Our ships
– and the men whose names they bear

G.O. Sars
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### The work of the Institute of Marine Research

The Institute’s four core areas of activity are marine resources, the marine environment, aquaculture and coastal zone management. The Institute lies at the cutting edge of research in these fields, and it regularly provides professional and scientific advice to the authorities, industry and the general public. The aims of our core areas of research are:

- to improve our basic knowledge of the most important species of marine animals in order to be able to offer more accurate stock assessments, prognoses and management advice
- to improve our understanding of environmental effects on the ecosystem and their importance for environmental and resources management, and to develop methodologies for incorporating environmental parameters in stock assessments
- to develop our knowledge of salmonids, marine species and crustaceans in order to improve aquaculture production, thus ensuring that the interests of both industry and society in general are taken into account in questions of health, the environment, food quality and ethics
- to provide a knowledge base and management advice for a balanced and future oriented utilization and protection of the coastal zone

This text is based on an earlier publication written by Per Solemdal and Sigmund Myklebost.
The Institute of Marine Research

The Institute’s headquarters are at Nordnes Point in Bergen, where the Marine Environment research and the Aquaculture research have their offices and modern laboratories. The main building also houses the Director General’s offices, the Department of Information, and so on. Just down the road we find the headquarters for research of the Marine Resources in its own building (close to the Directorate of Fisheries). A few minutes walk in the same direction brings us to the Fish Capture Section and the Department of Fisheries Research in Developing Countries. On Nykirkekaiaen (New Church Quay) the Administration and Service Department and the Research Vessel Department rent premises from the Bergen Harbour Authority. This is also where the Institute’s research vessels tie up on their occasional visits to Bergen, and where their research trawls and other equipment are stored.

Our stations

Matre Aquaculture Station, on the shore of the Masfjord, was established in 1971. Its scientists mainly study salmon and trout, but they also do research on marine fish species.

The Flødevigen Research Station lies on the island of Høsøy near Arendal. The station was established by Gunder Mathias Dannevig in 1882, when most of its work dealt with hatching and releasing cod larvae. The main activities of the station today revolve around coastal zone research and consulting.

Austevoll Aquaculture Station, which lies on the island of Hufskær in Austevoll, was established in 1978. The activities of the station are concentrated on a wide range of marine aquaculture species, including halibut, cod, haddock, scallops, lobsters and hake.

Tromsø: The Institute of Marine Research has taken over the research activities on marine resources which was formerly carried out by the Norwegian Fisheries Research Institute in Tromsø, and since January 2003, this area of research has been organised as a department of the Institute of Marine Research in Tromsø.
The following table shows the number of cruise days sailed in 2002 by our own vessels and chartered boats. Personnel cruise days are cruise days multiplied by the number of scientific personnel on board.

<table>
<thead>
<tr>
<th>Vessel</th>
<th>Cruise days</th>
<th>Personnel cruise days</th>
</tr>
</thead>
<tbody>
<tr>
<td>“G.O. Sars” (now “Sarsen”)</td>
<td>249</td>
<td>1,422</td>
</tr>
<tr>
<td>“Johan Hjort”</td>
<td>303</td>
<td>1,774</td>
</tr>
<tr>
<td>“Michael Sars”</td>
<td>265</td>
<td>1,092</td>
</tr>
<tr>
<td>“G.M. Dannevig”</td>
<td>143</td>
<td>355</td>
</tr>
<tr>
<td>“Fangst”</td>
<td>135</td>
<td>334</td>
</tr>
<tr>
<td>“Dr. Fridtjof Nansen”</td>
<td>302</td>
<td>657</td>
</tr>
<tr>
<td>“Håkon Mosby”</td>
<td>20</td>
<td>134</td>
</tr>
<tr>
<td>Other chartered vessels</td>
<td>371</td>
<td>482</td>
</tr>
<tr>
<td><strong>Sum</strong></td>
<td><strong>1,808</strong></td>
<td><strong>6,446</strong></td>
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Where do we carry out our research cruises?

**“Loophole”** (International Zone)
- Russian Economic Zone
- Greenland Economic Zone
- EU Water
- Icelandic Economic Zone
- Faeroes Economic Zone

**“Grey Zone”** (Disputed area between Russia and Norway)
- Dr. Fridtjof Nansen carries out research on behalf of developing countries and therefore is usually not in our home waters.

**“Banana Loophole”** (International Zone)
- “G.O. Sars” (now “Sarsen”)
- “Johan Hjort”
- “Michael Sars”
- “G.M. Dannevig”
- “Fangst”
- “Dr. Fridtjof Nansen”
- “Håkon Mosby”
- Other chartered vessels

**“Banana Loophole”** (International Zone)
- Greenland Economic Zone
- Fishery Zone around Jan Mayen
- EU Water
- Norwegian Economic Zone
- Faeroes Economic Zone
- EU Water
- EU Water
- EU Water

**EU Water**
- EU Water Protection Zone around Svalbard

Vessels and activities

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How we gather information

Every year, our research vessels gather large quantities of environmental and fisheries data. The illustrations on the opposite page show how catch data are collected.

Acoustic instruments (echosounders and sonar) make continuous recordings of “echo data” and trawls are set and hauled at regular intervals to collect samples of the fish registered by these instruments. The fish taken by the trawls are sorted into species, weighed and their length is measured. We remove their otoliths (tiny stones in the ear), which lets us determine their age, and their stomach contents are analysed in order to find out what they have eaten. These fish data from the trawl hauls provide the basic information that we use to interpret the acoustic data. The total echo density is mathematically transformed into numbers of fish. In conjunction with reliable catch data from the commercial fishing fleet, these data provide essential input for our calculations of the total number of fish of each species found in our waters.

