▲ ***Top left.*** *Jens Smed attending a meeting in Geneva in 1951.*
Top middle. *Jens Smed attending an FAO meeting in Rome in 1971.*
Top right. *Jens Smed assisting in the production of standard seawater. Between 1936 and 1974, standard seawater was produced by ICES in the basement of Charlottenlund Castle.*

Jens Smed: Bridges Made of Data

William Anthony speaks with Jens Smed, a man who, for forty-five years, helped to form the way that ICES communicates with the world, all through its hydrographic data.

From its inception, ICES has published hydrographic data collected by Member Country research vessels, and has been a pioneer in the collection, standardization, and sharing of that data. Ninety-five-year-old Jens Smed served ICES as caretaker of its hydrographic data for forty-five years while working on the staff of the ICES Secretariat, initially as Hydrographical Assistant and seven years later as Hydrographer. In addition, he made important contributions to the subject of hydrobiological variability in the sea, by his painstaking development of long time-series, and (perhaps even more importantly) by his establishment of a sound and comprehensive international dataset on which other studies of environmental variation could be based.

Jens Smed served ICES as the caretaker of its hydrographic data for forty-five years.

For nearly half a century, despite his assertion that "data centre work is not very dramatic", he was a driving force behind the work that advanced the handling of hydrographic data worldwide. He speaks with typical Danish modesty and good humour, but even at the age of ninety-five, he retains a firm, unapologetic grasp of the millions of facts that have crossed his desk.

Pinning down an exact definition of hydrography is not a simple matter. Smed says, "What we in ICES called hydrography is now called physical and chemical oceanography. Of course, hydrography in the English-speaking countries, that's quite another thing. It includes sounding of the depths and all that. When I was in America, my friend told me I had better call myself an oceanographer. All of these words can really be problematic. In Russia, I think it's called oceanology, and then we have hydrology and the many variants. I believe that the librarian at the Musée Océanographique de Monaco is trying to collect all of the terms in a paper, and that would be a good thing, but I don't think it's come out yet".

It is said that, in Denmark, you're never more than fifty kilometres from the sea. It would seem that every Dane must have a special relationship with the sea, but actually, there are two kinds of Danes: those who live from the land and those who live from the sea. Strangely perhaps, in view of the trajectory of his career, Smed started out deeply rooted in the land.

Jens Smed was born on 20 March 1914, the son of a farmer, and grew up in eastern Jutland in Vinterslev, a village, he says, that doesn't exist any more. "It has been swallowed up by the expanding cities. It was a wonderful way to grow up, one that hardly exists today".

"We had about forty acres. It would have been natural if I had taken over the farm, but after completing the village school, I thought it would be more interesting to continue my education. So I made my way to the Aarhus Cathedral School and later read physics at the University of Copenhagen".

"Actually, the job was offered first to one of my university colleagues…"

He distinguished himself academically, completing his master's degree, then winning a gold medal in physics. He was well on the way to becoming a high-school teacher, having already been promised a place on the faculty of one of Denmark's best schools, but then the call came from ICES in 1939.

"Actually, the job was offered first to one of my university colleagues, but he wasn't interested because he wanted to do experimental physics and the job was too theoretical. I was a theoretical physicist, but had no particular relationship with the sea. They knew they couldn't expect to find anyone trained in hydrography, so they were willing to hire someone and train him".

After an interview with Martin Knudsen, the long-serving Chef du Service of the Council's Service Hydrographique, Smed joined the small staff at the ICES Secretariat.

"I must say that we never called it 'ICES'. We always spoke of the 'Council'. 'ICES' is one of those acronyms that came up in the middle of the 1950s. Before that time it was the 'Council'".

Martin Knudsen suggested a salary of 4000 kroner a year, but the Administrative Secretary Wilhelm Nellemose protested. "I think he got more or less furious, because there had been a Council meeting a couple of months before, and the cost of my salary had not been mentioned. He contacted President Johan Hjort in Oslo, who agreed with Nellemose. So, Knudsen offered me 3000 kroner. I accepted it, which really surprised Knudsen".

"Knudsen could never really be replaced. He was a very kind man. I liked him very much".

Smed formally joined the Service Hydrographique as assistant to the Council's Hydrographer Jacob P. Jacobsen on 1 August 1939, "but then came the war, of course, and nobody knew what would happen".

The Secretariat managed to remain open for the duration of the war, and although Denmark was spared the destruction of its cities, it was a time bristling with danger and doubt about the future survival of ICES.

With no new data arriving, the staff could only evaluate data that had already been submitted, and Smed was mainly employed editing the *Bulletin Hydrographique*. Jacobsen was able to carry out work on a 1939 proposal to study the variation in the inflow of Atlantic water through the Faroe–Shetland Channel. This is a very important region because of the inflow of surface water from the Atlantic and the inflow of cold bottom water from the north. Smed recalls, "I was assisting Jacobsen, and I came across a certain variation in the salinities, and I wrote a small paper about that".

