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Historical Perspectives

Søren Hechmann Andersen

(Born 19 September 1936)

Søren Hechmann Andersen was born in Copenhagen on 19 September 1936, the son of a veterinarian. He graduated from the University of Copenhagen in 1961. His academic studies were in zoology, botany, geography, geology, and human physiology. His Ph.D. was on craniometrical measurements from harbor porpoises in the Baltic Sea and in the North Sea. He tried to define two subspecies but in vain. Later on, DNA studies revealed that there are two subspecies! After having joined the 1961-1962 Danish Noona-Dan expedition to Southeast Asia as a collector of mammals and birds, Andersen joined the international team in Strib from 1962 to 1967. From 1967, he managed the laboratory in Strib alone and worked as a lecturer at the Southern University of Denmark, Odense, teaching general physiology and neurophysiology at the medical faculty. He finished his study of porpoises in 1983 when he took a job as curator and later as managing director at the zoo in Odense. He left the zoo in 1992 and took a job teaching at a secondary school until 1999 when he retired at the age of 62. From 1967 to 1974, Andersen worked for Danish State Radio and Television as a freelancer. He is the author of three books on local history. His hobbies include wild bird and plant identification and gardening. For the last six summers, he has conducted harbor porpoise watching tours. He is the author of sketches and songs for local amateur scenes as well as an amateur actor.

Investigations on the Harbor Porpoise (*Phocoena phocoena*) in Denmark from 1962 to 1983

Søren Hechmann Andersen

Introduction

The first European research laboratory to study the harbor porpoise (*Phocoena phocoena*) was established in Strib, Denmark, in 1962 and was transferred in 1974 to the Southern University of Denmark, Odense. The laboratory was closed in 1983.

Why the Laboratory Was Established in Strib, Denmark

In 1962, Strib was a town of about 2,000 people. Strib is situated on the northwestern part of the island of Funen (Fyn). The nearest town is named Middelfart, which means "the water in the middle of the country" and not what English spoken people believe it means. Denmark is south of Norway, west of Sweden, and north of Germany. Denmark was chosen by the Dutch zoologist Willem Dudok van Heel because he knew that it was possible to catch harbor porpoises in the waters near Middelfart. A royal privileged guild had hunted winter migrating harbor porpoises from about 1550 to 1891 on their way from the Baltic Sea to the North Sea. This hunting was revived during World War I and II, and in the 1950s there were still fishers who knew how to catch the porpoises in the "old way." In 1957 to 1958, Dudok van Heel caught harbor porpoises there and used them for his studies of directional hearing in the Netherlands.

The Founders of the Laboratory

Zoologists in Europe knew in the 1950s that the U.S. Navy had recorded underwater sounds from different whales and dolphins while listening under water for enemy submarines and that the Office of Naval Research (ONR) kept bottlenose dolphins in captivity for the study of their echolocation ability. It was in the air that European scientists should begin to study harbor porpoises. The laboratory was founded by René-Guy Busnel, director of Laboratoire d'Acoustique Animale, Jouy-en Josas, near Paris, and Willem Dudok van Heel. They separately applied for a NATO grant for studies of harbor porpoises and were asked to form a common project. NATO was of course interested to know about biological sounds in European waters. I was invited to join the team because I was the only scientist in Denmark who had specialized in marine mammals and it was mandatory that a Danish scientist should participate when NATO sponsored a project in Denmark. Dudok van Heel left the team after a few years and went back to the Netherlands to establish a huge dolphinarium in Harderwijk, Holland.

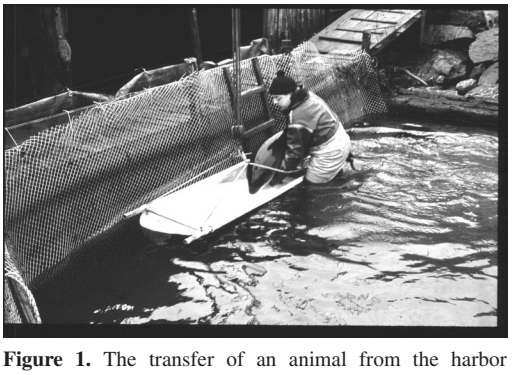

Figure 1. The transfer of an animal from the harbor enclosures to the laboratory could be done by one person.

The Name of the Laboratory

Busnel gave the laboratory the name "Station Oceanographique Anton Bruun" after the internationally well-known Danish oceanographer Anton Bruun (1901-1961). What he did not know was that Anton Bruun, for various reasons, was not very esteemed in Denmark, so his name did not achieve the expected publicity to the laboratory among Danish scientists. The name of the laboratory was painted on a huge board outside, but the local people of the tiny town never learned to pronounce the French name and baptized the facility "Marsvine-stationen," meaning "Harbor Porpoise Station." In Danish, this construction is a little odd.

