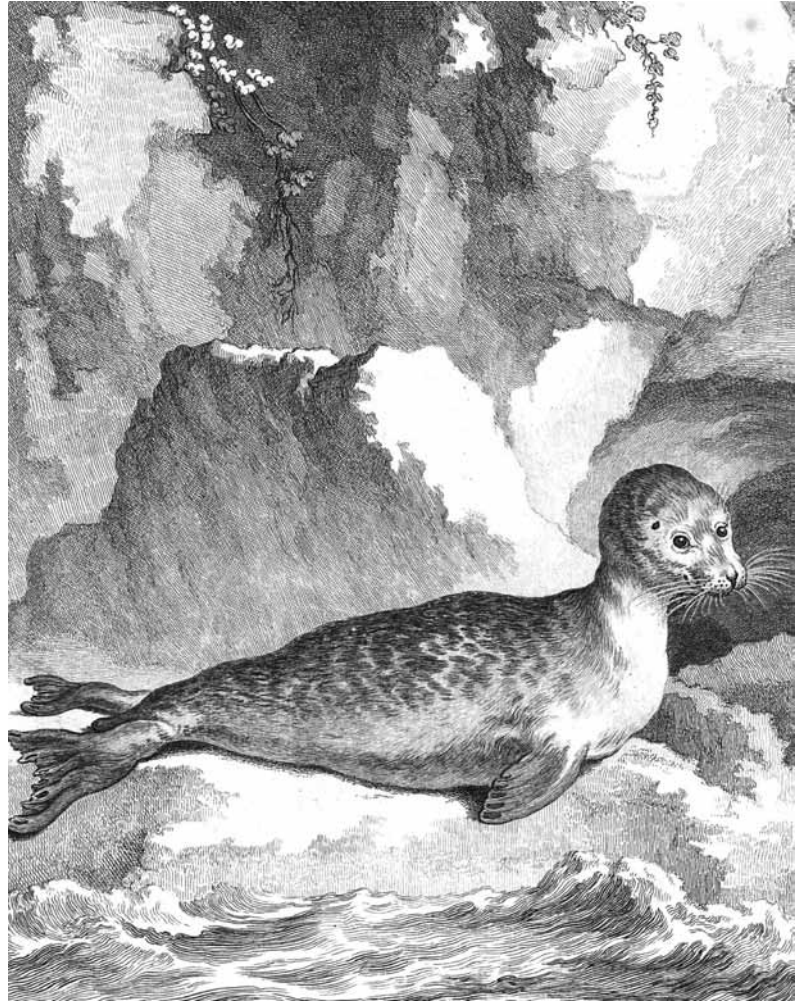
Der graue Seehund: Schreber 1775-1778: 309; Borowski 1780: 9; Erxleben 1777: 587 *α*.

Utselur, Vetrarselur ?: Olafsen 1772: 219, 488, 529, 750.

Udsæl ?: Olavius 1780: 515.

Øesæl ?: Horrebow 1753 (German edit.): 269.

Fig. 31. This melancholy looking 'phoque de notre ocean' was for many years considered the best illustration of *Phoca vitulina* and repeatedly copied by later authors (Buffon & Daubenton 1765: Tab. 45).



Third species, The Spotted [Common or Harbour] Seal (*Phoca vitulina*)

Names

I have good grounds for considering this species the same as the common seal that Linnaeus (1761: 2, Sp. 4) had in mind with his *Phoca vitulina*, both because his description agrees best with this one, and because the several specimens of the common seal that I have seen in Denmark and Norway, dead or alive, were found to be the same species as the Greenland **spraglet sæl** [spotted seal]. The stuffed specimen to be found in the collection of the University of Copenhagen under the name of *Phoca vitulina* belongs here, too. Similarly, the descriptions and illustrations of the common seal in Buffon & Daubenton (1770: 184, 217, Pl. 45), Schreber (1775-1778: 303, Pl. 84) and others, resemble the Greenland species completely. By this I do not mean

that all seals occurring in Danish and Norwegian waters called by this name necessarily constitute just one species; a closer examination at the localities where they are commonly encountered and caught will no doubt reveal something else.

Although one might doubt whether the *Vitulus marinus* of the ancient writers was this northern species, and the name *vitulina* in my opinion should rather be changed to *canina*, since it is more like a swimming dog than a calf when seen in the water, all the same, acknowledging that this name has been attributed to it and is generally used for the best known seal species, I have both in my *Fauna Groenlandica* (Fabricius 1780: 9, Spec. 6) and in this place kept this name in order not to create confusion. The Danish name **spraglet sæl** was already used by Superintendent Egede (1741: 46, with fig.), and the name does suit its speckled skin, and is generally used

in the Greenland colonies, where a distinction is made between the **smaa-spraglede** (small-spotted) and the **stor-spraglede** (large-spotted), that is the young and old seals, respectively. No doubt it is also identical to the **Kobbe** of the Norwegians (Pontopidan 1752: 203; Strøm 1762: 153), the **Landselur** of the Icelanders (Olafsen 1772: 529, Pl. 32), the **Steenkobbe** of the Faroese (Debes 1673: 151), the **Nuor-rofth** of the Lapps (Leem 1767: 213), and the **Vikare-Själ** of the Swedes (Linnaeus 1761: 2). As for the other *synonyma* used previously for this species with more or less justification, or about which one might have some doubts or comments, I will defer my comments until the conclusion.

The Greenlanders call it *Kassigiak* [*qasigiaq*], and this is its specific name, which according to the etymology of the language could mean ‘one that is usual on top’ (because it is frequently seen lying on rocks or ice or swimming on the surface). The name does vary, however, according to the age of the seal: the youngest ones are called *Kassigiarak* [*qasigiaaraq*], i.e. ‘*Kassigiak* pup’, and later in the same summer *Kassigieitsiak* [*qasigiatsiaq*]⁶¹, i.e. ‘middle-sized *Kassigiak*’; in the second year *Kassiginak* [*qasigiinnaq*], i.e. ‘a rather poor *Kassigiak*’ (because its skin is poor); in the third year it is called *Kassigiarsoak* [*qasigiarsuaq*], ‘the large *Kassigiak*’, and neither this name nor the size changes later, since it appears to reach full size within three years. At some localities in the country various other designations may be used – *Ermik*, *Ermitsiak*, *Akuteleak* and *Akunnektok* – although these are less frequently used and I have rarely heard them.

Appearance and morphology

As regards this commonly known seal species I could have written briefly, almost only needing to refer to the descriptions by others, had it not been for the fact that some people might like a more detailed account of the specimens that occur along the Greenland coasts, in order to compare them with those occurring in Denmark and Norway. It differs primarily from the two preceding species in having a depression at the back of its head that makes it appear somewhat hollow-necked, with a clear separation of head and neck. Its body is also more cylindrical, and the hairs do not

bristle as much as in the ringed seal, but more than in the harp seal, and are softer than those of both these species. There are, in addition, other distinguishing characters, as will appear from the following.

In colour, the oldest ones are speckled black and white all over, the black parts having a bluish tinge in which a large number of white spots are strewn, making them almost tiger-striped; but the ventral surface is lighter. The one-year-olds are paler(?) so that the white spots are less conspicuous, but in the first year they have a beautiful black colour that covers most of the back, speckled with small white spots, and a completely white underbelly.

When this species is full-grown it is larger than the fiord seal, but generally it is not as large as the harp seal; the difference is not great, however, for in one of the largest ones measured by me the proportions were as follows:

Total length	4 ft.10 in. ⁶² [152 cm]
Maximum girth	3 ft. 3 in. [102 cm]
Head length	7 in. [18 cm]
girth	16 in. [42 cm]
Snout length	3 in. [8 cm]
width at the end	2½ in. [7.5 cm]
Whiskers, the longest almost	4¼ in. [11 cm]
Neck length	6 in. [15.5 cm]
girth in front of the flippers	21 in. [55 cm]
Body length from fore flippers to hind flippers	2 ft. 9 in. [86 cm]
Body width between fore flippers	9 in. [23.5 cm]
Fore flipper length	8 in. [21 cm]
width at root	3 in. [8 cm]
after outer slope	5 in. [13 cm]
Hind flipper length	12 in. [31 cm]
width at body	2 in. [5 cm]
between the two outermost toes	14 in. [56.5 cm]
Tail length	5 in. [13 cm]
width at root	1⅔ in. [4 cm]

The head is flattened at the top but ball-shaped at the sides and not as long as in the harp seal, but larger than in the fiord seal, the snout being more proportionate to the head. On this there are many whiskers, which are flattened and undulating on two narrow

61. In Fabricius 1780: 9 it is erroneously spelled *Kassigiectsiak*.
 62. [In Fabricius’ time a Danish foot was 31.4 cm, an inch 2.6 cm].

sides, the outermost and longest ones being whitish, while the innermost and smaller ones are black. In other respects, the head with its tongue, eyes, ears and nostrils are as in the harp seal.

There are 34 teeth: 1) ten front teeth consisting of a) six in the upper jaw, the middle four of which are smaller, conical, sharp and slightly inward-curving while the outermost two are longer, outward-curving and somewhat separated from the others; b) four in the lower jaw, in pairs on each side, separated in the middle by a small gum; otherwise almost as the four middle ones in the upper jaw, but shorter and thicker, especially the two middle ones; 2) four long, curved, pointed canine teeth, one on each side of the upper and lower jaw; 3) 20 molars, five on each side of the upper and lower jaw, those in the upper jaw low and cloven into two sharp tips and with small additions at the base; those in the lower jaw broader and tricuspid, otherwise as the upper ones.

The neck is only of medium length, but rather slim, thus appearing longer than it in fact is, particularly in lean specimens,⁶³ and increasing in thickness to the fore flippers. At the back of the head, at the start of the first vertebra, it is bent somewhat downward by a low-lying depression which makes the head higher than the neck.

The body is oblong, round, almost uniformly thick between the fore and hind flippers, and thus almost cylindrical; at the shoulders, however, the back is higher, decreasing gradually in height towards the hind flippers; the underbelly is flatter.

The fore flippers are almost egg-shaped, have five toes and five black, long, grooved-hollow claws on the top of the skin, which is indented at the edge to follow the claws. The hind flippers are flat but bend inward in the lower parts; they have round ankles and between the toes there is a large web that takes up much space when distended. Otherwise the flippers and the tail are formed as in the harp seal.

The skin is not particularly thick, yet it is heavy to wear as clothing. It is covered all over by closely packed hairs, which do not lie as smoothly against the body as in the harp seal; nor do they bristle as much as

in the fiord seal; they are soft, fine and beautifully glistening, of medium length, and have little wool at the base. During the second year (when the seal is called *Kassiginak [qasigiinnaq]*), the hairs are shorter, thinner and somewhat greasy;⁶⁴ the hairs are then also looser, and the skins are poorer-looking and therefore little appreciated. The skins of the young, however, are very soft and warm for clothing as well as very beautiful and durable.

The spotted seal has excellent blubber; when the seal is full-grown the blubber is not much inferior to that of the harp seal in quantity; but it certainly is in quality because, being compact and dense, it is also more difficult to melt and leaves more greaves. To the Greenlanders, however, it is in some respects better than other kinds.

Its internal organs are not much different from those of the harp seal.

Occurrence

It occurs in Greenland throughout the year without migrating away; it is also found on the seashores in all parts of the country, in greater numbers at some localities, which have been named accordingly [e.g. *Qasigiannugit*]. One can find it in the fiords as well as along the shores of the open sea, but the preferred localities are those where people rarely come because it is extremely shy. It preferably goes deep into the fiords and remote bays or to offshore islands to be safe; guided by its excellent sense of smell, it escapes from previously used localities when the Greenlanders are settling there for the winter, so great is its unwillingness to be near such places. In the winter when the fiords are ice-covered it is rarely seen on the seashore, but when the ice breaks up in spring it appears there.

This seal species is not only found in the water and on ice but also climbs up on land, particularly on offshore islands, skerries and rocky beaches, where it lies sleeping or basking in the sun. In the solid ice it has large holes through which it climbs to lie on the ice like the fiord seal.

In water it is a powerful swimmer and more cautious than any other species, so it is very rarely seen

63. In the description of the harp seal in the First Part (p. 57; Fabricius 1790: 91) a printing error occurred, where it was attributed a shorter neck than the common seal. This should have said "a thicker neck", and is hereby corrected.

64. The specimen described by Daubenton (Buffon & Daubenton 1770: 218), must thus have been of this age, according to what is recorded about the greasiness and colour of the hairs.

lying inattentive or playing in the water, but is always seen swimming with its head above the surface, moving it to and fro and looking around, very much like a swimming dog. When it submerges again it jumps forward, exposing its back. Most often one finds it swimming by itself, since these seals rarely form flocks in the water, whereas they often lie several together on ice or land. Generally, one might think they are less likely to quarrel than other species, because their skins, as far as I have seen, are little scratched,⁶⁵ but one can sometimes see a couple fighting in the water. They always flee from humans, and rarely attack them even when wounded.

Breeding

As regards its breeding, it is believed that it mates in September, and it is certain that, in Greenland,⁶⁶ it gives birth in the month of June. It bears just one pup, which is born on land, on the beach. It would seem that the pup has already lost its white wool before birth, since it is usually found with a black coat; at all events it must lose it very quickly. The mother does not leave her pup willingly, but stays in the vicinity to protect it, and if the pup is pursued the mother tries to coax it into water by swimming to and fro in front of it; and if the pup has been caught, the mother will afterwards return to the beach to look for it, acting in this instance with great daring, although not attacking. The pup, aware of the solicitude of its mother, will call out to her with a feeble cry (almost like that of a cat) when it senses danger, but this very cry often gives it away to the pursuer.

Feeding

Its food consists of all kinds of medium-sized and small fishes and sea-insects, in which it does not differ much from the harp and ringed seals, although it is particularly desirous of the kind of trout that I have described in my *Fauna Groenlandica* under the name of *Salmo Carpio* [*Salvelinus alpinus*, char] (Fabricius 1780: 170, Spec. 124), which it pursues as far as the mouths of the rivers; it often ventures into small inlets where, as a result of the disappearance of the water at

ebb tide, it risks being easily caught. It is also often seen at the surface with small redfish (*Perca Norvegica* [*Sebastes maritimus*]) in its mouth, and prawns (*Cancer Squilla* [*Pandalus borealis*]) are frequently found in its stomach.

Predators

It probably has the same enemies as the harp seal and the fiord seal, but because of its circumspection it is rather good at avoiding the killer whale (*Physeter Microps* [*Orcinus orca*]) and the Greenland shark (*Squalus Carcharias* [*Somniosus microcephalus*]); and when it sees the danger approaching it escapes on to land where none of these enemies can follow it. The eagle (*Vultur* [*Haliaëtus*] *albicilla*) can only take the smallest ones, and it can hardly even take these, apart from the newborn. Thus its most serious enemy is the polar bear (*Ursus maritimus*), which takes it by surprise when it is lying asleep on land or ice.

Hunting methods

The spotted seal is caught as follows:

1. Chiefly with the bladder dart, in the same manner as described for the harp seal (see p. 71; Fabricius 1790: 128-131); because, since it is very timid, it has to be shot from a distance; and especially in battues with several hunters taking part.
2. Less commonly with the harpoon (see p. 68-70; Fabricius 1790: 122-128), because, being so cautious, it is not easy to approach except with the kind used on firm ice, described in connection with the fiord seal (see p. 84; Fabricius 1791: 89).
3. It is also shot with guns when it has crawled up on shore or on ice, or while it is swimming along the shore to find a convenient place to land.
Most of them are killed when they are either pregnant and unable to tolerate a long chase, or when they are small and newborn, at which time the Greenlanders waylay them before they are able to take care of themselves.

65. My experience is thus not in agreement with what is stated in Glahn (1771: 151): 'that the skins of the big ones are said to be full of scratches, which they get in fights, to which the species is said to be greatly inclined'.

66. I put it this way because, according to reports, in other countries it does not whelp at this time.

Utilization

This seal is used for the following purposes:

1. Its meat, which to the Greenlanders is a titbit and is usually eaten boiled, since they can scarcely wait long enough for it to be dried, except in localities where it is caught in abundance; in fact they prefer this meat to that of any other seal, and it must be admitted that it is the best, and looks so good that a European will not hesitate long before eating it. I myself once tried the tongue, heart, liver and kidneys, all of which were quite edible, so that if hunger or the need for a change of diet should force us to turn to seal meat, this kind should be given preference, in which case one could not be said to suffer much hardship if one had bread to eat with it.

2. The viscera are also used like those of the harp seal.

3. The blubber is used for burning in the lamps, but most of it is eaten, since the Greenlanders consider it very tasty. It is also traded at the trading post, where the blubber of the largest animals is almost of the same value as that of the harp seal.

4. The skin (apart from the fact that it is often eaten together with the blubber) is almost solely prepared in two ways:

a. For hair skins (see p. 74-75; Fabricius 1790: 141-145), of which some few are traded in at the trading post and afterwards made up as trunk covers and tobacco pouches; sometimes the skins of the youngest are used for vests and the oldest for horse-cloths, as they are handsomely tiger-striped. The colonists in Greenland also make most use of the young skins for clothing, as these are the finest of all sealskins and good against the cold of Greenland. However, the Greenlanders usually keep the most, the best and the most handsome skins for themselves, using the adult skins for inner tent-sheets, the medium-sized and short-haired ones for boots with the hair on the outside, whereas both men and women use the youngest and finest for their best coats, and trousers with the hair on the outside, which makes them look good.

b. When peeled off whole, the skin of the young ones is also made into floats (see p. 77-78; Fabricius 1790: 153-154); it is considered very good for this purpose and takes on a fine white colour.

Its skin can of course be prepared in all the other ways, but it is usually considered too good for that, for it would be a pity not to preserve the beautiful hair.

Parasites

In this species I have not yet found any worms, from which I deduce that it is less burdened with them than the other species.

Synonyms

As regards the *Synonymie* of this seal species, much confusion prevails because Linnaeus and others have been liable to assign all seals with a smooth head, no hood and noticeable earlobes to this species, as I have previously mentioned (see p. 54; Fabricius 1790: 84). Furthermore, in many passages of these authors one is left very uncertain about which species they are referring to in describing a seal, when they only touch slightly on the matter without giving precise characteristics; that they are encountered lying on ice or at skerries, quarrel and roar, swim singly or in flocks, etc. are descriptions that apply to several species.

I believe, however, that with good reason one can consider the Mediterranean *Phoca* or *Vitulus marinus* of the ancient naturalists a separate species, distinct from the common or spotted seal of the northern waters, since there are other species to which the former can more properly be assigned: Buffon & Daubenton (1770: 183, 187, 228, Pl. 83) consider it to be their 'small seal' (**Der kleine Phoke**), to which, however, I will object that their small seal was not found in the Mediterranean but in India (l.c.: 188), and had noticeable earlobes, whereas Aristotle says of the seal known to him that it had no external ears (earlobes), only ear ducts or holes – indeed Buffon (l.c.) himself refers to this. On the other hand, I am more inclined to agree with Professor Hermann (1779: 456, Pl. 12-13; Linnaeus/Gmelin 1788: 64) that it is identical to his **monk seal (Der Mönchs-Robbe)** (*Phoca [Monachus] Monachus*), which was indeed from the Mediterranean, and the description of which agrees very well with what was reported by Aristotle, Pliny, and several other ancient writers about their seal.

Molina (1786: 244) has also informed us of a kind of seal occurring frequently in the seas of Chile, which he calls **Urgine** or *Phoca lupina*, said to be the **little sea-wolf (loup marin petit)** of the French and Spaniards; he distinguishes this from the common

seal, and if his description is reliable (which there is reason to believe, since everything is given in great detail), then the reported characteristics are indeed distinguishing features: particularly that it only has four toes in the fore flippers, in which it differs from all the species known to me; it is now my opinion that all seals reported under the name of **sea-wolf** or **sea-calf** (**loup marin, veau marin**) by various authors as occurring in South American regions should more properly be referred to his *Phoca lupina* than to *Phoca vitulina*, although they have previously been attributed to the latter as *synonyma*.

The **Grå Sæl**, previously also considered simply a variety of the common seal, I have discussed above under the fiord seal (see p. 86; Fabricius 1791: 95). The **Siberian Seal** (**Der sibirische Seehund**, Schreber 1775-1778: 310), which is completely white and is still supposed to be a variety of the common seal, should most likely be viewed as a distinct species, and is no doubt the one described by Lepechin (1778: 264, Pl. 8-9) under the name of *Phoca Leporina*. When we exclude these species in this way, we obtain a considerable reduction in the *synonyma* of the spotted seal. Whether the **Caspian seal** (**Der Caspische Seehund**, Schreber 1775-1778: 310), usually also referred to this species, is indeed to be regarded as only a variety is not easy to determine, because it has been described in such a number of colours that one is inclined to believe that more than one species occurs in the Caspian Sea; in any case this has not yet been sufficiently studied.

No doubt this species must be among those listed in the *Speculum Regale* (Anon. 1768: 176-178) since it is so common and must have been better known to the author than any other species, but as regards the size I find that none of those mentioned fits,⁶⁷ and besides this we have too little basis to make a judgement, so it might be better to leave the question open. Judging from the colour, the **Morunge** of the Swedes (Ödman 1784: 84) is nothing else than a pup of this species, however much Mr. Ödman tries to make it a separate species. This will have to await closer examination by Swedish naturalists.

The **Latrselr** of Torfaeus (1706: 88) appears to

belong here, too, since everything he writes about it applies fairly well to the common or spotted seal, but in that case it becomes difficult to unite all the kinds of seals mentioned under this name by the old and new Icelanders and the Faroese. Mohr (1786: 5) lists **Latra-Sele** under *Phoca foetida* and suggests that it is identical to the **Laatu-Keupur** of the Faroese, but I find nothing that could induce me to agree with him in any of these conclusions. Debes (1673: 151) considers the **Later-Kobbe** a separate species distinct from the **Steen-Kobbe** 'in being as large as a cow and lying on rocks and skerries below high promontories where no one can approach them in boats, and when they give birth in September they take refuge in large hollows beneath the mountain, which the inhabitants call **Later** from the old Faroese word *lateris*, i.e. mating, because they believe that the seals mate in there'. If the information about the size and breeding period that Debes has for this seal is reliable, this demonstrates precisely that it can neither be *Phoca foetida* (*hispidus*) nor *vitulina*, but rather the one called **Utselr** (**Udsæl**) by the Icelanders, about which I have expressed my opinion in the section on the fiord seal [ringed seal].

Neither in Olafsen (1772) nor in Olavius (1780) can I find the **Later-seal** mentioned as a separate species: only in one passage of the former work is there a reference to **Laatur** as a habitation of a seal, when he reports that 'an old method used for catching the seal was the construction of landings to lure the animal into climbing up and giving birth to their young, these **Laater** being constructed such that the catch could be completed at one's discretion' (Olafsen 1772: 59), and this agrees to a reasonable extent with the conception of the same word by the Faroese; but such artificial landings or seal habitations could be used to catch the **land-seal** as well as any other species, and since in this passage Olafsen is actually dealing with the land-seal, it is possible that Torfaeus (1706), with his **Latr-seal** is only referring to the kind of seal that is usually caught on Laaters.

In general, the most laborious part of the description of a natural phenomenon is to determine its *synonyma* exactly when one encounters authors who have

67. Bishop Gunnerus states in his comments on Leem 1767: 213, No. 62, that the **Havselr** of the *Speculum Regale* corresponds to the **Steenkobbe**, but I do not find this name in *Spec. Reg.*, while in Torfaeus 1706: 87, it is considered to be another species (the harp seal).

almost nothing to report apart from the name, or at most such characters as could apply to several species of the same genus. As far as I can judge from the above, the *synonyma* of the spotted seal are as follows:

- Phoca vitulina*: Linnaeus 1766: 56; Linnaeus 1761: 2; O.F. Müller 1776: 1; Erxleben 1777: 83; Fabricius 1780: 9; Borowski 1780: 7; Mohr 1786: 2; Linnaeus/Gmelin 1788: 63; Lepechin 1778: 259.
- Phoca maris Oceani*: Rondeletti 1554: 458 (*Poissons*, p. 343), c. fig.; Gesner 1604: 705, c. fig.; Aldrovandi 1638: 723, c. fig. (all these illustrations are poor).
- Vitulus marinus*: Olaus Magnus 1555: 701.
- Phoca s. vitulus marinus*: Ray 1693: 189; Sibbald 1684: 10; Rzaczynsky 1736: 244; Brisson 1762: 162.
- Phoca*: Worm 1655: 289; Charleton 1677: 48; Grew 1686: 94.
- Phoca maris*: *Ephem. Naturae curios. Decur.* I. Ann., 9. Obs, 98. Dec., III. Ann., 7. App., p. 15 (anatomical descript.). ? *
- Phoca vulgaris*: Jonstoni 1649: 221 (1657: 150), Pl. 44 (poor illustration).
- Phoca communis*: Linnaeus 1754: 5.
- Phoca pedibus anticis digitatis, unguicularis, posterioribus latis, unguibus teretibus*: Gronovius 1763: 7, n. 28.
- Phoca mediae magnitudinis*: Steller 1751: 290.
- Phoca s. Robbe*: Klein 1760: 279.
- Spraglet Sæl**: Egede 1741: 46 with a small (poor) illustration.
- Sælhund**: Pontoppidan 1763, (I): 639, 643.
- Den almindelige Sælhund**: Aphelen 1770: 14.
- Kobbe**: Pontoppidan 1752: 203 with fig. (poor); Strøm 1762: 153; Hammer 1775: 3.
- Steenkobbe**: Debes 1673: 151; Hammer 1775: 4
- Landselur, Vørselur**: Olafsen 1772: 58, 219, 354, 488, 529, 980, Pl. XXXII (fairly good illustration of both the old and the young, but the toes and claws are too big, separated and equally long, and at the fore flippers only four toes can be seen and no web, which is unnatural).
- Landsæl**: Horrebow 1753: 269; Olavius 1780: 79, 85, 175, 227, 273, 345, 408, 512.
- Latrselr**: Torfaeus 1706: 88.
- Nuorrofh**: Leem 1767: 213.
- Kassigiak**: Cranz 1765: 163, 169; Glahn 1771: 150, 152; Stauning 1775: 142.
- Skæl, Skjæl, Sjæl**: Linnaeus 1745: 184, 198, 270, 299; Linnaeus 1747: 191; Kalm 1746: 85.
- Wikare-Sjæl**: Linnaeus 1761: 2; Cneiff 1757 (German transl.): 171 etc.
- Svarte-Wikare-Sjæl**: Ödman 1784: 84 (German transl.: 82).
- Morunge**: *ibid.*: 84 (German transl.: 83) a young.
- Phoque de nôtre Ocean**: Buffon & Daubenton 1765: 333, 339, Pl. 45 (best illustration).
- Der Phoke unsers Weltmeers**: Buffon & Daubenton 1770: 184, 217, Pl. XLV (best illustration).
- Der Seekalb, Robbe**: Halle(n) 1757: 579.
- Seehund**: Müll. *Saml. (russischer Geschichte, Petrop.* 1732 ?) III: 559; Knorr 1766: Pl. H. 8.
- Der Robbe oder Seehund**: P. Müller 1773: 198.
- Die andere Sort Seehund**: Steller 1774: 107.
- Meerkalb**: Adelung 1768: Pl. XIX (poor illustration).
- Der gemeine Seehund**: Leske 1784: 167 (1779: 132 ?); Pauli 1777: 561; Schreber 1775-78: 303, Pl. 84 (Buffon's illustration).
- Rob of Zee-Hond**: Houttoyn 1761-1773, II: 14, Pl. II(6).
- The Seal**: Pennant 1768: 71.
- The common Seal**: Parsons 1753: 120, Pl. 6. (poor illustration); Pennant 1771: 339; Pennant 1781: 518.
- The Sea-Calf**: Hill 1752: 554, Pl. 27 (poor illustration).
- The Soyle**: Borlase 1758: 284.
- Vitello marino grande**: Alessandri & Scatagli 1775, 4: Pl. 171 (Buffon's illustration).
- ? Der Caspische Seehund**: Schreber 1775-78: 310; Erxleben 1777: 588
- ? Phoca caspica**: Linnaeus/Gmelin 1788: 64.

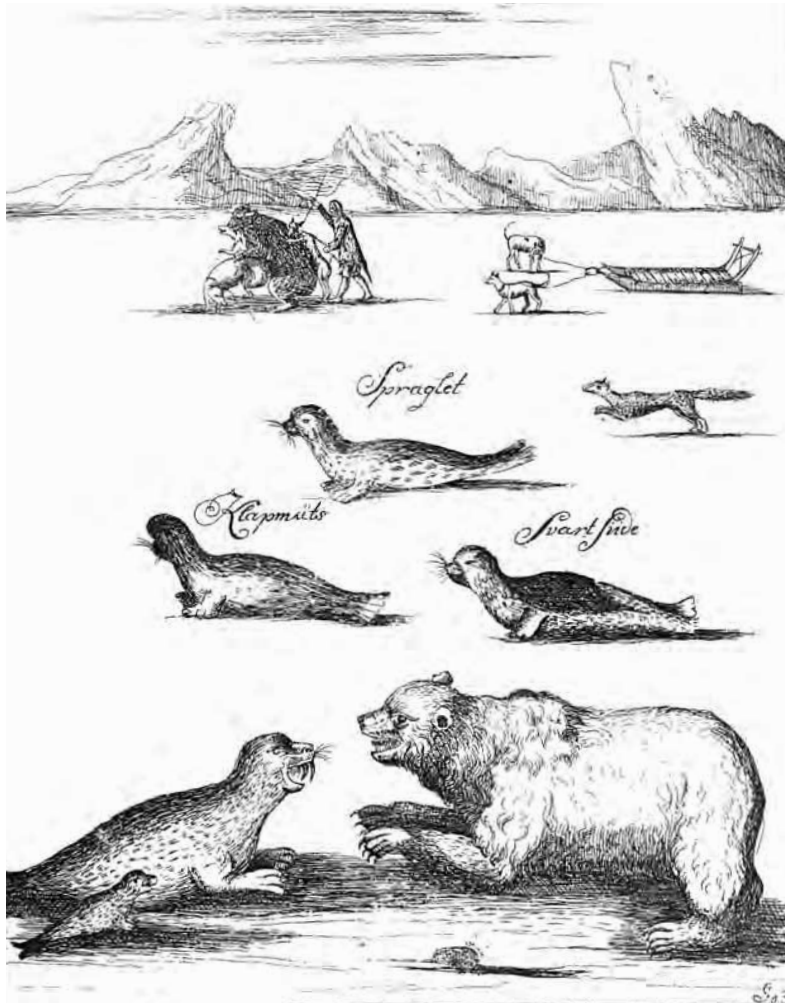


Fig. 32. Three kinds of seal were named ('caricatured' Allen 1880) in the centre of this plate: Spraglet (*Phoca vitulina*), Klapmüts (*cristata*) and Svartsiide (*groenlandica*); the creature facing the polar bear below is more difficult to identify. In the background a polar bear hunt using dogs is illustrated (Egede 1741: 46).

Fourth species. The Hooded Seal [or Bladder-nose] (*Phoca [Cystophora] cristata*)

Names

This seal species is the Sea Lion of Anson (1748: 100, Pl. 100; 1749: 115, Pl. 13) and the *Phoca Leonina* of Linnaeus (1766: 55), who has in fact observed the correct synonymy in his *Systema*. Under the same name I have described it in my *Fauna Groenlandica* (Fabricius 1780: 7-9, Spec. 5) and I would have let it keep the name if some authors had not later called another seal species sea lion, namely *Phoca jubata* (Erxleben 1777: 582; Linnaeus/Gmelin 1788: 63), separating these two species only by calling the former the **smooth-haired sea lion (der glatte Seelöwe)**, the latter the **long-haired sea lion (der zottige Seelöwe)** (Schreber 1775-1778: 297-298); but since the latter,

because of the long curly hairs on its neck, more resembles the terrestrial lion and therefore more merits the name of lion, as also correctly judged by Molina (1786: 250), who therefore used *Phoca Leonina* for this species only, calling the other *Phoca Elephantina* (l.c.: 248 & 250) – which however to me appears slightly improper, since it has no trunk like the elephant, only a hollow inflatable crest or bladder at the front of the head – and since the hooded seal is always given the specific name *Phoca capite antice cristato* by *Systematici*, it is my opinion that it should be distinguished from all other species by the trivial name *Phoca cristata*.

For a time I did believe that *Phoca Leonina* and *Phoca jubata Auctorum* were one species, the former being the male, the latter the female, particularly as Steller (1751: 360) appeared to have confused them, because the sea lion he describes is indeed the species later called *Phoca jubata*. And yet he considers it iden-

tical to the **sea lion** of Dampier (1717: 118), which is no doubt the marine animal so called by Anson, because the sea lions referred to by both authors were found on the same island, as Schreber (1775-1778: 298) correctly states; but Steller (1751: 360-361), in the description of his sea lion, is not only absolutely silent about the bladder at the front, which he had to notice if he was facing the hooded seal, but also assigns it long curly hairs in its neck and short upright earlobes, which the hooded seal does not have. Since several later authors have also reported the same characteristics for it and, like Steller, speak of both sexes and even present an illustration of it (Pernety 1770: 47, Pl.10; Molina 1786: 250), which in many respects differs from that of the hooded seal, I can no longer question that *Phoca jubata* is indeed a separate species, which may most conveniently keep the name *Phoca Leonina*, while the name *Phoca cristata* should be used for the hooded seal.