Managing the ecosystem

Good resources management means that we must look at stocks in an overall context, for example in terms of how the stocks of each species influence each other. Cod, for example, prey on capelin. This is known as “multi-species management”. Non-commercial species have to be taken into account in resource management of this sort, and the ocean environment is an important factor in a management strategy that looks to the future. One thing we need to ensure is that the sea is kept as “clean” as possible. This sort of integrated management of all life-forms and of the marine environment itself is what we can call ecosystem management, one of the most important aims of the Institute of Marine Research and the International Council for the Exploration of the Sea (ICES).
The men who gave their names to our ships became Professor of Zoology after 24 years as a priest Sars survived to adulthood. 14 children, eight of whom poet J. S. Welhaven, bore him. His wife Maren, sister of the parish, just north of Bergen, in history. In 1830 he was called to the poverty-stricken parish of Kinn, moving to Manger to the west of Bergen. At that time, it was widely believed that animal life did not exist at great depths. Together with his son Georg Ossian, and the zoologist Per Christian Asbjørnsen, Sars exploded this belief. In 1839 Asbjørnsen caught a primitive and free-swimming starfish from the bottom of the Hardanger Fjord. This was given the name Brisinga, after the goddess of Michael Sars was probably the most serious missionary for the new learning. Per Christian Asbjørnsen offered an amusing personal description of Michael Sars as a “good comrade and excellent man.” He also smokes tobacco like a man and curtsies as though he had never mounted a pulpit”.

One of the founding fathers of modern zoology, Michael Sars (1805–1869) was trained as both a priest and a zoologist. Sars was the son of a German-born ship’s captain of the same name. His mother, Diwert H. Heilman, had come to Norway from Narvik, a town on the Russian-Estonian boundary. Even as a young boy, Michael displayed a burning interest in natural history, especially palaeontology. He started to study natural history at the University of Christiania (now Oslo), but abandoned the course after only three terms, changing to theology, although without giving up his interest in natural history. In 1830 he was called to the poverty-stricken parish of Kinn, moving to Manger parish, just north of Bergen, in 1839. Financial difficulties plagued him for much of his life. His wife Maren, sister of the poet J. S. Welhaven, bore him 14 children, eight of whom survived to adulthood. After 24 years as a priest Sars became Professor of Zoology at the University of Christiania. His scientific production covers his periods both as priest and professor. Most of his work was on marine animals: their reproduction, development and their horizontal and vertical distribution in the ocean. At that time, it was widely believed that animal life did not exist at great depths. Together with his son Georg Ossian, and the zoologist Per Christian Asbjørnsen, Sars exploded this belief. In 1839 Asbjørnsen caught a primitive and free-swimming starfish from the bottom of the Hardanger Fjord. This was given the name Brisinga, after the goddess of Michael Sars was probably the most serious missionary for the new learning. Per Christian Asbjørnsen offered an amusing personal description of Michael Sars as a “good comrade and excellent man.” He also smokes tobacco like a man and curtsies as though he had never mounted a pulpit”.

The miserable cod fisheries at the turn of the century caused real distress, especially in northern Norway, and the authorities demanded that marine scientists should find out why catches varied so much. Johan Hjort accepted the challenge, but it was his son who continued to work. “On the Origin of Species”. At first, Michael Sars was unwilling to accept the evidence in favour of the theory of evolution, but towards the end of his life he defended it. His own work supported evolutionary theory, but it was his son who would become the most serious missionary for the new learning.

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Georg Ossian Sars was the son of Michael Sars, and was christened after the (mythical) Celtic poet Ossian. While he was still a student he was also collaborating with his father and accompanying him on research trips. After his father’s death in 1869 he completed the studies they had been doing together, producing a series of basic works on various groups of marine invertebrates: starfish, molluscs, etc.). He followed up his father’s methods in that he studied living material.

G.O. Sars’ principal work, “An Account of the Crustacea of Norway”, described most of the Norwegian crustaceans, and is still an international standard work. Its nine volumes and 4000 pages were published between 1895 and 1928. The drawings in these volumes bear witness to his artistic abilities; he engraved his crustaceans directly on copper plates. In 1864, G.O. Sars and the herring scientist Axel Boeck (1833–1873) became Norway’s first full-time marine scientists. Sars gradually took over responsibility for the practical scientific studies of Norway’s ocean fisheries, which he led until 1893, when Johan Hjort took over. He also became a fellow of the University in 1870 and professor in 1874.

Sars’ made his most important findings in fisheries science in the Vestfjord during the annual cod fisheries, between 1864 and 1869. As he was rowed around the fjord he could observe with his own eyes the millimetre-sized eggs and recently hatched cod larvae floating on the surface. The finding that cod eggs float in the sea or on the surface was new to science, which until then had firmly believed that all fish laid their eggs on the seabed (as salmon do). However, Sars’ discovery was not news to the Lofoten fishermen! Sars’ methods of direct observation depended on the following conditions: 1) a small boat; 2) good eyesight (Sars was 27 when he discovered the pelagic eggs); 3) good weather! As far as the weather was concerned he had no choice (as we do today with our modern ocean-going research ships), and his reports to the Ministry usually begin: “On a fine, calm day…”. Georg Ossian Sars’ studies of the life-history of the spawning cod were models of their kind, even though he did not get to the bottom of all the mysteries involved. His research vessel was simply too small. His research methods showed the unmistakable influence of his father, with their use of living material and their thorough planning. But his reports also reveal a brilliant independent scientist with a highly developed ability to concentrate and a great deal of imagination.