He has worked steadily since retiring, turning out a stream of historical papers that continues unabated to this day.

It was during the war that Smed had his first serious experience at sea, aboard the Danish research vessel "Biologen", which belonged to the Danish Biological Station but had been borrowed for the cruise by the nautical section of the Danish Meteorological Office. The stated purpose of the cruise was to make hydrographical observations in the Limfjord in northern Jutland. Smed laughs, "I think it was arranged so the Germans couldn't get their hands on the vessel. I was aboard for a month. There wasn't much to do in the Limfjord".

During the war, Smed familiarized himself with the Council's hydrographical card index. The card index was the brain-child of Wilhelm Nellemose, a former commander in the Danish navy, who had been forced to take early retirement as the result of an injury. He joined the Council as Administrative Secretary[1] and developed the two-type card system that recorded observations of temperature and salinity simultaneously. This was used

[1] *The title Administrative Secretary was given to Knud Schøning (1927–1932), Wilhelm Nellemose (1932–1944), and Ebba Brønniche (1944–1945) instead of General Secretary. According to Arthur Went (1972) in* Seventy Years Agrowing, *the Council "invited Captain Schøning to become, not General Secretary but, as Maurice says 'in a less independent but still in a responsible position'". This title was used until 1945, when Harald Blegvad was appointed General Secretary.*

▲ *Martin Hans Christian Knudsen, Danish Delegate 1899 and 1901–1949, and ICES Bureau member 1932–1946.*

to store information about the North Atlantic, the Norwegian, Baltic, and North seas, and the Transition Area (between the Baltic and North seas).

Two types of cards were used: surface cards, for surface observations, and station cards, for observations at a series of depths at a station. Each card included details of the year, date, position, temperature, and salinity. The station cards also indicate the depths at which the recorded temperatures and salinities were recorded, and the bottom depth.

The end of the war saw the revival of projects that had been interrupted and, in that release of energy, information began to flood the data centre. "As time went on, there were so many data coming in that we couldn't publish them all". With Jacobsen's passing in 1946, Smed assumed the post of Hydrographer, and when Knudsen retired two years later, he became Chef du Service Hydrographique. Smed comments with typical understatement, "I was fairly young but nevertheless they trusted me. I was aware that I could never replace Knudsen".

Smed remembers Knudsen. "He was a very kind man. I liked him very much. Perhaps that was partly because we shared similar backgrounds. We were both raised on farms and received our elementary education in country schools. He was, of course, very important in many respects, a professor at the university and the technical high school, and a great thinker and inventor in many fields besides marine science. He was nominated several times for the Nobel prize in physics".

The post-war period was one of expanding international cooperation and developments in hydrographic equipment.

A tribute to Smed, published at the time of his retirement (ICES, 1984), sums up the ICES-related achievements by Knudsen, Jacobsen, and Smed. "Knudsen established an international reputation for his work on the determination of salinity and his studies relating to the equation of state of seawater, and Jacobsen was best known for his development of the temperature–salinity (T–S) diagram as a tool in water mass analysis, whereas Jens Smed has become internationally recognized, first, for the development of ICES as a regional oceanographic data centre and, second, for his work on long time-series of T–S data. Under him the Service Hydrographique has played a vital role in the quality-control, exchange, promulgation, and archiving of hydrographic data collected by ICES Member Countries".

The post-war period was one of expanding international cooperation and developments in hydrographic equipment that allowed more accurate and varied measurements to be taken. Under Smed, the Council established important links with the World Data Centres for Oceanography in Washington, DC and in Moscow.

He was instrumental in developing relationships with the various national data centres and with marine and fishery science laboratories in Member Countries. The connections created on the Council's behalf served as new channels for the flow of data and information between the marine science communities in Europe and North America, amplifying the work that the Council had pioneered.

Both before and during Smed's time, the work was done by a minimal but extremely dedicated staff that has been compared, more than once, to a family. Smed and his "ladies", Inger Bondorff, Poula Holm, Birthe Knudsen, and Ruth Larsen, processed the vast number of hydrographic observations submitted to the Council. The metaphor of a family was quite genuine because Inger Bondorff was Martin Knudsen's daughter, and Birthe Knudsen was his daughter-in-law.

Helen M. Rozwadowski (2002) describes the devotion with which Smed and his staff personally reviewed all incoming data. "Oceanographers who submitted

▲ *ICES hydrographic scientists at a meeting. Left to right: Jan Szaron, Jens Smed, Dieter Kohnke, and Tom Dalzeil. In addition to the purely scientific work carried out in the meetings, Jens Smed claims that the bonds formed during the many hydrographic social events helped to promote the exchange of scientific ideas. Former General Secretary Emory Anderson remembers, "The hydrographers' parties hosted by Smed during the annual Statutory Meetings were famous. There was always a lot of hard drinking and singing, inducing some non-hydrographers to try to wrangle an invitation".*

Smed was responsible for implementing the resolutions of the Hydrography Committee and providing secretarial support.

data from national cruises regularly received letters or phone calls politely informing them that 'this station is in the middle of Sweden,' as Swedish oceanographer Stig Fonselius recalled. 'You understood they [the staff of Service Hydrographique] sat there looking at every [observation],' marvelled fellow Swede Artur Svansson".

