Jørgen Knudsen: an Appreciation

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Jørgen Knudsen was born on the 6 March 1918 in the village of Børkop between the towns of Vejle and Fredericia, in Vejle County, where he went to school, as did his younger brother Palle. Their father was a medical doctor who worked at an institution for psychologically disabled people. His wife was his assistant. Subsequently, Jørgen went to high school in Fredericia but could not have excelled academically because one of his teachers considered that he should join the army rather than, upon graduation, go on to university.

Notwithstanding, Jørgen joined the University of Copenhagen in 1937 and in 1941 obtained a position as an assistant in the University’s Zoological Museum. This came about after a field trip where he met his future mentor Anton Bruun (1901–1962), the zoologist and oceanographer who was later to become the first chairman of the International Oceanographic Commission (IOC), and who offered Jørgen a post in the museum to sort out the molluscs collected from all over the world by Th. Mortensen (1868–1952). While doing this, Jørgen discovered some unusual specimens in the material collected from Indo-Malayan waters by Mortensen’s Pacific Expedition of 1914–1916. Encouraged by Bruun, Jørgen described from this material his first bivalve, a new species of galeommatoid, *Jousseaumeilla concharum*, living commensally with a gephyrean and a polychaete in empty mitrid shells. This research, published in 1944, was one of the first modern interpretations of the anatomy of a galeommatoid and the first paper of Jørgen’s that I encountered when, as a young man, I began my researches on this group of fascinating bivalves. But that would be almost 30 years later when Jørgen was already an established and well-known scientist.

Jørgen graduated from the University in January 1945 with a M.A. degree, bachelor degrees not then part of the tertiary educational system in Denmark. In December 1944, Jørgen was invited to apply for a teaching position at the Royal Veterinary and Agriculture University. Thus, in the spring of 1945, at the age of 27, Jørgen found himself teaching zoology to agriculture students. One of his other duties was the organization of the University’s collection of, mostly, mammals that had died at the local zoo. These were, he found, hanging in a room from the ceiling and in a terrible condition and their preservation became, he later confessed, the worst task of his life.

During the summer of 1945, with the Second World War over, a wealthy businessman, Viggo Jarl, wanted his large yacht - the *Atlantide* - to be used for a scientific expedition and Jørgen was contacted by Anton Bruun (who was to be the scientific leader of the expedition because of his experience from participating in the Dana Expedition of 1928–1930) to see if he was interested in joining it. Jørgen was. The yacht had been built in 1904 as a trans-Atlantic racer, initially named...
the *Shenandoah*, and not really suitable for an expedition. Nevertheless, planning for the expedition commenced in August 1945 with a test cruise taking place in Gullmarsfjorden, Sweden, in September. Jørgen did not participate in this because in that month he married his high school sweetheart, Johanne (“Hanne”) Lomholdt. It was lucky for him that he didn’t join the test cruise, because it was, apparently, a disaster and the expedition almost died before it was born.

Notwithstanding, the expedition departed Copenhagen on 3 October 1945 with Jørgen aboard. The *Atlantide* sailed first to Plymouth in England where it picked up a long metal hawser necessary for deep sea dredging. This was because the British had such long lengths that had formerly been used to anchor barrage balloons over major cities during the war to try and halt air raids by the Luftwaffe. From there, the *Atlantide* sailed to West Africa, as far south as Angola and, on the return, as far west as the Açores, for ten months at sea. Along with Jørgen came a younger contemporary, Torben Wolff (born 1919), and with whom he shared a cabin. Since, however, the cabin only had one bunk, the two men shared this on a rotating monthly basis, the other taking his turn on a mattress on the floor. Such circumstances are how (lifelong) friendships come to be made!

The *Atlantide* Expedition would be a turning point in Torben’s and Jørgen’s careers, and both men would eventually serve the University of Copenhagen’s Zoological Museum with great distinction. Upon the return of the *Atlantide* to Copenhagen on 29 June 1946, Jørgen again took up his University teaching position and then, in 1947, obtained a position at the laboratories of the then named Danish Biological Station, a research institution under the Ministry of Agriculture and Fisheries, in Charlottenlund. In 1947, however, this organization was not particularly research oriented although Jørgen did eventually publish
two papers on the whiting \((\text{Gadus} \equiv \text{Merlangius} \text{merlangus})\) and cod \((\text{Gadus} \text{calliarias} \equiv \text{morhua})\) in 1950 and 1954, respectively. To sustain his molluscan interests, however, Jørgen continued his researches in his spare time publishing on the variability of \(\text{Littorina obtusata}\) populations in the North Atlantic in 1949 and contributing sections on the Amphineura, Scaphopoda and even Tunicata (with J. Huus) of Iceland between 1949–1950.