The Vestfjord studies convinced Sars that an understanding of the animal life and the fisheries off the coast of Norway could not be isolated from each other. It was essential to study the “whole of the Northern Seas”. Together with the geophysicist Henrik Mohn, Sars managed to finance three expeditions to the Norwegian Sea with SS Vøringen in 1876–1878. Norway had joined the competition to explore the ocean depths.
Finn Devold (1902–1977) – the herring shepherd

Finn Devold was the son of Harald Devold, a master of the Church, and Alda Else Marie Lampe. He was born in Bergen but grew up in Tromsø. He studied at the Sorbonne, Bergen but grew up in Tromsø. He studied at the Sorbonne, and had many different jobs before joining the Institute of Marine Research in 1935.

Devold was an assistant at the Department of Geophysics in Tromsø and at Fridtjof Nansen in 1922–23. He soon acquired a taste for the exciting life of the Arctic, and ran the meteorological stations at Kveiksdalen on Svalbard and on the island of Jan Mayen. At the request of the Norwegian Government he led the occupation of an area in Southeast Greenland in 1931, while his brother Hallvard occupied what was known as Eirik the Red’s land. Norway lost this case at the International Court in the Hague.

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Devold became a fisheries biologist, and was awarded his masters degree for a fine piece of work on the biology of the plaice. He is best known for his study of the migration pattern of the German-Slavianian herring. He also suggested an explanation for the long-term changes in the size of the herring population off the coast of Norway, an explanation which is still discussed today.

Helge Ingstad wrote in a memorial article about Finn Devold, "Finn Devold was one of the finest and most fearless men I have ever known. Now he is gone from us – a giant tree has fallen in the forest".

"G. O. Sars" (1)

Devold’s "herring shepherd"

The fact that Devold’s name is so closely coupled with the vessel "G. O. Sars" (1) is due to the great efforts he made on behalf of the people of the coast during the rich herring years of the 50s. These efforts were made with the aid of a device which had been developed by the British during the Second World War to locate and track submarines. This device was ASDIC (Anti-Submarine Detection Investigation Committee), and it was installed on the Norwegian herring vessels. It was Norwegians who modified this vertical-search device to enable it to locate schools of fish. It was Emar Lea, one of Hoyt’s closest associates, who took up the idea in 1947, and 1949 saw the delivery of the first herring ASDIC. The instrument was re-named SONAR (Sound Navigation And Ranging), which was realised that the herring were being observed as far as 200 nautical miles from the coast. At that time, most people believed that all herring fry stayed close to the coast. Drift nets do not catch these tiny fish, but the sonar could see them as far as two hundred miles from the coast. Devold had to ask them to stay out of the way in order not to hinder his work. The "parade" of boats must have looked rather strange. When one of the skippers asked what was going on, the skipper of the seine-netter "Reform" from Sunnmøre answered, "Well, we’re all marching in a 17th of May (Constitution Day) procession, and the Sars boat is setting the tune!"

When the herring arrived off the coast at Runde on January 21, 1951, "G. O. Sars" had demonstrated its good qualities and sea-worthiness and the sonar its fantastic ability to find herring. Devold and the Institute of Marine Research had won the trust of the people of the coast. This was a fine start for the Institute’s first sea-going research vessel since "Michael Sars".

In the early 60s, the echo integrator was developed at the Institute of Marine Research. This instrument made it possible to "collect" echoes from a large number of fish and use these to estimate their biomass. The prototype was tested on board "G.O. Sars", and later became the most important instrument for the Institute of Marine Research’s fish stock assessments.

Although "G.O. Sars" is closely linked to herring studies in the popular consciousness, the vessel was also the Institute’s workhorse in several other fields. During the post-war years, the aim of Norwegian fisheries policy was to build up a diversified fishing fleet, including occupying vessels. There was a particularly high level of research activity in the Barents Sea during this period. This is a region that makes very high demands of both crews and ships, especially in the winter months, but in 1958 "G.O. Sars" was joined by the third "Johan Hjort".

Read about "G.O. Sars" (2) on page 32.

Shipped to: Ak Paus, Polarhalvøya, Arendal

Built: AB Moss Værft & Dokk

Model: "G.O. Sars"

LOA: 51.985 m

Beam: 8.690 m

GRT: 594.69 tonnes

Main propulsion machinery: 2 x Crossley HRL6, each of 600 GHP

Main engines: 2 x Sydney 9 x 71 EGV

Rebuilt: 1915/1950

Home port: Tromsø

MMSI: 257000516

Route: Barents Sea

Linked to herring studies in the popular consciousness, the vessel was also the Institute’s workhorse in several other fields. During the post-war years, the aim of Norwegian fisheries policy was to build up a diversified fishing fleet, including occupying vessels.
Gunder Mathisen Dannevig (1841–1911) - sea captain and pioneer in the aquaculture of marine fish

Shipyard: Lunde Båtbyggeri, Tysnes in Sunnhordland
Built: 1949
LOA: 19.80 m
Beam: 5.5 m
Draught: 2.70 m
GRT: 55 tonnes
Main propulsion machinery: Alpha, 200 HP
Accommodation: 3 double cabins.

The story of this ship is interesting. "G.M. Dannevig" was brought into service in 1950 and was intended for use as a transport vessel for fish fry (releases of cod larvae) and research cruises off the Norwegian coast and in the Skagerrak. The building of "G.M. Dannevig" signalled the start of a new epoch in the history of the Flødevigen Research Station, in that the new vessel greatly extended the range of tasks that could be carried out at sea. The ship gradually became too small to perform the functions it was intended for, and was sold in 1987.