Pennant (1771: 342 & 348) must have believed that **Anson's sea lion** was distinct from the hooded seal in northern waters, since he has listed them as two separate species, one called **Hooded Seal** (Pennant's #268) the other **Leonine Seal** (#272). Schreber (1775-1778: 297 & 312) likewise has the former under the name **glatte Seelöwe** and the latter under the name **Klapmütze**. Erxleben (1777: 581 & 590) and Linnaeus/Gmelin (1788: 63-64) have followed him with their *Ph. Leonina* and *cristata*, with some differences: Erxleben expressed doubts about whether the latter is distinct from the former,⁶⁸ while Gmelin simply accepts this with no doubts. They are, however, indeed a single species, since everything reported by Anson on his **Sea lion** applies fairly well to the **Klapmyds** of Greenland. The *systematici* have in fact revealed their difficulties in finding characteristics that discriminate properly between the two, since they have used the colour, calling the former *Phoca capite antice cristato, colore fusco*, the latter *Phoca capite antice cristato, colore griseo*, but who cannot see how unreliable this characterization is? And I believe that my description below will serve as better proof than those of others that the two are a single species.

The Danish name **Klapmyds**, given to it by the colonists and the Danish sailors, and already attributed to it by Superintendent Egede (1741: 46), is after all nothing but the German name **Klapmütze** (hanging-cap), which was probably first given to it by the German or Dutch whalers because its front bladder resembles a cap hanging down in front of its eyes. There is no doubt either that it is identical to the Icelanders' **Blaudru-Selur** (Bladder-seal) (Torfaeus 1706: 88; Olafsen 1772: 532) and the **Oaaido** of the Lapps (Leem 1767: 214).

The Greenlanders call it *Neitsersoak [natser-suaq]*⁶⁹ i.e. 'the large *Neitsek [natseq]*', because in some respects, particularly the hairs and the colour, it resembles the seal called *Neitsek [natseq]*, i.e. the fiord seal, although it is very dissimilar to it in many other respects. During the first year it is called *Neitsersoarak [natsersuaaraq]*, i.e. 'the young of a hooded seal', and during the second year *Kakortak [qaqortaq]*, i.e. 'one that has become white'. An old male is called *Nesauralik [nasaasaalik]*, i.e. 'one with a woman's hood', because its frontal bladder resembles the large hood of the women's coats that can be pulled over the head. The Greenlanders and foreigners have thus formed similar ideas of this frontal bladder.

Appearance and morphology

The colour of the oldest hooded seals is coal-black on the head, flippers and tail; the remainder of the body is black or dark brown with whitish-grey spots, the back being darkest. For the first year the pup has a completely white underbelly, but is bluish-grey along the back. In the second year it is even whiter, but the grey stripe along its back is darker and slightly brownish. Over the following years it gradually approaches the colour of the old ones.

In size it surpasses the previous species greatly and it must be considered one of the largest seal species, since there are hooded seals as big as an ox, eight feet in length or longer. The specimen I had before me for my description was not quite full-grown, and yet it measured as follows:

68. On *cristata*: "Num forte idem animal cum *Phoca leonina*?" [possibly the same animal as *Ph. leonina*?] (Erxleben 1777: 590).

69. This Greenlandic name (as well as the Icelandic *Blaudruselur*) is incorrectly mentioned by Erxleben (1777: 583) under his *Phoca jubata*, whereas it belongs to his *Ph. Leonina*; and later it appears again under his *Ph. cristata* (*ibid.*: 590).

THE SEALS OF GREENLAND

Total length	7½ ft. ⁷⁰ [235 cm]
Width between fore flippers	19½ in. [51 cm]
between the hind flippers	8 in. [21 cm]
Length of head	12½ in. [32.5 cm]
and the width almost the same	
Length of whiskers, the longest	
almost	5½ in. [14.5 cm]
Length of the neck	10 in. [26 cm]
and just as thick	
Length of body	4 ft. 4½ in. [137 cm]
Fore flipper length	13 in. [34 cm]
width at root	4 in. [10.5 cm]
and after the outermost slope	6 in. [15.5 cm]
Hind flipper length	15 in. [39 cm]
width at root	4 in. [10.5 cm]
and between the two outermost	
toes	18 in. [47 cm]
Tail length	6 in. [15.5 cm]
width at root	2½ in. [6.5 cm]

The head is extremely large, ball-shaped and almost as broad as it is long. The size is further increased in the male by the presence at the front of the forehead of a large hood, that is a thick hairy piece of skin which is hollow inside and hangs loose from the frontal bone so that it appear like a bulge that can be blown up into to a large bubble, becoming wrinkled along the middle but ball-shaped on the sides; this hood begins just below the eyes and reaches up to the nostrils, which are included in it. The female does not have this hood, however old she is, yet along the upper part of the forehead there is a low elevation as a trace of it; this can also be seen in the young males, but in these it becomes larger and larger with age and eventually hollow inside, so that it gradually attains the right shape. The function of the hood is not easy to determine;⁷¹ perhaps it has been given to the male in order to give him a more masculine and formidable look when fighting with others of the same sex or against other marine animals to defend himself, the females or

the young; or it may simply be a sexual characteristic and excretory organ for superfluous fluids, as found in several other male mammals or birds.

The mouth is large and the snout is broad. On the latter there are many long whiskers which are pale grey, flat-rounded and winding, starting shortly after the root and ending near the tip, which is blunt and completely flattened.⁷² The upper whiskers are longer, the lower ones shorter. The tongue is cleft at the tip.

The nostrils are large and wide, longish, rounded at the upper end but narrower at the lower end. All the young as well as the females have only two nostrils, but besides these true nostrils the old males have two additional false or round openings in their hoods, and these appear gradually so that one can find specimens with an opening on only one side of the hood, while the fourth on the opposite side is not yet completed.

The eyes are at the very top of the head and are large, with black pupils with dark brown circumferences. The eyebrows are closer to the top of the head than to the eye, giving the impression that they are absent; they are gathered in a small group and are rather long and strong like the whiskers. The seal is usually rheumy-eyed. The ears have no lobes.

There are 32 teeth, consisting of 1) four front teeth in the upper as well as the lower jaw, evenly spaced, the two median of which are small while the outer ones are long and large, all conical, pointed and curving inward; 2) four canine teeth, one on each side in upper and lower jaw, long, curved, powerful and pointed;⁷³ 3) 20 molars, five on each side in upper and lower jaw and evenly spaced, short and small, narrow at the root but broad at the top, where they are jagged with a sharp, upright edge. In all the specimens I have seen (and they are not few) I have never found more than four front teeth in the upper jaw; but in one specimen I found only two in the lower jaw, and in another six molars on one side of the lower jaw. In addition to the five molars in the upper jaws, a small point is found farthest in, like the trace of a tooth, thus consti-

70. [In Fabricius' time a Danish foot was 31.4 cm, an inch 2.6 cm].

71. Cranz 1765: 164 suggests that it serves as protection for the eyes against sharp rolling stones and sand in storms and surf (and Schreber 1775-1778: 313 quotes him for this), but he forgets to state that no such hood is found in the female, whose eyes should be just as important to Providence.

72. But I have not observed that they are *rubro annulatae*, as noted in Linnaeus (1766: 58).

73. The canine teeth are indeed large and long, but I have not observed that those in the lower jaw are *subexcerti*, as Linnaeus l.c. reports; still less that they protrude four inches [10.5 cm] from the jaw, as Molina (1782: 248) says, since they are less than an inch long [2.6 cm] and shorter than those in the upper jaw.

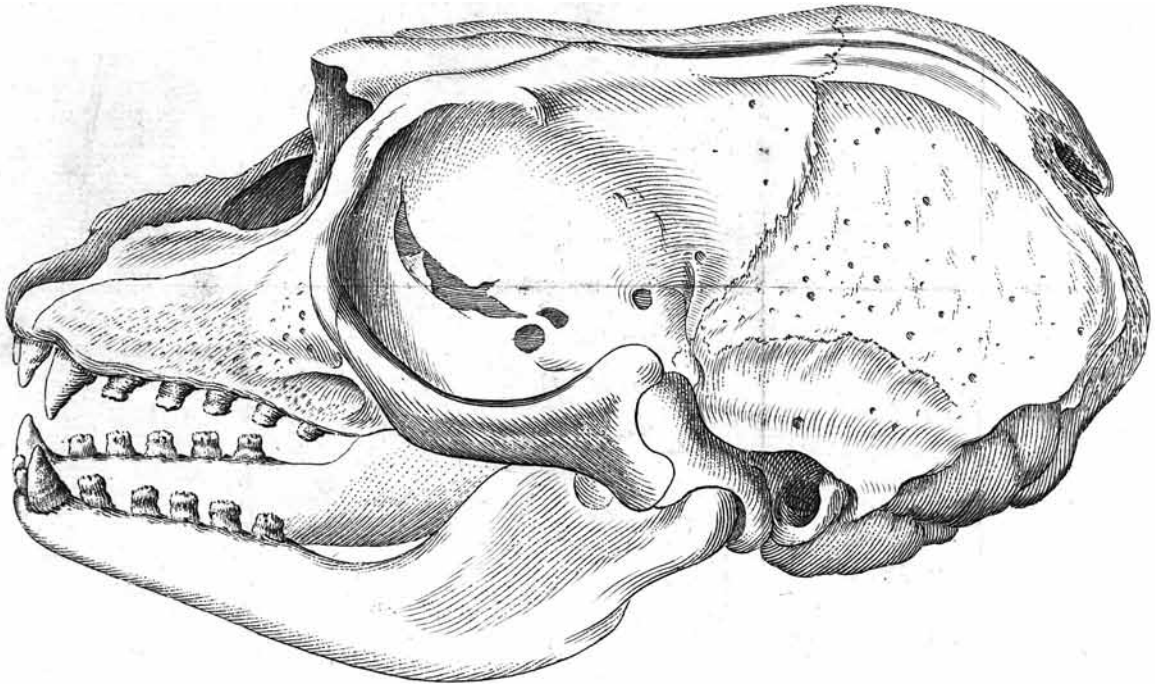


Fig. 33. The first illustration of a hooded seal cranium (Fabricius 1791: Tab. 12, Fig. 2).

tuting the sixth; but it is only seen in *crania* when the meat has been removed. In this species, however, one frequently finds fewer teeth than normally expected, and in a number of the old specimens they are so much worn that only stumps are left; particularly dilapidated are the front teeth; in some specimens I have seen only one left in the upper jaw. [Fig. 33; Fabricius 1791:Tab. XII, Fig. 2]

The neck is short, but thick like the neck of an ox, and as thick as it is long. The fore flippers are fairly long, sloping out sideways, with five toes with long, sharp, white claws, which are curved and hollow at the base. The front edge of these flippers is straight, while the rear is rounded such that the foremost toe is the longest and the others decrease in length gradually until the hindmost toe, which is the shortest.

The hind flippers are larger, longer and broader, pointing horizontally to the rear of the body, and likewise have five toes, the outermost two of which are the longest, the following two shorter, and the middle one the shortest, and the skin is adapted to this shape by indentations on the outer edge, which cover the toes completely so that even the claws are barely noticeable on the top of the skin. Right between the hind flippers the tongue-shaped tail is found.

The body is long, almost conical and very heavy,

so it is not far from resembling a middle-sized ox-trunk.

The skin is hairy all over, thick and strong. The hairs are long, densely packed, somewhat bristly, but feel soft, and at their base they have a large quantity of small, curly, woollen hairs that make these skins warmer than other clothing; but they are rather heavy, too.

It has an extremely thick layer of blubber, rather more than three inches [7.8 cm], but at the time when the female is giving birth she has less blubber. The quality of its blubber is like that of the harp seal (see p. 61; Fabricius 1790: 102), and it leaves little residue when melted, so the blubber of these two seal species can be mixed without problems.

The internal organs are not significantly different from those of the species previously described.

Occurrence

The hooded seal usually lives very far out at sea and presumably occurs all along the coasts of Greenland, but especially in the southern part of the country, where drift ice is found abundantly. In the months of April, May and June it comes closer to the shore, and at that time it is caught by the inhabitants, whereas at other times of the year it is rarely or never seen.

Behaviour

In the water its behaviour is almost the same as that of the harp seal (see p. 63-65; Fabricius 1790: 107-111), but it can stay submerged for a considerably longer period, and is more cautious when in the water; but it keeps mostly to the drift ice, apparently following it from the south in spring, because the more drift ice there is at that time of the year, the more hooded seals are found. However, if the drift ice arrives earlier than April and drifts past northwards before the end of that month, few hooded seals are found inshore that year. It climbs on to the drift ice in flocks to bask in the sun or sleep; it is then very foolhardy and not difficult to approach. These seals are very fierce, barking and howling like dogs among themselves, and also attacking the Greenlanders who approach them on the ice.

Breeding

The time of the year when the female becomes pregnant cannot be determined, because the seal is only found inshore for such a short period; but according to the tales of the Greenlanders it gives birth to a single pup on the drift ice at the end of April or the beginning of May, which agrees with my own experience that the females have milk in their teats in the month of May.

Feeding and predators

Its food is very much the same as that of the harp seal (see p. 67; Fabricius 1790: 119-120), although it appears particularly to prefer redfish, cod, Greenland halibut, and other such large fish species. Its enemies are also the same as those mentioned under the harp seal (see p. 67; Fabricius 1790: 120-122).

Hunting methods

The Greenlanders mostly hunt the hooded seal with the harpoon alone (see p. 68-70; Fabricius 1790: 122-128), but they also make use of the lance and all their other small throwing weapons, since the seal will break whatever comes within its reach. Only a few are caught in the water, the method then being the same as for the harp seal; but on the drift ice catching it calls for a particular procedure. If the seal sees the hunter too soon it will normally dash into the water and will then be difficult to approach; for that reason the hunter endeavours to take it unawares and hides among the ice floes, gradually paddling along the edge of the floe on which it is lying (and which is usu-

ally fairly large), until he reaches the spot where it is; he then places himself in his boat right opposite the seal and allows himself suddenly to be seen; this gives the seal such a shock that the tears run from its eyes and discharge from its nostrils; generally it will not move, but will watch its enemy with frightened eyes and patiently await its fate; by this time the hunter will be quite close to it and, given the size of its body, it is not easy for him to miss his mark with the harpoon, which he thrusts deep into its chest; while it is endeavouring to get rid of this, the hunter kills it completely with the other weapons. Should it retreat to the middle of the ice floe, the hunter climbs on to the floe and moves towards the seal with his darts; with rapid leaps it will then attack with its fore flippers and teeth, giving the Greenlanders plenty to do, and some may be hurt; but since the seal is slow to turn to the side but moves straight ahead, the Greenlanders dodge aside and in the impetus of its rush the seal passes them and is killed from behind. If the hunter cannot hide in the ice, but has to move straight ahead to the seal, he tries to scare it even more by propelling the boat forward, holding the paddle aloft and roaring in an attempt to imitate the killer whale; this scares the seal from diving into the water, and the hunter can get within range of it.

When out looking for this seal, whether in the water or on the ice, several hunters usually join forces to help kill it and drag it home; everything caught is then divided among them all when they get ashore, even if some have merely been lookers-on; but the man who first puts his harpoon into the seal is entitled to the best part of it. Therefore, when one of the party has harpooned one seal, the others are allowed to kill the next in turn, one or more, so that each may have equally large shares; and if the party includes an old man who is not much good at hunting, they let him strike the first so that he too may have something. Sometimes they spend whole days and nights on these hunts before returning home, and they will not be empty-handed.

Utilization

Of this seal the Greenlanders utilize the following parts:

1. The flesh, perhaps the blackest and poorest of all the species, since it is so compact and coarse-fibred; on the



Fig. 34. 'Veau marin marqué de noir' ('Blackside seal'; 'Seehund mit einer schwarzen Seite') and 'Veau marin coëffé' ('Seal with a cap'; 'Seehund mit einer Haube') from the Hudson Bay region (Ellis 1749: (2) 24).

other hand it goes a long way and for a time provides the Greenlanders with much food; a seal of this kind, when fully grown, is perhaps good for as much food as three of the ordinary kinds. Its flesh is prepared by boiling, drying or pickling as described for the harp seal (see p. 72; Fabricius 1790: 133-135).

2. The same is true of the internal organs (see p. 72-73; Fabricius 1790: 135-138), among which the stomach, if the need arises, is also used as a float for the harpoon, inasmuch as it is fairly large.

3. The blubber is used as fuel for the lamps and for eating; it is also sold to the trading post, and one gets more for the blubber of this seal than for that of a harp seal.

4. The skin is sometimes eaten together with the attached blubber as a titbit; otherwise it is prepared either for boat coverings (although only the largest are used for this), even if it is rarely very good, being so torn by their battles, or for use as hair skins (see p. 74-75; Fabricius 1790: 141-149), a few of which are sold to the trading post; the majority, however, are utilized at home: those of the fully grown seals as platform skins and inner tent-sheets, whereas those of the young, which are very fine, are used by the women for their very best coats with the hair on the outside. They are also made into trousers, and among the Greenlanders these skins are valued almost as highly as caribou skins and are very expensive.

5. Of the bones and sinews they make the same use as of those of the harp seal (see p. 73-74; Fabricius 1790: 138-139).

Documentation and synonyms

Of the hooded seal we do not yet have a good illustration, for the one given by Anson (1749: Pl. 13; Fig. 42) and copied by Schreber (1775-1778: Pl. 83 A), is only just passable but in many respects erroneous. In particular, the head and the flippers are unnatural, the fore flippers being too long, looking like normal feet and having flat nails like human toes; the hind flippers, moreover, are split into too many end lobes, and look as if they are united in one limb at full length from the lobes without any sign of a tail. The frontal hood also appears to me to be far too wrinkled, without any sign of elevation along the middle – in any case it does not look like that when it is blown up. In the mouth only two teeth can be seen protruding from the lower jaw, and none at all in the upper jaws, as if it had no more; perhaps this was what caused Linnaeus to write of *Dentibus 2 inferioris maxillae subexsertis*, something that Molina (as mentioned above) has taken even further, leading one to suppose that he too was influenced by Anson's illustration, because as far as I can see Anson does not mention this in the text. The posture of the animal, too, is far too crooked and unnatural. The illustration in Pernety (1770: Pl. 9, Fig. 1) is not much better, and appears as if it might have been drawn after that of Anson, which it greatly resembles, the only improvement being that he has given it more teeth in the mouth and curved claws on the fore flippers. The illustration in Ellis (Fig. 34; 1750: Pl. 7, Fig. 4) is poor, and that of Egede (Fig. 32; 1741: 46) is too small to permit us to discern any limbs, but otherwise fairly good.

I am in complete agreement with Bishop Gunnerus (1784: 25-27) in believing that the **Klakkedal** of the Norwegian fishermen and the **Havstrambe** of

the Old Norsemen (Anon. 1768 [*Speculum Regale*]: 166; Torfaeus 1706: 97) is nothing but the hooded seal, having been turned into a marvellous creature by superstition, as he has proved in so much detail that I have no objection and nothing to add. Of the **Raudkemingur** (Anon. 1768 [*Speculum Regale*]: 129; Torfaeus 1706: 94; Mohr 1786: 17) or **Rødkammen** (Olafsen 1772: 545) of the Icelanders, however, I hold a different opinion. Although this is considered the same seal species by Gunnerus (1784: 38), I think that there is better reason to assign it to the proper **sea lion** species (*Phoca jubata*), since it is characterized by a red mane at the neck, which agrees better with the long curly hairs at the neck of the sea lion, and although this species is not particularly common in northern waters, it is not unlikely that it can visit them occasionally, since Steller has after all has encountered it in Kamchatka; it is thus likely that the kind of seal that is said to occur occasionally on the islands along the east coast of Iceland, and is called **Rødhalse** by Council Secretary Olavius (1780: 515), is nothing but **Steller's sea lion**. If the acute Gunnerus had also been aware of the difference between Anson's and Steller's sea lion, I am sure that he too would have shared my opinion of **Rødkammen**; but it is obvious that he considered them just one species, in which case his judgement is not as unfounded.

The *Synonymie* of the hooded seal is then as follows:

Phoca Leonina: Linnaeus 1766: 55; O.F. Müller 1776: viii; Erxleben 1777: 581; Fabricius 1780: 7; Borowski 1780: 5; Mohr 1786: 2; Linnaeus/Gmelin 1788: 63.

Phoca cristata: Erxleben 1777: 590; Linnaeus/Gmelin 1788: 64.

Phoca Elephantina: Molina 1786: 248.

Klapmyds: Egede 1741: 46 with a small illustration; Hammer 1775: 4; Aphelen 1770: 15; Olavius 1780: 514.

Søeløve: Aphelen 1770: 493; Hammer *l.c.*: 4; Anon. 1760: XV, 382, Pl. 18 (Anson's illustration).

Blaudru-Selur, Blodrselr, Blæresæl: Torfaeus 1706: 88; Olafsen 1772: 532; Olavius 1780: 79, 86; Hammer *l.c.*: 5.

Klakkedal, Kiknæb: Gunnerus 1784: 25-26.

Havstrambe: Anon. 1768 [*Speculum Regale*]: 166; Torfaeus 1706: 97; Egede 1741: 47; Cranz 1765: 154; Stauning 1775: 139; Gunnerus *l.c.*: 27.

Oaaido: Leem 1767: 214.

Neiterssoak: Cranz 1765: 164; Glahn 1771: 157; Stauning *l.c.*: 145.

Lion Marin: Dampier 1717: 118; Juan & Ulloa 1752: 24; Buffon & Daubenton 1765: 333, 351.

Die Meerlöve: Buffon & Daubenton 1770: 184, 193.

Seehund mit einer Haube: Ellis 1750: 140, Pl. 7 [Seal with a cap: Ellis 1748: 134; Veau marin coiffé: Ellis 1749(2): 24].

Sea-Lion: *Woodes Roggers Voyag. I: 207, 223; Anson 1748: 100 with illustration of male and female (1749: 115, Pl. 13.); Parsons 1753: 121.

Leonine Seal: Pennant 1771: 348; Pennant 1781: 534.

Hooded Seal: Pennant 1771: 342; Pennant 1781: 525.

Zee-Leeuw: Houttoyn 1761-1773, II: 5.

Der Seelöwe: P. Müller 1773: 197 (but Anson's and Steller's sea lion incorrectly mixed).

Loup marin de la grand espèce: Pernetty 1770, II: 40, Pl. IX* Fig. 1.

Der glatte Seelöwe: Leske 1779(?): 132 (1784: 167); Schreber 1775-78: 297, Pl. 83 A.

Klapmütze: Schreber *l.c.*: 313.

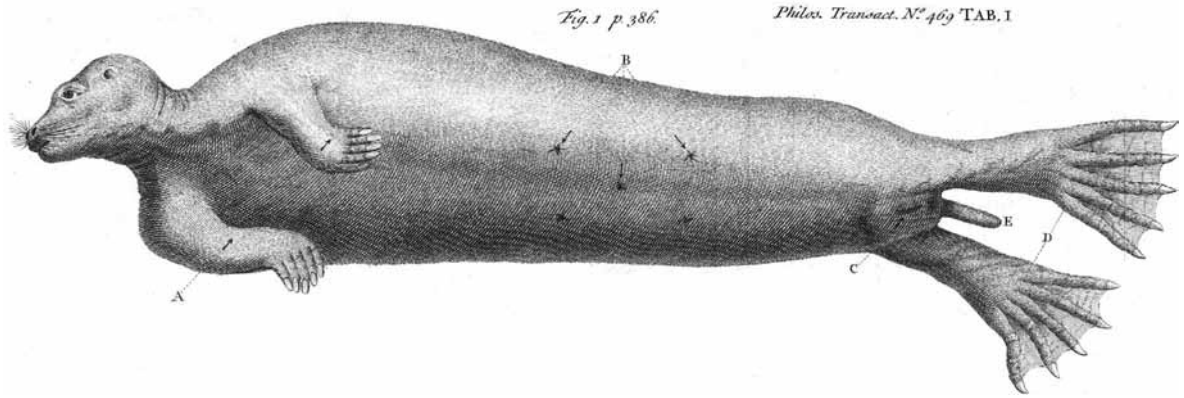


Fig. 35. The illustration of Parsons' Great Sea-calf (*Phoca, Vitulus marina*) "is in general fairly good, although I find the neck too compressed, the toes far too distinctly separated, the claws far too broad, almost resembling nails, and that the curled tips of the whiskers are missing (Fabricius 1791: 156)" (Parsons 1744: Pl. 1).

Fifth species. The Bearded Seal (*Phoca Barbata* [*Erignathus barbatus*])

Names

This seal species is apparently little known by naturalists, since so few have reported on it. At all events it had not been acknowledged by systematists until I gave information about it from Greenland under the name of *Phoca barbata* to Conferensraad (Counsellor) O.F. Müller, who then included it in the introduction to his *Prodromus* (1776: viii); under the same name it is described in my *Fauna Groenlandica* (Fabricius 1780: 15-17, Spec. 9). Erxleben (1777: 590) and Linnaeus/Gmelin (1788: 65) have kept the same name in their systems, and it is a particularly apt name for this species, which has more numerous and stronger whiskers than any other species I know of; in addition, these whiskers are white and curled at the tip, thus resembling a white beard. Schreber (1775-1778: 313), on the other hand, called it **Der grosse Seehund**, supposing it to be the **Great Sea-calf** described by Parsons (Fig. 35; 1744: 383, Pl. 1), which is indeed considered the largest seal by Buffon & Daubenton (1770: 184, 189); it certainly merits a name like this in view of its considerable length, and in my first notes on the peculiarities of nature in Greenland I myself called it *Phoca maxima*; but since in the designation of an animal one cannot rely on the size relative to other

species unless one is sure that one has seen all the species; and furthermore, since this would not apply to the young of the species, I considered it better to choose a name based on an external bodily characteristic that was particularly conspicuous. I therefore thought that the large beard was a better choice.

I do not doubt, however, that in the above-mentioned passage Parsons was dealing with this Greenland species, since both the illustration and the description could very well apply to it, even when it comes to the internal organs; thus Parsons was the first to make this species known and almost the only one to describe it properly, while other writers either only mentioned it and briefly reported on it, or copied Parsons, until I offered a more detailed description of it in my *Fauna*; at that time I was not aware of the description by Parsons, and I must likewise conclude that my *Fauna* was not known to Gmelin when he published his *Systema* (Linnaeus/Gmelin 1788), since he did not deign to cite me on the matter, to which I certainly believe I brought something new.

There is every reason to believe that this seal is the **Lachtak** of the Kamchadalians (Steller 1751: 290), the **Havert** of the Norwegians (Leem 1767: 215, not. 66, 3), and the **Grænsselr**, **Gramselur** or **Kampselur** of the Icelanders (Anon. 1768 [*Speculum Regale*]: 177; Torfaeus 1706: 87; Olafsen 1772: 532; Mohr 1786: 4),⁷⁴ although about the first of these nothing is said

74. It is true that Mohr believes that Gram-Selur and Kamp-Selur may be different, because Olafsen states that the former is 24-30 feet long. However, this statement is only based on the accounts of others, and neither *Speculum Regale* nor Torfaeus makes it larger than 12 to 14 feet. All these names must therefore be considered dialect variants at most.

except that it is 'the largest kind of seal'; about the second only that 'it has a very thick skin'; and about the last that 'it has a large white beard like an old man'. Yet each of these good characteristics is sufficient to make it recognizable.

I have used the Danish name **Remmesæl**, which some colonists in Greenland call it because it is the skin of this seal species that the Greenlanders use to produce the straps and thongs [**remme**'] used for their harpoon lines, fishing lines, etc. The Greenlanders themselves call it *Urksuk* or *Uksuk* [*ussuk*], the etymology of which I cannot explain; some also call it *Takkamugak* [*taqammuaq*] after *Takkamorpok* [*taqammorpoq*], i.e. 'flop in the water', probably because its large body flops more resoundingly in the water than that of the other species. I have, however, also heard another explanation based on the fact that *Takkamorpok* can have a different meaning, 'to bounce back', and that it is so named because the lung is so hard that it bounces back when thrown at the ground. The young of this species is called *Terkigluk* [*teqilluk*] from *Terkigau* [*teqigaa*] 'keep away from something' because, as I have been told, as a result of ancient superstitious rules about avoiding certain food items, the Greenlanders are particularly afraid of touching and eating the meat of this seal.

Appearance and morphology

This is the largest of all the seal species found in Greenland; a full-grown bearded seal can easily be 10 feet [c. 314 cm] in length. A yearling is almost as large as an old harp seal, and a one-year-old specimen that I had before me when composing this description measured as follows:

Length	6 ft. 9 in. ⁷⁵ [212 cm]
Width across underbelly	22 in. [57.5 cm]
Length of head c.	9 in. [23.5 cm]
width	6 in. [15.5 cm]
Whiskers, longest	6 in. [15.5 cm]
shortest	1 1/3 in. [4.5 cm]
Neck length	6 in. [15.5 cm]
width across chest	10 in. [26 cm]
Body length from neck to hind flippers	4 ft. 6 in. [141 cm]

Fore flipper length	9 in. [23.5 cm]
width at root	3 1/3 in. [8.5 cm]
at outermost edge	10 in. [26 cm]
Hind flipper length	13 in. [34 cm]
width at root	3 1/2 in. [9 cm]
at edge when distended	18 in. [47 cm]
Tail length	6 in. [15.5 cm]
width	1 1/2 in. [4 cm]

The colour of the young seal is bluish and very light at the back, but white at the underbelly; with age the animals become almost blackish-blue all over. Later the back again becomes light-coloured while the underbelly remains blackish-blue, but the very oldest animals lose almost all their hairs, except for a few that remain on the chest, so that the black naked skin can be seen all over.

The head is oblong, bowed at the top, somewhat ball-shaped from the back of the head to the eyes, but in front of these depressed to a broad snout which protrudes forward and to the sides into a thick lip, and is covered by many strong whiskers that are horny but flexible in the sense that they keep a bend given to them; they are rather broad and very long, flattened, regular, smooth and clear, with whole rims and curled tips; they are very loosely attached, and the outermost are longest, the innermost shortest. The snout itself is naked and black, and the nostrils are as in the harp seal.

The eyes are at the front of the head; they are large, but not especially visible, since they are deep-set. The pupil is pale black and round (whereas it is only visible as a line in the other species) with a brown circle, and the eyelids are black and naked. The eyebrows are high on the forehead, almost in the middle of the front, and consist of just two small bristles for each eye, similar in shape to the whiskers. In addition, on the white-haired head of the young seals there is a round black spot above the eyes.

At some distance from the eyes, almost at the middle of the side of the head, are the ears; they have no proper earlobe, although the ear duct surroundings protrude more than in the preceding species.

The tongue is short, but thick and broad, cloven at the tip, with a white shaggy cover, like small fringes;

75. [In Fabricius' time a Danish foot was 31.4 cm, an inch 2.6 cm].

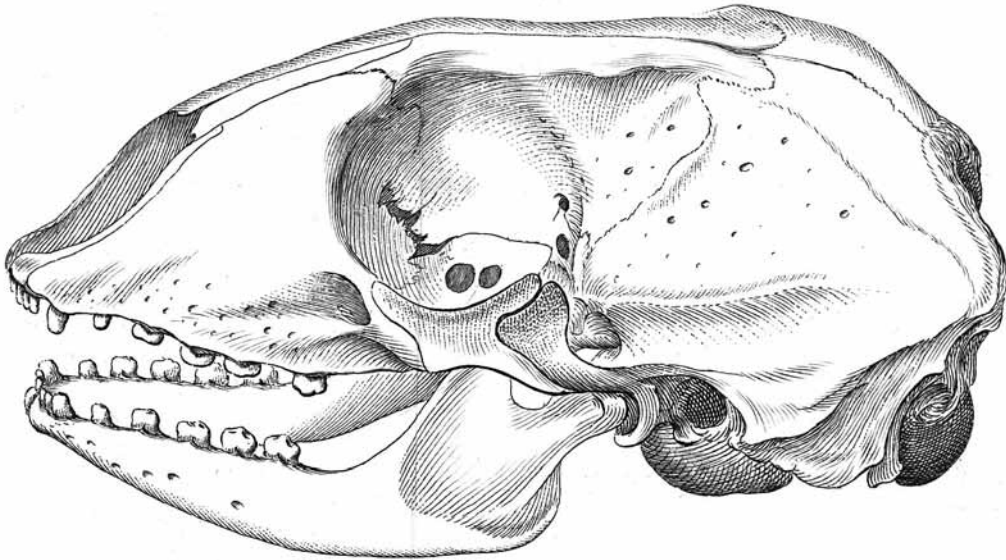


Fig. 36. The first illustration of a bearded seal cranium (Fabricius 1791: Tab. 13, Fig. 3).

the same applies to the palate, on which this is layered, although not as distinctly as in the harp seal.

