

HEADQUARTERS  
Army Air Forces, Anti-Submarine Command  
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### WHALES, NOT SUBMARINES

The shape and size of objects seen at sea are notoriously deceptive to the eye, as their appearance differs according to the angle of view, the weather conditions and other factors. Therefore, although there are many differences between submarines, whales and sharks, there is enough superficial resemblance to give rise to confusion.

Most whales inhabit the open ocean, and are likely to be seen, especially in summer, some distance out from the coasts of Ireland, the Hebrides, the Shetlands and the Faroes. They are very rare in the North Sea and the English Channel; basking sharks, however, are sometimes common in northern British coastal waters and some small whales may be seen there also. Little is known of the density of the whale population, but the average can hardly be more than two or three to ten square miles of ocean.

The group of animals which includes whales, porpoises and dolphins is known as the Cetacea. They have an outward fishlike appearance and spend their whole life in the water, but are distinguished from fish by numerous fundamental characters. They are warm-blooded and air-breathing; round the mouth are a few scattered hairs, the last remnant of the typical covering of all mammals; the fore-limb has in its skeleton all the elements which are found in a typical mammal fore-limb. The hinder limb has completely disappeared, leaving no external trace. The tail is in the horizontal plane, whereas in all fishes it is vertical.

Cetaceans, like other mammals, give birth to live young, which accompany the mother for several months and are suckled by her.

Existing Cetacea are divided into two sub-orders (whalebone whales and toothed whales) based on the presence or absence of teeth in the adult.

To the whalebone whales belong all the species which are of very large size except the Sperm. They are characterized by absence of teeth, the possession of whalebone, and nostrils opening to the exterior by two longitudinal slits--the blow-hole--situated far behind the tip of the snout.

WHALES, NOT SUELIARITES (Cont'd)

Whalebone is not bone in the accepted sense of the word; it consists of a series of some hundreds of triangular horny plates in the mouth, attached, one behind the other, to each side of the upper jaw. The inner edges are frayed, and form a very efficient straining mechanism for catching the small shrimps and other organisms on which these whales feed.

The toothed whales, as their name indicates, are characterized by the possession of teeth and the absence of whalebone. The number of teeth varies greatly; for instance, the Common Dolphin has about forty on each side of upper and lower jaws, but the Bottle-nosed whale has a single pair at the extreme tip of the lower jaw, which have no obvious functional importance whatsoever.

These whales feed on squids, octopuses and fishes; and the Killer whale may eat seals and even other Cetaceans.

The outer opening of the nostrils, or blowhole, of the toothed whales is a single aperture; in the Sperm whale it is situated at the extreme end of the snout, but in all the remaining member of the sub-order it is some distance behind.

The whalebone whales which might be suggestive of U-Boats or parts of U-Boats are the Biscayan and Greenland Right whales, the Blue whale (maximum size 100 ft.), the Fin whale (up to 60 ft.), the lesser Rorqual (up to 30 ft.) and the Humpback (up to 50 ft.). The Right whales are now rare, especially the Greenland Right-- which is confined to the Arctic. The most important are the Rorquals which include the Blue, Fin, Sei and Lesser Rorqual. Of these the Fin whale is probably much the commonest, but they are not easily distinguished from one another. Blue and Fin whales generally keep to the open ocean but the Lesser Rorqual is not uncommon in northern coastal water, and Sei whales sometimes form unexpected local concentrations. Humpbacks, which are near relatives of the Rorquals, keep to more definite migration routes which may be close to the land in warmer latitudes.

The Sperm whale is the only large toothed whale and is occasionally seen in British latitudes in the open ocean. There are various smaller toothed whales in British waters, but some are rare and many are small dolphin-like animals which may be neglected for our present purpose. However, the Bottlenose, Blackfish and Killers grow to 20-30 ft. (See illustration.)