Gunder M. Dannevig was the son of skipper Mathias Wilhelm Dannevig and Kirsten Gundersdatter Guldsmedengen. He went to sea at an early age and became a skipper when he was only 24 years old, when Arendal was the richest and most important shipping centre in Norway. In 1878 he became a fisherman. There was a critical shortage of fish on the coast of Southern Norway at the time, and fishermen wanted to have certain types of fishing gear banned. Dannevig, who had a good understanding of how the fisheries were developing in other countries, had heard that the Americans had begun to experiment with hatching marine species of fish. The idea of improving cod stocks by releasing newly hatched larvae into the sea won the support of everyone in the fishing industry, and community spirit in Arendal provided the necessary financial support for a cod hatchery. Dannevig received scientific backing from G.O. Sars who, in his first report from Lofoten in 1864, had already proposed artificial hatching in order to even out annual variations in the cod fisheries. Dannevig’s hatchery at Flødevigen was the first large-scale hatchery for marine fish in the world. Hundreds of millions of cod eggs were hatched every year, and the yolk-sac larvae were released into specially selected locations. Dannevig attempted to demonstrate the results of the releases by local questionnaire studies. The fishermen who had a positive attitude to these measures also tended to respond positively to questions about trends in cod stocks. When the launch of the venture obtained financial support, the practical scientific studies also began. Dannevig then proposed to investigate the effects of the releases by means of beach hauls of nets in selected fjords where fish had been hatched, and in others without releases. This was in 1904–06. Johan Hjort was not convinced of the usefulness of the sort of activity, and he insisted that his assistant, Knut Dahl, should be on the spot to check the catches. The spirit of cooperation between the old sea-captain and the young academic must have been poor. The front page of the first mimeographed report from the beach-net studies is "decorated" with the following remark: "Damned lies. Knut Dahl". But it was precisely this report that provided the first signals about a new explanation of the wide annual fluctuations in fish catches, the central finding of the golden age. The verdict of history on the economic importance of Dannevig’s releases of cod fry has been negative. On the other hand, the scientific activity which his initiative triggered in the infant Norwegian marine research sector has given him a major place in the history of marine research in Norway. The biologist O. Nordgaard described Dannevig in the following words: "Dannevig was characterised by his unusually practical bent, his almost violent energy, and his sharp under- standing. Whether he was speaking Norwegian, English or French, he resembled a post that was difficult to shift. He could be unpleasant to have as an opponent".

The biologist O. Nordgaard described Dannevig in the following words:

"G.M. Dannevig" (1) transport vessel for fish fry "G.M. Dannevig" was brought into service in 1950 and was intended for use as a transport vessel for fish fry (releases of cod larvae) and research cruises off the Norwegian coast and in the Skagerrak. The building of "G.M. Dannevig" signalled the start of a new epoch in the history of the Flødevigen Research Station, in that the new vessel greatly extended the range of tasks that could be carried out at sea. The ship gradually became too small to perform the functions it was intended for, and was sold in 1987.
Johan Hjort (1869–1948) – still a current name in Norwegian marine research

Johan Hjort's father was a professor and eye specialist, who came from an old Danish family of civil servants. His mother was from the Falun family.

Johan Hjort inherited his interest in science from his father; his rather volcanic temper came from his mother. He studied biology in Munich and was G. O. Sars' successor as leader of the fisheries studies in Christiania in 1893, at the age of 24. In 1900 these studies were moved to Bergen, and after a few years, Hjort became both director of marine research and director of fisheries. He resigned during the First World War in protest against the behaviour of the authorities in connection with the sale of fish to Britain, believing that Norway was not observing the conditions of neutrality. After the War, Hjort studied biology in Cambridge, and he also spent some time in Denmark before becoming a professor at the University of Oslo. His scientific production covered a wide range of subjects, from larval development in Ascidians to plankton and hydrographic studies also provided valuable new knowledge.

Underlying ecological attitude is in line with the ecological management model for marine resources which we can glimpse in the distance. Hjort’s observa-
tions came to the aid of the Institute of Marine Research in the 80s in particular, when one “stock earthquake” after anot-
er was discovered in the Barents Sea. Hjort’s descrip-
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After the First World War there was little money available for research cruises, and “Michael Sars” was laid up, while the Institute acquired a small wooden vessel which was specially designed for research purposes. This was the first “Johan Hjort”, and it is said that Dr. Hjort was not particularly satisfied by the honour of having such a “pathetic” vessel named after him. Nevertheless, the new boat performed well in Lofoten (cod), off the coast (winter and spring spawning herring) and in the fjords (tardines and yearling herring). Plankton and hydrographic studies also provided valuable new knowledge.

Since it turned out to be impossible to get “Micha Sars” into operation again (except for a whaling trip to the Davis Strait in 1924), “Johan Hjort” was refitted for large-scale studies in the Norwegian Sea. However, it was felt that such operations were beginning to...
The second "Johan Hjort" was also a small wooden vessel of 79 ft. LOA, designed for use in coastal water. Financial conditions were difficult at this time, and the fishing industry was struggling with overproduction and market problems. Hjort's expansive ocean fishery model was de-emphasised, and the scientists' wishes for new boats were modest.