There are 34 teeth, namely: 1) ten front teeth consisting of a) six in the upper jaw, curved and small, the four midmost almost of uniform shape and size and smallest, cylindrical and somewhat flattened at the tip, while the outermost two are longer and more pointed, although somewhat blunt at the very tip; b) four in the lower jaw, all very small, uniformly sized and blunt; 2) four canine teeth, one upper and one lower in each jaw; the upper two are hindmost, pointing sideways and also curving to the rear, the longest of all the teeth; the lower two are in front of these and so close to the front teeth that they appear to be among them, curving outward, smaller and blunter than the upper ones; 3) 20 molars, five on each side of upper and lower jaw, all short, thick, tripartite at the end, the middle tip being the longest and sharpest, the other two equally small and insignificant. [Fig. 36; Fabricius 1791: Tab. XIII, Fig. 3]

The neck is short but rather thick, increasing in thickness towards the fore flippers. The fore flippers are large and long, and have five long toes with five long, black, straight claws that are hollow at the base; all the toes are joined by a common thick web, which is hairy like the body and covers the entire flipper, so that only the outermost parts of the toes are seen. The fore flippers of this seal differ from those of the other species in that they look like hands that are bent back-

wards, and the proportions among the toes are like those of the fingers of a hand, such that the foremost or the one closest to the belly is the shortest (like the thumb), the hindmost or outermost one is slightly longer (like the little finger), the foremost but one again slightly longer (like the index finger), followed by the second to last (like the ring finger), and the middle one is longest (like the middle finger), although the last-mentioned two are only slightly different in size; this is completely different from what was stated about the fore flippers of the other species, and is thus a characteristic by which the species can be recognized with certainty.

The hind flippers are much larger and different from these. They stretch to the rear as in other seals and curve downwards, as they are concave below with a raised border of skin. These too have five toes with five long claws, which are shorter, however, than those of the fore flippers and are partly hidden in the web, as are all the toes as described in the preceding species; the claws are blackish-blue with white borders. The tail is as in the other species. Its body is large, long, stout and very high-backed.

The skin of this seal species is extremely thick compared with that of the other species; it is almost like horse skin, and the hairs are short, closely packed, fine, soft, somewhat bristling, with little wool underneath; they are very loose and easily come loose from the old seals with just a touch, which may in part be

due to the fact that they are most often encountered with in the moulting season.

The seal has a very thick layer of blubber, too, but this blubber is not considered the best kind for producing train oil, because it is so compact and leaves much residue when melted.

The intestines are extremely long and almost like ox-guts in thickness; when totally extended they measure 90 feet [c. 28 m], of which the rectum alone constitutes ten feet [c. 314 cm]. The stomach is curved, broadest at the rear end near the intestines, narrowest in the middle, and slightly broader at the end next to the throat.

The liver is very large and quinquepartite, as if in five different 'tongues' or blades, which are, however, not uniform in size or shape. The middle section is the largest and lowest, and is rounded at the end, ball-shaped on the surface facing the underbelly, but flat on the surface facing the back; this part is much split up by large 'cuts', and in the left side it has a small, thin, triangular by-tongue.⁷⁶ The next two tongues are slightly higher, short and pointed, almost identical and triangular. The outermost two are at the top, and are not of uniform size, the left one being slightly larger. These too are somewhat triangular although their outermost surface is slightly flat-rounded. They are all joined at the top against the throat in a circular depression, and hang like a gorget. The colour is dark red with white spots. The gall-bladder is long and curved.

The kidneys are shaped as in the harp seal, and are dark red with bright white glands and of the size of a lemon. The lung is large and quadripartite, and differs from those of other species in being very solid and crunching between one's teeth. Otherwise the internal organs are as in the harp seal (see p. 61-63; Fabricius 1790:103-105).

Occurrence and behaviour

The bearded seal occurs and is most often encountered in the southernmost part of Greenland from 61°N southwards; however, it is also found in certain northern areas and is particularly abundant at Isortoq Fiord [c. 67°N] near Disko Bay. It occurs mostly in the open sea and is found almost in the same places and at the same times as the hooded seal (see p. 97; Fabricius

1791: 130), but more frequently closer to coastal areas.

It is very fond of lying on the drift ice. In the water the old seals are slow swimmers, making them easy to catch up with. They are very timid, but also imprudent.

Breeding

According to the southern Greenlanders, this seal's breeding behaviour is similar to that of the hooded seal (see p. 98; Fabricius 1791: 131), although it gives birth earlier in the spring. When newborn, the pup is very woolly-haired, but loses this quickly.

Feeding and predators

Its food and enemies are the same as those of the harp seal (see p. 67-68; Fabricius 1790: 119-120).

Hunting methods

It is caught with the harpoon, like the hooded seal (see p. 98; Fabricius 1791: 131), or with the bladder-dart, like the spotted seal (see p. 90; Fabricius 1791: 108), with several taking part in the hunt, in which case it is shared out such that its skin is not carved up but remains serviceable for its intended purpose; it is therefore cut across the body, not lengthwise (as with the other species), the skin being flayed off in wide belts with the head section forming one share, the body below the fore flippers one or two shares, and the remainder one share, although it must undoubtedly be divided into smaller sections if more hunters are entitled to a share.

Utilization

Its useful parts are as follows:

1. The flesh, which looks white and fine, especially that of the young seals, and is nowhere nearly as dark as that of the harp or the hooded seal, but is treated in the same way (see p. 72; Fabricius 1790: 133-134).

2. The internal organs are also treated in the same way (see p. 72-73; Fabricius 1790: 135-138), in which connection it must be said that its intestines, which are so large, are considered best for curtains because fewer seams are then required, and the curtains therefore give more light.

76. Adding this by-tongue to the other five indeed gives it six, as Parsons 1744 reports for the liver of his Great Sea-calf.

3. The blubber, some of which is taken for lamp fuel, although it is not actually the best for this purpose because it is so compact, melts slowly and yields little oil; some is also sold to the trading post, but the greater part is eaten by the Greenlanders themselves and is one of their favorite delicacies, since it is little inferior to whale blubber and has more gristly substance than fat, and is therefore also a popular morsel together with crowberry (*Empetrum nigrum*), angelica ([A.] *Archangelica*) etc.

4. The skin is the most important part of this seal, because from it the Greenlanders obtain:

a. Their so-called seal thongs (*Alliksak [alissaq]*), which are so indispensable as harpoon lines, fishing lines, thongs and ropes of all kinds, for the Greenlanders use them for all purposes for which we have cables, ropes and string. It is with these that the people of the south engage in so much internal trading with their countrymen in the north, in whose region this seal species is not so common. But they must necessarily obtain the lines, and in return the southlanders trade for baleen, narwhal tusk and the like, which are only available in the northern regions. The skin of this seal, and of no other, is serviceable for these lines, for it has the thickest and toughest skin of all.

I will now explain briefly how these lines are prepared. When the skin has been flayed off in wide belts, these are placed in the urine tub in the same manner as the 'sole skins' (see p. 77; Fabricius 1790: 150-151), to loosen the hairs, and when these have been plucked the skin is cut into one long strip from one end to the other, as far as the belt will allow without being cut in two; for if it were to prove too short for some purpose it would have to be knotted, and this would be a decided drawback and impossible with harpoon lines (*Allek [aleq]*). The fewer the knots, the better the fishing line (*Aulisaut [aalisaat]*). If the line is to be used for a harpoon line it is cut wider, but narrower for fishing lines and thongs. This line is then stretched out in the open air to dry; when at length it is to be used it must also be trimmed; quite a number of things must be observed if it is to be a harpoon line, for not only must it be trimmed; it must also be made supple with oil and urine.

b. When the hairs are not too loose, and especially when the supply of lines is ample, the skin may be

used as 'hair skin' (see p. 74-75; Fabricius 1790: 141-145) and to make trousers, while a few skins may be sold to the trading post.

Parasites

In the entrails of this seal I have found two kinds of worms, namely:

1) In the stomach a roundworm which I have called *Ascaris tubifera* in my *Fauna* (Fabricius 1780: Spec. 251) and which I have also described and illustrated in *Zoologia Danica* (Müller 1779-1780: 101 (ed. min.; 46 ed. maj.), Pl. 74, Fig. 2), as far as was possible with the use of a simple magnifying-glass [See Fig. 28]. Since that time I have not had occasion to discover anything more that might correct or improve this; but because of the greater knowledge I now have of intestinal worms, I am inclined to agree with Counsellor Müller (1779-1780: 107 ed. min.; 49 ed. maj.) that it is more likely a thorny-headed worm (*Echinorhynchus*). The correct answer will depend on closer examination.

2) In the intestines a tapeworm which I have called *Taenia Phocarum* and described in detail in my *Fauna* (Fabricius 1780: 316). The description given in that passage was based on what I saw through a simple magnifying-glass, and while conceding that a more experienced naturalist than myself – especially at that time – might have discovered and determined several things more correctly, I still believe that, since the worm was so large, I cannot have mistaken or overlooked anything except the tiniest parts that were invisible to the naked eye. I would have liked a new opportunity for a closer examination, but since I was unfortunate enough neither to preserve the worm in alcohol nor to obtain a new specimen, I have to leave this matter unresolved. However, since my description has been cited several times (Goeze 1782: 373; Müller 1780: 179; 1781: 79; 1787: 39) and the naturalists have considered this tapeworm a previously unknown species, at the conclusion of this treatise I will present an illustration drawn then with my crude brush and found among my papers, and will here provide an extract of the description for comparison, adding my later reflections when I believe that something should be corrected or improved. [Fig. 37; Fabricius 1791: Tab. X, Fig 3]

I found several specimens of these tapeworms in one seal. They were wallowing in a yellow, stinking

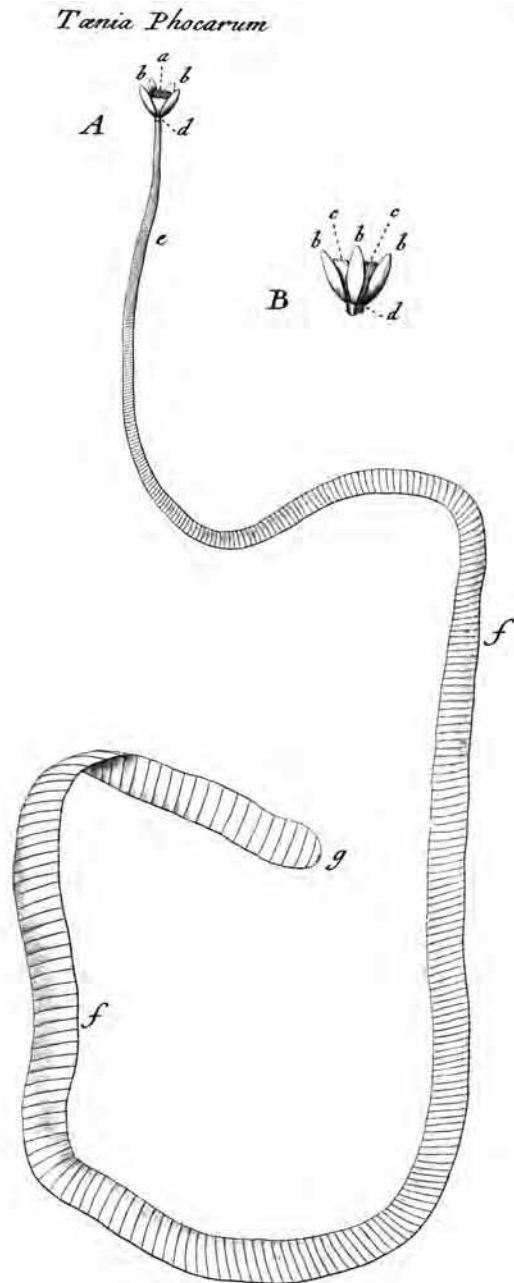


Fig. 37. The seal tapeworm (*Taenia [Pyramicocephalus] phocarum*) found in the bearded seal. A. The tape worm of the bearded seal. B. The head somewhat enlarged; a. The foremost end; b. The corner-lips; c. The supposed glands; d. The neck; e. The foremost slender segments; f. The wider segments of the body; g. The anal fissure. (Fabricius 1791: Tab. 10, Fig. 3A and B).

and I was in fact unable to detect such hooks. The longest worms were $3\frac{1}{2}$ feet [c. 110 cm] long and two lines⁷⁷ [4 mm] wide. They were also light yellow all over and completely flat. The body is broader towards the rear and, starting at the middle, increasingly narrow towards the head. Its segments were innumerable; trying to count them from the rear I reached 400 or more, but those closest to the head were so tiny that I was unable to count them, and eventually they disappeared completely into the neck (d). Besides this, they overlapped, such that the foremost one repeatedly served as the base for the next one, the end of which was inserted in it. The large segments (f) were like oblong rectangles across, with no protruding border or notch on the sides. I saw neither any opening (*Osculum*) on the broad side or at the sharp edge, nor any internal ovary (all this might have been discovered by using a better magnifying-glass). The head (B) is large and easily visible,⁷⁸ wider than the remainder, elongated, quadrangular and in each angle has a protruding ear or oblong, almost lanceolate slimy lip (b), two above and two below, curved and bristling forward. At the fore-end of the head, as far as I could see, it was furnished with a great many small glands (c) that might act as suction apertures. (I can hardly believe that I was mistaken as regards these glands and overlooked larger holes that might have been under the earlobes. However a better magnifying-glass must determine this when the opportunity arises). Just behind the head there is a slender neck, apparently without circular lines, and at the extreme rear end there is a rounded segment with a very thin fissure, as an anal opening. If, contrary to expectation, I should succeed in obtaining another specimen of this worm

substance filling the intestines. All were free, and were not observed with their heads attached to the intestinal wall, from which one could deduce that, unlike other members of this genus, it lacks mouth-hooks,

77. [A Danish line ('linje') was one twelfth of an inch, or 2.2 mm].

78. In my *Fauna* I began the description thus: 'Hanc fatis demonstraturam esse credo, Taenias dari capitatas; est enim tam magna, & caput ejus tam visibile, ut de re certo certior factus sum'. This was done for the sake of those still in doubt about the head of the tapeworm, which has now become better known to the naturalists, and I believe that my discovery, having been made in 1769, might have been one of the first and most convincing pieces of evidence for the correct state of affairs if it had been published earlier, but circumstances prohibited this.

for renewed examination, I will not fail to correct anything lacking in this description.

Documentation and synonyms

I will now return to the bearded seal which hosts these worms. As far as I know, the only existing illustration is the one presented by Parsons (1744); in general this is fairly good, although I find the neck too compressed, the toes far too distinctly separated, the claws far too broad (particularly on the fore flippers), almost resembling nails, and that the curled tips of the whiskers are missing.

I note that Erxleben (1777: 591) has had some doubts as to whether this seal might be the female of the hooded seal;⁷⁹ in all probability he was led astray into this supposition by the fact that the specimen described by Parsons was a female; but I can firmly reject this notion, having had the opportunity to see both sexes of either species. As the preceding description clearly demonstrates, they have far too many points of distinction to be considered one species.

I am now again faced with the question that I raised in the section on the fiord seal (see p. 86; Fabricius 1791: 95), and which I promised to examine further in this place: whether the **Utselur** of the Icelanders might be identical to the *Urksuk* [*ussuk*] of the Greenlanders, the bearded seal. I have all the more reason do so when I note that Schreber (1775-1778) simply includes the **Udsæl** among the *Synonyma* for the **Great Seal**, in which connection he presents a composite description, built up partly from what Cranz (1765:165) has said of the *Uksuk*, partly from what Olafsen (1772: 529, and in other passages) has reported of the **Udsæl**, with the result that his description in that passage has become very erroneous (as in other instances for the same reason). On the basis of his word, Linnaeus/Gmelin (1788) has also made the same assumption, without expressing any doubts. The only support for this idea, however, is the size, which might be approximately the same; for everything else appears to argue against it. In addition, it does not seem reasonable to me that the Icelanders should have two names for the same species, particularly as Olafsen repeatedly writes that the **Udsæl** is a very well-known species, and the **Gramsæl** a rare one. If we decide that the latter is the

bearded seal, the former cannot be. The **Udsæl** may possibly come to be viewed as a species in its own right, a subject concerning which we must await further information until some happy day in the future when a naturalist travelling in Iceland reports further on the matter.

There might be more reason to consider the *Phoca Leporina* of Lepechin (Figs 46-47; 1778: 264, Pl. 8-9) as a young bearded seal, since both a thick skin and numerous powerful whiskers are attributed to it; but the colour, the shape of the fore flippers, the number of teeth, etc. are against this; besides, he shows illustrations of an old specimen as well as of a young one, showing that he is not only referring to the young one. Furthermore, since the **Lachtak** of the Kamchadalians is indeed identical to the bearded seal, and Lepechin reports that they have a different name for his *Phoca Leporina*, one might suppose from this that they had two names for the same kind of seal, which is hardly likely. For these reasons I consider it a distinct species, and in the following will mention another kind of seal from Greenland to which, if to any, it seems to correspond.

In consequence, the *Synonyma* of the bearded seal are as follows:

Phoca barbata: Fabricius 1780: 15-17; O.F. Müller 1776: viii; Erxleben 1777: 590; Borowski 1780: 10; Mohr 1786: 4; Linnaeus/Gmelin 1788: 65.

Havert: Leem 1767: 215, not. 66, 3; Hammer 1775: 4.

Grænselr v. **Graselr**: Anon. 1768 [*Speculum Regale*]: 177; Torfaeus 1706: 87; Anon. 12th Century *Olav Trygvasons Saga*: 263.

Gramselur: Olafsen 1772: 532; Hammer *l.c.*: 5.

Uksuk [**ussuk**]: Cranz 1765: 165; Glahn 1771: 157; Stauning 1775: 145.

Sea-Calf: Parsons 1744: 381, Pl. 1.

Long-bodied Seal: Parsons 1753: 121.

Grand Phoque: Buffon & Daubenton 1765: 333, 343.

Der grosse Seehund: Buffon & Daubenton 1770: 184, 189.

The great Seal: Pennant 1771: 341; 1781: 524.

Lachtak: Steller 1751: 290; *Müll. *Saml.* III: 250 (*Sammlung russischer Geschichte*, Petrop. 1732 ?); Steller 1774: 107.

79. "An Femina praecedentis (i.e. cristatae)?"

* PS *

These were the five well-known seal species about which I can report at some length. I should have liked to present illustrations of the second, third, fourth and fifth species, which might still be necessary; but having neglected to make drawings when in the country, or more precisely not having dared to do this work, for which I felt unqualified, and having no access here to specimens from which such drawings could be made, I must for the time being leave this aside. This year, however, I have received the skulls of the first, fourth and fifth species, which I will hereby present for the sake of comparison, to demonstrate how distinct they are; these illustrations are appended to this treatise. [Figs 22, 33 and 36]

In addition to the species mentioned in the foregoing, the Greenlanders speak of four additional ones; but, since these are rarely seen and have never been presented to me personally, I can only give their names together with the little said of them by the Greenlanders, and finally establish the most reasonable *Synonymie*.

Sixth Species. The Sea Bear (*Phoca Ursina*)

I consider this to be the *Auvekaejak* of the Greenlanders and have included it in my *Fauna* (Fabricius 1780: 6-7, Spec. 4). Apparently they know of two different marine animals under this name, one of which could be the **Sea Cow** (*Trichechus Manatus* [*Hydro-malis gigas*]) of Steller (1751: 294, Pl. 14, Fig. 1), as also indicated in my *Fauna* (Fabricius 1780: 6, Spec. 3); the other one is no doubt the **Sea-bear** (Fig. 41; Steller 1751, Pl. 15). There may, however, be some difference in the Greenlandic names, although they are pronounced in the same way, such that *Auvekaejak* may be derived from *Auvek* [*aaveq*], the name of the walrus (*Trichechus* [*Odobenus*] *Rosmarus*) (Fabricius 1780: 4-6, Spec. 2), and thus mean 'one that is almost like a walrus', which would fit best with the sea cow, which belongs to the same *genus* as the walrus, while the name of the sea-bear should perhaps, to make a distinction, be written *Auikaejak*, i.e. 'one that tends to break everything in pieces'.

Of the latter the Greenlanders told me that, like the polar bear (*Ursus maritimus*), it occurs both on land and in the sea, and that it resembles a dog with hair all over its body, is a good walker, and fiercely faces anyone who attacks it. The most dreadful ideas are associated with it: it devours everything, human and animal, even gnawing stones to pieces. For these reasons it is usually not pursued; only when someone has observed it at sea and gives warning, do they set out to harpoon it; but instead of a float a large stone is used for it to pull, while the people flee towards the shore; it will then immediately pursue them on land, but there the people climb on to large rocks, and since it cannot get rid of the stone it is carrying, it can only walk around tightening the line, so that it can be lanced from above. This is what is said; but so much fabulous matter is intermingled with this that it must obviously be a rare occurrence, particularly in recent times; otherwise it said that it is most often encountered in the southern part of the country.

Once it has been caught, the meat is eaten. The sinews are said to be excellent for thread. The teeth are used for hunting implements because they are white and solid, and are said to be half a foot long; the heathens also use them as amulets and to cure abscesses.

Its *Synonyma* are thus as follows:

Phoca Ursina: Linnaeus 1766: 55; Fabricius 1780: 6, Spec. 4;⁸⁰ Erxleben 1777: 579; Borowski 1780: 2, Pl. 9 (Steller's illustration); Linnaeus/Gmelin 1788: 62. [*Callorhinus ursinus*, Northern Fur Seal]

Ursus marinus: Steller 1751: 331, Pl. 15; Brisson 1762 (1756): 166.

Søebiørn: Aphelen 1770: 470 [O.F. wrote 370].

Seebär: Anon. 1753XI(3): 264 c. fig. (Steller's illustration); Halle(n) 1757: 585; Steller 1774: 97; Müller, P. 1773: 195; Schreber 1775-1778: 289, Pl. 82 (the figure of Steller); Leske 1779: 131(1784: 166); Adelung 1768: 667, Pl. XIX (Steller's illustration); Pallas 1781: 288.

Seekatzen: Müll. Saml. III: 249 (Sammlung russischer Geschichte, Petrop. 1732 ?)

Zee-Beer: Houttoyn 1761, II: 3.

The Ursine Seal: Pennant 1771: 344; 1781: 526.

80. In this passage the *Synonyma* include Buffon's kleine Phoke, but this should be deleted, since it is a completely different species, namely *Phoca pusilla* (Linnaeus/Gmelin 1788: 65).

Seventh Species. The Pig Seal (*Phoca Porcina*)

The seal species to which I refer here is called *Siguktôk* [*sigguttooq*], i.e. 'the long-snouted' by the Greenlanders, and is said to have an unusually long and slender snout like a pig's snout, but in other respects to be like a harp seal. It is true that none of the Greenlanders to whom I have spoken has ever caught this seal; they have only seen it at sea. Moreover, since such a seal species is said to exist in northern as well as in southern waters according to the accounts of other authors, there is no reason to doubt the statements of the Greenlanders that it also occurs in the Davis Strait. It must, however, be extremely rare.

The synonyms are:

Phoca Porcina: Molina 1786: 248.

*Siguktôk*⁸¹ [*sigguttooq*]: Fabricius 1780: 17.

Fatne Viudne: Leem 1767: 214.

Botle-Nose [Bottlenose] Seal: Pennant 1781: 531.

The Hook-snouted [Grey] Seal (*Phoca* [*Halichoerus*] *Grypus*)

Further to my remarks on the above-mentioned species I have to note that I do possess the skull of a

long-snouted seal which I am, however, reluctant to include under that species because it in no way corresponds to the description by Molina (1786). On the other hand, it is distinct from all the Greenland species I have seen, so in order to make it better known I will present a short description of it below.

The seal from which this skull was taken was shot in the month of June 1788 off the island of Amager near Copenhagen, in quite shallow water near the beach. The entire body was pale white with some darker spots that hardly showed through, making these areas steel-grey, yet somewhat brighter, approaching ash-coloured. The hairs lay smoothly against the body, and were not bristly, but were glossy. The head was 6 in. [15.7 cm] wide at the eyes and 10 in. [26.2 cm] long; of this the snout made up 5 in. [13.1 cm] as far as the eyes, and 4 in. [10.5 cm] as far as the corner of the mouth. The snout reaches somewhat beyond the lower jaw, sloping down to it, and is also broader. This long snout is arched at the top (i.e. not flat as in the harp seal) and somewhat curved, particularly between the eyes, looking as if it has been damaged by a blow. Thus the head might bear some resemblance to a sheep's head if it were more laterally compressed; but the end of the upper jaw makes it broader and blunter. Otherwise the snout is covered by hairs of the same colour as the rest of the head. The wall separating the nostrils has a groove and protrudes. The

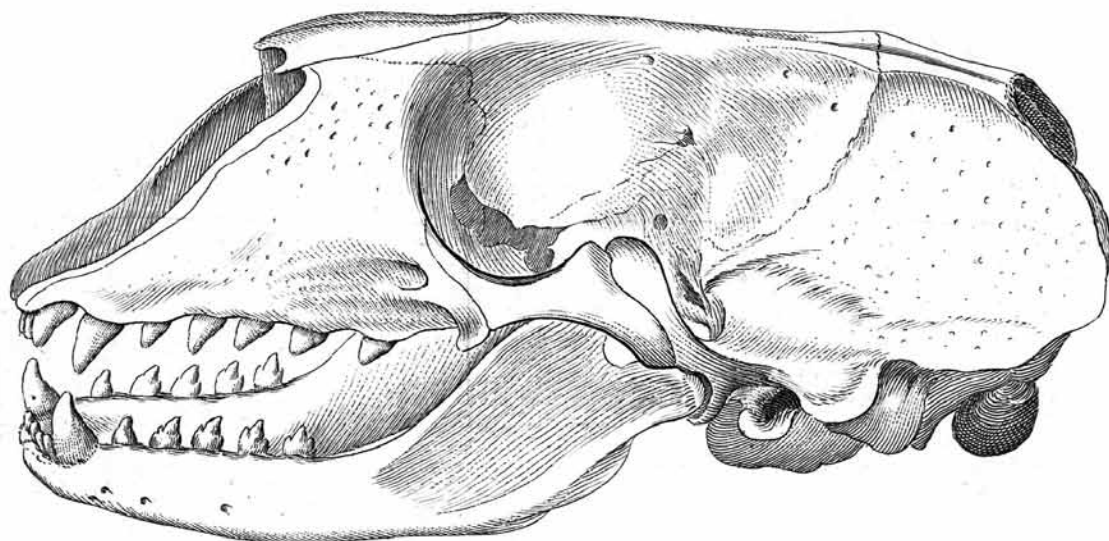


Fig. 38. Cranium of the 'hook-snouted seal' *Phoca grypus* n.sp. [grey seal *Halichoerus grypus*] (Fabricius 1791: Tab. 13, Fig. 4).

81. In Fabricius 1780: 17 erroneously spelled Singuktok.

lower jaw is 3½ in. [9.2 cm] long as far as the corner of the mouth. The nostrils are large and lunate. The whiskers are compressed and undulating as in the harp seal, and large but short, and not particularly numerous; the hindmost whiskers are considerably broader than the others, but short and white, while the others are partly pale, partly black. No such bristle was seen at the lower lip, but above the eyes there were three or four fine, short whiskers of the same colour, like eye-brows. The ear openings were unusually large, but I observed no earlobe.

In the upper jaw there were six front teeth, the outermost two of which were some distance from each other, were larger and had a slope on the inside; the next two were separated from the middle ones and were much smaller than the outer ones, yet slightly larger than the middle ones, which were smallest and close together; these four were conical. In the lower jaw there were four tiny, conical, widely spaced front teeth. The four canine teeth were large, curved and conical, one in each side of the upper and lower jaw, those in the upper jaw inside those in the lower jaw. There were five molars in each side of the upper and lower jaw, i.e. a total of 20, conical and curving slightly to the rear, and with some side-flaps, particularly the hindmost ones; all those in the upper jaw were

inside those in the lower jaw. [Fig. 38; Fabricius 1791: Tab. XIII, Fig. 4]

The palate was white and frayed, the neck rather long and lean. The body was of the size of a spotted seal in its third year, and not large relative to the size of the head. The fore flippers were as in a common seal but with large, broad, pale claws; the hind flippers were similar, but the inner toe there seemed to be shorter than the outer one. The seal was moulting and very lean, hardly yielding seven pots [6.78 l, c. 6 quarts] of train oil, and it had no doubt been ill. It had also almost finished moulting, and perhaps the hairs might have been darker if they had been fully developed.

Someone present during my observations asked whether it was the long-snouted or the pug-snouted kind, and suggested that the former was rarer than the latter. So evidently people call the common seal 'pug-snouted' from its short snout, and the one described above, which is rarer, must then be the 'long-snouted', a name it fully merits.

Whether this seal can be assigned to any of the species mentioned by other authors, and if so to which one, is not easy to determine. It could be the **long-necked seal** of Parsons (1753: 120, Pl. 6; Pennant 1781: 521), but the fact that he says that it has no toes at

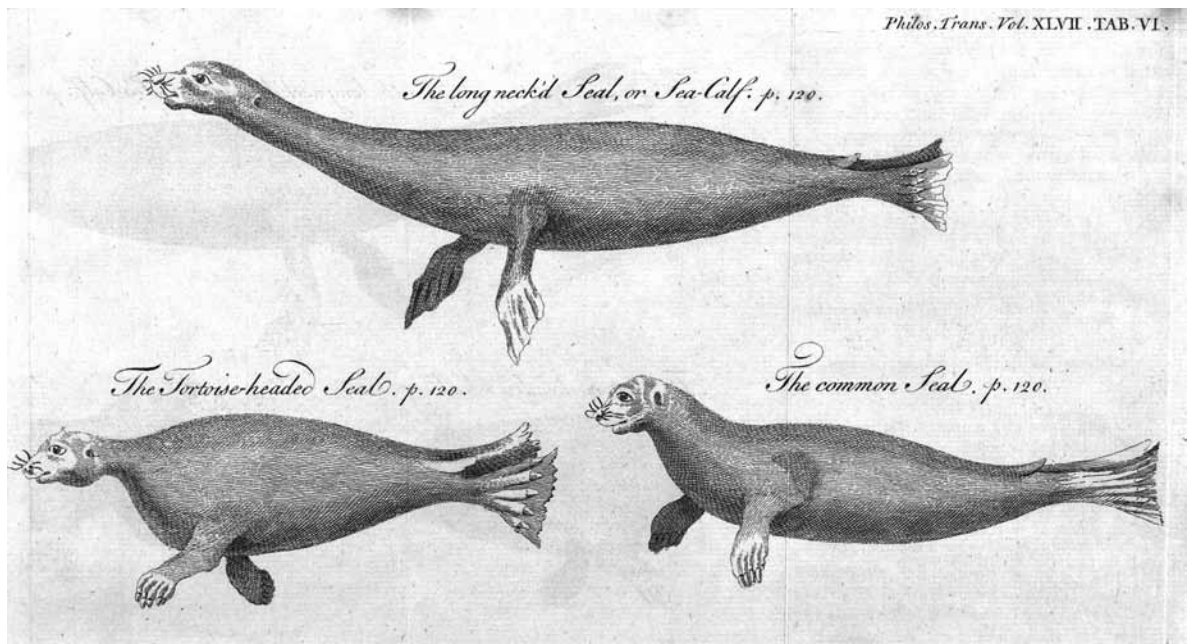


Fig. 39. Parsons' illustrations of the 'long-necked seal' and the 'Tortoise-headed seal' show no resemblance to any known species, whereas his common seal is an acceptable picture of *Phoca (vitulina?)* (Parsons 1753: Pl. 6).

the fore flippers argues against this; and the neck was not as immensely long as his illustration shows. It comes close to the **Sea-calf** described by Perrault (1757: 217, Pl. 28), as long as his illustration is correct, because both this and the description agree so well with the specimen seen by me that I would hardly doubt that it is indeed the same species, were it not for the fact that he did not find nails on the hind flippers; but perhaps they were worn off, as can easily happen in captivity, in which the specimen described by Perrault had presumably lived for some time. Possibly this is also identical to the **Tortoise-headed Seal** of Parsons (1753: Pl. 6; Pennant 1781: 522)? I also have a strong suspicion that it may be the **Ståtskålar** of the Swedes (Ödman 1784: 84; Germ. transl.: 82), as far as can be judged from the brief description given of it; but we must await more accurate determination to be sure of this.

For the time being I will call it the **hook-snouted seal** (*Phoca Grypus*).

Eighth Species. The Sea Hare (*Phoca Leporina*)

I have already reported in the section on the fiord seal (see p. 80; Fabricius 1791: 77) that a white variety of this species exists, called *Ukalerajek* [*ukaleriaq*] by the Greenlanders, but in addition to this they speak of another kind of seal, which they call either by the same name, or for the sake of distinction *Imam-Ukalia* [*imap ukalia*] 'the sea hare'. This is said to be white all over and to have fiery red eye-circles. A trustworthy baptized Greenlander has told me that he caught one of these himself, giving me less reason to doubt its existence. Its *Synonyma* would then be:

Phoca Leporina: Lepechin 1778: 264, Pl. 8-9.

Imab-Ukalia: Fabricius 1780: 17.

Jægees: Leem 1767: 213.

Der Sibirische Seehund: Schreber 1775-1778: 310.



Fig. 40. Also Perrault's 'veau marin' is difficult to determine to species, but the illustration is certainly remarkable for the 'setting' ! (Perrault 1733: 191).

Ninth Species. *Atârpiak*

Of this I dare hardly say anything, neither whether it does in fact exist or whether it is an animal belonging to the seal genus, for the accounts of it are very varied and rather contradictory. I have heard tales of a marine animal with the name *Atârpiak* [*aataarpiaq*] i.e. ‘rather like the harp seal’, which with respect to hair and colour, is said to be completely like a harp seal, even having the black ‘trousers’ on its sides, but so small that it can lie in one hand. It was said usually

to be taken with a fishing line or seen near the beach in Tunnudliorbik [*Tunnulliarfik*] Fiord (Fabricius 1780: 17).