In 1950, however, Jørgen published his first paper on the West African molluscs he had collected on the \textit{Atlantide} Expedition and, interestingly, it was also his first paper on prosobranch reproduction and egg capsules. The eminent Danish marine biologist Gunnar Thorson (1906–1971) was also then at the University’s Zoological Museum, working on the planktonic larvae of benthic invertebrates (his \textit{magnus opus} being published in 1946), so that Jørgen really had to shift his research focus to accommodate the great man. Between 1950 and 1985, Jørgen, sometimes in co-operation with W. Adam, tapped the rich vein of molluscan material that the waters off West Africa had yielded up resulting in a suite of nine publications. It was not until after Gunner Thorson had died, however, that Jørgen was able to get back to research on prosobranch egg capsules and larval development.

While he was working at the laboratories of the Danish Biological Station, Jørgen learned that there was to be another expedition departing Denmark in 1950 and similarly led by his mentor Anton Bruun. This was to be the second round-the-world \textit{Galathea} Deep Sea Expedition, following in the path of the first Danish expedition by the naval corvette \textit{Galathea} in 1845. The expedition was to have departed in 1945 but, as we are all aware, things sometimes take longer to achieve fulfilment. Jørgen, along with the polychaete specialist Jørgen Kirkegaard (1920–2006), applied to join the expedition and both were accepted and given permission to do so by the then director, Harald Blegvad (1886–1951). It was decided that Jørgen and Kirkegaard would take turns to participate in the expedition. Kirkegaard went first from December 1950 to March 1951, but when it came time for Jørgen to replace him, Blegvad died suddenly (the coincidence being unrelated!). Subsequently, the Ministry of Agriculture and Fisheries decided to amalgamate the Danish Biological Station and the Commission for Danish Fisheries and Marine Investigations to form the Danish Institute of Fisheries Research (DIFRES). Since 1 January 2008, this organization has become the National Institute of Aquatic Resources (DTU Aqua) and is part of Denmark’s Technical University.

The incoming director of DIFRES had, however, voiced strong opposition towards the \textit{Galathea} Expedition and Jørgen was advised by colleagues not to submit an application for leave-of-absence to join it and he thus became the only young marine biologist of that generation for whom politics denied him the once-in-a-lifetime opportunity to participate in one of the greatest expeditions of recent times. It was particularly sad for him because his \textit{Atlantide} companion Torben Wolff was joining the \textit{Galathea} – a converted frigate – that eventually departed the Langelinie Quay in Copenhagen on 15 October 1950. Between 1950 and 1952, the expedition amassed a huge collection of deep-sea material, but for a number of years Jørgen could not work on the collection and he continued working with the West African material. In January 1953, Hanne gave birth to their daughter Lisbet, and Jørgen became a father.

In 1957, Jørgen left the Danish Institute of Fisheries Research and rejoined the University Museum, but this time not as an assistant but as a teacher and curator. He was appointed to replace Gunnar Thorson who was occupied building the University’s marine biological laboratory at Helsingør (Elsinore). Jørgen was busy building too albeit, in his case, the new family home. As a farewell present, his fisheries colleagues bought him a wheelbarrow decorated with pastry snails. Jørgen still has the house and the wheelbarrow, but the snails are long gone.

In 1959, Jørgen spent about six months, sponsored by UNESCO, teaching at the marine laboratory in Nha Trang in Vietnam. There, he had the opportunity to join one of the cruises of the NAGA Expedition, sailing from Bangkok to research the waters of the Gulf of Thailand and spending the Christmas and New Year of 1959–1960 there too. While he was away in Asia, his daughter Lisbet began at her first school and after his return from Bangkok in 1960, Jørgen
had personally to take her to school so as to prove to the other kids that she actually had a father! With a heavy load of administration and routine fisheries work, during the 1950’s Jørgen had little time for research, although he did publish in 1957 one of the first papers on the anatomy of a mature male specimen of *Architeuthis* that had stranded in Denmark. Once again, Jørgen was demonstrating his great scientific flexibility – a quality rarely found today.

