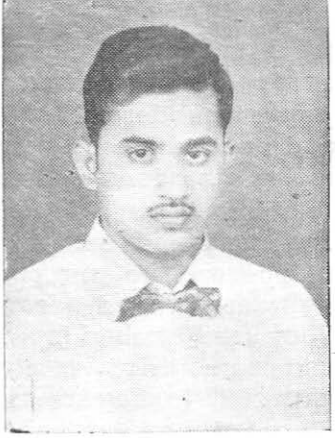
Marine Mammals



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The large scale mortality of about 147 pilot whales, probably of the species *Globicephala melaena*, which occurred in the South east coast of India between Manapad and Kulasekharapatnam fishing villages in Tamil Nadu during January of this year attracted international attention. According to press reports their size ranged from 220 to 575 cms and they weighed from 0.3 to 2 tons. Even though experts have pointed out many reasons like the attack of Killer Whales, suicide committed to balance the population, pollutants present in the seawater; dynamitting the coral reefs for making cement and starvation due to lack of proper food, their deaths remain still a mystery. In this context, it will be interesting to know more about the mammals which inhabit the oceans and especially their commercial significance to which we have hardly paid attention.

Most of the important aquatic mammals belong to the orders Carnivora, Cetacea and Sirenia. The ancestors of all the present day aquatic mammals were land living creatures. They have gradually adopted to aquatic life and have undergone great changes in body form and other physiological characters.

The animals belonging to the sub order Pinnipedia of the order Carnivora are exclusively marine. They live mainly on fish, molluscs and crustaceans. Walrus (odobenidae), Seals (Phocidae) and Sea lions (Otaridae) are the important marine mammalian carnivores. They live in the Arctic, North Atlantic and the Pacific coasts respectively. Polar bears are also, to a lesser degree, marine. They are confined to the Arctic region, mainly on or near floating ice. Fur-seals belonging to the division Otaridae are the most important, economically. Fur-seals were common in Falkland, Kergurin and Prince Edwards islands. But they were exploited by indescriminate slaughter for their valuable hide. Now they exist on the coasts of South Africa. Furseals are also found in the Pribrilof, Kommander and Kuril Islands in the sea of Okhotsk. The indescriminate killing of these animals on breeding grounds reduced 5 million seasl in 1800 to about 1 lakh in 1910. This massacre was stopped in 1911 by the International Fur seal treaty by U.S.S.R., U.S,A. and Japan. Under this treaty killing was regulated. This paid back and in the next 30 years the population has increased many times.

Skins of 3 year old male seals are taken in June–July months. Hides are stripped from the body and consist of pelt and subdermal fat. Pelts are washed and steeped in sea water till the adhering fat hardens. The hardened fat (blubber) is removed and then the pelts are cured and salted. Then they are transferred to fur companies. Here pelts are graded according to quality. They are stretched in frames, heated up and coarse hair is removed with a blunt knife. Then they are treated with seal oil and tanned. Further finishing touches make them soft. It takes about 90 days for processing one pelt. Sea lions are also hunted for hide and oil in California, Northern Berring sea, Newzealand and Australia. There are 20 species of Hair seals or Phocidae all over the world. Main fishery for Hair seals is in Newfoundland. Harp seal *(Phoca greenlandia)* is another important species commercially. Several other species are important livilihood for people living around the Arctic region. Pelts of Hairseals yield high quality leather which is used in the manufacture of suit cases and Handbags. Blubber oil is used as a lubricant.

The Walruses (Odobenidae) are confined to the Arctic and Pacific icey shores and on floating ice. They undertake migrations on floating ice. They are also hunted for hide, oil and ivory from their tusks. The Alaskan Walrus is now protected and except for food for Eskimos, is prohibited from killing.