"Johan Hjort" (2) had the honour of testing out the echosounder to locate fish. This extremely important tool for practical fishing had originally been developed by the British Admiralty in the 30s as a depth sounder. In 1934, Oscar Sund heard that the brisling seine netter "Signal" had recorded echograms of fish shoals. Sund managed to obtain money for an echosounder, and on March 11, 1935, "Johan Hjort" arrived at Hølla in Lofoten. Now, for the first time, it was possible to "see" the concentrations of spawning cod in a thin horizontal layer in thermocline water at 4–6 °C. The results of the investigations were published in the well-known journal "Nature" on June 8 that very same year. A new era in world fishing had arrived. When the third "Johan Hjort" was handed over in 1958, the second boat was renamed "Oscar Sund"; a well-deserved honour!

Oscar Sophus Sund (1884–1943) - marine scientist from the North

Oscar Sund was born on the Sund property in Gildeskål in the County of Nordland. His father, Haagen Olsen, was a country policeman and was married to Annette Katharina Neumann. He grew up among the northern fisherfolk, virtually at the gateway to the sea. His great ambition was to study fish and their migrations, in order to help the fishermen. While he was still a student he published a number of studies on central topics in zoology, demonstrating that he was an excellent basic scientist.

In 1908 he was engaged as an assistant to Hjort, and he carried out most of the age determinations of cod that formed much of the data in Johan Hjort's important publication of 1914. Like most of Hjort's close associates, Sund was keen to keep the fishermen always up to date about his research results, and he had a gift for doing so. His schematic method of showing the variations in catches of spawning cod are particularly well known. Gunnar Rollefson has characterised Oscar Sund's presentations as "masterly analyses and diagrams of the changes in cod stocks". Oscar Sund also played an important role in processing the material from the major "Michael Sars" expedition in 1910. In 1916 he took over as leader of the fisheries studies when Johan Hjort resigned.

Perhaps Oscar Sund's gifts of popularisation were most evident in "Skårungen" ("The Youngster"); his last and best-known work, published in 1942. The sub-title of the book offers a fine characterization of Sund: "A book about the sea and its fauna, ships and travel, for the young people of the coast."

In 1947 the people of Northern Norway erected a monument to Oscar Sund at the new church in Gildeskål, bearing the following inscription: "He was a tireless servant of science, and a friend and helper of the fishing community. A faithful, warm-hearted northerner who brought honour to his community."

The second "Johan Hjort" was also a small wooden vessel of 79 ft. LOA, designed for use in coastal water. Financial conditions were difficult at this time, and the fishing industry was struggling with overproduction and market problems. Hjort's expansive ocean fishery model was de-emphasised, and the scientists' wishes for new boats were modest.

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Read about the current "Johan Hjort" on p. 34.
The success of “G.O. Sars” (1) opened people’s eyes to the possibility of carrying out important new tasks in fishing research, and when the new “Johan Hjort” (the third vessel of that name) arrived in 1958, it was designed, with “G.O. Sars” (1) as its model and ideal, as an ocean-going vessel. Even then, some people believed that a stern trawler would have been more useful, but the side-trawler tradition was still powerful. With two ocean-going vessels available, the geographic range of the Institute’s investigations could be increased, and new fish stocks were added to the study programme. Fish-finding and hydrographic instruments were renewed in step with developments in technology. In 1975, the vessel was fitted with stern-trawling gear, which was not particularly practical for that type of vessel, and the stern trawlers began to dream of a new boat. The idea at that time was top rent rather than buy, and the result was a multi-year contract with the fishing boat “Eldjarn”, which was fitted up with the necessary equipment for research. “Johan Hjort” was sold in 1983 and moved to the North Sea offshore sector under the name of “Skandi Ocean”.

Shipyard: Mjellem & Karlsen AS, Bergen
Built: 1958 (rebuilt 1975)
LOA: 52.35 m (53.30 m)
Beam: 9.30 m
Draught: 5.28 m
GRT: 697
Main propulsion machinery: MAN G7V 40/60 MA, 1300 hp
Class: DNV +1A1 ice
Accommodation: 25 cabins (crew, 32; scientists, 7)

Peder A. Rønnestad (1879–1949)
Peder A. Rønnestad joined “Michael Sars” in 1902 as a fisherman under Captain Thor Iversen. Following several years of education and commercial fishing, he returned to the ship as its captain in 1912. In 1916 he became an expert consultant in fisheries to the Directorate of Fisheries. Rønnestad has been praised for his wide-range of contributions to fisheries research, and in particular for his work on the Load-line Act and registration of Norwegian fishing vessels, as well as his efforts to improve sanitary conditions in the fishing villages and in building fishermen’s shacks for use in the seasonal fisheries.

“Peder Rønnestad” – trawler and fishing trials vessel
The boat was built as the trawler “Spitzbergen” and was purchased by the Directorate of Fisheries in 1951. During its first few years with the Directorate, it was primarily used as a fishing trials vessel by the Directorate’s practical fishery consultants. When “Oscar Sund” (ex. “Johan Hjort” (2)) was taken out of service in 1958, “Peder Rønnestad” was rebuilt and handed over to the Institute of Marine Research. The vessel lost its “good looks” as a result of the rebuilding operation, while it acquired the laboratory and cabin facilities needed for research cruises. It was employed on the coast and in the firths, and occasionally over large areas of the North Sea and on the banks west of the Shetlands. The boat was equipped with side trawls, drift-netting and long-lining gear and a hydrography/plankton winch. “Peder Rønnestad” was sold in 1979.

Shipyard: Mjellem & Karlsen AS, Bergen
Built: 1958 (rebuilt 1975)
LOA: 26.25 m
Beam: 6.40 m
Draught: 3.22 m
GRT: 126 tonnes
Main propulsion machinery: Bergen Diesel 250 HP
Class: Deutsche Lloyd 100A4 fishing vessel/North Sea
Accommodation: 8 single and 2 double cabins

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Thor Carl Iversen was a well-known personality in the world of Norwegian fisheries and marine research. Already in possession of experience from merchant shipping, fishing, sealing and whaling he joined "Michael Sars" as a seaman in 1900. He was later captain of the vessel, and skippered it on its famous Atlantic research cruise in 1910.