In 1964, also sponsored by UNESCO, Jørgen began to teach marine biology at the University of Copenhagen to students from developing Asian countries. And, although he had foresaken the opportunity to join the *Galathea*, in the 1960’s Jørgen set to work on the molluscan material the expedition had collected producing four papers on the wood-boring bivalve *Xylophaga* (1961), the deep-sea Scaphopoda and Gastropoda (1964), the benthic Bivalvia (1969, 1970) and the volutid *Guivillea alabastrina* (1973). He also published (1970) further on the prosobranchs collected by Th. Mortensen and wrote up (in 1967) the bivalves collected during the John Murray Expedition to the Indian Ocean (1933–1934), publishing this in the expedition’s huge series of reports. It was this detailed series of studies, really the first comprehensive examination of the deep-sea benthic Mollusca, that made Jørgen’s reputation and from then on he became the authority on them, reviewing the known information about them in 1979. It was also fitting that this pioneering research earned him his doctorate (D.Sc.) in 1970, thereby demonstrating that his absence from the *Galathea* Expedition had been a serious error of scientific and administrative judgement.

It is less generally known, however, that Jørgen became an authority on cephalopods, possibly after translating into English, with A. Volsøe and W. Rees, the cephalopod papers of Japetus Steenstrup (1962). In 1972, he wrote up (with G. Ruby) the Cephalopoda of the eastern Mediterranean and in 1981 added three new species of *Sepiola* to this list, concluding his researches with the publication in 1983 (with T. K. Kristensen) of a catalogue of the type specimens of Cephalopoda in the collections of the Zoological Museum of the University of Copenhagen.
In the 1980’s and early 1990’s, Jørgen’s research interests diversified. In 1980, he first recorded the blue mussel *Mytilus edulis* from the shores of South Africa, investigated (with D. Stroud, 1982) the demography and reproduction of *Littorina rudis* in West Greenland, examined the Anomalodesmata from the Saba Bank in the Caribbean (1982) (and was to revisit these strange bivalves in 2005 from the Surinam Shelf, also in the Caribbean), revised with A. G. Beu (1987) the taxonomy of *Cymatium* (Gastropoda, Ranellidae [=Cymatiidae]), and undertook with other colleagues, including the eminent Dutch malacologist J. G. J. Kuiper, a supranational project to map the distributions of the small freshwater finger-nail clams (*Sphaeriidae*) in Northern Europe (1990, 1991).

Jørgen sustained an interest in introduced species and in 1989 described the immigration of marine invertebrates into the Danish Limfjord and the North Sea-Baltic Transition Area, recording in the same year the arrival of the American jack-knife clam, *Ensis americanus*, into Northeastern Atlantic waters.

Although I had known of Jørgen’s work for a long time, I think we first met at the European Malacological Congress in Geneva in 1970. As a young malacologist and marine biologist, I was of course overwhelmed by the man’s reputation at this my first conference, but found him to be a warm and giving person, especially when talking marine science and molluscs over glasses of that most famous of Danish people - Mr. Carlsberg! It was not, however, until 1988 that we met and worked as colleagues in the field and laboratory. How did this come about?

In the 1970’s, despairing of ever being able to understand the incredibly rich marine flora and fauna of subtropical Hong Kong, I had devised the concept of research workshops whereat visiting academics would join local scientists and students to undertake research projects, usually in the field, for extended stays at remote laboratories. The first in 1977 was a trial on the Mollusca, the second in 1980, much bigger, and the first on marine biology. Dr Kathe R. Jensen was the first Danish researcher to participate in the second malacological workshop in 1983 and who returned for the second marine one in 1986. By this time, the idea was catching on and the third, international marine workshop was convened at Albany in Western Australia in 1988. I participated in this and Jørgen joined Kathe from Denmark.