To others, however, it is known as *Atârpek* (perhaps rather *Atârpik* [*aataarpik*] i.e. ‘the right harp seal’), and is said to be far larger than an ordinary harp seal (Glahn 1771: 159). In this matter it is not easy to establish the facts. But since the colony Julianehaab [Qaqortoq] has recently been established near Tunnudliorbik Fiord, it should now be possible to resolve the matter.

References

- Adelung, J.C. 1768. Geschichte der Schiffahrten und Versuche welche zur Entdeckung des Nordostlichen Weges nach Japan und China von verschiedenen Nationen unternommen worden. Zum Behufe der Erdbeschreibung und Naturgeschichte dieser Gegende ... – J.J. Gebauer, Halle: 8 + 740, 19 Pls.
- Aelianus (Ailianos), C. 1744 (c.170-235 A.D.). De natura animalium libri XVII. Cum animadversionibus Conradi Gesneri et Danielis Wilhelmi Trilleri curante Abrahamo Gronovio qui et suas adnotationes adjecit 1-2. – Londini: 14 + 27 + 35 + 1128 pp. & Index. (1784 *Ibid.* Graece et Latini cum priorum interpretum et suis animadversionibus, edidit Io. Gottlob Schneider, Lipsiae: 10 + 585 + 20 + 228 + 44 pp.).
- Alessandri, I. & Scataglia, P. 1775. Vitello marino grande, Tab. 171. – *In: Animalia quadrupedi tolti dal naturale dissegnati, incisi e miniati co i loi veri colori* 4. – Venezia.*
- Aldrovandi, U. 1638 (1613). De Phoca, sive Vitulo marino. Cap. X, p. 722-728. – *In: De Piscibus libri V & de Cetus liber unicus, cum figuris ligne incis. – (Opus posthume I.C. Uterverius collegit). N. Theobaldinum, Bononiae: 5 + 750 pp.*
- Anderson, J. 1748. Sælhund, p. 223-227. – *In: Efterretninger om Island, Grønland og Strat Davis, til Videnskabernes og Handelens sande Nytte, med Kobberstykker og et Landkort. Hvortil er føjet en tilforladelig Beskrivelse over Lapmarken. – G.C. Rothe, Kiøbenhavn: 6 + 27 + 574 pp.*
- Anonymous 12th Century. Olav Tryggvasons Saga.*
- Anonymous 1753. Herrn G.W. Stellers Beschreibung des Seethieres das Dampier zum ersten gesehen, unter den Namen des Seebäres beschrieben hat. Aus dem Novi Commentarii Academiae Scientiarum Imperialis Petropolitanae 2, p. 264-303. – *In: Hamburgisches Magazin, oder gesammelte Schriften, aus der Naturforschung und den angenehmen Wissenschaften überhaupt, 11(3). – G.C. Grund, Hamburg, und A.H. Holler, Leipzig.*
- Anonymous 1760. Søløver, p. 382-383, Pl. 18. – *In: Georg Ansons Reyse omkring Verden over Sydvest. Den Anden Afdeling. Den Engelske Esquadres Forretning i Aaret 1741. – Almindelig Historie over Reiser til Lands og Vands, eller Samling af alle Reisebeskrivelser, som hidtil ere udgivne i adskillige Sprog af alle Folk, og som giver et fuldstændigt Begreb om den nyere Jordbeskrivelse og Historie, hvori alle Folks virkelige Tilstand forestilles, og det Merkværdigste, Nyttigste og Sandeste i Europa, Asia og Amerika indeholdes, i Henseende til ... ; Sammen- draget ved et Selskab lærde Mænd i det Engelske, og nu oversat til Dansk, 15. Bind, 2nd Bog ..., 4th Cap.*
- Anonymous 1768 (12th Century). Cap. XVI, p. 165-179. – *In: Speculum Regale / Icel. Konungs Skuggsjá, / Dan. Kongespejlet. – Sorø 1768: 78 + 814 pp.*
- Anson, G. 1748. Sea-lyons, Pl. p. 100. – *In: A voyage round the world in the years 1740-44 by G. Anson, commander in Chief of a squadron of His Majesty's, sent upon an Expedition to the South Seas, compiled from his Papers and Materials by Richard Walter ... Illustrated with 42 Copper-Plates. ..&c. – Cooper, London: 34 + 417 pp.*
- Anson, G. 1749. Die Meerlöwen, p. 115-117, Pl. 13. – *In: Des Herrn Admiral, Lord Ansons Reise um die Welt welche er als Oberbefehlshaber über ein Geschwader von Sr. Grossbritannischen Majestät Kriegsschiffen, die zu einer Unternehmung in die Südsee ausgeschiedt worden in den Jahren 1740-1744 verrichtet hat, aus dessen Aufsätzen und Urkunden zusammengetragen und unter seiner Aufsicht an das Licht gestellt von M. Richard Waltern ..., aus dem Englischen in das Deutsche übersetzt. Nebst vielen Kupfertafeln und Landkarten. – A. Vandenhoeck, Leipzig & Göttingen: 44 + 382 + 28 pp.*
- Aphelen, H. von 1770. Sæl, Sælhund, Robbe; Søbjørn; Søløve, p. 13-24; 470-474; 493-495. – *In: Den almindelige Natur-Historie, i Form af et Dictionnaire ved Valmont de Bomare ... oversat, forøget og forbedret af H. von Aphelen 7. – Kiøbenhavn: 727 pp.*
- Aristotle 1533 (384-322 B.C.). Historia Animalium. – Editio Parisiis 1533 (Francofurti 1587, Tolosae 1619).*
- Belon de Mans (Bellonius), P. 1555. Le veau marin, p. 15-16. – *In: La nature et diversité des poissons, avec leur portraits, representez au plus pres du naturel. – Ch. Estienne, Paris: 40 + 448 pp.*
- Borlase, W. 1758. The seal or sea-calf, p. 284. – *In: The Natural History of Cornwall, the air, climate, waters, rivers, lakes, Sea and Tides; of the Stones, Semimetals, Metal, Tin, and the Manner of Mining; the Constitution of the Stannaries; Iron, Copper, Silver, Lead, and Gold, found in Cornwall; Vegetables, Rare Birds, Fishes, Shells, Reptiles, and Quadrupeds; of the Inhabitants, their Manners, Customs, Plays or Interludes, Exercises, and Festivals; the Cornish Language, Trade, Tenures, and Arts. Illustrated with a new Sheet Map of the County, and Twenty-Eight Folio Copper-Plates from Original Drawings taken on the Spot. – W. Jackson, Oxford: 19 + 326 + 2 pp., 28 Pls, 1 map.*
- Borowski, G.H. 1780. Phoca, p. 2-10, Taf. XI. – *In: Gemeinnüssige Naturgeschichte des Thierreichs, darinn die merkwürdigsten und nüzlichsten Thiere in systematischer Ordnung beschrieben und alle Geschlechter in Abbildungen nach der Natur vorgestellt werden, ausfertigt von ..., I(2) Säugethiere, Vierfüssige Thiere. – G.A. Lange, Berlin und Stralsund: 6 + 98 pp., 48 Taf.*
- Brisson M.J. 1762 (1756). Genus Phoca, p. 162-164. – *In: Regnum Animale in Classes IX distributum, sive Synopsis Methodica Sistens Generalem Animalium distributionem in Classes IX, & duarum primarum Classium, Quadrupedum scilicet & Cetaceorum, particularem divisionem in Ordines, Sectiones, Genera & Species. Cum brevi cujus-cus speciei descriptione, Citationibus Auctorum de iis tractantium, Nominibus eis ab ipsis & Nationibus imposi-*

- tis, Nominibusque vulgaribus. Cum Figuris aeneis (Lat. & French), Edit. altera auctor. – Lugduni Batavorum: 8 + 296 pp.
- Buffon, G.L. de & Daubenton, L.J.M. 1765. Le Phoque, p. 333-358, 395-414 & 433-434, Pls. 45-53. – *In: Histoire Naturel, Générale et Particulière, avec la Description du Cabinet du Roi. Quadrupèdes*, 13. – L’Imprimerie Royale, Paris: 6 + 441 pp.
- Buffon, G.L. de & Daubenton, L.J.M. 1770. Die Phoken, p. 183-197, 217-229 & 242-248, Pls. 45-53. – *In: Allgemeine Historie der Natur nach allen ihren besondern Theilen abgehandelt; nebst einer Beschreibung der Naturalienkammer Sr. Majestät der Königes von Frankreich, Quadrupedes*, 7(1) (Germ. transl. by A. van Haller). – A.H. Hallens Witwe, Hamburg und Leipzig: 16 + 248 + 6 pp.
- Charleton, G. 1677. Phoca, p. 48-49. – *In: Exercitationes de Differentiis & Nominibus Animalium quibus accedunt Mantissa Anatomica et quaedam de variis Fossilium generibus deque differentiis & nominibus colorum. Pars 2, Pisces. Editio secunda, duplo fere auctior priori, novisque iconibus ornata.* – Theatro Sheldiano, Oxoniae: 106 pp.
- Cneiff, J.D. 1757. Berättelse om Skäl-Fangst i Österbotten. – Kongliga Svenska Vetenskaps Academiens Handlinger för År 1757, 18: 177-194.
- Cranz D. 1765. Von den vierfüßigen See-Thieren oder See-hunden, p. 161-169, 204-220. – *In: Historie von Grönland, enthaltend die Beschreibung des Landes und der Einwohner, insbesondere die Geschichte der dortigen Mission der Evangelischen Bruder zu Neu-Herrnhut und Lichtenfels. Mit acht Kupfertafeln und einem Register*, 1-2. – H.D. Ebers, Barby und Weidmanns Erben und Reich, Leipzig: 36 + 1132 + 26 pp.
- Dampier, W. 1717 (1697). A new Voyage round the World, Describing particularly the Isthmus of America, several Coasts and Islands in the West Indies, the Isles of Cape Verde, the Passage by Terra del Fuego, the South Sea Coasts of Chile, Peru, and Mexico; the Isle of Guam, one of the Ladrones, Mindanao and other Philippine and East India Islands near Cambodia, China, Formosa, Lucaris, Celebes, etc., New Holland, Sumatra, Nicobar Isles, the Cape of Good Hope, and Santa Hellena; their Soil, Rivers, Harbours, Plants, Fruits, Animals, and Inhabitants; their Custums, Religion, Government, Trade, etc. I. – 6th edit., J. Knapton, London: 9 + 611 pp. (First edit. 1697; Fr. edit. 1723 Rouen).
- Debes, L.J. 1673. Sælhunde, p. 151-155. – *In: Faeroae et Faeroa reserata. Det er: Færøernis oc Fæøeske Indbyggeris Beskrivelse, udi hvilken föris til Liuset adskillige Naturens Hemmeligheder, oc nogle Antiquiteter, som her til Dags udi Mörcket hafve været indelugte, oc nu her opladis. Alle curieuse til Velbehagelighed, sammenskrevet oc forklaret aff L.J. Debes.* – M. Jørgensen, Kiøbenhavn: 20 + 367 pp., 2 maps.
- Egede, H. 1741. P. 45-49, Pl. p. 46, and p. 58-62, Pl. p. 58. – *In: Det gamle Grønlands Perustration eller Naturel-Historie, og Beskrivelse over det gamle Grønlands Situation, Luft, Temperament og Beskaffenhed; De gamle Norske Coloniers Begyndelse og Undergang der Samme-Steds, de itzige Indbyggeses Oprindelse, Væsen, Leve-Maade og Handtæring, samt Hvad ellers Landet Yder og giver af sig, saasom Dyer, Fiske og Fugle &c. med hosføyet Land-Caart og andre Kaaber-Stykker over Landets Naturalier og Indbyggernis Handtæring.* – J.C. Groth, København: 12 + 132 pp.
- Ellis, H. 1750. Seehund mit einer Haube & Seehund mit einer schwartzen Seite, p. 140-141, Tab. 7. – *In: Reise nach Hudsons Meerbusen, welche von zweyen Englischen Schiffen, der Dobbs-Galley und California, in den Jahren 1746 und 1747, wegen Entdeckung einer nordwestlichen Durchfahrt in die Süd-See verrichtet worden, nebst einer richtigen Abzeichnung der Küste, und einer kurzen Naturgeschichte des Landes, Beschreibung der Einwohner, auch einer wahren Vorstellung der Umstände und Gründe, welche die künftige Erfindung einer solchen Durchfahrt wahrscheinlich machen, beschrieben von H. Ellis ... ; aus dem Englischen übersetzt und mit Anmerkungen aus andern hieher gehörigen Schriftstellern versehen. Mit Kupfertafeln und zweyen neuen Karten von Hudsons Meerbusen und den angränzenden Ländern.* – *In: Sammlung neuer und merkwürdiger Reise zu Wasser und zu Lande* 1. – A. Vandenhoeck, Göttingen: 45 + 364 + 10 pp., 11 Pls, 2 maps. – [Ellis 1748 (original); Ellis 1749 (Fr. Transl.)]
- ? Ephem. naturae curios. Decur. , I. Ann. 9. Obs. 98. Dec., III. Ann. 7. App. p. 15.*
- Erxleben, J.C.P. 1777. Phoca, p. 579-592. – *In: Systema Regni Animalis per Classes, Ordines, Genera, Species, Varietates, cum Synonymia et Historia Animalium. Classis I, Mammalia.* – Weygandianis, Lipsiae: 48 + 636 + 64 pp.
- Fabricius, O. 1780. Phoca, sp. # 4-9, p. 6-17. – *In: Fauna Groenlandica, Systematice Sistens Animalia Groenlandiae Occidentalis Hactenus Indagata, quoad Nomen Specificum, Triviale, Vernaculumque; Synonyma Auctorum Plurium, Descriptionem, Locum, Victum, Generationem, Mores, Usus, Capturamque Singuli, Prout Detegendi Occasio Fuit, Maximaque Parte Secundum Proprias Observationes.* – I.G. Rothe. Hafniae & Lipsiae: 16 + 452 pp., 1 Pl.
- Fabricius, O. 1788a. Beskrivelse over den store Grønlandske Krabbe. – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 3: 181-190, 1 Pl.
- Fabricius, O. 1788b. Field-Ræven (*Canis Lagopus*). – Nye Samling af det Kongelige Danske Videnskabernes Selskabs Skrifter 3: 423-448, 1 Pl.
- Gesner, C. 1604. De Phoca seu Vitulo Marino, p. 702-711. – *In: Historiae Animalium Liber quartus, qui est de Piscium & Aquatilium Animantium natura. Cum Iconibus singulorum ad viuum expressis ferè omnibus DCCXII. Editio*

- secunda, nouis Iconibus, necnon observationibus non paucis auctior, atque etiam multis in locis emendatior. – A. Bombresi, Francofurti: 38 + 1052 + 38 pp.
- Glahn, H.C. 1771. Anmærkninger over de tre første Bøger af Hr. David Crantzes Historie om Grønland. – København [Re-issue M. Lidegaard (ed.) 1991. Grønlands Selskabs Skrifter 30: 205 pp.].
- Gmelin, J.F. – see Linnaeus/Gmelin 1788.
- Goeze, J.A.E. 1782. Versuch einer Naturgeschichte der Eingeweide-Würmer thierischer Körper. – Blankenburg: 11 + 471, 44 Pls.
- Grew, N. 1686. The Sea-Calf or Seal, Phoca, Vitulus Marinus, p. 94-95. – *In*: Musaeum Regalis Societatis: or, a Catalogue and Description of the Natural and Artificial Rarities Belonging to the Royal Society and preserved at Gresham Colledge. – T. Malthus, London: 11 + 384 + 2 pp., 22 Pls.
- Gronovius, L.T. 1763. Phoca, p. 7. – *In*: Zoophylacii Gronoviani. Fasciculus Primus exhibens Animalia Quadrupeda, Amphibia, atque Pisces quae in Museo suo adservat, site examinavit, systematice disposuit, descripsit, atque iconibus illustravit. – Lugduni Batavorum: 2 + 136 pp.
- Gunnerus, J.E. 1784. Critiske Tanker om Kraken, Sjøormen og nogle flere Vidunder i Havet. – Nye Samling af det Kongelige Norske Videnskabs Selskabs Skrifter 1(1): 25-38.
- Halle(n), J.S. 1757. Das Seekalb (Robbe), p. 579-583, Pl. 10 (Fig. 60-61). – *In*: Die Naturgeschichte der Thiere in Systematischer Ordnung. Die Vierfüßigen Thiere, welche lebendige Jungen zur Welt bringen; nebst der Geschichte des Menschen. Mit Kupfern. – C.F. Boss, Berlin: 24 + 619 + 9 pp., 11 Pls.
- Hammer, C. 1775. Kobbe og Sælhund, p. 3-5. – *In*: Forsøg til en Norsk Natur-Historie 1, Fauna Norvegica eller Norsk Dyr-Rige. – H.C. Sander, København: 29 + 248 pp.
- Hermann, J. 1779. Beschreibung der Mönchs-Robbe. – Beschäftigungen der Berlinischer Gesellschaft Naturforschender Freunde, 4(19): 456-509, Pls. 12 & 13.
- Hill, J. 1752. The Sea-calf, Phoca, p. 554-555, Pl. 27 (p. 561). – *In*: An History of Animals, containing Descriptions of the Birds, Beasts, Fishes, and Insects of the Several Parts of the World; and including Accounts of the several Classes of the Animalcules visible only by the Assistance of Microscope. In these the Characters, Qualities, and Forms of the several Creatures are described, the Names by which they are commonly known, as well as those by which Authors, who have written on the Subject have called them are explained; and each is reduced to the Class to which it naturally belongs. Illustrated with Figures. – Th. Osborn, London: 7 + 584 + 2 pp.
- Horrebow, N. 1753. Vom Seehunde, p. 267-271. – *In*: Zuverlässige Nachrichten von Island, nebst einer neuen Landkarte und 2 Jahrl. Meteorologische Anmerkungen, aus dem Dänischen übersetzt. – F.C. Helt, Kopenhagen und Leipzig: 28 + 516 pp., 1 map.
- Houttoyn, M. 1761-1773. Zee-Beer, Zee-Leeuw, Rob of Zee-Hond, p. 3, 5, 14, Tab. II(6). – *In*: Natuurlyke Historie, of uitvoerige Beschryving der Dieren, Planten en Mineralien, volgens het Samenstel van den Heer Linnaeus, II Dieren (18 st.) – Amsterdam.*
- Jonstoni, J. 1657 (1649). De Phoca, seu Vitulo marino, p. 150-160, Tab. 44. – *In*: Historia naturalis de Piscibus et Cetus, libri V, cum aeneis figuris. – 2nd edit, I. Iacobi, Amstelodami: 8 + 160 pp. (1649 Francofurti: p. 221?).
- Juan, G. & Ulloa, A. de 1752: Voyage historique de l'Amerique meridionale fait par ordre du Roi d'Espagne II. – Amsterdam & Leipzig. (1748. Relacion historica del Viage de Orden de S. Mag. para medir algunas Grados de Meridiano, par D. Jorge Juan y D. Antonio de Ullúa. – Madrid).*
- Kalm, P. 1746. Sjä, p. 85. – *In*: Wästgotha och Bahusländska Resa, förrättat År 1742. Med Anmärkningar uti Historia Naturali, Physique, Medicine, Oeconomie, Antiquiteter, etc. Jemte nödige Figurer. – L. Salvius, Stockholm: 8 + 304 + 14 pp.
- Klein, J.T. 1760. Robbe, Phoca, p. 279-282. – *In*: Classification und kurze Geschichte der Vierfüßige Thiere, aus dem Lateinischen übersetzt, und mit Zusätzen vermehret nebst eine Vorrede von F.D. Behn. – J. Schmidt, Lybeck: 32 + 381 + 8 pp., 5 Tab.
- Knorr, G.W. 1766. Seehund, Tab. H 8. – *In*: Deliciae Naturae Selecta, oder auserlesenes Naturalien Cabinet, welches aus den drei Reihen der Natur zeigt was, von Curiosen Liebhabern aufbehalten und gesammelt zu werden verdient. Ehemals [1754] herausgegeben von G.W. Knorr ... fortgesetzt von dessen Erben, beschrieben von P.L.S. Müller, und in das Französische übersetzt von M.V. de la Blaquière 2 (Germ. & Fr.) – Nürnberg: 24 + 56 pp., 23 Pls.
- Leem, K. 1767. Sælhund, p. 212-219. – *In*: Beskrivelse over Finmarkens Lapper, deres Tungemaal, Levemaade og forrige Afgudsdyrkelse, oplyst ved mange Kaaberstykker, med J.E. Gunneri, ..., Anmærkninger. – G.G. Salikath, Kongelige Waysenhuses Bogtrykkerie, Kiøbenhavn: 14 + 544 + 2 pp., 100 Tab..
- Lepechin, I.I. 1778. Phocarum Species Descriptae. – Acta Academia Scientiarum Imperialis Petropolitaneae pro Anno 1777, I(1): 257-266, Pls. 6-9.
- Leske, N.G. 1784 (1779). Die Robbe, Phoca, p. 166-169. – *In*: Anfangsgründe der Naturgeschichte 1. Allgemeine Natur- und Tiergeschichte mit 12 Kupfertafeln. Zwote verbesserte und viel vermehrte Ausgabe. – S.L. Crusius, Leipzig: 44 + 68 + 2 pp., 12 Pls. (P. 131-132 ? in 1st edit. 1779).
- Linnaeus (C. von Linné) 1745. Siæl, Phoca, p. 256 & 270. – *In*: Ölandska och Gothländska Resa på Rikens högföflige Ständers Befallning förrättat Åhr 1741. Med Anmärkningar uti Oeconomien, Natural-Historien, Antiquiteter, etc., med åtskillige Figurer. – G. Kiesewetter. Stockholm & Upsala: 14 + 433 + 30 pp., 1 Pl., 2 maps.

- Linnaeus (C. von Linné) 1746. *Phoca dentibus caninis tectis*, p. 4, # 11. – *In: Fauna Suecica sistens Animalia Suecica Regni: Quadrupedia, Aves, Amphibia, Pisces, Insecta, Vermes, distributa per Classes & Ordines, Genera & Species, cum Differentiis Speciorum, Synonymis Autorum, Nominibus Incolarum, Locis, Habitationem, Descriptionibus Insectorum.* – L. Salvii, Stockholmiae & Lugduni Batavorum: 28 + 411 pp., 2 Pls.
- Linnaeus (C. von Linné) 1747. Skæl, p. 191. – *In: Wästgötha Resa på Riksens höglöflige Ständers Befallning förrättat år 1746. Med Anmärkninger uti Oeconomien, Naturkunnagheten, Antiquiteter, Invånornes Seder och Lefnads-Sätt. Med tilhörige Figurer.* – L. Salvii, Stockholm: 12 + 284 + 19 pp., 5 pls.
- Linnaeus (C. von Linné) 1754. *Phoca communis, Phoca dentibus caninis tectis*, p. 5. – *In: Museum S:æ R:æ M:tis Adolphi Friderici Regis Svecorum, Gothorum, etc...*, in quo *Animalia Rariora Imprimis, et Exotica: Quadrupedia, Aves, Amphibia, Pisces, Insecta, Vermes Describuntur et Determinatus, Latine et Suetice. Cum Iconibus ... (I).* – *Typographia Regia, Holmiae: 4 + 30 + 96 + 7 pp.*, 33 Pls.
- Linnaeus (C. von Linné) 1761. *Phoca vitulina*, p. 2, # 4. – *In: Fauna Suecica sistens Animalia Suecica Regni: Quadrupedia, Aves, Amphibia, Pisces, Insecta, Vermes, distributa per Classes & Ordines, Genera & Species, cum Differentiis Speciorum, Synonymis Autorum, Nominibus Incolarum, Locis, Habitationem, Descriptionibus Insectorum.* – L. Salvii, Stockholmiae, editio altera: 50 + 578 pp., 2 Pls.
- Linnaeus (C. von Linné) 1766. *Phoca*, p. 55-56. – *In: Systema Naturae per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis 1 (1 & 2). Regnum Animale. 12th edit. (Reformata).* – L. Salvii, Holmiae: 1327 + 37 pp.
- Linnaeus, C. A. /Gmelin, J.F. 1788 (ed.). *Phoca*, p. 62-65. – *In: Systema Naturae per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis 1(1). Mammalia et Aves (1). 13th edit.* – G.E. Beer, Lipsiae: 10 + 323 pp.
- Martens, Fr. 1675. Seehund, den man auch Rubbe oder Salhund nennet, p. 75-78, Taf. P(a). – *In: Spitzbergische oder Groenländische Reise Beschreibung gethan im Jahr 1671. Aus eigner Erfahrung beschrieben, die dazu erforderte Figuren nach dem Leben selbst abgerissen (so hierbey in Kupfer zu sehen) und jetzo durch den Druck mitgetheilet.* – G. Schultzen, Hamburg: 8 + 135 pp., 16 Pls.
- Mohr, N. 1786. *Phoca*, sp. # 3-7, p. 2-5. – *In: Forsøg til en Islandsk Naturhistorie, med adskillige oekonomiske samt andre Anmærkninger.* – C.F. Holm, Kjøbenhavn: 14 + 414 pp., 7 Pls.
- Molina, G.I. 1786. *Phoca Porcina & Phoca Elephantina*, p. 248-250. – *In: Versuch einer Naturgeschichte von Chili, aus dem Italiänischen übersetzt von J.D. Brandis, mit einem Landkarte.* – F.G. Jacobär, Leipzig: 18 + 328 pp., 1 map.
- Müller, O.F. 1776. *Phoca*, p. viii & 1-2. – *In: Zoologiae Danicae Prodomus, seu animalium Daniae et Norvegiae indigenarum characteres, nomina, et synonyma imprimis popularium.* – Hallager, Havniae: 32 + 282 pp.
- Müller, O.F. 1779-1780. *Ascaris species*, p. 101-102, Tab. 74, Fig. 1-3. – *In: Zoologiae Danica, seu animalium Daniae et Norvegiae rariorum ac minus notorum icones 2.* – M. Hallager, København: 4 + 124 pp., Tab. 41-80.
- Müller, O.F. 1780. Von Bandwürmen. – *Der Naturforscher 14(8): 129-203.*
- Müller, O.F. 1781. Om Bændelorme. – *Kongelige Danske Videnskabers Selskabs Skrifter Nye Samling 1: 55-96.*
- Müller, O.F. 1787. Verzeichniss der bisher entdeckten Eingeweidewürmer, der Thiere in welchen sie gefunden worden, und der besten Schriften die derselben erwähnen. – *Der Naturforscher 22(3): 33-86.*
- ? Müll. Saml. III: 249-250, 559 (? ? Sammlung russischer Geschichte, Petropolis, 1732 seq.). *
- Müller, P.L.S. 1773. Das Seekalb *Phoca*, p. 194-205, Tab. IX(5-6). – *In: Des Ritters Carl von Linne ... vollständiges Natursystem nach der zwölften lateinischen Ausgabe und nach Anleitung des holländischen Houttuynischen Werks mit einer ausführlichen Erklärung, ausgefertigt von P.L.S. Müller 1. Von den Säugende Thieren, Mit 33 Kupfern.* – G.N. Raspe, Nürnberg: 24 + 508 + 14 pp.
- Müller, P.L.S. 1776. Seelöwe & Seehunde, p. 25-26. – *In: Des Ritters Carl von Linne ... vollständiges Natursystems Supplements- und Registerband über alle sechs Theile oder Classen der Thierreichs. Mit einer ausführlichen Erklärung ausgefertigt von P.L.S. Müller.* – G.N. Raspe, Nürnberg: 16 + 384 + 20 + 536 pp., 3 Tab.
- Ödman, S. 1784. Anmärkninger om Skäl-Slägtet i Öster-Sjön. – *Konglige Svenska Vetenskaps Academiens Nya Handlinger 5: 82-86 (Germ. transl. ? p. 82).*
- Olafsen, E. 1772. Vice-Lavmand Eggert Olafsens og Land-Physici Bjarne Povelsens Reise igiennem Island, foranstaltet af Videnskabernes Selskab i Kiøbenhavn og beskrevet af forbemeldte Eggert Olafsen, med dertil hørende 51 Kobberstøkker og et nyt forfærdiget Kart over Island 1-2. – J. Lundgrens Enke, Soroe: 1042 + 31 pp.
- Olaus Magnus 1555. De piscatura Vitulorum marinorum, Liber XX, Cap. 4-7, p.701-704. – *In: Historia de Gentibus Septentrionalibus, earumqve diversis statibus, conditionibus, moribus, ritibus, superstitionibus, disciplinis, exercitiis, regime, victu, bellis, structuris, instrumentis, ac mineris metallicis, & rebus mirabilibus, necnon universis pene animalibus in Septentrione degentibus, eorumqve natura. Opus ut varium, plurimarumqve rerum cognitione refertum atqve cum exemplis externis, tum expressis rerum internarum picturis illustratum, ita delectatione iucunditateque plenum, maxima lectoris animum voluptate facile perfundens. Cum indice locupletissimo.* – Romae: 84 + 815 pp.
- Olavius, O. 1780. Oeconomisk Reise igiennem de nordvestlige,

- nordlige og nordostlige Kanter af Island, tilligemed Ole Henschels Underretning om de Islandske Svovel-Miner og Svovel-Raffinering, samt S.C. Zieners Beskrivelse af nogle Surtebrands-Fiede i Island ... med nogle Anmærkninger, Register og Forberedelse, samt et nyt Land-Charte og flere Kaaberstykker. – Gyldendal, Kjøbenhavn: 220 + 756 + 28 pp., 17 Pls.
- Pallas, P.S. 1781. Vom Seelöwen und Seebären, p. 288-290. – *In*: Topographische und physikalische Beschreibung der Beringsinsel, welche im ostlichen Weltmeer liegt. Neue Nordische Beyträge zur Physikalischen und geographischen Erd- und Völkerbeschreibung, Naturgeschichte und Oekonomie 2. – J.Z. Logon, St Petersburg und Leipzig.
- Parsons, J. 1744. Some Account of the *Phoca*, *Vitulus marina*, or Sea-Calf, shewed at Charing-Cross in February, 1742-43. – Royal Society, London, Philosophical Transactions for the years 1742 and 1743, 42: 383-386, Pl. I.
- Parsons, J. 1753. A dissertation upon the class of the *Phocae marinae*. – Royal Society, London, Philosophical Transactions for the years 1751 and 1752, 47:109-122, Pl. VI.
- Pauli, J. 1777. Der gemeine Seehund, p. 561. – *In*: Von den Tieren, Insekten und Würmen der Spitzbergischen Gegenden. Aus Herns C.J. Phips Reise nach dem Nordpol (Bern 1777: p. 95 u.s.w.). – Berlinische Samlungen zu Beförderung der Arzneywissenschaft, der Naturgeschichte, der Haushaltungskunst, Kameralwissenschaft und der dahin einschlagenden Litteratur 9(6) I: 559-597.
- Pennant, T. 1768. The Seal, p. 71-77. – *In*: British Zoology I, Class I Quadrupeds. (2nd edit.). – B. White, London: 26 + 232 pp.
- Pennant, T. 1771. Seal, sp.# 265-272, p. 339-351. – *In*: Synopsis of Quadrupeds. – J. Monk, Chester: 26 + 382 pp., 31 Pls.
- Pennant, T. 1781. Seals, p. 518-535, Pl. 51. – *In*: History of Quadrupeds 2. – B. White, London: 24 + 566 + 12 pp.
- Pernety, A.J. 1770. Loup marin de la grande espèce, p. 40, Tab. IX(1). – *In*: Journal historique d'un voyage aux Iles Malouines, fait en 1763 & 1764. – Saillant & Nyon, Paris. (Engl. Transl. 1771 London: 4 + 17 + 294 pp., 9 Pls, 1 map.)
- Perrault, C. (Charras und Dodarts) 1757. Anatomische Beschreibung eines See-Kalbes, p. 217-244, Pl. 28-29. – *In*: Abhandlungen zur Naturgeschichte der Thiere und Pflanzen, welche ehemals der königliche französischen Akademie der Wissenschaften vorgetragen worden; Mit dazu gehörigen nach den Leben gezeichneten Kupfern. Aus dem Französischen übersetzt 1. – Arkstee und Merkus, Leipzig: 26 + 346 + 12 pp., 45 Pls.
- Pliny the Elder (Caius Secundus Plinius) 1685 (23-79 A.D.). *Historiae Naturalis libri XXXVII quos interpretatione et notis illustravit J. Harduinus*. – Edit. Parisiis 1685 (edit. altera 1723).
- Pontoppidan, E. 1752. Kobbe eller Sælhund, p. 203-209, Pl. p. 212. – *In*: Det første Forsøg paa Norges Naturlige Historie, forestillende dette Kongeriges Luft, Grund, Fiede, Vande, Væxter, Metaller, Mineraler, Steen-Arter, Dyr, Fugle, Fiske og omsider Indbyggernes Naturel, samt Sædvaner og Levemaade. Oplyst med Kobberstykker 2. – Berlingske Arvingers Bogtr. v. L.H. Lillie, Kjøbenhavn: 26 + 462 + 23 pp.
- Pontoppidan, E. 1763. Sælhund, p. 639, 643. – *In*: Den Danske Atlas, eller Konge Riget Danmark .. Land-Beskrivelse 1. – A.H. Godiche, Kjøbenhavn: 9 + 3 + 40 + 2 + 28 + 723 pp., 30 Pls.
- Ray (Rajo), J. 1693. *Phoca seu Vitulus Marinus, Angl. The Sea-Calf or Soile*, p. 189-191. – *In*: Synopsis Methodica Animalium Quadrupedum & Serpentina Generis. Vulgarium Notas Characteristicas, Rariorum Descriptiones integras exhibens: cum Historiis & Observationibus Anatomicis perquam curiosis Praemittuntur nonnulla de Animalium in genera, Sensu, Generatione, Divisione, &c. – R. Southwell, S. Smith & B. Walford, Londini: 16 + 336 + 8 pp.
- Rondeletti, G. 1554. De Vitulo maris mediterranei et oceani, p. 453-458. – *In*: Libri de Piscibus marinis, in quibus verae Piscium effigies expressae sunt, que in tota Piscium historia contineantur, indicae Elenchus pagina nona & decima. Postreme accessarunt Indices necessarii. – Matthiam Bonham, Lugduni Gallorum: 16 + 583 + 24 pp.
- Rzaczyński, P.G. 1736. *Phoca seu Vitulus marinus*, p. 244-245. – *In*: Auctuarium Historiae Naturalis curiosae Regni Poloniae, Magni Ducatus Lithuaniae, annexarumque Provinciarum. – I.I. Prevssii, Gedani: 4 + 504 pp.
- Schreber, J.C.D. von 1775-1778. Der Robbe, *Phoca*, p. 285-316, Pl. 82-86. – *In*: Die Säugethiere in Abbildungen nach der Natur, mit Beschreibungen 3. – W. Walther, Erlangen: 284-590.
- Scopoli, G.A. 1777. Pusa & *Phoca*, p. 490. – *In*: Introductio ad Historiam naturalem Sistens Genera Lapidum, Plantarum et Animalium hactenus detecta, characteribus, essentialibus donata, in Tribus divisa, subinde ad leges naturae. – W. Gerle, Pragae: 8 + 506 + 34 pp. (cfr. Hermann 1779: 464-465).
- Sibbald, R. 1684. *Phoca sive Vitulus Marinus*, p. 10. – *In*: Scotia illustrata, sive Prodromus Historiae Naturalis in quo Regiones natura, Incolarum Ingenio & Mores, Morbi iisque medendi Methodus & Medicina Indigena accurati explicantur: et multiplices Naturae Partus in triplice ejus Regno, Vegetabili scilicet, Animalium & Mineralium per hanc Borealem Magnae Britanniae Partem, quae Antiquissimum Scotiae Regnum constituit, undiquaque diffusi nunc primum in Lucem eruuntur, & varii eorum Usus, Medici praesertim & Mechanici, quos ad Vitae cum necessitatem, tum commoditatem praestant, cunctis perspicue exponuntur. Cum Figuris aeneis. Pars Secunda Specialis. Tomus Secundus de Animalibus Scotiae tam feris quam domesticis, et de Metallis et Marinis Scotiae. – J. Kniblo, J. Solincensis & J. Colmarii, Edinburgi: 6 + 56