In 1957, anticipating an influx of data from the International Geophysical Year and future projects, the Service Hydrographique replaced its index-card system with the technologically more advanced system of punch cards, which allowed the mechanical reading of the cards and automatic preparation of *ICES Oceanographic Data Lists*, the series that replaced the *Bulletin*. In addition to promoting the compatibility of the Council's system with the systems used by other institutions, such as the US Hydrographic Office, it served as a model for national data centres in ICES Member Countries.

Smed was responsible for implementing the resolutions of the Hydrography Committee and providing secretarial support, but he made his own contributions to the field of data management, synoptic charts, fishery hydrography, and the study of climatic fluctuations.

As other organizations began to establish data centres in earnest, often under the aegis of UNESCO's Intergovernmental Oceanographic Commission after 1961, ICES decided to continue the Service Hydrographique as a regional centre, reflecting its continued utility for ICES Member Countries, as well as for the World Data Centers. One investigation revealed that the Service Hydrographique provided 87% of the data forms held in World Data Center A in Washington, DC. The computerization of ICES work was introduced at the very end of Smed's forty-five-year tenure, and once again, ICES became a major provider of data to the World Data Center system. In recent decades, the Council's role as a regional hydrographic data centre has expanded as its participation in marine environmental research has grown, and it now includes marine chemistry and other fields as well as oceanography.

Smed remains modest about his role in the quality-control, exchange, promulgation, and archiving of hydrographic data collected by ICES Member Countries. He deflects questions about his personal importance, but the history speaks for him.

▲ *Jens Smed.*

Since his retirement[2], he has worked steadily, turning out a stream of historical papers, which continues unabated to this day. Upon his retirement, members of the Hydrography Committee wished Smed "a long and happy retirement". Based on his output of papers and commentary since then, it seems that this wish has been fulfilled. We haven't heard the last from Jens Smed.

[2] *Former General Secretary Emory Anderson remembers, "Even after retirement, he was given office space in the Secretariat at the Palægade site. He remained there until about 1990, when the growing Secretariat staff made it necessary to re-assign his office for other purposes. It was hard for me to tell him he had to leave, but I assured him that he was always welcome to use the library, etc."*

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▲ *During the moulting season in May through June, grey seals gather in colonies of up to more than a thousand individuals on the islets of the outer archipelago. Photo by Mervi Kunnasranta.*

Dealing with Success: Seals vs. Fisheries in the Baltic

Mervi Kunnasranta and Petri Suuronen provide details on the rise and fall of grey seal populations in the Baltic, but that's not good news for everyone.

The grey seals glance up, made curious by the noise and movement of our single-engine Cessna as it circles their moulting grounds. Below us, in the sparkling water, hundreds of seals rest on rocks and sand, unaware that they have just become part of the spring seal census. The numbers are encouraging, if you're a seal. Other members of the ecosystem are not so optimistic.

The grey seal (*Halichoerus grypus*) is the largest and most abundant of the three seal species inhabiting the Baltic Sea. Grey seals occur throughout the Baltic, but most of the population lives on the sea's northern edge, between latitudes 58°N and 61°N. In spring, the largest concentrations of grey seals are found in the southwestern archipelago of Finland and in the Swedish archipelago.

Growing seal populations

The grey seal population has doubled since 2000, when approximately 10 000 grey seals were counted during annual spring censuses conducted by Finland, Sweden, Estonia, and Russia. In 2008, more than 22 000 Baltic grey seals were counted. Typically, grey seals are highly mobile, with a wide seasonal migration range, resulting in census counts that are always smaller than the actual size of the population. The proportion of the population represented by the census is unknown but, in good conditions, can be close to 80%. As the census is repeated at the same time each year, the results give a good idea of grey seal population trends.

The size of the Baltic grey seal population has fluctuated during the last century. It has been estimated that, one hundred years ago, the grey seal population comprised 100 000 individuals. By the late 1970s, the population had fallen to less than 4000 as a result of intensive hunting and the effects of high loads of contaminants, mainly polychlorinated biphenyls (PCBs) and dichlorodiphenyltrichloroethane (DDT). There is evidence that high concentrations of organochlorine compounds can weaken seals' health, especially their reproductive health.

During recent decades, the situation has improved; the contaminant load has fallen, and the reproductive health of female grey seals is currently normal. The annual rate of increase was 7 to 10% during the 2000s.

In addition, the population of the Baltic ringed seal (*Phoca hispida botnica*) is increasing in the Bothnian Bay, but not as quickly as that of the grey seal. In future, climate change will probably affect the breeding conditions for both species. The effects for ringed seals can be significant because their breeding is strongly influenced by ice and snow cover, whereas grey seals can probably adjust fairly well to ice-free winters.