For the proceedings of this 1988 workshop, published in 1991, Jørgen wrote up his observations on the limpet-like prosobranch *Hipponix australis*. Subsequently, Jørgen published his observations on egg capsules and reproduction of prosobranchs and a list of other marine prosobranch gastropods from Hoi Ha Wan (which was then proposed for marine park status), Hong Kong, for the proceedings (1992) of the fourth marine workshop in 1989. For the fifth marine workshop convened on Rottnest Island in Western Australia in 1991, he published his observations on the similarly limpet-like hipponicid *Antisabia foliacea* (1993) and, in the same year, re-described the egg mass of *Milo miltonis* (Volutidae). For the proceedings (1994) of the third molluscan workshop convened in 1992, Jørgen described more of the egg capsules and reproduction of Hong Kong’s marine prosobranchs, and continued with this rich vein of research, examining the reproductive strategies and zoogeographies of marine prosobranchs from the islands for the proceedings of the second Açorean workshop convened in 1991 and published in 1995. For the proceedings of the eighth international marine biological workshop convened in 1995, Jørgen published two papers (1997) on the egg capsules and reproduction of four species of *Ovulidae* and *Nassarius* (*Zeuxis*) *siquijorensis* and observations on *Calyptraea extinctorum* (Calyptraeidae) from Hong Kong. For the proceedings (1999) of the ninth international marine biological workshop, convened on Rottnest Island, Western Australia, in 1996, Jørgen published his work on another calyptraeid, *Calyptraea calyptraeformis*. For the last workshop Jørgen participated in, the tenth marine biological one in 1998, he rounded off his observations on egg capsules and protoconchs of yet further marine prosobranch gastropods from Hong Kong (2000). To complete the workshop circle, however, Jørgen participated in the Hong Kong workshops reunion conference (1977–1998) convened in 2001 and presented a poster on his research upon egg capsules, protoconchs and prosobranch reproduction over the last thirteen years of active
workshop research and, of course, prior to this. He was 83 years old!

During these hectic years of international workshop traveling, research and writing, Jørgen did not ignore his other researches in Denmark. In 1991, he published (with M. Roeleveld) a study of the ommatostrephid *Todarodes sagittatus*, in 1992 (with A.B. Klitgaard) some notes on the chitons of the North Atlantic and in the same year recorded *Tremoctopus violaceus* as new to the Eastern Mediterranean, in 1995 (with K.R. Jensen) a checklist of Recent marine molluscs in Danish waters, in 1997 a catalogue of marine fouling bivalves, and, also in 1997 (with H.H. Dijkstra), two papers on the morphology of *Pseudohinnites levii* and the Pectinoidea (Propeamussidae) of the Red Sea.

In addition to Danish, Jørgen speaks and writes French, German and English virtually fluently and has, over the course of his career, translated and published some important biological texts first from German into Danish and latterly from Danish into English. From 1999 onwards, Jørgen, in collaboration most often with J. Hylleberg and K.R. Jensen, translated many of Lorentz Spengler’s important taxonomic works into English. In 2001, to celebrate the 100th anniversary of the first Danish marine biological expedition to Thailand, and as part of the Tropical Marine Mollusc Programme, the Phuket Marine Biological Centre, with which the University of Copenhagen has had a long and rewarding association, held a research workshop and published a special celebratory publication in which a number of these important translations appeared alongside other workshop papers.

Since 2001, Jørgen has continued his research and writing on invasive species in co-operation with K. R. Jensen and, in 2005, produced a summary (published in *Oceanographical and Hydrobiological Studies*) of the alien marine benthic invertebrates now found in Danish waters. This paper would mark 61 years of publishing the results of a long and fruitful research career in ma-

rine science. For the proceedings (published in 2009) of this, his own 90th birthday celebrations, however, Jørgen has co-authored two papers on fossil panopeans from Rhodes, Greece (with E. Thomsen and E. Koskeridou) and on Johan Christian Fabricius and his molluscan species, *Acesta excavata* (Fabricius, 1779) (with J.-A. Sneli and A. Vedelsby).

John Steinbeck wrote (talking of his friend Ed Ricketts): 'And in our love of the sea (and marine biologists really are the best kind of people) there will be scholarship and authorship.'

Steinbeck could well have been talking about Jørgen Knudsen. But I can add to this: Jørgen is a quiet, modest, self-effacing gentleman. He is, moreover, a dedicated scholar, a warm and help-ful colleague, a loyal and trustworthy friend and, finally, a wonderful, warm, human being who has, over a professional career spanning more than 60 years and a publishing record of 65 years, earned my own and the wider marine scientific community’s greatest respect and admiration.

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