Marine mammals belonging to the order Sirenia are heavy bodied animals with a flat tail. Their fore limbs are modified as paddles. They are popularly known as 'Sea-cows' or 'Mermaids'. They live in estuaries, bays and lagoons and do not go to the open ocean. They are herbivorous, feeding on sea weeds and other marine vegetation. They are supposed to have evolved from the primitive Ungulate mammalians from which stock the present day, Elephants have also evolved. Halicore (Dugong) lives in the Indian Ocean especially in the Gulf of Mannar and Palk Bay and in the Australian seas. Manatus (Manatee) lives in the rivers of South America and Africa. Sea cows are very much limited in number and at present they are not commercially exploited. Rhytina (Hydrodamalis) or "Steller's Sea Cow" which lived in the Berring Strait became extinct by about 176 by ruthless human slaughter for its flesh aud fat.

Order Cetacea includes commercially the most important aquatic mammals. Whales and dolphins are all members of this order. Their large scale capture is known as 'Whaling' or 'Whale fishery'. They are highly modified for aquatic life by a streamlined body and fin-like fore limbs and tail. The hind limbs are absent. The hairy covering of the skin is reduced to few bristles near the mouth. They have a thick layer of fat (blubber) beneath their skin which prevents the loss of heat and reduces their specific gravity. Their nasal apertures lie far back on the top of the head as a single or double blowhole. Networks of blood-vessels (retia mirabilia) lie in various parts of the body for storing oxygen to be used while under water.

The blue whale (*Balaenoptera musculus*) is easily the biggest creature the world has ever seen. The Brachiosaurus, biggest of all the dinosaurs probably weighed 50 tons, but a fat 35 metre blue whale may weigh upto 160 tons–bigger than three Brachiosauruses, or 20 African bull elephants. Only in the last 300 years have naturalists discovered that the whale is not a fish but a mammal. Once

a land creature which probably took to the water in search of food, it still has the structure of 5 fingers burried in its flippers, and deep in the flesh of its body are two useless bones, the remnants of what were once hind legs.