In 1912, Thor Iversen became a consultant to the Directorate of Fisheries, and in addition to a number of administrative tasks, he carried out several research cruises, particularly in northern waters. His list of publications bears witness to a wide range of interests, which included the history of fishing, geographical measurements and descriptions, charting fishing banks, etc. His artistic bent found expression in film and photography, a hobby that he cultivated with such keenness and talent that he must be given a place among the "greats" of Norwegian photography.

"Thor Iversen"
- practical fishing trials and research

This vessel was originally built as the trawler "Gerdy Mia", but was purchased as a relatively new vessel by the Directorate of Fisheries for test fishing, and especially for training Norwegian fishermen in trawling techniques. The boat was named after Thor Iversen, and was used first and foremost by the Directorate’s consultants for practical fishing trials. "Thor Iversen" was also used by the Institute of Marine Research.

The vessel was sold in 1968, and as fishing vessel, "Thor Iver" sank west of Kvannhovden Lighthouse in 1976.

Built: the Netherlands 1951
LOA: 83 ft
Beam: 19.7 ft
Draught: 9.3 ft
GRT: 84 tonnes
Main propulsion machinery: 200 HP diesel engine
Crew: 8

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GRT: 84 tonnes
Main propulsion machinery: 200 HP diesel engine
Crew: 8
Fridtjof Nansen was a man of many talents. He began to study zoology at the University of Christiania in 1880, and after only two years of study was appointed curator at Bergen Museum. In the same year he sailed with the sealing boat “Viking” of Arendal to the Western Ice off Greenland, where he studied seals and made hydrographic observations of the waters of Eastern Greenland. Here, in the drift ice, Nansen found driftwood and mud which probably came from Siberia. As a result of these observations he led the 1893–96 “Fram” expedition, on which he collected oceanographic data as the vessel drifted across the Polar Sea.

Among other things, Nansen noted that the polar ice drifted at an angle of about 45 degrees to the right of the direction of the wind – and he was the first to realise that this must be due to the rotation of the Earth. Nansen believed that the ice dragged the water beneath it along with it. In the same way, each layer of water would drag the next layer along. Friction would mean that the current velocity would fall off with depth at the same time as the direction of the current gradually turned more to the right. Nansen did not have the mathematical knowhow that would have enabled him to demonstrate that this was the case, but at his request, Professor V. W. Ekman succeeded in proving Nansen’s theories. The phenomenon has since been known as the “Ekman Spiral.”

Fridtjof Nansen made major, pioneering discoveries in several aspects of the development of modern marine research, particularly in physical oceanography. He was also a keen exponent of international cooperation in marine research, and played a key role in the establishment of the International Council for Exploration of the Sea (ICES). Nansen’s doctorate (1888) was a study of the central nervous system of the hagfish (an invertebrate), with a thesis whose quality and range was probably not fully appreciated by his contemporaries. Today, however, Fridtjof Nansen is internationally recognised as one of the pioneers of brain research. In 1897 Nansen became Professor of Zoology at the University of Christiania, and planned the physical-oceanographic studies for the Board of Fisheries carried out by the “Michael Sars”, which was named after his father-in-law.

In 1922 Fridtjof Nansen was awarded the Nobel Peace Prize for his important humanitarian efforts in the wake of the First World War. It was Nansen who negotiated and organised the transport home of about 400,000 German and Russian prisoners of war. He was also the underlying force and the organiser of efforts to feed millions of people threatened by famine in Russia.

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“Dr. Fridtjof Nansen” (1)

- the international helper

The marine research vessel “Dr. Fridtjof Nansen” is a Norwegian contribution to international development efforts, the appropriate choice of a nation that can point to a rich tradition of brain research, and planned the physical-oceanographic studies for the Board of Fisheries carried out by the “Michael Sars”, which was named after his father-in-law. The vessel is operated on behalf of developing countries which lack vessels and expertise. Its programmes are drawn up in close collaboration with these countries, and with scientific support provided by the UN’s Food and Agriculture Organisation (FAO).

The vessel is financed by NORAD (Norwegian Agency for Development Cooperation) and is operated by the Institute of Marine Research. Its principal tasks are mapping the distribution and quantity of fish stocks, which it has been studying continuously since 1975, from the South China Sea in the east to the Pacific coast of Central America in the west. Most of the work of the vessel has been off the east and west coasts of Africa.

It is appropriate that the ship bears the name of Fridtjof Nansen, who was so well known for his contributions to both marine research and in the field of international aid.

Read about the current “Dr. Fridtjof Nansen” on page 35.

Shipyard: Mjellem & Karlsen AS, Bergen
Built: 1974
LOA: 47.50 m
Beam: 10.30 m
Draught: 4.35 m
GRT: 495 tonnes
Main propulsion:
- Name: LIFEDER, 1500 HP
- Accommodation: 14 single cabins, 2 double and 2 four-berth cabins

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"Fjordfangst"

This vessel originally belonged to the Fish-capture Section of the Norwegian Fisheries Technology Research Institute, and it was built in order to carry out tests and trials of fishing gear. The vessel came to the Institute of Marine Research when the Fish-capture Section was incorporated into the Institute in 1990, and it was sold to Iceland in 1999.

Built by Sandøy Plast AS (hull) and Storebø Slipp & Mekaniske Verksted AS.

