

WOODS HOLE OCEANOGRAPHIC INSTITUTION

WOODS HOLE, MASSACHUSETTS

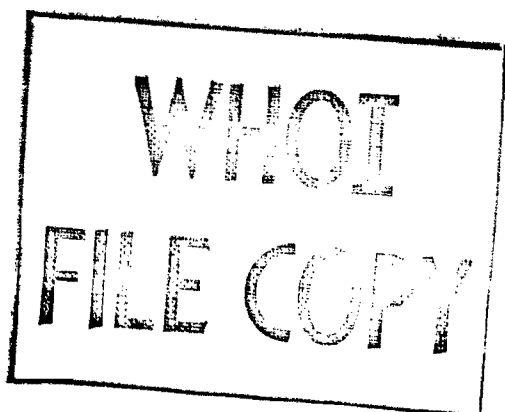
Reference No. 50 - 1

**A PHONOGRAPH RECORD OF THE UNDERWATER
CALLS OF DELPHINAPTERUS LEUCAS**

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Approved for distribution
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Director



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Delphinapterus leucas (Pallas), variously called white porpoise, white whale, or beluga, has long been known as a vociferous species. It is an arctic form, generally restricted to waters north of N. Lat. 60°, except along the coast of eastern Asia, where it ranges as far south as the offing of southeastern Sakhalin, and along the coast of eastern North America, where it is normally abundant to about the same latitudes in the St. Lawrence estuary. It was in this region, in the lower Saguenay River, Quebec, that our records were made, in July 1949. In these restricted waters we have been fortunate in finding concentrations of *Delphinapterus* with no other aquatic sound-makers in evidence. For this and other reasons detailed before (1949, Science, Vol. 109, pp. 143-144, Feb. 11), we are convinced that all the sounds heard on this record were made under water by *Delphinapterus*. This particular cetacean makes a very good subject, as it is especially conspicuous both optically and acoustically, and is easy to identify at sight—and, we now submit, likewise by ear.

In recent years many people, especially in submarines and other naval services, have become familiar with the underwater sounds made by various marine animals, especially certain shrimps, many kinds of fish, and, among the mammals, whales and porpoises. It is often difficult to know which animal is responsible for which sound, especially in the case of the larger and more active ones. Many of the smaller kinds (shrimps and fish) have been isolated in aquaria and their sounds identified. With the hospitable permission of Marine Studios, we attempted this for the porpoises in their Oceanarium near St. Augustine, Florida, but, because there were then three genera of porpoises in the same tank, we cannot surely separate the sounds of each kind on our phonograph records made there. Nevertheless, this experience was valuable in confirming the cetacean nature of many sounds heard at sea.

We believe our phonographic recordings of the underwater calls of *Delphinapterus* to be the first specifically identified record of sound of a cetacean, and emphasize that it was made under completely natural conditions. The accompanying disk contains selections from several days' recordings.

Arctic voyagers have heard some of these underwater calls under favorable conditions of quiet as the animals swam under their vessels; sometimes the hull, acting as a resonator, amplified these sounds, especially in the past, before engines and generators made even idle ships noisy. The development of underwater listening gear has made it possible to hear much more of underwater sounds, not merely those intense enough to be heard in the air. In the present instance relatively crude portable battery-powered equipment was used. The listening gear consisted of a Rochelle salt hydrophone and a three-tube amplifier; for recording a small commercial dictating machine was used. This combination has a fairly flat frequency response between about 100 and 4000 cycles per second. In re-recording some of the selections on the first side of the accompanying disk, a 60-cycle rejection filter was employed to cut out the motor hum of the dictating machine, but for the entire second side and two cuts on the first side (the sharp report and the last cut) the sounds are just as recorded in the field.