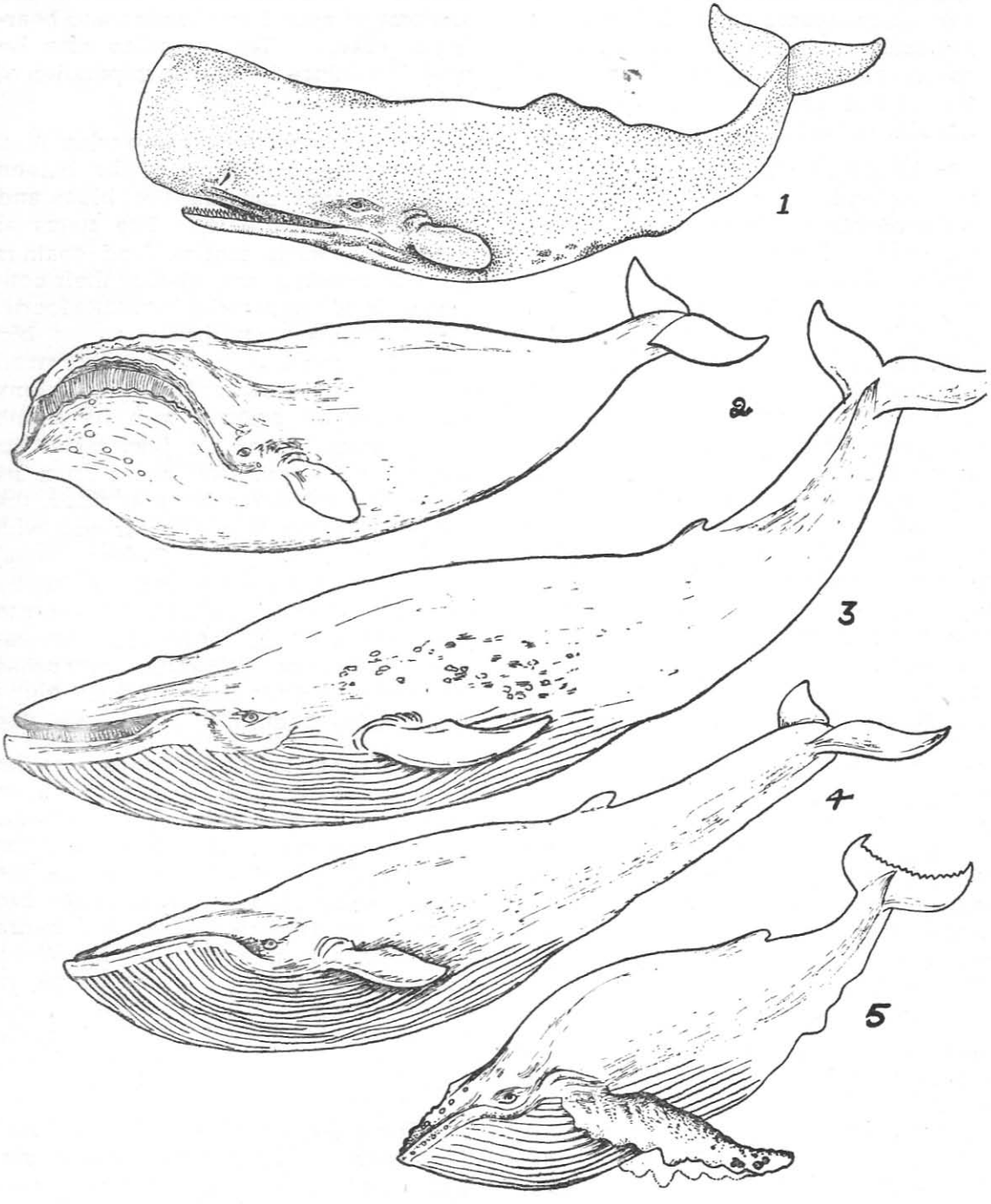
In the thousands of centuries since it left dry land, the whale has adapted itself superbly to life in water. Unlike the fishes it still must surface regularly to breath fresh air, but it can stay under water for as long as an hour at a time. It breathes through the blowhole on top of its head, letting out the air in a great gust which condenses into a spout. To protect its eyes from salt water, it has a set of glands which secrete an oily substance so that a whale is constantly shedding great greasy tears. To protect its hearing it has lost its external ear, leaving only a small opening which closes up tight when it plunges to the great depths of the oceans. We do not know much about the family life of the whales and dolphins. But judging from the size of foetuses found in hunted whales, biologists believe that the mating season is mainly June and July. In courting, big male humpback whale (Fig, 5) splashes and rolls on the surface of the ocean to attract the female's attention striking love taps with its flippers that can be heard for miles. To feed the young the mother whale rolls over on her side and special muscles pump milk down the baby's throat - a "baby" that may be 15 metres long.

For more than 2000 years it has been known that porpoises and whales make sounds that man can hear. In fact in the mid-300's B. C. Aristotle wrote in *Historia Animalium* that the dolphin 'Squeaks and moans in air'. Now we know that dolphins and whales make sound for communication and navigation by echolocation. Since Second World War, considerable work has been done on the anatomy of sound production and hearing of whales. These studies may be useful in future for the manipulation of both whales and fish stocks.

Whale's most remarkable adaptation is the feeding apparatus of the baleen whales, which include the blues and finbacks (Figs. 3 & 4). The status of baleen whales in marine food chain is very interesting considering their consumption of comparatively minute foods. The baleen's tiny throat is just big enough to swallow its main diet of small crustaceans. It swims through a colony of shrimp or prawns with its mouth open, then closes its jaw, raises its tongue and expels the water from its mouth through a vast soup strainer, the baleen. Baleen is a thick fringe with numerous horny plates (baleen plates) hanging from the palate in rows like the leaves of a book. It allows the water to flow out but will not let the small crustaceans to escape. When the water has been expelled the baleen whale glups the food left behind.