- + 16 pp.
- Stauning, J. 1775. Om de fireføddede Søedyr eller Sælhundene, 5. Kap., p. 140-152. – *In*: Kort Beskrivelse over Grønland. – Kongelige privilegerede Bogtrykkerie C.H. Mangor, Viborg: 14 + 328 pp.
- Steller, G.W. 1751. De Bestiis Marinis. – *Novi Commentarii Academiae Scientiarum Imperialis Petropolitaneae* 2, ad Annum 1749: 289-398, 3 Pls.
- Steller, G.W. 1774. Seehunde, p. 97 & 107-112. – *In*: Beschreibung von dem Lande Kamtschatka, dessen Einwohnern, deren Sitten, Nahmen, Lebensort und verschiedenen Gewohnheiten, herausgegeben von J.B. Scherer, mit viele Kupfern. – J.G. Fleischer, Frankfurt & Leipzig: 8 + 384 pp., 8 Pls, 2 maps.
- Strøm, H. 1762 & 1766. Physisk og oeconomisk Beskrivelse over Fogderiet Søndmør, beliggende i Bergen Stift i Norge 1 & 2. – Soroe: 16 + 570 pp., 4 Pls., 1 map.
- Torfaeus (Torfason), T. 1706. De generibus phocarum & cetorum ex speculo regali Islandico, Cap. XII, p. 87-89. – *In*: Groenlandia antiqua, seu Veteris Groenlandiæ Descriptio, ubi coeli marisque natura, terrae, locorum & villarum situs, animalium terrestrium, aquatiliūqve varia genera, Gentis origo & incremento, status Politicus & Ecclesiasticus, gesta memorabilia & vicissitudines, Antiquis memoriis, præcipue Islandicis, qva fieri potuit industria collecta exponuntur – Typ. Regiæ Majest. & Universis., Havniae: 64 + 269 + 19 pp., 5 Tab.
- ? Woodes Roggers Voyag. I:207, 223. *
- Worm, O. 1655. Phoca, p. 289. – *In*: Museum Wormiani seu Historia Rerum Rariorum, tam Naturalium, quam Artificialium, tam Domesticarum, quam Exoticarum, quæ Hafniæ Danorum in ædibus Authoris servantur .. Variis & accuratis Iconibus illustrata. – I. Elsevirium, Lugduni Batavorum: 14 + 389 + 3 pp., 2 Pls.
- Zorgdrager, C.G. 1750. Die Robben, p. 191-198. – *In*: Beschreibung des Grönländischen Walfischfangs und Fischerey, nebst einer gründlichen Nachricht von dem Bakkelau- und Stockfischfang bey Terreneuf, und einer kurzen Abhandlung von Grönland, Island, Spitzbergen, Nova Zembla, Jan Mayen Eiland, der Strasse Davids u.a. Aus dem Holländischen übersetzt, und mit accuraten Kupfern und Land-Charten gezieret. – G.P. Monath, Nürnberg: 4 + 370 + 12 pp.

Otto Fabricius,
a Pioneer in the Study of Seals
Finn O. Kapel

Otto Fabricius, a Pioneer in the Study of Seals

Introduction

Otto Fabricius (1744-1822) was known as a prominent personality within the missionary work in Greenland, the study of the Greenlandic language, as well as in ethnography and natural history. In the two last-mentioned disciplines his pioneering work has been of decisive significance for all subsequent ethnographical and scientific research relating to Greenland. His principal work in natural science, *Fauna Groenlandica* (1780), was widely known by his contemporaries, being written in Latin, the international scientific language of that time, whereas the remainder of his scientific contributions to natural history, written as they were in Danish, received only restricted distribution outside Scandinavia and for that reason are known today by a few specialists only. A short presentation of Otto Fabricius' life and achievements in natural science and several other fields is given in another paper by the present author (Kapel 2005, *this volume*).

Among the scientific works of Fabricius a treatise on the seals of Greenland, presented verbally in March and December 1790 in the Danish Society of Natural History and published in the journals of that society in 1790 and 1791, deserves special attention, on a par with the attention due to *Fauna Groenlandica*. A translation into English of this work compiled by the present author is published simultaneous with the present paper (Fabricius/Kapel 2005, *this volume*).

The state of knowledge of seals according to *Systema Naturae*

In the 10th edition of *Systema Naturae* (1758: 37-38) Linnaeus acknowledged four species of *Phoca*, including the walrus (*Ph. rosamarus*); in the 12th edition (1766: 55-56) that species was moved to another genus (*Trichechus*) and sub-order (*Bruta*, together with manatees, elephants, and others), leaving only three *Phoca*

species: *Ph. ursina* (Steller 1751), *Ph. leonina* (Anson 1749, Ellis 1750),⁸² and *Ph. vitulina*; for the last-mentioned species reference was given to the *Vitulus marinus* of earlier writers (Gesner 1604, Aldrovandi 1638, Jonstoni 1657, Dodart 1733(?), Ray 1693), indicating that it was attached to European waters, and the description was short and general, fitting any species of 'true' (earless) seal.

Linnaeus did not mention any of the Norse or Nordic sources available in his time: *Speculum Regale* (Anon. 1768) and Torfaeus (1706) mentioned six kinds of seals (in addition to the 'rosmer', and some fabulous marine creatures); Debes (1673) distinguished between two kinds of seals off the Faroe Islands; Horrebow (1753) mentioned three from Iceland, Pontoppidan (1752) four from Norway, and Egede (1741) three or four from Greenland. Admittedly the descriptions in these works were not very precise, and the few illustrations were poor, but it is strange that Linnaeus ignored all this information completely.

Of those mentioned by Torfaeus (1706: 88), the hooded seal is recognizable under the Icelandic name 'Blaudru Selur' (bladder-seal, also used by Olafsen 1772: 532). In a rather poor illustration, Egede (1741: 46) listed three kinds of seals by their Norwegian names: 'Spraglet', 'Svartsiide' and 'Klapmüts' (Fig. 32). Ellis (1750: Tab. 7) presented another (just as poor!) illustration of the two last-mentioned: 'seal with a black side' and 'seal with a cawl' (Fig. 34). The ringed seal was not explicitly mentioned by Egede although the hunting methods depicted on his plate p. 58 apply mainly to that species, but this does not appear clearly from the creatures shown in the illustration (Fig. 30).

The early history of identification of the bearded seal is somewhat obscure. Already in the Nordic saga literature (Anon. 1768, *Speculum Regale*) a large seal called 'Grænselr' or 'Gramselr' was mentioned, which is also referred to by Torfaeus (1706: 87) and later by Olafsen (1772: 532) under the name 'Gramselur', said to be even larger but much rarer than the 'Utselur'.

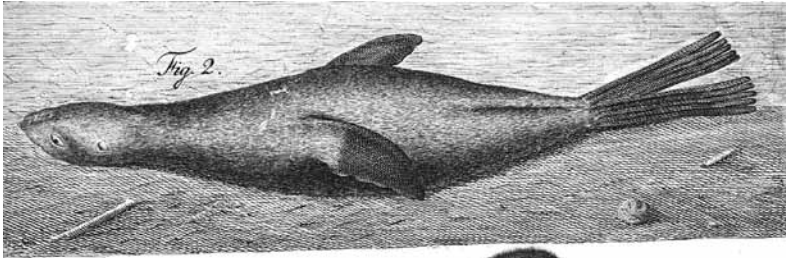


Fig. 41. Male (Fig. 1) and female (Fig. 2) of Steller's 'See-Bär', Linnaei *Phoca ursina* [Northern Fur Seal, *Callorhinus ursinus*] (Steller 1751: Tab. 15).

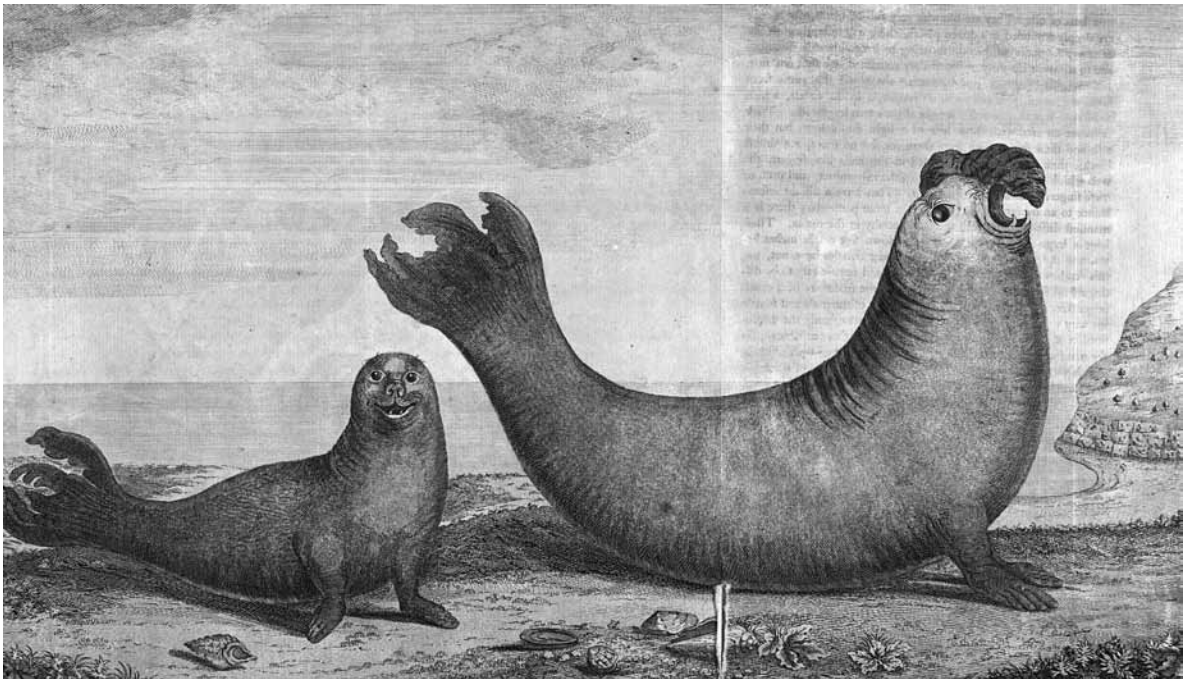


Fig. 42. Female and male of Anson's Sea Lion, Linnaei *Phoca leonina* [Southern Elephant Seal, *Mirounga leonina*] (Anson 1749: 122, Pl. 19).

Parsons (1744: 383-386, Pl. I) described and depicted a large 'Sea-Calf, *Phoca, Vitulus marina*' which was possibly a young bearded seal; one indication of this was the fact that four teats can be clearly seen on his figure (Fig. 35). In a later paper (1753) Parsons referred to the specimen as 'the long-bodied seal'. Steller's '*Phoca maxima*', or 'Die gröste Meerkalber' from the Kamtchatka region (1751: 290; 1753: 43) was not described in any respect apart from its great size, but the local name 'Lachtak' reveals that he was in fact referring to the bearded seal. Egede (1741) did not mention the species in Greenland explicitly.

From 'Historie von Grönland' to 'Fauna Groenlandica'

In 1765, a year before the 12th edition of *Systema Naturae* David Cranz published his '*Historie von Grönland*'. Cranz (1723-1777) was a secretary to the Moravian sect in Germany, who spent the year 1761-1762 at the mission station Neu-Herrnhut near Godthaab (Nuuk) in West Greenland. After his return he described the country, its inhabitants, and especially the history of the Moravian mission in Greenland (since 1733). In Cranz' bulky book (more than 1100

pages) all the five seal species in Greenland were for the first time identified by their Greenlandic names (p. 161-172); the descriptions of the individual species were not particularly detailed or precise, but these twelve pages should nevertheless become crucial to later accounts of northern seals, in two ways. Firstly, Cranz' description of Greenland, written in German and soon translated to English, Dutch, and Swedish, became widely distributed and was often cited in topographical and scientific literature; secondly, it provoked a reaction from the part of the Danish national mission in Greenland, which viewed with mistrust at activities of the Moravian Brothers considering them competing rather than assisting in converting the Greenland heathen to the true faith.

In 1771 appeared a very detailed commentary to Cranz' 'History'; the anonymous author of this work was a national Danish missionary, H.C. Glahn (1738-1804), who served at Sisimiut (Holsteinsborg) 1763-1769. Cranz and Glahn used the Greenlandic names 'kassigiak' and 'atarsoak' (or 'atak') for Egede's 'spraglet' and 'svartsiide' respectively. The first description of the ringed seal appeared in Cranz (1765) under the Greenlandic name 'neitsek'; Pennant (1771) called it 'the rough seal', apparently referring to Cranz' description of the pelage.



Fig. 43. It is difficult to make out which kind of seal Cranz was referring to in this illustration, and also the representation of the kayak, the harpoon, and the house in the background called for a number of corrections (Cranz 1765: Pl. 4).

82. The first species (Steller 1751: Tab. XV Fig. 1) is clearly identical to what presently is known as Northern Fur Seal (*Callorhinus ursinus*); Anson's 'sea lion' (1749: Pl. XIX) is the Southern Elephant Seal (*Mirounga leonina*) – but Linnaeus started the confusion about that species by including a reference to Ellis (1750: Tab. 7 Fig. 4) which is a poor illustration of a seal found in the Hudson Bay, namely the hooded seal (*Cystophora cristata*)!

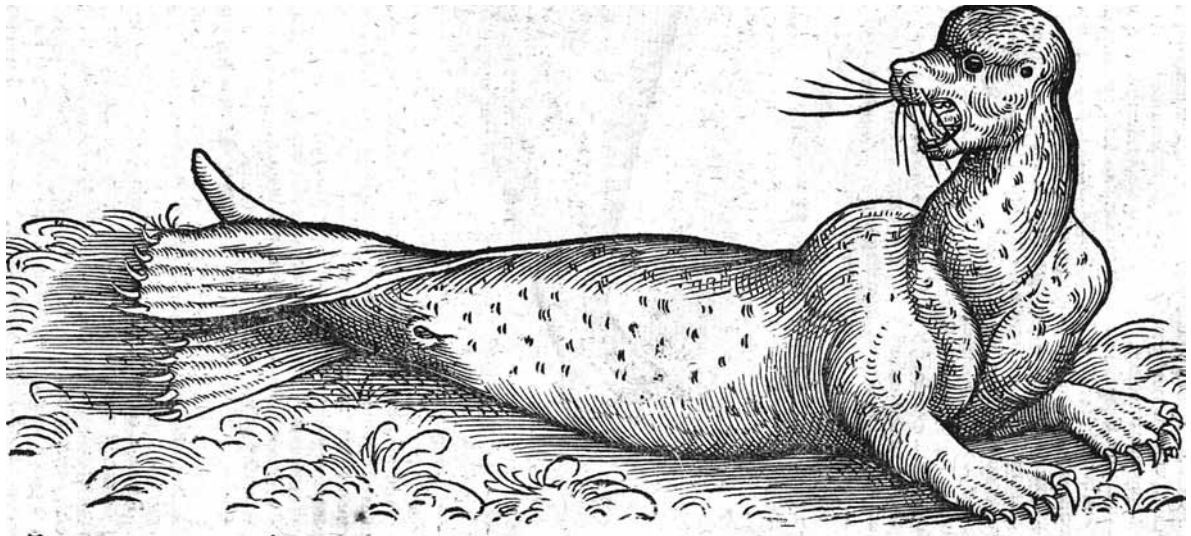


Fig. 44. "From a friend I once received this picture of *Vitulus marinus ex Oceano*" (Gesner (1558) 1604: 706).

Cranz (1765: 164) and Glahn (1771: 157) referred to the hooded seal by the Greenlandic name 'neitser-soak'. Pennant (1771: 342) was apparently the first author to call it the hooded seal. Finally, Cranz (1765: 165) and Glahn (1771: 157) used the Greenlandic name 'uksuk' for the bearded seal.

In the introduction to *Fauna Groenlandica* Fabricius mentioned that before his emision to Greenland, the head of the Council of Mission imposed on him to use his leisure on studies of the nature of the country. Obviously, the reason behind this order might have been the wish to counteract the account of Cranz, which in many respects surpassed those of Hans Egede (1741) and his sons. It is likely that similar orders were issued to other missionaries sent to Greenland, and that this explains the appearance of Glahn's commentary on Cranz' 'History'. In *Fauna Groenlandica* (1780) Fabricius referred to Cranz as well as to Glahn, and in his seal monograph (1790 & 1791) quite a few footnotes were used for correcting Cranz' statements, most often supporting Glahn's commentaries but sometimes also making amendments to the latter.

When Otto Fabricius set out to work as a missionary at Frederikshaab (Paamiut) in southern Greenland, he was – as he states himself – in no way a trained naturalist, and his only reference book was a specimen of Linnaei *Systema Naturae*. In all probability it was the 10th edition (1758), but it could have been the 12th (1766-1768). As far as we know he did not get

the opportunity to augment his library with respect to natural history during his stay in Greenland. It is, however, likely that he was familiar with Hans Egede's topographical description of Greenland (Egede 1741), because this prime missionary of Greenland had been a regular visitor in Otto's paternal home, and because his son Poul Egede was the principal teacher at the missionary school at the time when Otto Fabricius concluded his study.

Fabricius gained his knowledge of the seal species occurring in Greenland during his stay in the country 1768-1773, and in the process of working on his own manuscript during his time of office 1775-1779 in Drangedal (southern Norway) he was able to contribute to the work of O.F. Müller, *Zoologiae Danicae Prodrromus* (1776). In the main text of this work only one seal species, *Phoca vitulina*, was mentioned (Müller 1776: 1-2, species # 3) with the same short characteristic as Linnaeus (1766: 56): *capite laevi inauriculata* (smooth head without ear lobes), adding a long list of Nordic vernacular names with reference to *Speculum Regale* (Anon. 1768), Debes (1673), Egede (1741), Cranz (1765), Leem (1767), Aphelen (1770), and Olafsen (1772), and concluding with the question: varieties or species? In the preamble, however, Müller (1776: viii), with reference to O. Fabricius, listed the other four species of 'true' seals in Greenland (*Ph. leonina*, *foetida*, *groenlandica* & *barbata*) as scientific *nomen nuda*, i.e. without descriptions (but accompa-

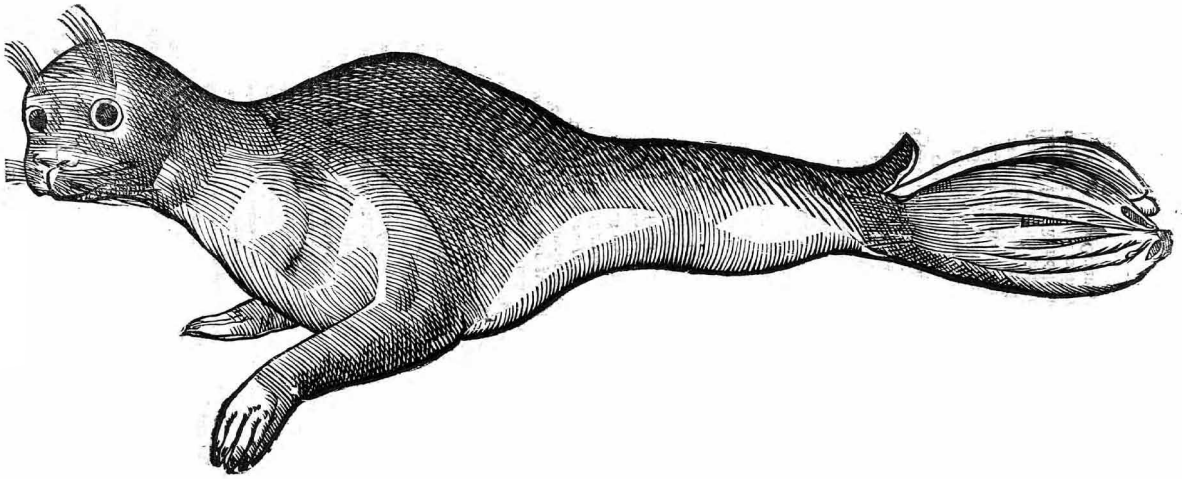


Fig. 45. The inquisitive gaze and the tiny erect tail of this *Vitulus marinus* are those of a seal – but which one? (Aldrovandi 1638: 724).

nied with correct vernacular names in Greenlandic).⁸³

In *Fauna Groenlandica* (Fabricius 1780: 7-17) all five species were presented with short but concise descriptions that allow unambiguous discrimination between the five species. In addition, some information on habitat, food, reproduction, use, and hunting methods was added.

After returning from Greenland in 1773, Fabricius evidently got access to a wider range of reference works, and he began to build up his own library. This was probably not very large during his stay in Drangedal – where the greater part of *Fauna Groenlandica* was written, but in addition to the 12th edition of *Systema Naturae* he made reference to about a dozen other publications in the section on seals. Most of these are topographical accounts by earlier visitors to northern regions (e.g. Adelung 1768, Cranz 1765, Debes 1673, Egede 1741, Ellis 1750, Glahn 1771, Horrebøw 1753, Leem 1767, Olafsen 1772, and Torfaeus 1706); few of them can be called scientific contributions to the study of nature (Linnaeus 1746, Pontoppidan 1752, Buffon & Daubenton 1770, and Müller 1776).

In the treatise on seals (Fabricius: 1790 & 1791), the number of references had increased considerably (to about sixty) including both ancient writers

(Aristotle, Pliny, Aelian), the saga literature (*Olav Tryggvason's, Speculum Regale*), a number of 16th and 17th century works (e.g. Rondeletti 1554, Belon 1555, Olaus Magnus 1555, Gesner 1604, Aldrovandi 1638, Jonstoni 1657, Jonae 1643, Worm 1655), as well as supplementary voyage accounts and topographical descriptions (Martens 1675, Dampier 1717, Zorgdrager 1750, Anson 1749, Gmelin 1751-1752, Strøm 1762 & 1766, Olavius 1780), and contemporary scientific authors (e.g. Steller 1751, 1753, Pennant 1771 and 1781, Schreber 1775-1778, Erxleben 1777, Lepechin 1778, Hermann 1779, Gmelin 1788). Considering that Fabricius' main daily occupation was to serve as a man of the church, it is remarkable how well-grounded he was in the relevant scientific literature; only a few works appear to have escaped his attention (Zimmermann 1778 & 1780, 1782, Boddaert 1785).

The contemporary 'early technical writers'

At the same time as Fabricius was working on the manuscript of *Fauna Groenlandica* in the remote valley of Drangedal, some important contributions to the study of seals were published elsewhere in Europe (Schreber

83. For one species, Neitersoak (the hooded seal), Müller (Fabricius) used the Linnaean name *Phoca leonina*, supposing it (correctly) to be identical to the "seal with a cawl" of Ellis, and (incorrectly!) to the 'sea lion' of Anson (Southern elephant seal). The other three species were in this place for the first time given a scientific name. Icelandic vernacular names were also added, correctly for hooded, harp and bearded seal.

1775-1778, Erxleben 1777, Lepechin 1778, Hermann 1779), and over the following decade a number of other works made attempts to summarize the available knowledge of seals (e.g. Gmelin 1788). This period (1776-1792) was later characterized by Allen (1880: 460) as the 'period of the early technical writers'.

In order to evaluate Fabricius' contribution to the study of seals, a comparison of his description of the seals in Greenland with the contemporary works of Schreber (1775-1778), Erxleben (1777) and Lepechin (1778) is illustrative.

Schreber 1775-1778

J.C.D.E. von Schreber (1739-1810), a disciple of Linnaeus, studied in Halle and Uppsala, and acted from 1770 as professor at the University of Erlangen.

The volume III of Schreber (1775-1778) examined by me was published in 1778, but an earlier version must exist, since Erxleben (1777) referred to it. The treatment of 'Der gemeine Seehund', *Phoca vitulina* (p. 303-309) was detailed and is followed by short descriptions of three varieties which he hesitated to call distinct species: 'Der graue Seehund', 'Der sibirische Seehund', and 'Der caspische Seehund' (p. 309-310). He made reference to about 35 earlier works, some of which are doubtful in this context. The account was in many respects a valid description of 'the seal', but it contained several examples of information pertaining more properly to other species, and some almost mythical statements were uncritically carried over from earlier accounts. The accompanying illustration (Fig. 31) was the melancholy-looking dog-headed seal of Buffon & Daubenton (1765, Tab. 84).

The next species was called 'Der schwarzseitige Seehund' (p. 310-312), making reference to the 'Svartsiide' of Egede (1741), as well as to Cranz (1765), Olafsen (1772), Pennant (1771), and Steller (1774), adding that it is called 'Sattler' by the furriers. A scientific name was not offered. The description was short: "It has a tapering head and a thick body. A fully-grown seal is mostly whitish grey with a black shield at the back like two half-moons with the tips pointing upwards towards each other. Some completely black specimens are also found. It often changes colour, is born white and woolly, becomes pale white in the first year, grey in the second, and does not become spotted until the third year. In the fifth year it is fully-grown and gets the complete shield. It grows up to eight feet

long." He further reported that this species is found along the coasts of Iceland, Greenland, Spitsbergen, Labrador and Newfoundland – and that it is the most common species in Greenland, but leaves the coast twice a year, firstly in March producing the young in April at some unknown place, returning in late May or early June in a very lean condition. In the second place it leaves the coast in July, returning in September now being fat. He added some thoughts about its possible migration routes during the intervening periods. He further mentioned that the seals swim in a straight line in large flocks led by a large specimen which in Iceland called 'Robbenkönig' (seal king). He concluded with a few notes on the use of blubber and pelts, and how the hunting is carried out. Clearly, most of this description was taken from Cranz (1765) and partly from Olafsen (1772).

The next kind of seal mentioned by Schreber was 'Der rauhe Seehund' (p. 312), with references to both Cranz (1765) and Pennant (1771). His seven-line description said: "The hairs do not lie close against the body but stand up roughly like a pig's bristles. The colour is pale white to brownish, and blackish around the eyes. The size is not very different from that of the two preceding seals. It is caught along the coast of Greenland and Labrador, and the pelts are used locally for clothing, with the hairs worn inward (Cranz)". The accompanying illustration (Tab. 86), on which the scientific name *Phoca hispida* appeared for the first time, has little resemblance with a ringed seal, the neck being far too long and the colour not characteristic (Fig. 49).

Schreber (p. 312-313) presented 'Die Klappmütze' as a separate species (distinct from Linnaei *Phoca leonina*), referring to Egede (1741) and Pontoppidan (1752), with the following short description: "At the front this seal has a wrinkled skin fold, almost a bladder, which it can draw down over its eyes in order to protect them from sharp rolling stones and sand during storms and among heavy waves. Between the white hairs is found a short, dense, black wool which gives the pelt a beautiful grey colour. It is much larger than the previous one [*hispida*] (Cranz 1765). It is caught in the southern part of Greenland (Cranz 1765), at the west coast of Iceland (Olafsen 1772), and at Newfoundland (Pennant 1771). Due to the above-mentioned skin fold it is difficult to kill." A scientific name was not given.

Schreber next mentioned 'Der grosse Seehund' (p. 313-314), and he cites Parsons (1744), Steller (1751), Cranz (1765), Buffon & Daubenton (1765), Pennant (1771), and Olafsen (1772). He wrote: "The hairs are blackish, in colour not unlike those of the common seal, but much darker although becoming whitish with age; it is, however, much greater, up to ten feet long. It is found in the southern part of Greenland, and commonly in Iceland. The female gives birth in withered grass in November and December, three to four weeks before Christmas. Those that are found closer to the coastline are whelping a couple of weeks earlier. The young is white to begin with, but changes colour later like the other species. The skin is very thick. The Greenlanders use it for cutting thongs for seal hunting. In Iceland, another large species of seal is found, called 'Gramselur' (Olav Tryggvason, *Speculum Regale*, and Olafsen). It is said to be 24-30 Icelandic feet long, having long hairs at the head, and being seen very rarely. Whether the latter in fact is different from the 'Utselur' [Olafsen 1772] is not known.' Schreber was clearly mixing two species; in a note he remarked that the four teats in Parsons' illustration were unusual for the genus *Phoca*.

Erxleben 1777

J.C.P. Erxleben (1744-1777) studied at the University of Göttingen, was Lecturer there since 1766, Professor 1775, and the author of textbooks in chemistry, physics and natural history forming the basis for many generations of students in Germany.

The introduction to the treatment of *Phoca vitulina* (Erxleben 1777: 583-587) was the same species characteristic as used by Linnaeus and Müller ('capite laevi inauriculata') with the addition: 'dark body'. Then followed a long list of vernacular names and about forty references, from Rondeletti (1554) to Müller (1776), most of which pertained to this species. His description of the appearance of the species was brief but generally valid and sufficient. On the habitat he stated that it is a coastal marine, primarily boreal species found in North America, Greenland, Spitsbergen, Northern Europe and Russia; 'possibly the same species is found around New Zealand' (p. 587). Some information on occurrence, behaviour, food, and local use was given. He stated that mating takes place in April, whelping in winter (February) or spring, and that the pup is born white, is being nursed

for two weeks and changes to a yellowish coat after four weeks; these reproductive data were in all probability quoted from previous writers, and are not compatible with present-day knowledge, evidently due to mixing and confusion with other species. Finally, Schreber's three possible varieties, if not distinct species were mentioned: 'der graue', 'der sibirische', and 'der capische Seehund' (p. 587-588).

For the next species Erxleben adopted the name *Phoca groenlandica*, with reference to Müller (1776: viii); other references were to various vernacular names cited by Egede (1741), Ellis (1750), Cranz (1765), Pennant (1771), Steller (1774), and Schreber (1775-1778). The short characterization (p. 588-589) said: 'a seal with a smooth in-auriculate head, a grey body with a black moon laterally', to which was added that the body length is nine feet, the head more acute than in *vitulina*, the body thick, extremely fat, whitish grey, that the lateral moon-mark has the tips pointing upwards, and do not become visible until the fifth year. The Greenlanders' name for the wool-haired white foetus, and for the following age stages were mentioned (evidently from Cranz 1765). The habitat was said to be Greenland and Newfoundland, as well as around Kamtchatka, and possibly also in Lake Baikal. It was said to be the most important species in respect to pelts as well as amount and quality of oil. The description of the migrations was short but similar to that of Schreber, evidently quoted from him or directly from Cranz and Olafsen.

Erxleben (p. 589-590) adopted Schreber's name *hispida* as well as his 'rauhe Seehund' and Pennant's 'rough seal', but mentioned also Cranz' 'neitsek' and Müller's *Ph. foetida*, and (erroneous) the Icelandic name 'Utsel' without giving any reference for that. In addition, he made reference to Parsons' (1753) 'long-necked seal' citing his description, however putting a question mark after that. His own description was short: "a seal with a smooth in-auriculate head, a pale dark body with roughly bristling hairs, blackish around the eyes. The size is like that of the preceding species [*groenlandica*]. Habitat in Greenland and Labrador." – Clearly, he is citing Schreber almost literally.