Since whales are warm-blooded mammals and breathe air they can never leave the surface of the sea for long. They break surface in order to breathe, and this is normally the only time when they are seen. The blowhole is on top of the head and is the first part of the body to leave the water (See illustration). The air is immediately expelled from the lungs, and the sudden reduction of pressure condenses the moisture in the breath to form the fountain-like spout. Air is quickly drawn in through the open blowhole, which then shuts as the head sinks below water. A considerable part of the back is exposed after the head has disappeared (See illustration). In Fin whales the period of exposure is only about 3 to 6 seconds and is usually repeated five or six times at intervals averaging about 25 seconds. In these intervals the whale keeps close to the surface, but at the last "blow" the back is arched (See illustration) and the whale dives (or sounds) and does not reappear for about 2-10 minutes. At the next series of blows it may be swimming in quite a different direction. Other species behave in a similar way though the intervals may differ a little.

## WHALES, NOT SUBMARINES (Cont'd)

Fin whales swim alone or in schools of about two to eight. Blue whales are more solitary and it is very uncommon to see more than two in company. Several Humpbacks might be seen together, but of Sperm whales only solitary males would be seen in these latitudes.

Most whales have a gregarious tendency. A "school" consists of a small number swimming within a few feet of each other, but sometimes large numbers of schools and individuals are seen at the same time in an area of a few square miles, forming a herd of sorts. This is not uncommon with Fins and Humpbacks. Fin and Blue whales normally swim at something like 6-7 knots. When feeding they swim more slowly and frequently change direction. When they are travelling "on passage" the speed is greater (perhaps 8-9 knots) and they keep on a definite course. When scared they may reach a speed of 12-16 knots. The Sei and Lesser Rorqual are smaller whales but not much slower, and Humpback, Right and Sperm whales are rather slower than the Rorquals.

Whales are most easily seen in calm weather and the spout is most noticeable in cold weather. In rougher weather rather more of the body is exposed, but they are not easily spotted because the surface of the sea is broken up and in a strong wind the spout is flattened out.

Except when travelling at speed, a whale produces very little foam. The movement of the horizontal tail flukes, however, leaves a series of swirls at the surface. This is called the "slick", and looks like an oily patch about 20 ft. across. Whales can often be followed by the slick when they are swimming a little way below the surface. In no circumstances, however, does any living whale exude oil or leave a film of oil on the water.

Whalebone whales feed mostly on small organisms, such as shrimps, for which they do not have to dive to any great depth. Sperm whales, however, feed principally on squids, and to find these they are believed to go to considerably greater depths.

Whales are migratory animals. Broadly speaking they travel northwards in summer into the colder waters where their food is most abundant, and return southwards in winter towards the tropics, where they find little food, but where breeding takes place. To the west and north-west of the British Isles they should be commonest in summer, but might be seen at any time of year.

The Basking shark, though as large as a small whale can be distinguished by the vertical position of the tail-fin. It is a sluggish, surface-swimming fish with a habit of lying nearly motionless at the surface in fine weather with the back awash, as if "basking" in the sun. When moving at the surface, the tip of the triangular fin in the middle of the back and the upper tip of the powerful tail-fin characteristically project from the water (See illustration) and, if the fish is engaged in feeding on plankton (small organisms in the water), the snout may also break the surface from time to time.

Little is known of the winter habits of this shark, which appears to retire then to deeper waters, and any information as to the movements of large shoals would be welcome to scientists.

WHALES, NOT SUBMARINES, (Cont'd)

A hundred feet may be taken as the maximum size of the largest species of whale, so that to look anything like a submarine, the whale must be considerable nearer. Note that the head of a Whalebone whale is broader than the bow of a U-Boat, but the head of a sperm whale seen in profile is not unlike the bow of a U-Boat. Seen from above the underwater parts of a whale may be visible in calm weather, and the flippers and tail flukes should then be distinctive. Since Basking sharks do not expose the body they should not easily be mistaken for U-Boats, but glimpses of the fin and tail from the end-on view might suggest a distant conning tower or periscope. The dorsal fin of a Killer whale (See illustration) can look very like a periscope. Humpbacks have a habit of rolling about at the surface and waving their limbs in the air, and here again a periscope might be suspected.