Compared to the baleen whales the toothed whales like the sperm whale, (Fig. 1) eat very simply. They dive far into the ocean depths and devour giant squids. Unlike the baleen whale, the sperm whale has a large gullet big enough to swallow whole, a 3 metre shark (or a man named Jonah). When there is a shortage of food supply in winter months, both the baleen and toothed whales live off their blubber, the storage blanket of oily fat just beneath their skin.

The order Cetacea is divided into 2 suborders; *Odonotocetii* and *Mystacocetti*, on the basis of the presesce or absence of teeth in the adult animal. Whales belonging to the suborder Odon-



Legend to Figures

Figs. 1. Sperm whale, 2. Right whale, 3. Blue whale, 4. Finback, 5. Humpback.

tocetii hava 40–60 conical teeth in their mouth. *Physeter* or spermwhale has a snout enormously swollen with the accumulation of fat known as 'spermaceti'. *Orca* or killer whales are about 10 metre long. They feed on fish and attack other whales also. Porpoises or *Phocaena* and *Delphinus delphis* or dolphins also belong to this suborder, *Platanista gangeticus* or "Susu" is the Gangetic dolphin. Members of the Suborder Mystacoceti are toothless. Instead they have filtering devices known as baleen plates in their mouth. Blue whales belonging to this suborder is the largest animals nature has ever produced. Most of the whales of commercial importance like, blue whales, humpbacks and right whales (Fig. 2) belong to this suborder.

It is likely that stone age man hunted the smaller whales and dolphins. Earliest recorded whaling centre is an Alaskan whale hunting settlement dated back to A. D. 100 or 200. The first great whaling nation of the world was England, closely followed by Holland. They utilised the early techniques of the Basque whaler, who had been whaling on a small scale from 1200 A. D. The Yankees of New England (U. S. A) also entered the business, but later they were driven away by competition from Norwegians, Japanese, Russians and the Germans.

Svend Foyn, a Norwegian, developed a method of hunting the blue and fin back whales which swim too fast. He used a cannon, fixing a heavy grenade harpoon, mounted in the bow of a steam ship. With this technique whaling became a very profitable industry.

Whales provide food, oil and many other products of commerce. Formerly whale oil was used for lighting and soapmaking. Now whale oil is converted into margarine. In the latter 1950-s the annual production of whale oil was about 500,000 tonnes together with about 140,000 tonnes of by products for food or fertilizers. These came from a world catch of nearly 55,000 whales taken by about 360 whale catchers operating from more than 20 factory ships and nearly 50 shore stations. About 80% of the whale catch was from around Antarctica.

Many improvements in whale hunting techniques have been introduced after second World War with the development of electronic aids and reconnaissance air craft. Now there are sonar devices to frighten whales into flight with ultrasonic vibrations. By this they get out of breath and come often to the surface to blow air. Then they can be essily followed. An electric harpoon which yields unspoiled carcass and kills more rapidly than the grenade harpoon is a recently invented device.

Factory ships, killer ships and shore stations form the backbone of the whale hunting team. Factory ship is a mammoth installation of 600 Feet length and 30,000 tonnes gross weight. It can provide living quarters and 24 hours work space for 450 men and can carry sufficient apparatus to handle 50 tonnes of raw material or 1 ordinary whale per hour. The whale is hauled aboard through a ramp in the stern and flensed and dismembered on the main deck. Below deck are the batteries of rotary pressure digesters for the blubber and bone, and the many centrifuges. Huge vacuum evaporators supply fresh water to the boilers.

Each factory ship requires from 6 to 8 killer ships to supply whales and alse tankers to remove whale oil, meat, meat meal and bone meal and to bring fuel. Shore stations are

less expensive than factory ships. But they require plenty of fresh water, deep and quiet anchorage for the catcher boats and whale carcasses, wide gently sloping shores for hauling the whales up the ramp to the flensing desk and above all plenty of whales within 100 miles for atleast 4 to 6 continuous months.