Erxleben (p. 590) introduced the scientific name *Ph. cristata* for the hooded seal, adding the short characteristic: *capite antice cristato, corpore griseo* (i.e. grey as distinct from the *fusco*, 'dark', used of Anson's *Ph.*

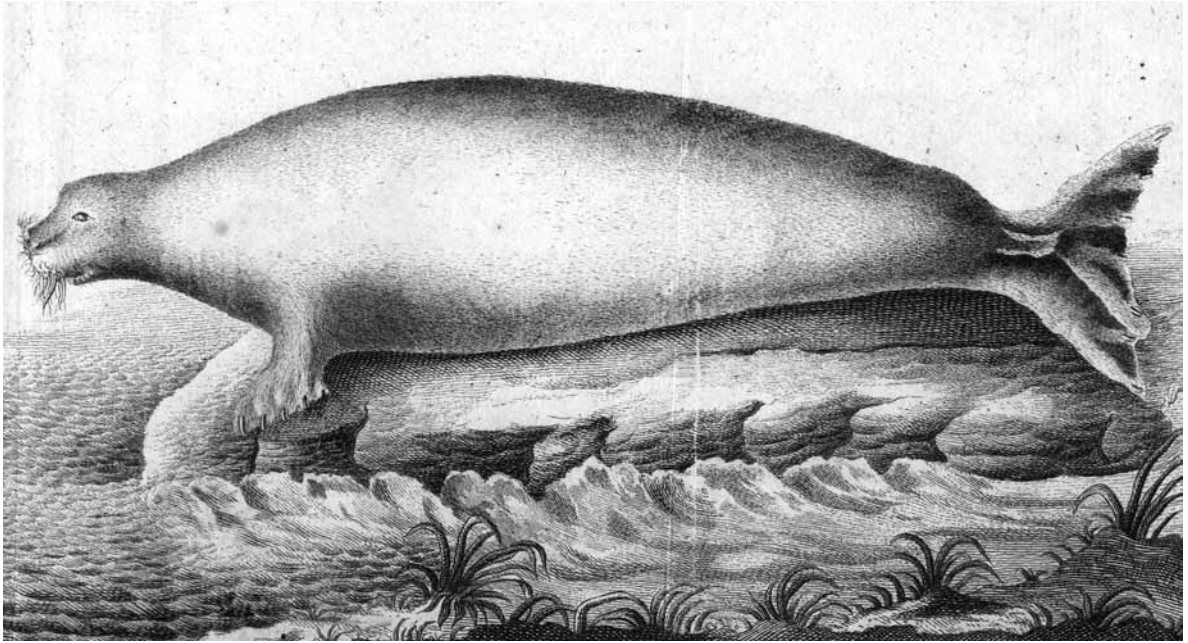


Fig. 46. "There might be reason to consider the *Phoca leporina* of Lepechin a young bearded seal .. but the colour, the shape of the fore flipper, the number of teeth, etc are against this (Fabricius 1791: 157)" (Lepechin 1778: Tab. 8).

leonina). His description was very short, evidently taken from Schreber (or perhaps directly from Cranz): "much greater than the previous one [*hispidus*]. At the front a strong, wrinkled skin fold that can be drawn over the eyes and nostrils. Colour beautifully grey: white hairs, dense black wool. Habitat in southern Greenland and Newfoundland. It is not killed by blows at the head if the frontal skin fold is not withdrawn. Possibly the same animal as *Ph. leonina*?" In addition to Schreber, reference was made to Egede (1741), Ellis (1750), Cranz (1765), and Pennant (1771).

Erxleben (p. 590-591) adopted the name *barbata* with reference to Müller (1776); other references were Parsons (1744, 1753), Steller (1751), Buffon & Daubenton (1765), Cranz (1765), Pennant (1771), and Schreber (1775-1778). The names 'Uksuk/Urksuk', 'Lactak', and 'Gramselr' were also mentioned (but not 'Utselr' which he listed under *hispidus*). His species characteristic was: "a smooth in-auriculate head, blackish body" and his short description continued: "similar to *vitulina*, body length up to 12 feet. Thick skin, hairs blackish. Habitat: at Scotland and southern Greenland, common around Iceland. Gives birth to a white pup in November-December. May be the female of the preceding one [*cristata*]?"

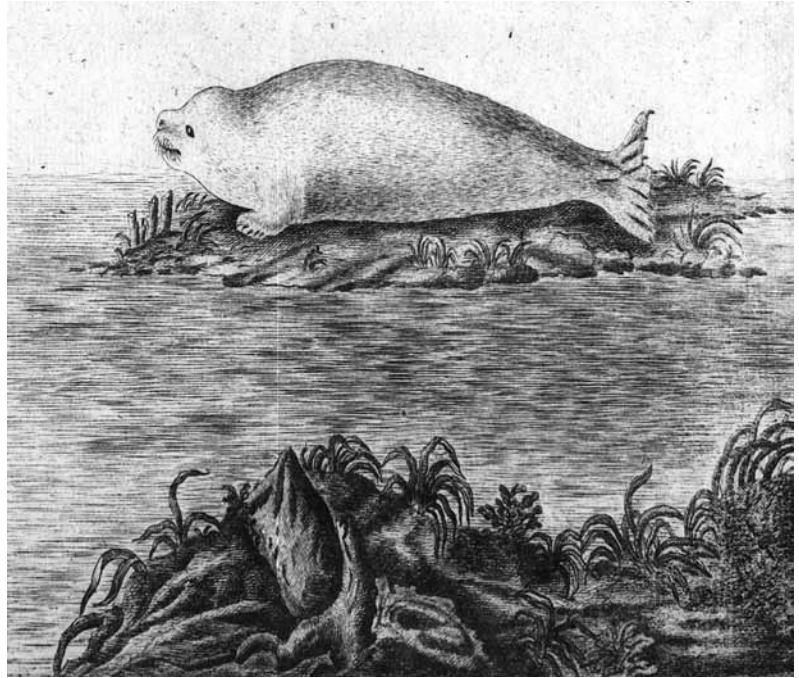
Lepechin 1778

I.I. Lepechin (c. 1739-1802) studied in Strassburg, but was repatriated by Tsarina Katharina II to explore the Russian empire, and acted from 1783 as permanent secretary to the Scientific Academy of St. Petersburg.

Lepechin (1778) described two seal species from the White Sea area. The first of these was called *Phoca oceanica*, with a reference to Steller (1751). He stated that the Russian name is 'Krylatca' (which, however, appears to be *Histiophoca fasciata* Zimmerman (Zemskogo 1980: 11, 51-54)). He began his description with a long list of measurements (p. 259-260), e.g. a total length of 5 feet 7 inches to the tip of the tail. He continued (p. 261-263) with a detailed description of the general appearance of the species, the dentition, tongue, whiskers, eyes, fore and hind flippers, the skin and the colour of the adult (characterizing the colour of the head and the half moon shield as dark castaneous); further, various age stages with their Russian names (translated as *albicantes* and *maculatae* in Latin) were mentioned. This description, and the accompanying illustrations of an adult and a three-foot long young seal (Tab. VI & VII; Figs 20 & 21) leave little doubt that the species was very similar or identical to that described by Cranz (1765).

The author discussed (p. 263-265) that possibility

Fig. 47. The soft and white coat of the *Phoca leporina* pup does not indicate a bearded seal pup (Lepechin 1778: Tab. 9).



and arrived at the conclusion that they represented two different species, based on the argument that Cranz' description of the colour variation according to age differed from his own, and particularly Cranz' statement that the pups were born completely white and woolly, whereas Lepechin maintained that those in the White Sea were grey with small dark spots. He suggested that Cranz was mixing up two species, the *groenlandica* with his own second species *leporina* which according to him gives birth to a white, woolly pup. This argument is hardly tenable; it appears that he himself was mixing two species. As indicated above, his description of *oceanica* and the excellent illustration of the adult seal (Tab. VI) indicate clearly that it is identical to *groenlandica*. If the quality of the other illustrations is as good as the first one, Tab. VII shows a moulted harp seal pup rather than a new-born 'white-coat'.

The description of the second species *Ph. leporina* (p. 264-266), is not quite as convincing as the previous ones, but later authors have generally indicated that Lepechin was dealing with the (immature) bearded seal (*barbata*). Some details of the description and the illustration of the large specimen (Tab. VIII; Fig. 46) support this opinion, but the statement that the coat of the pup is soft and white like that of a hare (*Lepus*) does not suit the characteristics of a bearded seal pup,

neither does the illustration of that one (Tab. IX; Fig. 47); it has no resemblance whatsoever to a bearded seal pup; if anything, it is a rather good illustration of a well-fed harp seal 'whitecoat' some days after birth but before moulting.

Fabricius 1780 and 1790-91

The short species characterization of *Phoca vitulina* in *Fauna Groenlandica* (Fabricius 1780: 9-11) was the same as in Linnaeus (1766) and Müller (1776): '*capite laevi*' but continued: "rather thin neck, medium long snout, almost cylindrical body, and undulating whiskers of a colour like marrow". As mentioned above, the list of synonyms was rather short: in addition to Linnaeus (1746, 1766) primarily Nordic writers were listed, supplemented by Adelung (1768) and Buffon & Daubenton (1770). These authors were, however, not referred to in the text which was based mainly on own observations and information from hunters in Greenland. Following a list of various Greenlandic names according to age, the size, dental formula, the shape of the head, body and neck, the hair types and colour were described, as well as the quality of the blubber and the red meat (considered the preferred seal meat in Greenland). Some information on habitat, occurrence, behaviour and food in Greenland was also given. Fabricius stated that mating takes place in

September, and that a single, dark-backed pup is born at the beaches in June. Finally, the use of the meat, blubber and skin, and the hunting methods in Greenland were mentioned.

As regards *Phoca groenlandica*, Fabricius (1780: 11-13) referred to his own specific name cited by Müller (1776: viii), to various vernacular names in Egede (1741), Ellis (1750), Cranz (1765), and other Nordic authors (Torfaeus 1706, Horrebow 1753, Leem 1767, Olafsen 1772), and to Adelung (1768) and Buffon & Daubenton (1770). The Greenlandic names for the age stages were also listed. The species characteristic was: "a seal with a smooth head, a long snout, and a depressed-conical body; the undulating whiskers are slightly curved at the tip and have a red marrow". The following description informed of a body length of six feet, a circumference of four feet, and stated the dentition formula; the appearance of the head, snout, whiskers, and body were described in some detail including characteristics of the hair layer, and the variation in colour according to age; two varieties to the general pattern were also mentioned. As regards eyes, ears, tongue, and flippers were referred to the description of the preceding species (*vitulina*); it was added that the blubber is excellent and rich in oil, and that the meat is dark. On the habitat he reported that the species is extremely common everywhere along the coast and in the fiords, but that it leaves Greenland between March and May, and between July and September. Further, information on feeding, reproduction, behaviour, use and importance, as well as hunting methods is given (p. 12-13).

Under the name *Phoca foetida* (Müller 1776: viii), the Greenlanders' 'neitsek' (Cranz 1765) was described precisely and detailed in *Fauna Groenlandica* (p. 13-15) in respect to the appearance of the species, in addition to which some information on habitat, behaviour, feeding, reproduction, local use, trade and hunting methods was given. No doubt this is the first unambiguous scientific description of this species. Among possible synonyms the Icelandic 'Utselur', 'Vetraselur', and 'Øesæl' (Horrebow 1753 and Olafsen 1772) were included.

In *Fauna Groenlandica* (1780: 7-9) Fabricius maintained the name *Phoca leonina* (Linnaeus 1766) for the Greenlanders' 'neitsersoak' as he had done in his contribution to Müller (1776: viii), and made (erroneous) reference to the Sea-Lion of Anson (1749) and Buffon

& Daubenton (1770); however, he also made (correct) references to Cranz (1765), Egede (1741), Ellis (1750), Torfaeus (1706), Olafsen (1772) and Leem (1767). His description of the species in Greenland was precise and detailed, and as usual information on occurrence, feeding, reproduction, local use, trade, and hunting methods was added.

The *Phoca barbata* (Müller 1776: viii) was described in *Fauna Groenlandica* (1780: 15-17) as short and almost as precise as the preceding species. The short species characteristic stressed the diverging shape of the fore flipper and the long, white, curling whiskers. This was described in more detail in the following text which also contained information on size, shape, hair structure and colour of various age stages. The existence of four teats was not mentioned, but some information on habitat, occurrence, behaviour, food, and reproduction was added. The special characteristics and use of the skin, the blubber and the light-coloured meat, and the hunting methods were also noted, as usual.

Nearly the entire Part One of the treatise on seals (Fabricius 1790: 87-157) was devoted to the description of the harp seal. Accordingly, the description was much more detailed than in *Fauna Groenlandica*: The references to and discussion of previous works and synonyms were dealt with both in the introduction (p. 87-91) and the conclusion (p. 156-157); a very detailed description of the appearance and anatomy covered almost fifteen pages (p. 91-105); the habitat, behaviour in the water, and migrations were treated in great detail (p. 105-117); the breeding biology was discussed (p. 117-119), information on feeding and predators was given (p. 119-122), followed by a comprehensive account of hunting methods and use (p. 122-154), and a report of internal parasites found in this seal species (p. 155-156).

In the Second Part of the treatise on seals the description of the 'fiord seal' [ringed seal] was expanded considerably (Fabricius 1791: 74-97). The scientific name *hispidus* was adopted instead of *foetida* (Müller 1776, Fabricius 1780), admitting that the former suited the species characteristics just as well and had already been used by a number of authors, although he expresses some reservations in respect to their descriptions, and particularly to the illustration in Schreber (1775-1778: Tab. 86; Fig. 49). In the concluding discussion of synonyms he firmly dissociated himself from

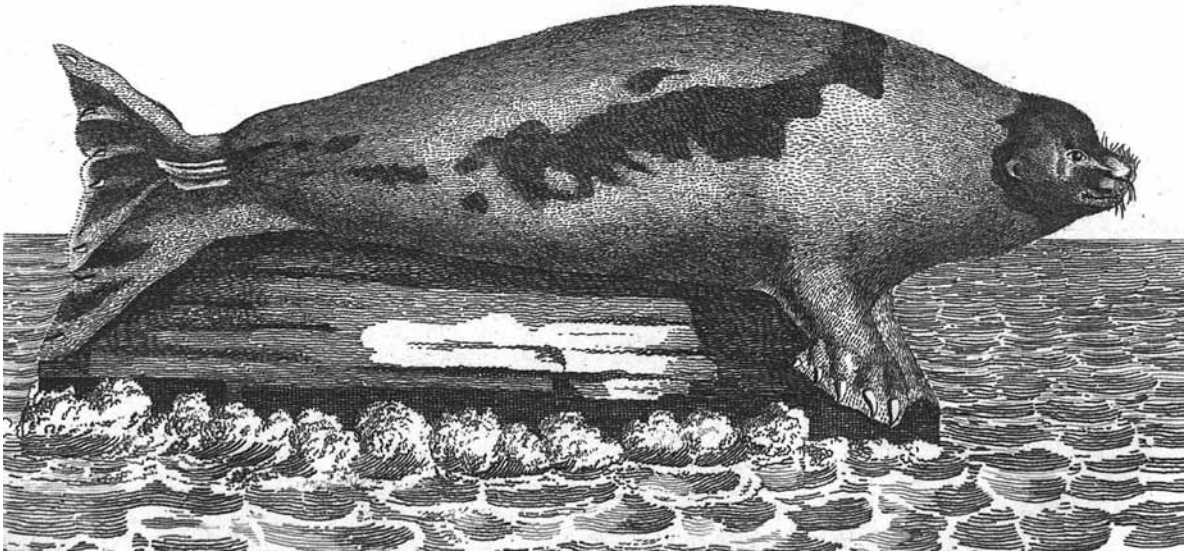


Fig. 48. Pennant's harp seal is obviously a mirror image of Lepechin's illustration of *Phoca oceanica* (Pennant 1781 Tab. 51).

the idea that the long-necked seal of Parsons (1753) could be identical with this species, and he was now inclined to consider the Icelanders' 'Utselur' and 'Ve-traselur' a different, not yet well described species. In respect to the Swedish 'Grå-sæl' or 'Grå-Vikare-Skælar' (Linnaeus 1746, Cneiff 1757, Ödman 1784) which by those and other authors (Erxleben 1777, Schreber 1775-1778, Borowski 1780) were considered varieties of the common seal (*Ph. vitulina*) or possibly a distinct species, Fabricius expressed the opinion that in some respects it appeared to be more closely related to *hispida*.

The treatment of the 'spotted seal' (*Ph. vitulina*) was expanded considerably (Fabricius 1791: 98-119), with reference to a large number of authors (63), particularly in the sections dealing with the identity and synonyms (p. 98-100, 111-119). Although expressing the thought that a better name might be *Ph. canina*, considering the shape of the head and neck of this species, he adopted Linnaeus' name also for Egede's 'spraglede' seal in Greenland, and discussed in some detail the identity of the seals referred to this species by previous authors. Accepting most of these, he dissociated himself from the ideas that the Mediterranean *Phoca* of Aristotle and other ancient writers should be identical with the boreal *vitulina*, or with the eared 'petit phoque noir' as suggested by Buffon & Daubenton (1765, 1770) and adopted by other authors (Schreber 1775-1778, Erxleben 1777, *Ph. pusilla*); instead he

supported the opinion that the monk seal described by Hermann (1779) was in fact the ancient, Mediterranean *Phoca* (Fig. 50). He further suggested that the South American seals mentioned by various authors did not belong to this but to a separate species (possibly the *Ph. lupina* of Molina 1786). He also put forward the opinion that the 'Utselr', the 'Grå-sæl', and the Siberian seal were all distinct from *vitulina*, whereas he expresses doubt in respect to the Caspian seal. Present knowledge by and large confirms Fabricius' main points in this section, although he did not arrive at the correct conclusion on the identification of all these species.

In the treatise on seals, Fabricius (1791: 120-139) adopted Erxleben's scientific name *cristata* for the hooded seal and presented an expanded description of the appearance, occurrence, biology and local importance of the species in Greenland. In the discussion of the identity and synonyms, however, he repeated his erroneous assumption that this species was identical with the 'sea lion' first described and depicted by Anson (1749: 122, Tab. 13), incorporated in Linnaeus' *Systema Natura* (1758) as *Phoca leonina*, as cited by many later authors, and today known as the Southern Elephant Seal (*Mirounga leonina*). Fabricius even discussed Anson's illustration (Fig. 42) critically, calling it "just passable, although in many ways erroneous ...", which would be generous when considering it an illus-



Fig. 49. Neither this illustration nor his text suggests that Schreber had a thorough knowledge of the species now credited to his name (Schreber 1775-1778: Tab. 86).

tration of a hooded seal, but in fact it is not that bad as a picture of an elephant seal, particularly not the male!

Also the bearded seal was dealt with in greater detail than in *Fauna Groenlandica*, a fairly detailed description of two intestinal parasites was added and one of them depicted (Fabricius 1791: 139-159, Tab. X). In an introduction and a conclusion the identity and synonyms of *barbata* were discussed: he took the credit for having provided the term to Müller (1776: viii) after whom Erxleben (1777) and Gmelin (1788) had adopted it, but he gave Parsons (1744) the credit of having described the appearance of the species scientifically for the first time (Fig. 35). He further supported the opinion that the 'Grænselr' or 'Gramselur' of the Icelanders (Torfaeus 1706, Olafsen 1772), and the 'Lachtak' of Steller (1751, 1774) were all identical with the Greenlanders' 'uksuk'/'urksuk' (Cranz 1765), adding two additional Greenlandic names ('Takka-mugak', 'Terkigluk'). He rejected the suggestion by Erxleben that *barbata* might be the female of *cristata*, having observed both sexes of the two species in

Greenland. He further dissociated himself from the assumption that also the Icelanders' 'Utselur' should be identical with the bearded seal, stating that the solution to this question would depend on a closer scientific examination – not realizing that he himself a few pages further on should be contributing to the solution. He finally discussed the identity of Lepechin's *leporina*, arriving at the conclusion that in all probability it was a different species.

'Ghost species': In addition to the description of these five well-known species of seals in Greenland, four additional species were listed in *Fauna Groenlandica* (1780: 6-7, 17); Fabricius stated that he has never seen these animals himself, nor the crania or skin of any of them, in this circumstance having only the accounts of the hunters to rely on. Nevertheless, they were mentioned again at the end of the Second Part of the treatise on seals (Fabricius 1791: 160-164, 168-169). The Greenlandic names of these were 'auvekaejak', 'siguktook', 'imam-ukalia' and 'ataarpiak' (or 'Ataarpiik').

The first- and last-mentioned can rather easily be dealt with as pure figments of the imagination: no seal species corresponding to the description of these creatures has ever been documented from Greenland (but one can speculate about what the myths and the names may be derived from: ‘auvek’ [aaveq] means walrus, and ‘âtaussaq’ [aataasaq] is the name of *Clione limacina*, a five cm long naked pteropod, that has a certain similarity to a miniature harp seal when moving in the surface layer of the sea!). The third one, ‘imam-ukalia’ was said to be a completely white seal with red eyes, and Fabricius suggests that it may be identical with Lepechin’s *Ph. leporina* and/or the Siberian seal. This is hardly the case; if anything, it could rather refer to the rare occurrence of albino seals.

The remaining ‘ghost species’, the ‘siguktok’, deserves a little more attention. The Greenlandic word means ‘the long-nosed’, and Fabricius told that no one of his acquaintance had ever caught such a seal, but a few hunters have seen an extremely long-nosed seal at sea, and he argued that seals of similar appearance have been reported from other areas, so it was not unlikely that they also occur rarely in Greenland

waters. As possible synonyms he even suggested *Ph. porcina* (Molina 1786), the ‘Fatne Viudne’ of the Lapps (Leem 1767), or the ‘bottle-nose seal’ (Pennant 1881).

At this passage in the treatise, Fabricius (1791: 164-167) added an observation which had nothing to do with the seals he knew from Greenland, but was of a seal he had examined in June 1788 at the beach of Amager, just south of Copenhagen. He then delivered a fairly detailed description of a species hitherto unknown to science, and called it *Phoca grypus*, the hook-snouted seal. He offered some discussion on possible synonyms without reaching a final conclusion, and he didn’t explicitly suggest that it was identical with the above-mentioned ‘siguktok’. Whether this species, which should later be known as the grey seal (*Halichoerus grypus* (Fabr.)), alias the ‘Grå-Siæl’ and the ‘Utseleur’, might occasionally occur in Greenland waters has not yet been documented, but it is not completely unlikely, since grey seals are quite common both around Iceland and in south-eastern Canadian waters, which is not that far away for a vagrant seal (Brown 1868b: 427, Winge 1902: 373, Kapel 1970).

At the end of the treatise on the Seals of Green-



Fig. 50. “I am more inclined to agree with professor Hermann that the Mediterranean *Phoca* or *Vitulis marinus* of the ancient naturalists is identical to his monk seal (*Ph. monachus*) (Fabricius 1791: 112)” (Hermann 1779: Tab. 12).

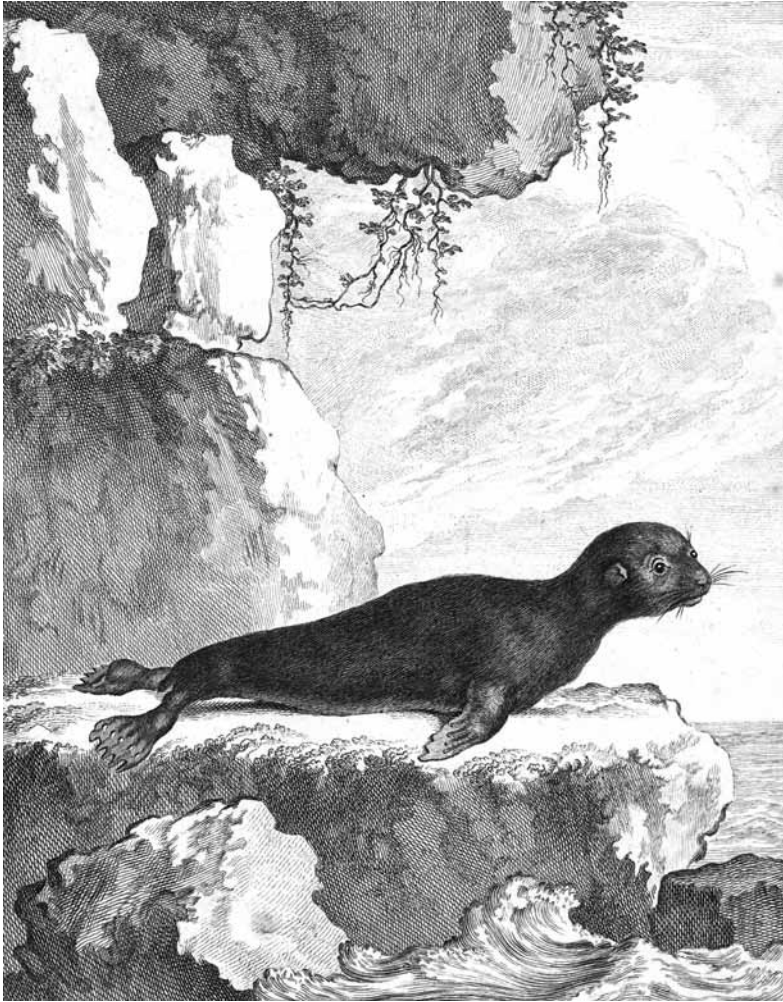


Fig. 51. "Their 'small seal' was not found in the Mediterranean but in India, and had noticable earlobes (Fabricius 1791: 111)" (Buffon & Daubenton 1765: Tab. 53).

land, Fabricius added two plates illustrating the crania of *Ph. groenlandica*, *cristata*, *barbata* and *grypus* n.sp. (Fabricius 1791: Tab. XII & XIII).

In summary, in the treatise on seals Fabricius expanded the description of the five species already presented in *Fauna Groenlandica*, giving one of the most comprehensive and exact accounts of the issue which became available in his time, and in addition he gave the first scientific description of the grey seal. His descriptions of the appearance of these seals are remarkable both for going into detail and for stressing the characters useful for distinguishing between them. Also, the information given on biology and behaviour is of a standard and quality rarely seen at that time, not to mention the addition of relevant ethnographical data. His discussion of nomenclature or relevant synonyms is less convincing, and in some cases erroneous or confusing.

Once more, it is worth noting that Fabricius' descriptions were not based on a literature study but almost exclusively on his own observations supplemented by the information gathered from the Greenland hunters. In the introduction to the first part of his treatise on the seals (1790: 80-82) he stressed this fact himself, saying: "In this area of natural history I presume no one may speak with more assurance and comprehension than myself, my five years in office in this country having offered me opportunities granted no one else ..., and I was able to get the most detailed information about these matters from the natives of the country", and a little further down he continued: "... from this everyday intercourse I acquired both a command of the language and much knowledge of nature, particularly with respect to seals, which would otherwise have remained unknown to me." He also commented on the accounts given by previous writers:

“In the works of most authors one finds a pronounced confusion, of which it is difficult to make sense. The reason is that the seal is a marine animal, and rather unapproachable in its natural environment ...” and “... naturalists have rarely had the opportunity to observe them alive, but have had to rely on the accounts of the kind of travellers who are not exactly naturalists and therefore not the most reliable ...”.

The encyclopaedists and the critical reviewers

According to Allen (1880: 459), the ‘period of the early technical writers’, starting with Müller (1776) and Schreber and ending with Fabricius’ treatise on seals, was followed by the epoch of the ‘encyclopaedists’ (1793-1831). During these four decades a number of ‘dictionaries’, ‘synopses’, etc. was published, containing lists of species of seals summarizing more or less well-documented accounts or descriptions by other authors up to that date. The 12-14 species of ‘true’ (earless) seals enumerated in Kerr’s (1792) translation of Gmelin’s *Systema Naturae* (1788) and Pennant’s updating (1793) of his own *History of Quadrupeds* (1781), were increased to 17-18 recognized plus 11-14 ‘doubtful’ species in the works appearing in the 1820s (Desmarest 1817, 1820; Cuvier 1826; Gray 1827, Lesson 1827, 1828; Fischer 1829). In addition, the nomenclature was enriched with the introduction of a multitude of new scientific names or synonyms, to which particularly Cuvier and Lesson contributed generously. Unfortunately, most of these new names did not represent valid species, but rather created further confusion on the issue. Among the works cited in these summaries were O.F. Müller (1776) and *Fauna Groenlandica* (Fabricius 1780), but not the treatise on seals (Fabricius 1790 & 1791).

In some early nineteenth-century works dealing particularly with the Nordic fauna, however, Fabricius’ treatise on seals was taken into account. In a textbook on the fauna of Denmark and Norway (Holten 1800) his work was cited, although some reservations were expressed about some of his findings. Also in the first edition of Nilsson’s handbook on the Swedish fauna (1820) due reference was made to Fabricius, and his *Phoca grypus* was for the first time acknowledged and introduced into the system as *Halichoerus griseus*. In a

detailed treatise on the seals of Iceland, Thienemann (1824) four years later also included the grey seal (although he gave it a new name, *Phoca halichoerus*), and made a general tribute to Fabricius’ work, saying (p. 20): “... one of the most valuable and sharp-sighted naturalists, being the first to bring light into the chaos of the natural history of Nordic seals, because he during his long stay in Greenland was able to examine and in part observe these animals. Since his time nothing of importance has happened. What Pallas is presenting in his *Zoographia Rosso-Asiatica* (1811/1831) is described on the basis of stuffed specimens, and although Professor Nilsson in his *Skandinavisk Fauna* put these animals in excellent systematic order, he has little to contribute in respect to life-like observations.” Near the end of the first three decades of the nineteenth century, the textbook by Melchior on the mammalian fauna of Denmark and Norway, published posthumously in 1834, summarised the works of Fabricius, Nilsson and Thienemann quite neatly (p. 209-243). Finally, a small but important contribution was published by Hallgrímsson in 1837, in which he demonstrated that the mysterious ‘Útselúr’ of the Icelanders is nothing else than Fabricius’ *grypus* (he also made some other comments on Thienemann’s account of the seals of Iceland).

As a passing remark, it should be mentioned that during this period two reviews of the *Fauna of North America* (Harlan 1825: 102-112; Godman 1826: 305-350) appeared, in which five species of true seals were listed, only *grypus* missing. Reference was made to Cranz (1765), Müller (1776), and Fabricius (1780), but not to his seal treatise (1790 & 1791) – whereas his treatise on seal hunting implements (Fabricius 1810) was mentioned.

Allen (1880) did not provide a name for his fourth period of the study of seals, but one line of development from the late 1830s to the appearance of his own monograph could qualify for the denomination: ‘the period of the critical reviewers’. The first of these was Professor Sv. Nilsson’s important sketch of systematic classification of the Phocacéa, which appeared firstly as a small note in the memoirs of the Swedish Academy of Science (1838), in a slightly expanded version two years later (1840), and finally in a German translation (1841). Based on studies of cranial material in a number of European museums, the establishment of seven genera was suggested and defined, with due



Fig. 52. In the revised version of the work by Schreber (1775-1778) an illustration of the harp seal was presented, with reference to both *Ph. groenlandica* Fabr. and *oceanica* Lepechin (Wagner 1846: Tab. 85 A).

discussion of previously described species or varieties, their validity and status as synonyms. Fabricius' valuable contribution was acknowledged, and the priority of his species name *grypus* for the grey seal was recognized (as it has been by all subsequent writers with the adoption of Nilsson's genus name *Halichoerus*).

In his update of Schreber's work (1775-1778), Wagner (1846: 1-97) followed Nilsson's nomenclature as regards the northern species, but lumped the monk seal with the Southern Hemisphere phocids, of which he listed four species (Nilsson mentioned just one), and enumerated six otarids i.e. eared seals (sea lions and fur seals, of which Nilsson mentioned only three). In another German review of the mammalian species published nine years later, the list and classification was almost identical (Giebel 1855: 124-150).

In a series of lists of mammalian specimens in the British Museum, however, Gray (1843, 1850, 1866, 1871) continued to develop the nomenclature initiated by Cuvier (1826) and Lesson (1827), discarding a number of the 'doubtful' species suggested by these

authors, but still introducing new names (for both genera and species). In the present context, Gray curiously enough revived the species name *foetida* originally suggested for the ringed seal by Fabricius (Müller 1776, Fabricius 1880), but later abandoned by himself in favour of *hispida* (Fabricius 1791)!

During the same period, Gill (1866, 1872: 69) gave his version of the nomenclature and classification of the pinnipeds, which came to form the basis for many later treatments of the issue.

Reviews of the Greenland and Arctic mammalian fauna

After Fabricius, few Danish scientists contributed to the study of seals in general, or to the knowledge of the seals of Greenland in particular. The dentition, and particularly the milk-dentition of several Nordic seal species was described in papers by the professors J. Th. Reinhardt (1842, 1865) and Steenstrup (1861,

1865). In his topographical description of Greenland, Rink (1852 & 1857) included much information on the occurrence of seals, seal hunting, and trade, and in an appendix to this work J. Th. Reinhardt presented the first complete list of mammals, birds and fish in Greenland since Fabricius' *Fauna Groenlandica*, based on the collections of the Zoological Museum of Copenhagen.