Possibly the most obvious difference between a U-Boat and a whale lies in the fact that a U-Boat is exposed at the surface for sometime, whereas a whale is never exposed for more than a few seconds at a time.

The presence of birds at the surface may indicate a whale, but they might also be attracted by, say, the galley refuse from a U-Boat, and there is no reliable distinction here.

A large whale is not easily killed. The lethal range of a depth-charge is probably not great, and a near miss with a bomb might do no more than injure it. A direct hit would presumably kill it outright, but there would be no great flow of oil. Most of the oil in a whale is contained in the blubber and bones. The blubber is simply a layer of fat about 6 in. thick under the skin, and if much lacerated might possibly ooze a little oil. It is very unlikely that it would cause any extensive film of oil on the water, but the water might be discoloured by blood and guts in the immediate neighbourhood of the carcass.

A dead Rorqual sinks, but a dead Right whale or Sperm whale will usually float.

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HOWARD MOORE,  
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A-2.



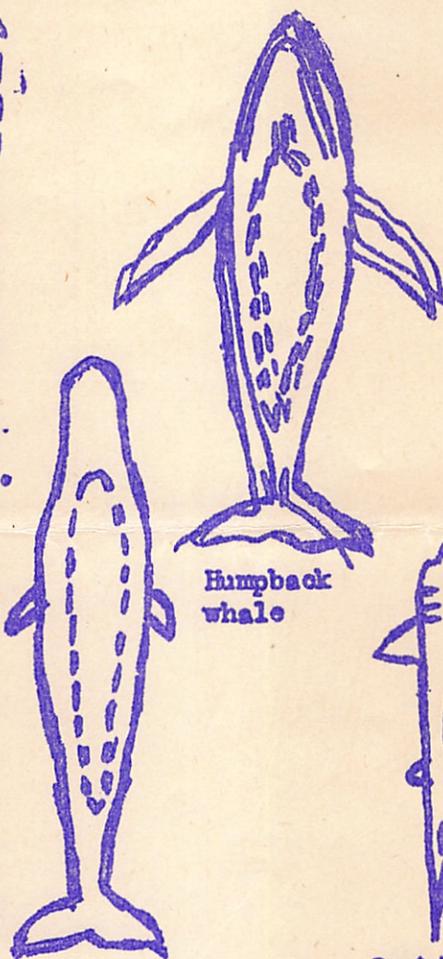
220  
ft.

U-Boat, 517 ton class



75  
ft.

Rorqual, seen from  
above; the dotted  
line shows the approx-  
imate area exposed at  
the surface.