Our Facilities

The laboratory in Strib was established in a former ferry harbor with a big pier against the narrow sound called Lillebælt between the peninsula of Jutland and the island of Funen. In the harbor, we built several enclosures lined with mesh wires and surrounded by bridges, and in a humble garage about 10 m by 10 m we installed two tanks, an office, a workshop, and a toilet. The electronic department was in a trailer near the outdoor enclosures. In 1974, we moved the laboratory to the Southern University of Denmark in Odense. It was still primitive, but we had an outdoor and an

Figure 2. The enclosures in the harbour of Strib; the grey cabinet housed the pressure valves that operated the bubble curtains used for driving the animals from one enclosure to another.

indoor pool and a tiny combined office and acoustical department.

Colleagues in the Laboratory

I have been fortunate to work with Bertel Møhl. He began his bright career with studies in the hearing of the harbor seal (*Phoca vitulina*) and worked later at the Institute of Biology at the University of Århus, Denmark. The gifted Swedish zoologist, Mats Amundin, studied echolocation of the harbor porpoise at our laboratory and continued his studies in the Kolmårdens Djurpark (zoo) in Sweden. The French electroengineer, Albin Dziedzic, took part in several experiments.

Scientific Results

My primary job was to describe the anatomy of the sound-producing organs in the harbor porpoise. After having sliced several frozen porpoise heads, I got an idea of the anatomy, and after several trials with compressed air blown into dead heads, I knew that the nasal plugs were the sites where the click sounds were made. High-speed film recordings confirmed this assumption. Unfortunately, our acoustical recording equipment was limited to 20 kHz during the French period and, therefore, we were not able to detect the high-frequency clicks of the harbor porpoise. For the same reason, we got unexplainable results from our string avoidance experiments with blindfolded porpoises. After the French period, I obtained high-frequency equipment and managed to make an audiogram, describe the directional hearing, and describe the high-frequency clicks of 125 kHz together with Bertel Møhl. Mats Amundin and I later measured and described the air pressures in different parts of the naso-pharynx. We were also the first to describe the bycatch of harbor porpoises in the Danish fisheries. We calculated a bycatch of about 5,000 animals per year.

Today, nobody will believe how little was known, about the harbor porpoise at that time. The gross anatomy was known, of course, but we knew almost nothing about their food, their behavior, their diseases and physiology, training methods, and transportation methods. Very soon it was realized that it was difficult to keep the animals alive in captivity. The animals we had died after a few months, obviously because the lungs were filled with worms or because they were stricken with fatal skin disorders due to a fungus. I therefore decided to describe the physiological ranges of blood chemical values and the normal ranges of formed elements of the blood to help diagnose diseases. To get an idea about what kind of food they ate, I identified hundreds of otoliths from stomach content samples kept in the Zoological Museum in Copenhagen. Later on, I studied the water environment of the porpoise and found that water osmotically could move through the live cells of the skin depending on the salinity of the environment. The water of the harbor in Strib was not always suited for porpoises. Seasonally, the harbor trapped millions of jellyfishes and sometimes the animals were covered with oil, which was leaking from a nearby oil refinery. The cleaning of the harbor seal was a particularly dangerous job. In wintertime, the water surface froze and so did the water in the pipes for the indoor basin. Furthermore, the saltwater pipes became clogged with clams and barnacles. We therefore had to learn how to make artificial recirculated saltwater for an indoor basin. This knowledge allowed us to move the laboratory to the University of Southern Denmark. Busnel tried to solve the problems with the ice by asking the European Atomic Commission to erect a handy little atomic reactor in our area so we could use the warm waste water

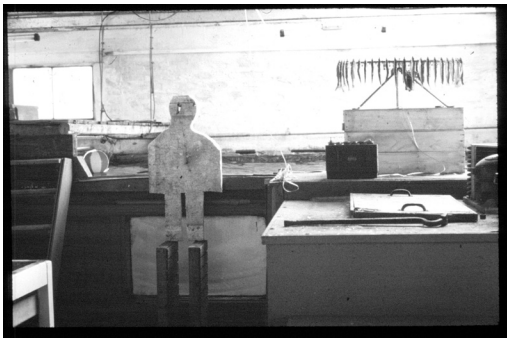

Figure 3. To reduce the work of feeding on weekends, we invented several automated feeders, which could be operated by the porpoise via a lever. This machine was the only one that worked, but only if a dummy of a person (simulating a keeper) was present in front of the underwater window!

to keep the tanks and the harbor free of ice–but in vain!