It is, however, an English scientist, Dr. Robert Brown, who must be given the credit for presenting the first comprehensive and critical treatise on the seals of Greenland since Fabricius. Brown, who obtained thorough knowledge of the Arctic fauna from two expeditions to Spitsbergen and Greenland, published his experiences on mammals in three treatises, two of which are relevant in the present context. In the first of these, he gave much credit to his predecessor: "The accounts of the older writers on Greenland (Egede, Saabye, Cranz, etc.) were very unsatisfactory; but a new era in the history of northern zoology dawned when Otto Fabricius, who had passed several years in Greenland as a Missionary, published his *Fauna Groenlandica*. This work, far in advance of its age, and which for the conciseness and accuracy of its descriptions has rarely been surpassed, has most deservedly retained its place as our standard authority on the zoology of Danish Greenland" (Brown 1868a: 330). In the list of mammals known from Greenland, Brown followed the generic nomenclature created by Cuvier, Gray and Nilsson, but gave Fabricius (or Müller 1776) credit for the species names *foetida*, *groenlandica*, *barbata*, and *grypus* (p. 335). The rest of this treatise was mainly devoted to a discussion of the zoogeography of terrestrial mammals, but in a concluding section on 'doubtful or mythical animals of Greenland' (p. 357-362), Brown discussed and criticized Fabricius for incorporating hunters' accounts of more or less mythical creatures never seen by him (and hardly ever by themselves), and Brown concluded that both Fabricius' *Trichechus manatus* (Steller's sea cow, *Rhytina gigas*) and *Phoca ursina* (Northern fur seal, *Callorhinus ursinus*) were entered into *Fauna Groenlandica* on false assumptions and should be deleted from the list. Similarly, he concluded that Fabricius' 'doubtful' seal species '*siguktôk*,' *imab-ukalia*,' *atârpiak*' or *atârpek*' were also not based on real evidence.

In his second treatise (1868b), Brown reviewed

the knowledge of the seals of Greenland in greater detail. After an introduction (p. 405-407) in which reference was made to his first (in part unsuccessful) voyage with a sealing vessel to the Spitsbergen and Jan Mayen seas in March-April 1861, and his second one in the summer of 1867 to the Davis Strait as far north as 70° N in Danish West Greenland, the author offered some remarks on the physiology of seals (especially their diving abilities) and their habits and instincts in general (p. 407-411). These remarks were apparently not based on own experiments or observations, rather on those by a certain Dr. John Wallace of the Hudson Bay Company, and were highly speculative in nature.

The major part of Brown's second treatise was devoted to 'Notes on the Species of Pinnipedia' (p. 411-438), in which comments were given on the seven species (the walrus included) known from the Davis Strait area. Few notes dealt with the appearance and identification of each species, because – as rightly stated by the author – this issue had been treated in detail by previous writers; more is said on popular names, distribution, habits, economic value and hunting. Some of Brown's notes are doubtful or erroneous, and it is not always clear on what evidence they were based; he seems to attach much weight on what he has been told by sealers or local informants. For instance, he stated that both the young of the Arctic harbour seal and the hooded seal are born white, contrary to the correct information given by Fabricius, and he agreed with the seal hunters that the female harp seal 'is very different in appearance from the male', and 'considers' that three years are sufficient for the harp seal to complete the development into the mature 'saddle' stage. On the other hand, Brown's notes did contribute to the discussion and knowledge of seals in the Arctic, particularly with respect to their distribution and exploitation. He gave a detailed description of the 'Spitsbergen' (Jan Mayen) breeding patches, and cited Rink (1852 & 1857) for the theory that (most) harp seals in West Greenland come from and go to the Newfoundland area, not the Jan Mayen area. He also cited Rink's estimates of the catch level for various seal species in West Greenland. The treatise was concluded with a section on the commercial importance of the 'Seal Fisheries' (p. 438-440), for which he expressed a pessimistic view on the future if being prosecuted with the same vigour as at the present past.

Of a certain interest are some observations on the

grey seal (*Halichoerus grypus*) which Dr. Brown reported (*l.c.*, p. 427): “In 1861, a little south of Disco Island, we killed a seal the skull of which proved to be of this species; and again this summer (1867) I saw a number of skins in Egedesminde and other settlements about Disco Bay which appeared to be of this species. Though the natives do not seem to have any name for it, the Danish traders with whom I talked were of the opinion that the ‘Graskäl’, with which they were acquainted as an inhabitant of the Cattedag, occasionally visited South and the more southerly northern portions of Greenland with the herds of *Atak* (*P. groenlandica*).

“The skull to which I refer, though carefully examined at the time, was afterwards accidentally destroyed by a young Polar Bear, which formed one of our ship’s company on that northern voyage; therefore, though perfectly convinced of its being entitled to be classed as a member of the Greenland fauna, I am not in the position to assert it with more confidence than as being a very strong probability. It should be carefully looked for among the herds of *P. groenlandica* when they arrive on the coast.”

Brown’s articles on the fauna of Greenland remained often cited references for a number of years, and were included *in extenso* in a manual of the natural history etc. of Greenland (Jones 1875) which apparently served as an important reference work for Arctic expeditions during the following decades.

Two years later, Rink’s topographical description of Greenland appeared in a revised English edition (Rink 1877), in which the five species of true seals were listed together with estimates of the number killed annually (p. 122-127); and in the Appendix-list of the Greenland fauna (p. 429 seq) *Halichoerus grypus* (O. Fabr.) was added with the note ‘very doubtful’, and reference was made to Brown’s works.

Allen’s monograph and Winge’s review

Exactly one hundred years after the appearance of *Fauna Groenlandica* the hitherto most detailed survey of northern seals was published: J.A. Allen’s monograph on the History of North American Pinnipeds (Allen 1880). In this exceptional pioneer work, the author not only described all the species of walruses, sea-lions, sea-bears and seals known from the North

American region (including Greenland), but also presented a critical and detailed review of the world-wide exploratory history of the entire group of pinnipeds, which has been an indispensable source for all later writers on the issue – including the author of the present article. The work falls into four main sections: the walrus family *Odoboenidae* (p. 5-186), the eared seals *Otariidae* (p. 187-410), the earless seals *Phocidae* (p. 412-756), and an Appendix containing a review of the material examined (p. 757-764) and additions and corrections (p. 765-773).

On the general issue of the study of the earless seals, Allen stated (p. 459-460): “... there have been four periods of unusual fertility in respect to the literature of the *Phocidae*. The first covers the time of Egede, Cranz, Anson, Steller, and Parsons (1741-1765), and antedates nearly all of the systematic literature of the subject, but for which it formed the ground-work of the early portion. The second (1776-1792) may be termed the period of Fabricius, Schreber, Erxleben, Molina, Gmelin, and Kerr, or that of the early technical writers. The third may be denominated the Encyclopaedic period, covering the work of Desmarest, F. Cuvier, Lesson, Gray (his first general review of the species only), to which may be added (in point of time) Péron, Nilsson, Fischer, and Pallas (1816-1831). During this period originated more than one-half of the synonyms with which the literature of the subject is burdened, out of nearly forty names only two representing new species. Within this period were published no less than eight monographic revisions of the Pinnipeds, prepared by the leading mammalogists of that time. The fourth period may be regarded as extending from 1837 to 1873, but the different portions of this interval were not equally prolific in important general memoirs. Of special note in the light of a general revision of the subject are those of Nilsson (1837), Gray (1843), Wagner (1846), Gray (1850), Giebel (1855), Gray (1866, 1871), and Gill (1866, 1872).”

On the study of the seals of Greenland in particular, Allen noted (p. 422): “As early as 1741 the harp seal and the crested seal were figured (or caricatured) by Egede under the names respectively of ‘Svartside’ and ‘Klapmüts’. He says in the accompanying text that seals are of different sorts and size, but have all the same shape, except the ‘Klapmüts’, which is the only species he expressly distinguishes in the text.” As mentioned above, the ‘Spraglet’ seal was also ‘caricatured’ in the

illustration referred to (Egede 1741: 46), as also indicated later by Allen (p. 562).

A little further on (p. 424), Allen continued: “The first really important account of seals in the northern seas is that given by Cranz (1765), in which he enumerates and briefly characterizes all the five species of seals hunted or commonly met with in Greenland. Although his descriptions are in most cases meagre, and relate more to the habits of the species and to their useful products than to their external characters, his species are, from one circumstance or another, so easily recognized that there has never been much uncertainty in regard to them The Neitsek or ringed seal appears to be here for the first time indicated.” These species all received systematic names from Fabricius, in the introduction to Müller (1776: viii), except the Kassigiak (*Phoca vitulina*), which had been named long before. “Fabricius’s names, however, were unaccompanied by descriptions, but carried with them the common Icelandic and Greenlandic names of the species indicated, by means of which they are susceptible of strict identification...”.

After discussing other contemporary contributions (Olafsen 1772, Schreber 1775-1778, Erxleben 1777, Lepechin 1778, Hermann 1779), Allen noted (p. 429): “The next year (1780) Fabricius published his “*Fauna Groenlandica*”, in which all the seals named in Müller (1776) are quite satisfactorily described, under the names there first proposed. He, however, erroneously includes among the seals of Greenland Steller’s Sea Bear, under the name *Phoca ursina*, and concludes his account of the Greenland seals by mentioning four other marine animals he had heard of from the Greenlanders, but of which he had never seen either skins or skulls, and of which he knew nothing with certainty, namely *Siguktok*, *Imab-ukalia*, *Atarpiak*, and *Kongeseteriak*.”

Finally, Allen wrote the following about Fabricius’ last contributions to the study of seals (p. 431): “In 1790 and 1791 Fabricius published his celebrated memoir on the Seals of Greenland, in which all the Greenland species are described in great detail, and the skulls of *Phoca groenlandica*, *Cystophora cristata*, *Erignathus barbatus* and *Halichoerus grypus* are for the first time figured, while the last-mentioned is for the first time named. In this series of papers the general subject is exhaustively treated in all its bearings. In the bibliography of these species are, however, given vari-

ous references that are not pertinent, particularly under *Phoca cristata*, under which name are confounded the Sea-Elephant of the Southern Hemisphere with the Crested seal of the Northern. The *Halichoerus grypus* is mentioned (but not fully described), and the skull figured, under the names ‘Krumnudede Sæl (*Phoca grypus*)’. As regards changes in nomenclature, he abandons the names *foetida* and *leonina* respectively for *hispidus* and *cristata*”, and Allen concluded (p. 432-433) by quoting the evaluation of the ‘mythical species’ by Brown (1868a).

An excellent review of the knowledge accumulated since Fabricius’ time on the mammals of Greenland was published in 1902 by the prominent Danish mammalogist Herluf Winge. On Fabricius’ various works on the mammals of Greenland in general, Winge stated: “Fabricius’ *Fauna Groenlandica* and his other works were a good foundation. The most important information gained from the long series of later works dealing with one or other aspect of the mammals of Greenland is a more thorough knowledge of the cetaceans, mainly from studies by Holbøll and Eschricht, and a clearer conception of the distribution of the animals along the Greenland coastline. To the species known by Fabricius, only three land mammals living in the then unknown parts of the North and East coast have been added, in addition to five cetacean species that are mostly occasional visitors” (Winge 1902: 330-331). Fabricius’ treatise on the seals of Greenland was characterized by Winge as “a basic work that for many years was, and partly still is, one of the most important sources of information on northern seals”.

In Winge’s review of the five phocid species commonly known from Greenland (*l.c.* p. 421-455) the same nomenclature was used as in Allen 1880 (and in Trouessart 1898-1899: 369-388); i.e. giving Fabricius credit for the species names *foetida*, *groenlandica*, *barbatus*, but the reasons for that were not stated. Under the heading for each species, reference was given to Fabricius 1780, Fabricius 1790 & 1791, Reinhardt 1857, Brown 1868b, and Trouessart 1898-99, and to various vernacular names used in West and East Greenland. The dentition and cranial characters were treated in some detail, but apart from that the appearance and characteristics of the species were not described. On the other hand, the distribution and occurrence in Greenland were treated in great detail with references to observations from a number of sources; finally the



Fig. 53. "In 1790 and 1791, Fabricius published his celebrated memoir on the Seals of Greenland, in which all the Greenland species are described in great detail, and *Phoca* [*Halichoerus*] *grypus* ... is for the first time named (Allen 1880: 431)". Still today only six phocids are known from the North Atlantic: harp seal (juvenile, pup and adult), ringed seal, harbour seal, hooded seal (adult male and pup), bearded seal, and grey (male) seal (del. H. Anthon, Den store danske Encyklopædi 1998 (18): 468).

general distribution of the species was shortly characterized.

The grey seal (*Halichoerus grypus* (Fabr.) Nilss.) was not included in Winge's list of mammals belonging to the fauna of Greenland, just mentioned as a 'likely possibility' (p. 373); apparently, he was not convinced by the evidence given by Brown (1868b).

Early 20th-century seal research in the Arctic and North Atlantic

During the last decades of the 19th and the first decades of the 20th centuries a number of explorative expeditions were conducted to the Arctic contributing significantly to the knowledge of the geography and oceanology of that region, in several instances also giving additional information on the occurrence and biology of the northern seal species. In this respect, the reports on Fridtjof Nansen's expeditions (Nansen 1890a, 1890b, 1924, 1925), the Danmark-Expedition (Johansen 1910), and the First and Fifth Thule-Expeditions (Freuchen 1915, 1935; Degerbøl 1935) should be mentioned.

Nansen was also one of the scientists behind the establishment (in 1902) of the International Council for the Exploration of the Sea (ICES), and may have been involved in taking the initiative to present surveys on the biology and hunting of seals in the European ice-fields (Wollebæk 1907, Knipovich 1907, Hjort & Knipovich 1907).

A detailed account of hunting in southern West Greenland by Rasmus Müller, mainly based on personal experience and adventures during twenty-five years in office as an employee of the Greenland Trade Department, presented numerous seal hunting episodes with many factual information on hunting methods and estimated trade yields, and some biological observations (Müller 1906: 143-238); direct reference to Fabricius was sparse but his nomenclature was used.

A more scientific approach of describing of the material culture of the inuit of West Greenland, including their seal hunting implements and traditions was presented by Porsild (1915), with due reference to Fabricius' earlier work on these issues.

In 1921 the 200 years anniversary for Hans Egede's arrival to Greenland was celebrated by the publication

of a comprehensive topographical description of Greenland (Amdrup *et al.* 1921). The work contained little new information on the biology of the seals, but with respect to hunting methods, the occurrence and importance of seals in various parts of Greenland was included a wealth of detailed information that has not been surpassed ever since.

On the occasion of the 100th anniversary of the death of Otto Fabricius his memory was celebrated by a comprehensive biography in three parts, dealing with his role as ecclesiastical personality, as missionary and philologist, and as naturalist, respectively (Kornerup 1923, Schultz-Lorentzen 1923, and Jensen 1923). In the last-mentioned work Fabricius' contribution to the study of seals was referred to in detail, and highly praised (Jensen 1923: 361-370). Six years later appeared a Danish translation of the sections on mammals and birds of *Fauna Groenlandica* (Helms 1929).

A comprehensive manual of the mammals of Norway (Collett 1911-12) did not mention Fabricius' work on seals, except for some nomenclature notes. The same is true of two works on the mammals of Iceland (Sæmundsson 1932, 1939); they have, however, an interesting reference to an overlooked 17th century account giving information on the identity of the Icelandic vernacular names (Gudmundsson 1924 (c. 1640)).

An account of sealing in the North Atlantic drift ice with special reference to the Norwegian participation (Iversen 1927) presented a description of the sealing activities and the economics of these, but included also information of the knowledge of the biology of the seal species in question (primarily harp and hooded seals), apparently mainly taken from the works of Nansen (1890a, 1924). A monograph on the biology of the harp seal summarized the results of Norwegian studies carried out in the White Sea region 1925-1937 (Sivertsen 1941). During the same period Soviet researchers carried out a number of studies on Arctic seals, many of which were related to the exploitation of this resource, whereas others dealt with seal biology or taxonomy (e.g. Smirnov 1924, Dorofeev & Freiman 1928, Naumov 1933, Ognev 1935, Chapskii 1938, 1940). The history of the sealing among the drift ice around Newfoundland and Labrador was almost simultaneously described by Chafe (1924).

Arctic North Atlantic seal research after the 2nd World War

Two North Atlantic seal species have received much attention during the second half of the 20th century: the harp seal and the hooded seal. After a temporary pause during the 2nd World War the commercial hunt at the ice fields in the White Sea, in the Jan Mayen-Denmark Strait area, and off Newfoundland-Labrador was resumed and soon reached so high levels that doubt about the sustainability of this exploitation was expressed by several scientists as well as by the public opinion.

One result was intensified sampling of biological material and data, particularly by Soviet, Norwegian and Canadian scientists, followed by a variety of publications both on stock assessment and on the biology of these two species. For the years 1900-1924 37 references to publications on harp and hooded seals are listed in the bibliography of seal literature by Ronald *et al.* (1976); for the following twenty-five years the list contains 115 references, and for 1950-1975 the number is 852! The first supplement to the bibliography (Ronald *et al.* 1983) contains 475 references to harp and hooded seals for the following eight years. Even if many of these references are of minor importance they do illustrate the increasing interest and the growth in the number of studies.

For the other four 'Fabricius seals' (ringed, harbour, bearded, grey) a similar development in interest and study intensity can be demonstrated, although perhaps 'triggered' by other conflicts or points of view (e.g. interaction with fisheries, or simple scientific curiosity).

A number of techniques and methods were developed allowing detailed studies to be carried out on the biology of seals, their growth and life history, their physiology and behaviour, the distribution and migrations of seals, and population dynamics. One important discovery was that accurate age determination could be carried out based on layers in the teeth (Scheffer 1950, Laws 1952, 1962). Other examples are experimental research on seals in captivity (Scholander 1940, Scholander *et al.* 1942), marking or tagging (Rasmussen and Øritsland 1964, Popov 1970, Sergeant 1991: 49-55, 104-105, Kapel 1996, Kapel *et al.* 1998), telemetry (Stewart *et al.* 1989, Heide-Jørgensen *et al.* 1992, Folkow and Blix 1995), and not least the

ability of edb-treatment of large data sets.

It is a major task to review all this research – and it is beyond the scope of the present study, which is trying to follow the trace of Otto Fabricius.

Since the 1950s several publications have attempted to give an overview of the state of knowledge at the time (Mohr 1952, Scheffer 1958, Mansfield 1963, 1967, King 1964, 1983, Harrison *et al.* 1968, Andersen 1969, Ronald & Mansfield 1975, Ridgway & Harrison 1981, Bonner 1982, Lavigne & Kovacs 1988, Sergeant 1991, Duguay & Robineau 1992, Blix, Walløe & Ulltang 1995, Sigurjónsson & Stenson 1997, Heide-Jørgensen & Lydersen 1998).

In the monograph on the seals in European waters by Mohr (1952) the trace of old Fabricius is reflected in giving him credit not only for the name *grypus* 1791 but also for *groenlandica* and *barbatus* 1776 (i.e. accepting the priority of the *nomina nuda* in Müller). This is probably the last time this happened!

Three years later appeared an attempt to revise the nomenclature of the subfamily *Phocinae* (Chapskii 1955), which appears to have had a major effect on all subsequent works on the systematics of seals. In the reviews by Scheffer (1958), Ridgway and Harrison (1981) and King (1983) only the name of the grey seal, *Halichoerus grypus* (Fabr.), reflects the contribution of the old Danish bishop. King lists ten species of northern phocids, of which four do not occur in the North Atlantic; all the six seal species known today from this region were described by Fabricius (1780, 1790 & 1791), but according to present nomenclature rules one is credited to Linnaeus (1758), one to Schreber (1775-1778) and three to Erxleben (1777), although their descriptions were not as precise and detailed as those by Fabricius.

The wide range of studies on seals was demonstrated at a symposium, 'Biology of the Seal', held in August 1972 in Guelph, Canada, jointly sponsored by the international organisations ICES, ICNAF and IBP (International Council for the Exploration of the Sea, International Commission for Northwest Atlantic Fisheries, and International Biological Program). 76 papers covering virtually all aspects of seal biology were presented (Ronald and Mansfield 1975).

In the comprehensive bibliography on pinnipeds mentioned above (Ronald *et al.* 1976) containing approximately 9500 references dating 'from the time of Homer and Aristotle to 1975', Fabricius 1780 (also

Helms 1929) and Fabricius 1790 & 1791 are listed, but not his ethnographical work on seal hunting (Fabricius 1810, Holtved 1962). Two supplements were added to this monumental work containing about 3200 and 5200 additional references, respectively (Ronald *et al.* 1983, 1991). This reflects the enormous amount of seal studies conducted and published during recent years. This development continued during the last decade of the 20th century, and it is not to be surprised that the contributions of old Fabricius sank into oblivion and were lost in the crowd of new and exciting discoveries of the secrets of seal biology.

Conclusion

Otto Fabricius appears as one of the ‘early technical writers’ – using the expression of Allen (1880) – who extended the knowledge on seals considerably in the decades following immediately after the emission of the 10th and 12th edition of the *Systema Naturae* of Linnaeus (1758, 1766). His background and contribution differ, however, in many respects from those of the other contemporary ‘technical writers’. He had no basis in a university education or a tradition in scientific studies of nature, but acquired his knowledge on seals and other specimens of nature during a five and a half year’s stay as missionary among hunters in South-west Greenland.

Even if the study period was comparatively short and his study area very restricted, the output of his studies of nature was both wide and profound. Based on own experience and the information obtained from his everyday companions, the seal hunters, he was able to make notes that allowed him to make significant contributions to science for the rest of his life. Particularly in respect to seals he could state: “no one may speak with more assurance and comprehension than myself (Fabricius 1790: 80).”

This assurance characterized his accounts of seals. Already in 1776 he was able to inform his friend and colleague O.F. Müller of the existence of four seal species in Greenland in addition to *Phoca vitulina* L., with reference to their vernacular names in Greenlandic and Icelandic; and four years later his precise description of all five species was published in *Fauna Groenlandica*, almost exclusively based on his own experience and notes from Greenland. He was not



Fig. 54. Portrait of Otto Fabricius (later than 1815 when he received the Danish Order of Chivalry). Photo of unknown origin.

aware that in the meantime the same species had been mentioned by other researchers (Schreber 1775-1778, Erxleben 1777 and Lepechin 1778), apparently mainly on the basis of the accounts by Egede (1741), Ellis (1750) and Cranz (1765). In the treatise on seals (Fabricius 1790 & 1791) he referred to and discussed the accounts of all these and a large number of other authors, but the basic description of the appearance of the animals and their biology was still his own.

The particulars and accuracy of Fabricius’ descriptions, especially in respect to the biology and behaviour of the seals, surpassed those of the contemporary writers, and in addition he provided detailed ethnological information as regards hunting implements and methods, and the utilization of the products obtained from the seals. This was included already in *Fauna Groenlandica*, expanded considerably in the seal treatise, and was the focus of his later paper on hunting implements (Fabricius 1810, Holtved 1962).

In respect to discussion of matters of nomenclature and the synonymies of the seals mentioned by

other authors the assurance of Fabricius was less pronounced; in many cases his judgement was good or reasonable, but in some instances it failed – most obviously in the case of the hooded seal which he lumped with Anson's 'sea-lion'. He was also later criticized for including some mythical accounts of the Greenlanders, but in this respect he did not differ much from his contemporaries, and in every case he made it clear that they were second-hand accounts and not based on solid evidence.

Fabricius' reputation as a pioneer in the study of seals remained strong for many years, as evidenced by the evaluation by Allen (1880). Many of the 19th century authors made reference to or cited Müller 1776 and Fabricius 1780, fewer were aware of the existence of the more elaborate treatment in the treatise on the seals of Greenland (Fabricius 1790 & 1791), in all probability because it was written in Danish. Exceptions were, of course, Scandinavian authors or writers dealing particularly with the Nordic fauna, many of which quoted this work and discussed its contents (e.g. Holten 1800, Nilsson 1820, 1847, Thienemann 1824, Melchior 1834, Brown 1868a & b, and Allen 1880).

In the 20th century, with the immense expansion of the amount and scope of scientific studies of seals, the name and contribution of Otto Fabricius apparently sank into oblivion. This is quite understandable but it is also a pity, since his work deserves to be remembered not only for historical reasons but also because many of his observations must still be considered of interest. It is my hope, that this paper might serve to give due tribute to this old Danish pioneer in seal research.

References

- Adelung, J.C. 1768. Geschichte der Schiffahrten und Versuche welche zur Entdeckung des Nordöstlichen Weges nach Japan und China von verschiedenen Nationen unternommen worden. Zum Behufe der Erdbeschreibung und Naturgeschichte dieser Gegenden.–J.J. Gebauer, Halle: 8 + 740 pp.
- Aldrovandi, U. 1638. De Piscibus libri V & de Cetus liber unicus. (I.C. Uterverius edit.). – N. Thebaldinum, Bononiae: 5 + 750 pp.
- Allen, J.A. 1880. History of North American Pinnipeds, A Monograph of Walruses, Sea-Lions, Sea-Bears and Seals of North America. – U.S. Geological and Geographical Survey of the Territories, Miscellaneous Publications 12: 16 + 785 pp.
- Amdrup, G.C., Bobé, K., Jensen, A. S. & Steensby, H.P. (eds) 1921. Grønland i Tohundredaaret for Hans Egedes Landing. – Meddelelser om Grønland 60 & 61: 174 + 567 & 797 pp.
- Andersen, H.J. (ed.) 1969. The biology of marine mammals. – Academic Press: 511 pp.
- Anonymous 1768 (12th century). *Speculum Regale / Konungs Skuggsjá / Kongespejlet*. – Sorø: 78 + 814 pp.
- Anson, G. 1749. A voyage round the world in the years 1740-44 by George Anson, commander in chief of a squadron of His Majesty's ships, sent upon an Expedition to the South seas, compiled from his papers and materials by Richard Walter ... Illustrated with 42 copper-plates. 5th edition. – J & P. Knapton, London: 20 + 418 pp.
- Aphelen, H. von 1770. Sæl, Sælhund, Søbjørn, Søløve, p. 13-24, 470-474, 493-495. – In: Den almindelige Natur-Historie, i Form af et Dictionnaire ved Valmont de Bomare, oversat, forøget og forbedret ... 7. – København: 727 pp.
- Belon de Mans, P. 1555. La nature et la diversité des poissons, avec leur portraits, representez au plus pres du naturel. – Ch. Estienne, Paris: 40 + 448 pp.
- Blix, A.S., Walløe, L. & Ulltang, Ø. (eds) 1995. Whales, Seals, Fish, and Man. Proceedings of the International Symposium on the Biology of Marine Mammals in the North East Atlantic, Tromsø, Norge 1994. – Elsevier, Amsterdam: 13 + 720 pp.
- Boddaert, P. 1785. Elenchus animalium I, Sistens Quadrupedia huc usque nota eorumque varietas. Ad ductum Naturae, quantum fieri potuit disposita. – C.R. Hake, Rotterdami: 40 + 174 pp.
- Bonner, W.N. 1982. Seals and man. A study of interaction. – University of Washington Press, Seattle: 12 + 170 pp.
- Borowski, G.H. 1780. Gemeinnüssige Naturgeschichte des Tierreichs, darinn die merkwürdigsten und nützlichsten Thiere in systematischer Ordnung beschrieben und alle Geschlechter in Abbildungen nach der Natur vorgestellt werden, .. 1(2), Säugethiere, Vierfüssige Thiere. – G.A. Lange, Berlin und Stralsund: 6 + 98 pp.
- Brown, R. 1868a. On the Mammalian Fauna of Greenland. – Proceedings of the Scientific Meetings of the Zoological Society of London for the year 1868, Comm. Sci. Corresp.: 330-362.
- Brown, R. 1868b. Notes on the History and Geographical Relations of the Pinnipedia frequenting the Spitsbergen and Greenland Seas. – Proceedings of the Scientific Meetings of the Zoological Society of London for the year 1868, Comm. Sci. Corresp.: 405-440.
- Buffon, G.L. de & Daubenton, L.J.M. 1765. Histoire Naturelle, Générale et Particulière, avec la Description du Cabinet du Roi 13. – L'Imprimerie Royale, Paris: 6 + 441 pp.
- Buffon, G.L. de & Daubenton, L.J.M. 1770. Allgemeine Historie der Natur nach allem ihren besondern Theilen

- abgehandelt; nebst einer Beschreibung der Naturalienkammer Sr. Majestät der Königes von Frankreich, 7(1). – A.H. Hallens Witwe, Leipzig: 16 + 248 + 6 pp.
- Chafe, L.G. 1924. Chafe's Sealing Book: A History of the Newfoundland Sealfishery from the earliest available records down to and including the voyage of 1923. – Trade Printers & Publ. Ltd., St. John's, Newfoundland.
- Chapskii, K.K. 1938. [Bearded seal (*Erignathus barbatus* Fabr.) of the Kara and Barents Seas (Biology and industry)]. – *In*: Chapskii, K.K. & Kovalev, K.V. (eds): Promyslovye Mlekopitayushchie Barentskova i Karskova Morei [Commercial mammals of the Barents and Kara Seas]. – Trudy Arkt. Naucho-Issled. Inst., Leningrad 173: 7-70. [1974. Fisheries Research Board of Canada, Translation Series 3162].
- Chapskii, K.K. 1940. [The ringed seal of the western seas of the Soviet Arctic (Morphological characteristics, biology, and hunting production)]. – Trudy Arkt. & Antarkt. Naucho-Issled. Inst., Leningrad 145: 1-72. [1971. Fisheries Research Board of Canada, Translation Series 1665].
- Chapskii, K.K. 1955. Opit peresmotra sistemi i diagnostiki tju- leni podsemejstva Phocinae. – Trudi Zoologitjeskogo Instituta, Akademija Nauk, S.S.S.R, Moskva & Leningrad 17: 160-199. (An attempt at revision of the systematics and diagnostics of seals of the subfamily Phocinae. – [1957. Fisheries Research Board of Canada, Translation Series 114: 57].
- Cneiff, J.D. 1757. Berättelse om Skäl-Fangst i Österbotten. – Kongliga Svenska Vetenskap-Academiens Handlinger för År 1757, 18: 177-194.
- Collett, R. 1911-1912. Norges Pattedyr. – Aschehoug & Co, Kristiania: 10 + 744 pp.
- Cranz, D. 1765. Historie von Grönland, enthaltend die Beschreibung des Landes und der Einwohner, insbesondere die Geschichte der dortigen Mission der Evangelischen Bruder zu Neu-Herrnhut und Lichtenfels. Mit acht Kupfertafeln und einem Register, 1-2.–H.D. Ebers, Barby und Weidmanns Erben und Reich, Leipzig: 36 + 1132 + 26 pp.
- Cuvier, F. 1826. Phoque, p. 540-553. – *In*: Dictionnaire des Sciences Naturelles 39. – Paris: 559 pp.
- Dampier, W. 1717 (1697). A new Voyage round the World. Describing particularly the Isthmus of America, several Coasts and Islands in the West Indies, the Isles of Cape Verde, the Passage by Terra del Fuego, the South Sea Coasts of Chile, Peru, and Mexico; the Isle of Guam, one of the Ladrões, Mindanao and other Philippine and East India Islands near Cambodia, China, Formosa, Lucaris, Celebes, etc., New Holland, Sumatra, Nicobar Isles, the Cape of Good Hope, and Santa Helena, their soil, rivers, harbours, plants, fruits, animals, and inhabitants. Their customs, religion, government, trade, etc. 1, 6th edition. – J. Knapton, London: 9 + 611 pp.
- Debes, L.J. 1673. Faeroae et Faeroa reserata. Det er: Færøernis oc Færøeske Indbyggeris Beskrivelse, udi hvilken föris til Liuset adskillige Naturens Hemmeligheder, oc nogle Antiquiteter, som her til Dags udi Mörcket hafve været indelugte, oc nu her opladis. Alle curieuse til Velbehagelighed, sammenskrevet oc forklaret aff L.J.Debes. – M. Jørgensen, København: 20 + 367 pp., 2 maps.
- Degerbøl, M. 1935. Systematic Notes, p. 2, 46-48. – *In*: Report of the mammals collected by the Fifth Thule Expedition to Arctic North America. Part I. Report of the Fifth Thule Expedition, 1921-1924, II(4-5). – Gyldendal, Copenhagen: 1-67.
- Desmarest, A.G. 1817. Phoque, Phoca, p. 544-605. – *In*: Nouveau Dictionnaire d'Histoire Naturelle, appliquée aux Art, à l'Agriculture, à l'Economie rurale et domestique, à la Médecine, etc., par une société de naturalistes et d'agriculture. Nouvelle édition presque entièrement refondue et considérablement augmentée; avec des figures tirées des trois regnes de la nature 25. – Deterville, Paris: 610 pp.
- Desmarest, A.G. 1820. Phoque, Phoca, p. 237-252. – *In*: Mammalogie ou Description des espèces de mammifères 1. – Veuve Agasse, Paris: 8 + 556 pp.
- Dodart 1733(?) – see Perrault 1757.
- Dorofeev, L.M. & Freiman, S. Yu. 1928. Opyt kolichestvennogo ucheta zapasov belomorskogo stada grenlandskogo tyuleny metodom aerofotografirovaniya. – Trudy Naucho Inst. Rybn. Khoz. 2(4): 1-28. – [Experiment of quantitative counting of the White Sea herd of the Greenland seal by method of air photography. – Fisheries Research Board of Canada, Translation Series 68].
- Duguay, R. & Robineau, D. 1992. Robben – Pinnipedia. – Handbuch der Säugetiere Europas 6(2), Aula-Verlag, Wiesbaden: 309 pp.
- Egede, H. 1741. Det gamle Grønlands Nye Perlustation eller Naturel-Historie, og Beskrivelse over det gamle Grønlands Situation, Luft, Temperament og Beskaffenhed; De gamle Norske Coloniers Begyndelse og Undergang der Samme-Steds, de itzige Indbyggers Oprindelse, Væsen, Leve-Maade og Handtæring, samt Hvad ellers Landet Yder og giver af sig, saasom Dyer, Fiske og Fugle &c. med hosføyet Land-Caart og andre Kaaber-Stykker over Landets Naturalier og Indbyggerns Handtæring. – J.C. Groth, København: 12 + 132 pp. (Re-issue: Bobé, L. (ed.) 1925. Meddelelser om Grønland 54: 498 pp.; reprinted 1984, Rhodos, København).
- Ellis, H. 1750. Reise nach Hudsons Meerbusen, welche von zweyen Englischen Schiffen, der Dobbs-Galley und California, in den Jahren 1746 und 1747, wegen Entdeckung einer nordwestlichen Durchfahrt in die Süd-See verichtet worden, nebst einer richtigen Abzeichnung der Küste, und einer kurzen Naturgeschichte des Landes, Beschreibung der Einwohner, auch einer wahren Vorstellung der Umstände und Gründe, welche die künftige Erfindung einer solchen Durchfahrt wahrscheinlich