Lengthened by Lunde Båtbyggeri AS.

LOA: 14.17 m
Beam: 4.25 m
Draught: 2.25 m
GRT: 25 tonnes
Main propulsion machinery: Toaener & HRE 165 HP
Accommodation: 2 two-berth cabins

"Virgo" and "Krill"

Between the wars, the Institute of Marine Research had a 40 ft motor boat, "Virgo", but this was confiscated during the Second World War. After the War, a new boat was purchased and given the name of "Krill". It had a cabin forward, with room for two or three persons. The boat was equipped with a hand-powered winch for plankton sampling and hydrography, and it was employed in studies in these fields in Hardanger and Sunnhordland, but it was also used more and more often for studies of brisling, crabs, lobsters and eels in the same area.

In spring 1985 the boat was transferred to the Matre Aquaculture Station, but was condemned after a couple of year.

Built in Nordtveigrend during the 40s
LOA: 25.5 ft
Beam: 6.6 ft
Motor: Sleipner petrol engine, 10–14 HP
Marna diesel, 18 HP
Sabb 22 HP (1970)

"Soppe"

Built in Nordtveigrend during the 40s
LOA: 40 ft
No further technical details available.
“Fangst” replaced the old “Fjordfangst”, which was the boat the Institute used for research studies on the coast and in the fjords. The Institute does not own “Fangst”, but has chartered the vessel on a long-term basis.

“Fangst” is only about half a metre longer than “Fjordfangst”, but has a greater beam and is much more roomy. The boat has three double cabins and provides good living and working conditions for its crew and scientific personnel. There is ample deck-space and a small wet laboratory. The vessel is ideal for many of the Fish-cap- ture Section’s behavioural studies and trials of new types of fishing gear. The Institute’s aquaculture scientists also use “Fangst” frequently.

A small vessel such as “Fangst” has low running costs in comparison with the Institute’s ocean-going research vessels, and it is a good, cost-effective facility for many types of coastal studies and research projects.

In 1985, the Fisheries Technology Research Institute’s vessel “Kystfangst” was transferred to the Institute of Marine Research and stationed in Flødevigen, where it was given the new name of “G.M. Dannevig”. In order to meet modern standards, the vessel was lengthened to 92 ft and refurbished in 1986-87.

Its instrumentation and equipment was supplemented in the next few years, so that after 1988 the Institute had a fully operational modern vessel suitable for marine research in the Skagerrak, the Kasttag and the North Sea.
The vessel was designed according to the "Dr. Fridtjof Nansen" (1) model, but with a slightly modified interior design. In February 2003, "G.O. Sars" (2) was renamed (R/V) "Sarsen". "Sarsen" was the nickname of the first "G.O. Sars".

The idea of this vessel was brought up as early as 1967, but 12 years were to pass before the second "Michael Sars" went to sea.

The 60s saw a series of very rapid developments in fisheries technology and instrumentation. The new "G.O. Sars" was built as a stern trawler and rigged to be able to deploy both bottom and pelagic trawls at the same time. The vessel’s hull was designed to disturb the echosounders as little as possible, since these had become essential instruments for fisheries research. While the boat was under planning, a new generation of echosounders was being developed in collaboration with Simrad. Used in combination with the echo integrator, the new sounders made it possible to perform quantitative measurements. While before it had been possible to register where the fish were and to only roughly estimate their biomass, scientists now had much more accurate measures of the amount of fish that they were recording.

Electronics was also entering the field of oceanographic instrumentation. Water samplers, which had been developed by Nansen at the turn of the previous century, and turning thermometers, were being replaced by sondes which recorded temperature, salinity, etc. while they were lowered through the water column. Signals from these sondes were registered and processed on board while the sondes were still being lowered, a process that required computer power. Echo integration was later also carried out by the computer system. After 3 years of operation, "G.O. Sars" is still a functional and serviceable vessel.

Fisheries and the Institute of Marine Research, but the Institute has gradually taken it over on a full-time basis.
The new “Johan Hjort” was based on the Institute’s good experience with “G.O. Sars” (2). The vessel was given a more modern hull form, which made it sea-kindly that work on board is not held back to any extent even in the Barents Sea in mid-winter. An important advance in this respect was the fitting of de-icing gear on the foredeck, as was the fact that winches and other items of deck equipment were largely built in under protective housings. It was hoped that “Johan Hjort” could be brought into service without a long period of trials, and the Institute managed to do so. A very solid, good research vessel, was the verdict of the scientists after its first season of operation.

In order to reduce surface noise (bubble formation by the hull in bad weather) during acoustic measurements, “Johan Hjort” was designed in such a way that towed echosounder heads could be deployed from the bottom of the hull. This system did not function well, but in 1995 “Johan Hjort” was fitted with a drogued head containing the echosounder and sonar heads. This set-up works so well that good acoustic measurements can be made even in heavy gales. Nowadays, all new ocean-going research vessels have such retractable drogues.