Humpback  
whale



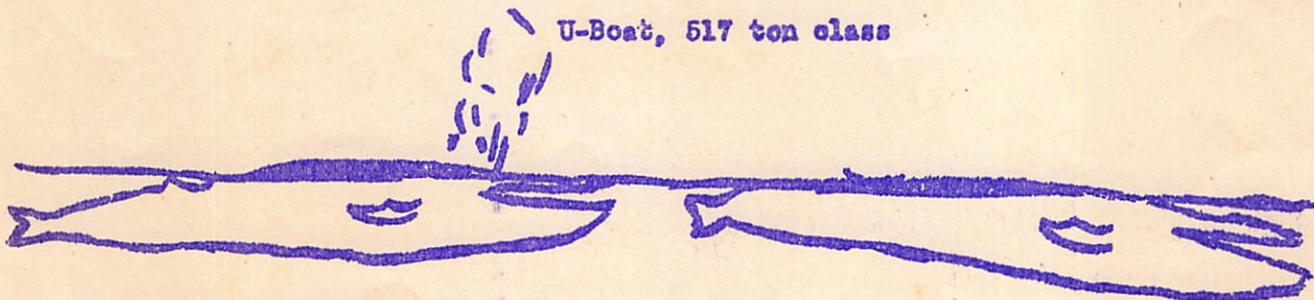
Sperm  
whale



Basking shark



U-Boat, 517 ton class

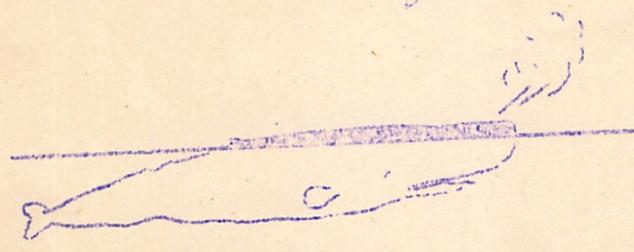


Typical view of a  
Rorqual breaking  
surface to 'blow.'

Rorqual immediately after  
blowing



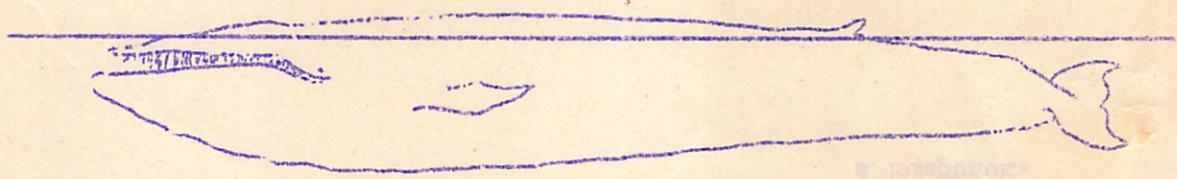
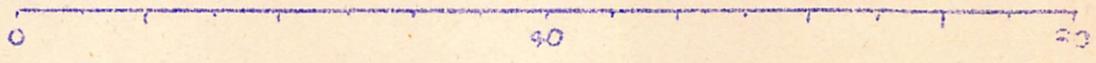
Rorqual about to dive after a series of blows; note arched back



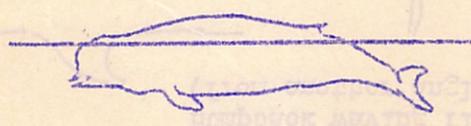
Sperm whale blowing. (Note that a sperm whale at short range bears more resemblance to a U-boat than a Rorqual.)



Humpback about to dive



75ft. Fin whale (Blue whales similar but larger, Sei or Little Piked whale similar but smaller).



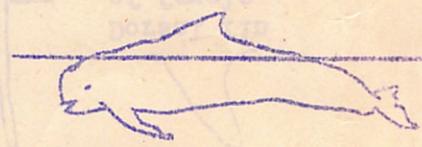
26ft. Bottlenose



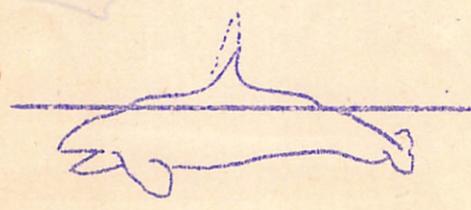
43ft. Humpback



50ft. Sperm whale



25ft. Blackfish



27ft. Killer



30ft. male Basking shark

DORSAL FINES:

Blue



Fin



Dorsal fin of adult male  
Killer



Dorsal fin  
of female  
Killer



End on view of  
dorsal fin of  
male Killer

Humpback

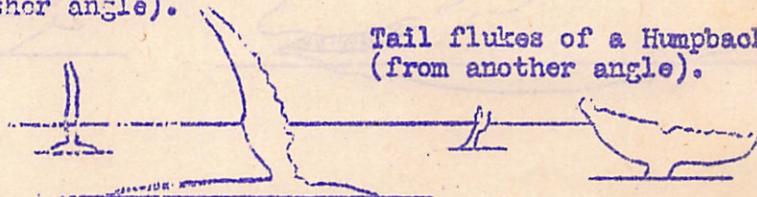


Humpback waving flipper  
(from another angle).

Sei



Tail flukes of a Humpback  
(from another angle).



Sperm



Humpback waving flipper.

Tail flukes of  
a Humpback.

