Obituary | Bertel Møhl | *1936-2017*

Bertel Møhl, Fellow of the Acoustical Society of America (ASA), passed away in his home in Dyssekilde, Denmark. Bertel was a pioneer in bioacoustics and paved the way for others to continue in his footsteps.

Bertel grew up not far from Copenhagen. After completing his studies in zoology at the University of Copenhagen, he was the first to measure the hearing sensitivity of seals in air and underwater. Together with Søren Andersen, Bertel also described the high-frequency component of harbor porpoise clicks. He was tenured at Aarhus University, Aarhus, Denmark, in 1969.

Bertel then extended his work on hearing to other animal groups. He discovered ultrasound production in butterflies as a countermeasure to echolocating bats. He refuted the idea of a coherent receiver in bat biosonar through an elegant psychophysical experiment. With colleagues from the University of Hawai'i, Honolulu, he showed unequivocally that the lower jaw of dolphins acts as a sound receiver.

In the 1970s, Bertel visited whaling stations in Spain and Iceland to study the anatomy of sperm whales. How could an animal with such a huge nose catch fast-moving squid under water? Together with Kenneth Norris, Bertel formulated the "big bang hypothesis," suggesting that toothed whales may stun their prey with loud sound pulses produced in the nose.

Through a long series of field studies, Bertel showed that both narwhals and sperm whales produce extremely intense biosonar signals. To determine source levels, he developed a novel acoustic localization system using GPS-linked receiver units. He also constructed a deep-sea hydrophone unit, operating at 500 m depth, by using the coated wire as the electric signal path and the seawater as the return path. Data from acoustic tags have subsequently refuted the idea of acoustic debilitation by sperm whales. Still, Bertel's ingenious field studies continue to be relevant and inspire many marine mammologists.

Bertel's passion for technical innovations did not cease with age. After he turned 70, he developed a fiber-optic-linked deepwater linear hydrophone array. It went onboard his 45-foot steel ketch *r/v Narhvalen* to East Greenland, Northern Norway, and the Canary Islands and could record whales down to depths of 1 km. He also collaborated with Mark Johnson and his former student Peter Madsen, and during a final field study in the Azores, they combined deep-sea linear hydrophone arrays with acoustic tags to obtain detailed information on the acoustic foraging behavior of sperm whales. After the Azorean expedition, he and his wife Lotte, who had accompanied him on several expeditions, stayed on land.

Bertel Møhl has left a legacy of innovative and outstanding research that continues to be an important source of inspiration. He is missed not only by family and friends but also by former students and colleagues all over the world.

Selected Articles by Bertel Møhl

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