**Shipyard:** Flekkefjord Slipp & Maskinfabrikk AS

**Built:** 1990

**LOA:** 64.4 m

**Beam:** 13.9 m

**GRT:** 910/1828 tonnes

**Main propulsion machinery:** Wärtsilä Wichmann diesel, 8V28B, 3264 HP (2400 kW)

**Class:** Det Norske Veritas +1A1, Ice 1B (hull), Ice 1C (propeller)

**Accommodation:** 24 single cabins, 5 two-berth cabins

When it was decided that it was time to replace the old “Dr. Fridtjof Nansen” with a new vessel, the Institute of Marine Research had only recently taken delivery of the new “Johan Hjort”, which was one of the most advanced marine research vessels in the world. It was therefore only natural that the team responsible for planning the new “Dr. Fridtjof Nansen” should incorporate both drawings and experience from “Johan Hjort”. The new international helper was not to be inferior to our domestic flagship, and in fact the two vessels almost look like sister ships in terms of design, internal layout and scientific equipment. This is also rational in purely research terms, given that both research and technical personnel alternates between cruises in domestic waters with the Institute’s vessels and cruises on board “Dr. Fridtjof Nansen”. Acoustic equipment, marine environment instrumentation and trawl set-ups are identical. This also makes it easier to utilise the same or similar methods, compare and exchange experiences, and to use the results and experiences gained for example in West African waters in our own Scandinavian waters, and vice versa. “Dr. Fridtjof Nansen” also gives students and scientific personnel from our development partner countries an ideal opportunity to become familiar with a modern marine research vessel, and with the marine resources in their own domestic waters.

**Shipyard:** Flekkefjord Slipp & Maskinfabrikk AS

**Built:** 1993

**LOA:** 56.75 m

**Beam:** 12.50 m

**GRT:** 1444 tonnes

**Main propulsion machinery:** Wärtsilä Wichmann diesel 6L28B, 3224 HP (2400 kW)

**Class:** Det Norske Veritas +1A Ice 1C, MV, EO, Stern Trawler

**Accommodation:** 23 cabins (33 berths)
Håkon Mosby (1903–1989)

Mosby was awarded his Cand.real. (M.Sc.) degree in 1940 and his doctorate in 1934. As a student in Oslo he acted as assistant to Professor Fridtjof Nansen at the Department of Oceanography, participating in several cruises with the research vessel “Armauer Hansen”. In 1927, before he took his final degree exams, he was engaged as a lecturer at the Department of Geophysics, Section for Theoretical Meteorology, at Bergen Museum. In 1927/28 Mosby was a member of L. Christensen’s first “Norvegia” expedition to the Antarctic Ocean, on the basis of which he wrote his doctoral thesis “The Waters of the Antarctic Ocean”. Håkon Mosby subsequently led several expeditions to our northern ocean regions. In 1939 he became a lecturer at the Department of Geophysics, Section A (Hydrography), and in 1947 he succeeded Bjørn Heland-Hansen as Professor at Bergen Museum. Håkon Mosby played a central role in the development and organisation of oceanographic research at national and international level. He was director of the Department of Geophysics for two periods, and from 1966 to 1971 he was Rector of the University of Bergen.

“Håkon Mosby”

The research vessel given his name, “Håkon Mosby”, is the sister ship of “Michael Sars” (2) and is owned by the University of Bergen. The vessel is equipped to carry out oceanographic, geological and biological research studies. It is used by the University of Bergen for teaching and research purposes, but is operated by the Research Vessel Department of the Institute of Marine Research.

Built: 1980
LOA: 47.24 m
Beam: 10.32 m
Draught: 4.70 m
GRT: 493/701 tonnes
Main propulsion machinery: Normo LDMB-9, 1500 HP
Class: Veritas 1A1 Ice
Accommodation: 17 cabins (crew; nine single-berth cabins; scientists: six single and two four-berth cabins)

The new "G.O. Sars" – the most advanced marine research vessel in the world; handed over in spring 2003

The new "G.O. Sars" – the most advanced marine research vessel in the world; handed over in spring 2003

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The new "G.O. Sars" – the most advanced marine research vessel in the world; handed over in spring 2003

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The new "G.O. Sars" represents a new generation of marine research vessels. With its vibration- and noise-damped diesel generators and its propellers driven by direct-current motors, "G.O. Sars" is an extremely quiet vessel under way. It emits 99% less noise under water than conventional research vessels. This means that the fish that are being registered by the vessel's acoustic instruments are not scared off, giving the scientists better biomass measurements of the fish in the sea.

Roomy trawl-deck
The new "G.O. Sars" has an extremely roomy and well-equipped trawl-deck. This is no less than 18.6 m broad, is equipped with two sets of trawl winches and has room for two complete sets of trawl-doors. This means that a pelagic trawl can be deployed as soon as the bottom trawl has been hauled, and the scientists can thus combine cod and capelin studies, for example, on the same cruise.

The efficiency of research cruises has also been improved by the fact that "G.O. Sars" has sufficient engine power to tow a large pelagic trawl at speeds as high as 5–6 knots, which is important when representative samples of fast-swimming fish such as mackerel are being taken.

Environmental studies
"G.O. Sars" is equipped with a large midships “environmental hangar” which contains no fewer than six winches, each of which carries up to 6000 metres of cable for lowering instruments to the deepest parts of the sea. One of the winches is loaded with fibre-optic cable, which is capable of transferring large quantities of data. At the after end of the trawl-deck are two winches for towing plankton sampling equipment and remotely operated underwater vehicles (ROVs).

Environmental hangar
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Geology and seismics
The vessel is also equipped to collect core samples 25 metres into seabed sediments, and a special echosounder will chart the seabed topography, while yet another will measure ocean currents.

Advanced acoustics
The new vessel is equipped with advanced acoustic instruments (echosounders and sonars) which will be capable of registering fish throughout the water column, from the surface down to the seabed. The vessel has an echosounder that operates at six different frequencies simultaneously. Three multi-beam sonars have also been installed to identify and measure shoals of fish. A special echosounder will chart the seabed topography, while yet another will measure ocean currents.

The new "G.O. Sars", which is used by the University of Bergen and the Institute of Marine Research, was handed over in May 2003.