- machen, beschrieben von H. Ellis, etc.; aus dem Englischen übersetzt und mit Anmerkungen aus andern hierher gehörigen Schriftstellern versehen. Mit Kupfer tafeln und zwoen neuen Karten von Hudson Meerbusen und den angränzenden Ländern. – A. Vanderhoeck, Göttingen: 45 + 364 + 10 pp, 11 Pls, 2 maps.
- Erxleben, J.C.P. 1777. Phoca, p. 579-592. – *In: Systema Regni Animalis per Classes, Ordines, Genera, Species, Varietates, cum Synonymia et Historia Animalium, Classes 1, Mammalia.* – Weygandianis, Lipsiae: 48 + 636 + 64 pp.
- Fabricius, O. 1780. Fauna Groenlandica. – J.G. Rothe, Hafniae & Lipsiae: 16 + 452 pp., 1 Pl. (see also Helms 1929).
- Fabricius, O. 1790 & 1791. Udførlig Beskrivelse over de Grønlandske Sæle, Første og Andet Stykke. – Skrifter af Naturhistorie-Selskabet, Kiøbenhavn: I(1), IV: 79-157 & I(2), VIII: 73-170, 3 Pls. (German translation 1793 *Schriften der Naturforscher-Gesellschaft zu Kopenhagen* I(1): 73-144 & I(2): 69-155; English translation *this volume.*)
- Fabricius, O. 1810. Nøiagtig Beskrivelse over alle Grønlændernes Fange-Redskaber ved Sælhunde-Fangsten, hvoraf vil sees deres mekaniske og ret hensigtsfulde Indretning. – Det Kongelige Danske Videnskabs-Selskabs Skrifter for Aar 1808 5(2): 125-178, 1 Pl. (English translation included in Holtved 1962, p. 27-66: A Precise Description of all Implements used by the Greenlanders for catching seals, from which will be seen their mechanical and very expedient design).
- Fischer, J.B. 1829. Phoca, 'Auriculus nullis', p. 234-242. – *In: Synopsis Mammalium.* – J.G. Cottae, Stuttgartiae: 42 + 527 pp.
- Folkow, L. B. and Blix, A. S. 1995. Distribution and diving behaviour of hooded seals, p. 193-202. – *In: Blix, A. S., Walløe, L. & Ultang, Ø. (eds): Whales, Seals, Fish, and Man. Proceedings of the International Symposium on Biology of Marine Mammals in the North East Atlantic, Tromsø, Norway, 29 November-1 December 1994.* – *Developments in Marine Biology*, 4. Elsevier, Amsterdam: 13 + 720 pp.
- Freuchen, P. 1915. Report on the First Thule Expedition. Scientific Work. – *Meddelelser om Grønland* 51(12): 387-411.
- Freuchen, P. 1935. Field Notes and Biological Observations, p. 195-235 – *In: Report of the mammals collected by the Fifth Thule Expedition to Arctic North America. Part II. Report of the Fifth Thule Expedition, 1921-1924, II(4-5).* – Gyldendal, Copenhagen: 68-278.
- Gesner, C. 1604. *Historiae Animalium Liber IV qui est de Piscium & Aquatiliu animantia natura, cum iconibus singularis ad vium expresses ferè omnibus, Editio Secunda, nouis iconibus, necnon observationibus non paucis auctior, atque etiam multis in locis emendatior.* – A. Bombresi, Francofurti: 38 + 1052 + 38 pp.
- Giebel, C.G. 1855. Die Säugethiere in zoologischer, anatomischer und palaeontologischer Beziehung umfassend dargestellt. – A. Abel, Leipzig: 12 + 1108 pp.
- Gill, T. 1866. Prodrôme of a Monograph of the Pinnipeds. – *Proc. Essex Inst. Salem, Communications* 5: 3-13.
- Gill, T. 1872. Arrangement of the families of Mammals with analytical tables. – *Misc. Coll. Smithsonian Institute, Washington D.C.* 230(11): 6 + 98 pp.
- Glahn, H.C. 1771. Anmærkninger over de tre første Bøger af Hr. David Crantz's Historie om Grønland. – København. (Re-issue: M. Lidegaard (ed.) 1991. – *Grønlandske Selskabs Skrifter* 30: 205 pp.).
- Gmelin, J.F. 1788. Caroli A. Linné, *Systema Naturae per Regna tria Naturae, secundam Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis.* 1(1) Mammalia et Aves 1, 13th edition. – G.E. Beer, Lipsiae: 10 + 323 pp.
- Gmelin, J.G. 1751-1752. Reise durch Sibirien von dem Jahr 1733 bis 1743, 1-4. – *Sammlung neuer und merkwürdiger Reisen zu Wasser und zu Lande, Göttingen* 4-7: 28 + 467 + 34 + 652 + 24 + 584 + 692 + 8 pp.
- Godman, J.D. 1826. *American Natural History* 1. – H.C. Carey & I. Lea, Philadelphia: 362 pp.
- Gray, J.E. 1827. Gen. Phoca, p. 175-181. – *In: Griffith, E. et al. (eds) The Animal Kingdom arranged in conformity with its organization by the Baron Cuvier, with additional descriptions of all the species hitherto named, and of many not before noticed, 5. Synopsis of the Species of Mammals as arranged with their organization by Cuvier and other naturalists with special characters, synonyma etc.* – London: 392 pp.
- Gray, J.E. 1843. Phocidae, p. 102-103. – *In: List of the specimens of Mammalia in the collection of the British Museum, London:* 28 + 216 pp.
- Gray, J.E. 1850. Catalogue of the specimens of Mammalia in the collection of the British Museum 2, Seals. – London: 8 + 48 pp.
- Gray, J.E. 1866. Seals, p. 8-43, 367-368. – *In: Catalogue of Seals and Whales in the British Museum, 2nd edit.* – London: 402 pp.
- Gray, J.E. 1871. Pinnipedia, p. 1-33. – *In: Supplement to the Catalogue of Seals and Whales in the British Museum, London:* 6 + 103 pp.
- Guðmundsson, J. 1924 (c. 1640). Ein stutt undirrietting um Íslands adskilianlegar náttúru (A short account of Iceland's different natures). – *Islandica, J. Hermannson (ed.), Ithaca, New York* [cited from Sæmundsen 1932, not found].
- Hallgrímson, J. 1837. Nogle Bemærkninger om den islandske Útselur. – *Naturhistorisk Tidsskrift* 2(1): 91-99.
- Harlan, R. 1825. *Fauna Americana, being a description of the Mammiferous Animals inhabiting North America.* – Philadelphia: 318 pp.
- Harrison, R.J., Hubbard, R.C., Peterson, R.S., Rice, C.E. &

- Schusterman, R.J. (eds) 1968. The behaviour and physiology of pinnipeds. – Appleton-Century-Crofts, New York.
- Heide-Jørgensen, M.P. & Lydersen, C. (eds) 1998. Ringed seals in the North Atlantic. – NAMMCO Scientific Publications 1: 273 pp.
- Heide-Jørgensen, M.P., Stewart, B.S. & Leatherwood, S. 1992. Satellite tracking of ringed seal, *Phoca hispida*, off Northwest Greenland. – *Ecography* 15: 56-61.
- Helms, O. 1929. Otto Fabricius: Fauna Groenlandica, Pattedyr og Fugle. – Grønlandske Selskabs Skrifter VI: 168 pp.
- Hermann, J. 1779. Beschreibung der Mönchs-Robbe. – Beschäftigungen der Berlinischer Gesellschaft Naturforschender Freunde 4(19): 456-509, Pl. 12 & 13.
- Hjort, J. & Knipovich, N. 1907. Bericht über die Lebensverhältnisse und den Fang der nordischen Seehunde. – International Council for the Exploration of the Sea (ICES), Rapports et Procès-Verbaux des Réunions 8: 125 pp.
- Holten, H.S. 1800. Danmarks og Norges Fauna eller Dyrhistorie I, Pattedyr. – N. Møller & Søn, København: 13 + 179 pp.
- Holtved, E. 1962. Otto Fabricius' Ethnographical Works. – Meddelelser om Grønland 140(2): 138 pp.
- Horrebow, N. 1753 (1752). Zuverlässige Nachrichten von Island nebst einer neuen Landkarte und 2 Jahrl. Metereologische Anmerkungen, aus dem Dänischen übersetzt. – F.C. Helt, Kopenhagen und Leipzig: 28 + 519 pp., 1 map.
- Iversen, T. 1927. Drivis og Selfangst. – A/S John Griegs Boktrykkeri, Bergen: 84 pp.
- Jensen, A. S. 1923. Naturforskeren Otto Fabricius, p. 331-399. – In: Biskop Dr. theol. Otto Fabricius. Et Mindeskrift i Hundredaaret for hans Død. – Meddelelser om Grønland 62(3): 215-399.
- Johansen, F. 1910. Observations on Seals (Pinnipedia) and Whales (Cetacea) made on the Denmark-Expedition 1906-08. – Meddelelser om Grønland 45(5,2): 201-224.
- Jonae (Jónsson), A. 1643. Groenlandia. – Amsterdam (1732 Kjøbenhavn: 8 + 68 pp.).
- Jones, T.R. 1875. Manual of the Natural History, Geology, and Physics of Greenland and the neighbouring Regions. – G.E. Eyre & W. Spotteswood, London: 12 + 733 pp.
- Jonstoni, J. 1657 (1649). Historia naturalis de Piscibus et cetis, libri V, cum aeneris figuris. – I. Jacobi, Amsterdam: 8 + 160 pp.
- Kapel, F.O. 1970. Optræder gråsælen i grønlandske farvande? – *Atuagagdliutit/Grønlandsposten* 110 (15): 12
- Kapel, F.O. 1996. Recoveries in Greenland, 1949-94, of tagged or branded harp and hooded seals. – *Scientific Council Studies, Northwest Atlantic Fisheries Organisation* 26: 87-99.
- Kapel, F.O., Christiansen, J., Heide-Jørgensen, M.P., Härkönen, T., Born, E.W., Knutsen, L.Ø., Riget, F. & Teilmann, J. 1998. Netting and conventional tagging used to study movements of ringed seals (*Phoca hispida*) in Greenland, p. 211-218. – In: Heide-Jørgensen, M.P. & Lydersen, C. (eds): Ringed Seals in the North Atlantic. – NAMMCO Scientific Publications 1: 273 pp.
- Kerr, R. 1792. The Animal Kingdom, or Zoological System of Linnaeus. A translation of that part of the Systema Naturae, as lately published by Professor Gmelin of Goetingen, together with numerous additions from more recent zoological writers and illustrated with copper plates. – Edinburgh.
- King, J.E. 1983 (1964). Seals of the world. – British Museum (Natural History), London & Oxford University Press (2nd edition): 240 pp.
- Knipovich, N. 1907. Über die Biologie der Seehunde im europäischen Eismeer, nach russischen Quellen. – International Council for the Exploration of the Sea (ICES), Rapports et Procès-Verbaux des Réunions 8: 83-107.
- Kornerup, B. 1923. Otto Fabricius' Levned og Betydning som kirkelig Personlighed, p. 217-292. – In: Biskop Dr. theol. Otto Fabricius. Et Mindeskrift i Hundredaaret for hans Død. – Meddelelser om Grønland 62(3): 215-399.
- Lavigne, D.M. & Kovacs, K.M. 1988. Harps and hoods: Icebreeding seals of the Northwest Atlantic. – University of Waterloo Press, Ontario, Canada: 18 + 174 pp.
- Laws, R. M. 1952. A new method of age determination for mammals. – *Nature*, London 169: 972.
- Laws, R. M. 1962. Age determination of pinnipeds with special reference to growth layers in the teeth. – *Zeitschrift Säugetierkunde* 27: 129-146.
- Leem, K. 1767. Beskrivelse over Finmarkens Lapper, deres Tungemaal, Levemaade og forrige Afgudsdyrkelse, oplyst ved mange Kaaberstykker, med J. E. Gunneri ... Anmærkninger. – G.G. Salicath, Kongelige Waysenhuses Bogtrykkerie, Kiøbenhavn: 14 + 2 + 544 + 2 pp., 100 Tab.
- Lepechin, I. I. 1778. Phocarum Species Descriptae. – Acta Academiae Scientiarum Imperialis Petropolitanae pro Anno 1777, 1(1): 257-266, Pls. 6-9.
- Lesson, R.P. 1827. Les Carnivores Amphibie ou Phocacées, p. 196-208. – In: Manuel de Mammologie, ou Histoire Naturelle des Mammifères. – Roret, Paris: 15 + 442 pp.
- Lesson, R.P. 1828. Phoque, p. 400-426. – In: Saint-Vincent, B. de (ed.) Dictionnaire classique d'Histoire Naturelle 13. – Rey & Grevier, Paris: 648 pp.
- Linnaeus (C. von Linné) 1746. Fauna Suecica sistens Animalia Sueciae Regni: Quadrupedia, Aves, Amphibia, Pisces, Insecta, Vermes, Distributa per Classes & Ordines, Genera & Species, cum differentiis specierum, synonymis auctorum, nominis incolarum, locis, habitationem, descriptionibus Insectorum. – L. Salvii, Stockholmiae: 28 + 4II, 2 Pls.
- Linnaeus (C. von Linné) 1758. Phoca, p. 37-38. – In: Systema Naturae per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis I, Regnum Animale. 10th edit. (Reformata). – L. Salvii, Holmiae: 2 + 824 pp.

- Linnaeus (C. von Linné) 1766. Phoca, p. 55-56. – *In*: Systema Naturae per Regna Tria Naturae, secundum Classes, Ordines, Genera, Species, cum characteribus, differentiis, synonymis, locis I (1 & 2), Regnum Animale. 12th edit. (Reformata). – L. Salvii, Holmiae: 1327 + 37 pp.
- Linnaeus – see Gmelin, J.F. 1788.
- Mansfield, A.W. 1967 (1963). Seals of arctic and eastern Canada. – Fisheries Research Board of Canada Bulletin 137 (2nd, revised edition): 35 pp.
- Martens, F. 1675. Spitzbergische oder Groenländische Reise Beschreibung gethan im Jahr 1671. Aus eigner Erfahrung beschrieben, die dazu erforderte Figuren nach dem Leben selbst abgerissen (so hierbey in Kupfer zu sehen) und jetzo durch den Druck mitgetheilet. – G. Schultzen, Hamburg: 8 + 135 pp, 16 Pls.
- Melchior, H.B. 1834. Den Danske Stats og Norges Pattedyr. Et Priisskrift udg. af S. Zahle. – Gyldendalske Boghandlings Forlag, Kjøbenhavn: 298 pp., 13 Pls.
- Mohr, E. 1952. Die Robben der europäischen Gewässer. – Monographien der Wildsäugetiere 12. Schöps, Frankfurt am Main: 283 pp., 40 Pls.
- Molina, G. 1786. Versuch einer Naturgeschichte von Chili, aus dem Italiänischen übersetzt von J.D. Brandis. Mit einer Landkarte. – F.G. Jacobär, Leipzig: 18 + 328 pp.
- Müller, O.F. 1776. Phoca, p. viii & 1-2. – *In*: Zoologiae Danicae Prodromus, seu animalium Daniae et Norvegiae indigenarum characteres, nomina, et synonyma imprimis popularium. – Hallager, Havniae: 32 + 282 pp.
- Müller, R. 1906. Vildtet og Jagten i Sydgrønland. – Hagerup, København: 519 pp.
- Nansen, F. 1890a. Paa Ski over Grønland, en Skildring af den norske Grønlands-Expedition 1888-89. – Kristiania: 704 pp.
- Nansen, F. 1890b. The bladder-nose seal and its capture, p. 168-189. – *In*: The first crossing of Greenland I. – Longmans, Green & Co., London: 22 + 510 pp.
- Nansen, F. 1924. Grønlands-selen & Klapmytsen, p. 31-138 & 158-214. – *In*: Blant sel og bjørn. Min første ishavs-ferd (1882). – J. Dybwad, Kristiania: 285 pp.
- Nansen, F. 1925. Hunting and Adventure in the Arctic. – Duffield & Co., New York: 343 pp.
- Naumov, S. P. 1933. Tyulenys SSSR ... – Moscow & Leningrad. [Seals of the USSR, the raw material basis for the marine mammal fishery. – Bur. Anim. Pop. Oxford, Transl. 107].
- Nilsson, S. 1820. Skandinavisk Fauna, En handbok för Jägare och Zoologer I, Däggande Djuren. – Lund: 9 + 65 + 419 pp.
- Nilsson, S. 1838. Utkast till en systematisk indelning af Phocacéerna. – Kongliga Vetenskaps-Akademiens Handlinger för År 1837: 235-240.
- Nilsson, S. 1840. Skandnaviens Skäldjur jemte öfversigt af de hittills kända exotiska Skäldjurens Naturhistorie, 33 unnumbered pp., Pl. 34, 37 & 38. – *In*: Illuminerade Figurer till Skandnaviens Fauna 2(20). – Akademie-Boktryckeriet, C.F. Berling, Lund.
- Nilsson, S. 1841. Entwurf einer systematischen Einteilung und spezielle Beschreibung der Phoken (Germ. translation of Nilsson 1838/1840, by W. Peters). – Wiegmann's Archiv für Naturgeschichte 7(1): 301-333.
- Nilsson, S. 1847. Skandinavisk Fauna I. Däggdjuren. (2nd, revised edit.). – C.W.K. Gleerup, Lund: 12 + 18 + 656 pp.
- Ödman, S. 1784. Anmärkninger om Skäl-Slägtet i Öster-Sjön. – Kongliga Svenska Vetenskaps-Academiens Nya Handlinger 5: 82-87.
- Ognev, S.I. 1935. Zveri SSSR i Prilezhashchikh stran (Zveri Vostochnoi Evropy i Severnoi Azii) 3. Kishchnye i Lastonogie). – Biomedgiz., Moscow & Leningrad. [Fauna of the USSR and adjacent countries (Mammals of eastern Europe and northern Asia) 3. Fissipedia and Pinnipedia. – 1962. Israel Program Sci. Transl.].
- Olafsen, E. 1772. Vice-Lavmand Eggert Olafsens og Land-Physici Bjarne Povelsens Reise igiennem Island, foranstaltet af Videnskabernes Selskab i Kiøbenhavn og beskrevet af forbemeldte Eggert Olafsen, med dertil hørende 51 Kobberstøkker og et nyt forfærdiget Kort over Island 1-2. – J. Lundgrens Enke, Soroe: 1042 + 32 pp.
- Olaus Magnus 1555. De piscatura Vitulorum marinarum. Liber XX, Cap. 4-7, p. 701-704. – *In*: Historia de Gentibus Septentrionalibus, ... – Romae: 84 + 1 + 815 pp.
- Olavius, O. 1780. Oeconomisk Reise igiennem de nordvestlige, nordlige og nordostlige Kanter af Island ...; med nogle Anmærkninger, Register og Forberedelse, samt et nyt Land-Charte og flere Kaaberstykker. – Gyldendal, Kiøbenhavn: 220 + 756 + 28 pp., 17 Pls.
- Pallas, P.S. 1831 (1811). Genus VII, Phocae, p. 99-119. – *In*: Zoographia Rosso-Asiatica sistens omnium animalium in extenso imperio Rossico et adjacentibus maribus observatorum recensionem, domicilia, mores et descriptiones, anatomen atque icones plurimorum, I. – Officina Caes. Academia Scientiarum Impress. Petropolis 1811, edit. 1831: 22 + 568 + 4 pp.
- Parsons, J. 1744. Some Account of the Phoca, *Vitulus marina*, or Sea-Calf, shewed at Charing-Cross in February, 1742-43. – Royal Society of London, Philosophical Transactions for the years 1742 and 1743, 42: 383-386, Pl. I.
- Parsons, J. 1753. A dissertation upon the Phoca marinae. – Royal Society of London, Philosophical Transactions for the years 1751 and 1752, 47: 109-122, Pl. VI.
- Pennant, T. 1771. Synopsis of Quadrupeds.–J. Monk, Chester: 26 + 382 pp., 31 Pls.
- Pennant, T. 1781 (1793). History of Quadrupeds, 1-2. – B. White, London: 24 + 566 + 12 pp. (1793 *Ibid.* 3rd edit.).
- Perrault, C. (Charras & Dodarts) 1757. Anatomische Beschreibung eines See-Kalbes, p. 217-244, Pls. 28-29. – *In*: Abhandlungen zur Naturgeschichte der Tiere und Pflanzen, welche ehemals der königliche französischen Akademie der Wissenschaften vorgetragen worden; Mit dazu gehörigen nach dem Leben gezeichneten Kupfern. Aus dem Französischen übersetzt I. – Arkstee und Merkus, Leipzig: 26 + 346 + 2 pp., 45 Pls.

- Pontoppidan, E. 1752. Det første Forsøg paa Norges Naturlige Historie, forestillende dette Kongeriges Luft, Grund, Fielde, Vande, Væxter, Metaller, Mineraler, Steen-Arter, Dyr, Fugle, Fiske og omsider Indbyggernes Naturel, samt Sædvaner og Levemaade. Oplyst med Kobberstykker 2. – Berlingske Arvingers Bogtr., L.H. Lillie, Kiøbenhavn: 26 + 462 + 23.
- Popov, L.A. 1970. Soviet tagging of harp and hooded seals in the North Atlantic. – Fiskeridirektoratets Skrifter, Ser. Havundersøkelser 16(1): 1-9.
- Porsild, M. 1915. Studies on the material culture of the Eskimo in West Greenland. – Meddelelser om Grønland 51(5): 111-250.
- Rasmussen, B. & Øritsland, T. 1964. Norwegian tagging of harp seals and hooded seals in North Atlantic waters. – Fiskeridirektoratets Skrifter 13(7): 43-55.
- Ray (Rajo), J. 1693. *Phoca seu Vitulus Marinus*, p. 189-191. – *In: Synopsis Methodica Animalium Quadrupedum & Serpentina Generis. Vulgarium Notas Characteristicas, Rariorum Descriptiones integras exhibens: cum Historiis & Observationibus Anatomicis perquam curiosis. Praemittuntur nonnulla de Animalium in genera, sensu, generatione, divisione, etc.* – R. Southwell, S. Smith & B. Walford, Londoni: 16 + 336 + 8 pp.
- Reinhardt, J.T. 1842. Bemærkning om Tandforholdet hos *Halichoerus grypus*. – *Naturhistorisk Tidsskrift* 4(3): 313-314.
- Reinhardt, J.T. 1857. Fortegnelse over Grønlands Pattedyr, Fugle og Fisk, p. 3-12 of Tillæg 1. – *In: Rink, H.J.: Grønland geografisk og statistisk beskrevet 2, Det søndre Inspektorat.* – A.F. Høst, København: 172 pp.
- Reinhardt, J.T. 1865. Om Klapmysdens ufødte Unge og dens Melketandsæt. – *Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn for Aaret 1864*: 248-264.
- Ridgway, S.H. & Harrison, R.J. 1981. *Handbook of Marine Mammals 2 (Seals)*. – Academic Press (London): 15 + 359 pp.
- Rink, H.J. 1852 & 1857. Grønland geografisk og statistisk beskrevet 1 & 2, Det nordre Inspektorat & Det søndre Inspektorat. – A.F. Høst, København: 407 & 172 pp.
- Rink, H.J. 1877. *Danish Greenland, its People and Products*. – H.S. King & Co., London (Repr. 1974 C. Hurst & Co., London & A. Busck, Copenhagen): 17 + 468 pp.
- Ronald, K. & Mansfield, A.W. (eds) 1975. *Biology of the Seal. Proceedings of a Symposium held in Guelph 14-17 August 1972*. – International Council for the Exploration of the Sea, Rapports et Procès-verbaux des Réunions 169: 557 pp.
- Ronald, K., Hanly, L.M., Healey, P.J. & Selley, L.J. 1976. An annotated bibliography on the Pinnipedia. – International Council for the Exploration of the Sea, Copenhagen: 785 pp.
- Ronald, K., Healey, P.J., Dougan, J., Selley, L.J. & Dunn, L. 1983. An annotated bibliography on the Pinnepedia. Supplement 1. – International Council for the Exploration of the Sea, Copenhagen: 346 pp.
- Ronald, K., Gots, B.L., Lupson, J.D., Willings, C.J. and Dougan, J.L. 1991. An Annotated Bibliography of Seals, Sea Lions, and Walrus. Supplement 2. – International Council for the Exploration of the Sea, Copenhagen: 801 pp.
- Rondeletti, G. 1554. *Libri de Piscibus marinis, in quibus verae Piscium effigies sunt, que in tota Piscium historia continantur, indicæ Elenchus pagina nona & decima. Postreme accessarunt Indices necessarii*. – M. Bonham, Lugduni Gallorum: 16 + 583 + 24 pp.
- Scheffer, V. B. 1950. Growth layers in the teeth of Pinnipedia as an indicator of age. – *Science* 112: 309-311.
- Scheffer, V.B. 1958. *Seals, Sea lions and Walruses. A Review of the Pinnipedia*. – Stanford University Press, California & Oxford University Press, London: 10 + 179 pp.
- Scholander, P. F. 1940. Experimental investigations on the respiratory functions in diving mammals and birds. – *Hvalrådets Skrifter* 22: 133 pp.
- Scholander, P.F., Irving, L. & Grinnell, S.W. 1942. On the temperature and metabolism of the seal during diving. – *Journal of Cellular and Comparative Physiology* 19: 67-78.
- Schreber, J.C.D. von 1775-1778. *Der Robbe, Phoca*, p. 285-316, Tab. 82-86. – *In: Die Säugethiere in Abbildungen nach der Natur mit Beschreibungen 3*. – W. Walther, Erlangen: 284-590.
- Schultz-Lorentzen, C.W. 1923. Otto Fabricius og den grønlandske Mission, p. 293-330. – *In: Biskop Dr. theol. Otto Fabricius. Et Mindeskrift i Hundredeaaret for hans Død*. – *Meddelelser om Grønland* 62(3): 215-399.
- Sergeant, D.E. 1991. Harp seals, man and ice. – *Canadian Special Publication of Fisheries and Aquatic Sciences* 114: 153 pp.
- Sigurjónsson, J. & Stenson, G.B. (eds) 1997. *The Role of Marine Mammals in the Ecosystem*. NAFO/ICES Symposium, St John's, Newfoundland 1995. – *Journal of Northwest Atlantic Fisheries Science* 22: 378 pp.
- Sivertsen, E. 1941. On the biology of the harp seal, *Phoca groenlandica* Erxl. Investigations carried out in the White Sea 1925-1937. – *Hvalrådets Skrifter* 26: 166 pp.
- Smirnov, N. 1924. On the eastern harp seal *Phoca (Pagophoca) groenlandica*. – *Tromsø Museums Aarshefter* 47(2): 3-11.
- Steenstrup, J. 1861. Mælketandsættet hos Remmesælen, Svartsiden og Fjordsælen (*Phoca barbata* O. Fabr., *Ph. groenlandica* O. Fabr., og *Ph. hispida* Schreb.), og i Anledning deraf nogle Bemærkninger om Tandsystemet hos to fossile Slægter (*Hyænodon* og *Pterodon*). – *Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn for Aaret 1860*: 251-264, Pl. 5.

- Steenstrup, J. 1865. Yderligere Bemærkninger om Mælketandsættet hos Remmesælen (*Phoca barbata*). – Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjøbenhavn for Aaret 1864: 269-274.
- Steller, G.W. 1751. De Bestiis Marinis. – Novi Commentarii Academiae Scientiarum Imperiale Petropolitaneae 2, ad Annum 1749, Petropolis: 289-398, Tab. XV.
- Steller, G.W. 1753. Ausführliche Beschreibung von sonderbaren Meerthieren, mit Erläuterungen und nöthigen Kupfern versehen. – C.C. Kuemmel, Halle: 18 + 218 pp., 1 Pl.
- Steller, G.W. 1774. Beschreibung von dem Lande Kamtschatka, dessen Einwohnern, deren Sitten, Nahmen, Lebensort und verschiedenen Gewohnheiten, herausgegeben von J.B. Scherer, mit vielen Kupfern. – J.G. Fleischer, Frankfurt & Leipzig: 8 + 384 pp., 8 Pls, 2 Maps.
- Stewart, B.S., Leatherwood, S., Yochem, P.K. & Heide-Jørgensen, M.P. 1989. Harbor seal tracking and telemetry by satellite. – Marine Mammal Science 5: 361-375.
- Strøm, H. 1762 & 1766. Physisk og oeconomisk Beskrivelse over Fogderiet Søndmør, beliggende i Bergen Stift i Norge 1 & 2. – Soroe: 16 + 570 pp., 4 Pls, 1 Map.
- Sæmundsson, B. 1932. Islensk Dyr, 2, Spendyrin (*Mammalia Islandiae*). – S. Eymundssonar, Reykjavik: 8 + 437 pp.
- Sæmundsson, B. 1939. Mammalia. The Zoology of Iceland 4(76). – E. Munksgaard, Copenhagen & Reykjavik: 52 pp.
- Thienemann, F.A.L. 1824. Naturhistorische Bemerkungen gesammelt auf eine Reise im Norden Europas vorzüglich im Island in den Jahren 1820 bis 1821 ausgestellt von F.A.L. Thienemann und G.B. Günter 1, Säugethiere. – C.H. Reelam, Leipzig: 8 + 160 + 6 pp.
- Torfaeus (Torfason), T. 1706. Groenlandia antiqua, seu Veteris Groenlandiæ Descriptio, ubi coeli marisque natura, terrae, locorum & villarum situs, animalium terrestrium, aquatiliūque varia genera, Gentis origo & incremento, status Politicus & Ecclesiasticus, gesta memorabilia & vicissitudines, Antiquis memoriis, præcipue Islandicis, qua fieri potuit industria collecta exponuntur. ... Havniae: 64 + 269 + 19 pp.
- Trouessart, E.-L. 1898-1899. Catalogus Mammalium, tam viventium quam fossilium. Nova Editio 1. – R. Friedländer & Sohn, Berlin: 5 + 664 pp.
- Wagner, J.A. (Schreber, J.C.D. von &) 1846. Die Säugethiere in Abbildungen nach der Natur mit Beschreibungen, fortgesetzt 7. – Erlangen: 8 + 427 pp.
- Winge, H. 1902. Grønlands Pattedyr. – Meddelelser om Grønland 21(2): 319-521.
- Wollebæk, A. 1907. Über die Biologie der Seehunde und die Seehundjagd im europäischen Eismeer, hauptsächlichen nach norwegischen Quellen. – International Council for the Exploration of the Sea (ICES), Rapports et Procès-Verbaux des Réuniones 8: 109-119.
- Worm, O. 1655. Museum Wormianum, seu Historia Rerum Rariorum, tam Naturalium, quam Artificialium, tam Domesticarum, quam Exoticarum, quae Hafniae Danorum in aedibus Authoris servantur ... Variis & accuratis Iconibus illustrata. – I. Elsevirium, Lugduni Batavorum: 14 + 389 + 3 pp., 2 Pls.
- Zemskogo, V.A. 1980. Atlas morskije mlekopitayushchie S.S.S.R. (Atlas of marine mammals of the U.S.S.R. – Moskwa: 184 pp.
- Zimmermann, E.A.W. van 1778 & 1780. Geographische Geschichte der Menschen, und der allgemein verbreiteten vierfüßigen Thieren, nebst einer hieher gehörigen zoologische Weltcharte 1 & 2. – Weigandische Buchhandlung, Leipzig: 16 + 308 & 8 + 432 pp.
- Zimmermann, E.A.W. van 1782. Phoca, p. 276-278. – In: *Ibid.*, 3, Appendix.
- Zorgdrager, C.G. 1750 (1720). Beschreibung des Grönländischen Walfischfangs und Fischerey, nebst einer gründlichen Nachricht von dem Bakkelau- und Stockfischfang bey Terreneuf, und einer kurzen Abhandlung von Grönland, Island, Spitzbergen, Nova Zembla, Jan Mayen Eiland, der Strasse Davids u.a.. Aus dem Holländischen übersetzt, und mit accuraten Kupfern und Land-Charten gezieret. – G.P. Monath, Nürnberg: 4 + 370 + 12 pp.