I felt very lonesome when faced with all these problems. The dolphinaria and the road show people did not publish a line, mostly because they kept there sacred knowledge secret. I was the first to publish a paper on the training of dolphins based on B. F. Skinner's method and became very unpopular because I revealed the method. A scientific cooperation was highly needed and Dudok van Heel, Professor R. J. Harrison from the University of Cambridge, and I founded the European Association of Marine Mammals in the late 1960s (to date, no marine mammal has held a membership!)

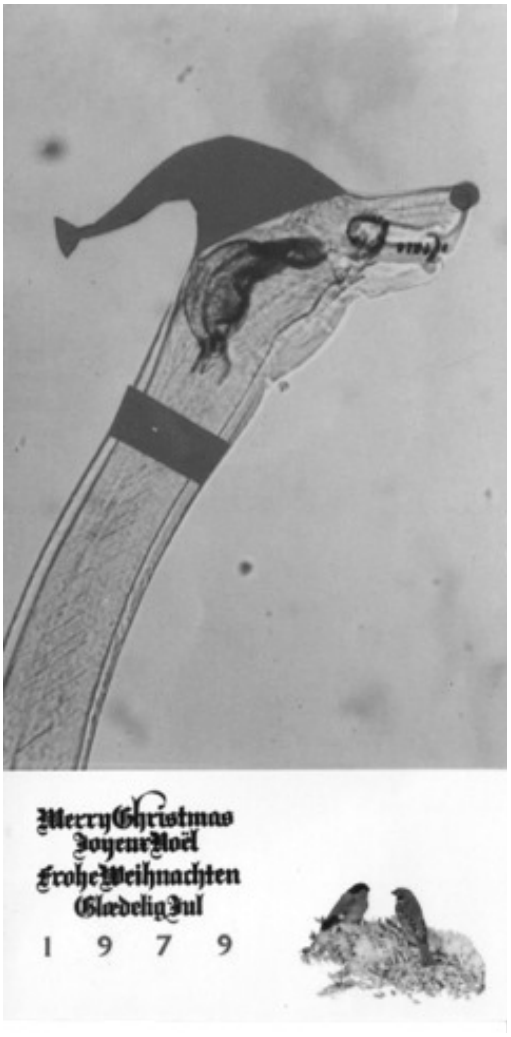

Figure 4. A New Year's greeting card based on the lungworm (*Pseudalius inflexus*)

Slowly, the curators and veterinarians of the European zoos that exhibited porpoises began to open up and share their experiences. In the same time period, American scientists began to publish their knowledge on keeping dolphins in captivity.

The Supply of Harbor Porpoises

The supply of animals was ample in the beginning. The animals trapped themselves by becoming enclosed in a big net cylinder open to the surface. This way of fishing faded-out, and we tried to catch the animals ourselves. We knew that fishing vessels were trawling nearby and that porpoises followed their trawl. Therefore, we got a 1,000 m by 10 m net and a bubble curtain (I spent three months making holes with insect needles of different sizes in a 300-m long hosepipe). The genius idea was to place the hose in a circle on the bottom of the sea at a depth of less than 10 m and when the trawl with the porpoises around it passed over, put pressure in the bubble curtain, which should hold the animals for a while, and then enclose the animals with a net circle created by a speedboat. Unfortunately, we had not accounted for the current, which laid down the bubble curtain almost parallel to the sea bottom. Later on, we used the bubble curtain in the harbor closures to drive the animals from one enclosure to another.

Notes from the International Period

I often recall this period as the most fantastic time of my life because of the many challenges and the knowledge I acquired. The presence of an international team inevitably created strange situations. Several people were hired to assist in feeding and performing experiments. A Swiss guy brought a crocodile with him after a holiday which he placed in a plastic tub in the laboratory without our knowledge. He managed to exchange it with a zoo for a buzzard which broke a wing in a train door on the way back to our facility. A Danish guy was thrown out by his wife, and one morning we found the laboratory filled with singing birds from numerous cages. At one time, four nationalities worked in the laboratory, and we had to write a signboard for "occupied" in four different languages on the toilet door. An otherwise nice French zoologist turned out to be an alcoholic; the records for feeding were illegible after 12 o'clock. Our budget was rather tight, and we had many visitors from Denmark and abroad who often were invited to our private homes. To cover at least the beer expenses, we entered the receipts under "vitamins" as fermented barley in water suspension. The French administration never discovered our harmless illegality.

Concluding Remarks

All the experiences we did not manage to publish were forwarded to the newly established "Fjord og Bælt Center" in the town of Kerteminde, Denmark, where they now keep harbor porpoises for scientific studies and public performance.

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