The whale is hunted from a killer ship and shot with a harpoon attached to a line. After death it is hauled close, inflated with air and eventually towed to the shore station or factory ship. Inflating the whale carcass with air is to prevent sinking when it is left floating and to facilitate towing. After inflation a long bamboo pole with a big red marker is planted on the carcass to aid in later detection. But sometimes wind and currents will drift such a carcass and be lost. This type of loss amounted to 10%. To avoid this, now-a-days, a small 'Whale transmitter' emitting radio signals of a particular wave length at regular intervals is attached to the marker and its signals are picked up by a direction finder.

After bringing the whale carcass to the factory ship or to the shore station, it is stripped off its blubber. The carcass is then rolled underside up and dismembered; the meat, glands and bone being properly disposed of. All work is done with cables and winches by experienced winchmen, cable tenders, flensers and lemmers or meat cutters. Blubber is processed in continuous rotary digesters. Oil is taken from parts of meat also. Bones also have a high oil content and must be utilised by law. Glands, lungs, intestine and other internal organs are utilised for the production of vitamins, hormones and other pharmaceutical preparations. Products obtained from whales are divided into 2 categories. Primary products include fresh or salted meat for human or animal consumption, baleen, ambergris, hides and frozen glands for pharmaceuticals. Secondary products are oils of all kinds, meat meal, bone meal, blood meat, meat extract, liver oil and canned meat.

Chemically, whale meat resembles beef. Japan and Norway have for long included whale meat in their national diet. But recently there is some demand for whale meat in other European countries. In many other parts of the world whale meat is definitely a substitute for beef, pork, mutton, fish and other culturally integrated food.

Ambergis, is a product resulting from a morbid digestive process of sperm whales. It is highly valued in perfume industry as a fixative for odour. Most often it is accidently found floating along the beaches on the surface of open ocean or in some cases in the lower intestine of dead sperm whales where it originates. It is soft and waxy to touch or hard and friable depemding on its dryness. It is black, greywhite, mottled grey and black or brown and yellow. Drier specimens have a sweet musky smell.

Ivory is derived from the teeth of sperm whales, killer whales, Narwhals and white porpoises. It is used for carving chessmen, miniatures and combs. Endocrine glands like pituitary, thyroid and pancreas are used for the extraction of hormones. Baleen or whale bone is keratinous, stiff, water proof and divisible by splitting into plates or fibres as fine as desired. It was used in the manufacture of stiffness of taffeta silk, dress stays and collars. But the advent of steel "Feather bone" has replaced it. So baleen is nowadaya discarded. Skins of white whale, Narwhal and bottlenose dolphin are used for making leather.

Whale oils are graded on the basis of colour and free fatty acid content. Oil

is sold by weight and not by volume. Previously whale oil was used for illumination purposes. Today it is used for the manufacture of margarine, candles and soaps. Liver oil is high in vitamin A. After extraction of oil from bones they are dried and used as bone meal. Gelatin from stick water, blood meal and meat extract are other by products.

Whaling of the large species like sperm, sei, finback, blue and humpback is regulated by the International Whaling Regulations (I. W. R.). The International Whaling Commission now specifies the season for hunting, usually January through March and it limits the annual catch. During the whaling season each expedition must report weekly by radio, announcing the number of whales killed. When the annual limit is reached, the season is over and the ships head for home.

Various species of whales are found in the Indian Ocean. But due to the lack of proper vessels and capital, India has not entered the whaling Industry so far. But, if properly developed, there is no doubt, it can be a very great ~~by~~ help to our poor economy.

Recently a lump of 'Ambergris' weighing about 97 Kg. was recovered from the coast of Kavaretti Island in the Laccadive islands group (Malayala Manorama Daily - 24 - 2 - 1973). Now it is being kept at the Kavaretti Government treasury. Samples from this lump have been sent for chemical analysis to assess the quality of the stuff. After detailed analysis it will be brought to the office of the Laccadive Administration at Calicut. The Laccadive Fisheries Director has stated that there are records about the occurrence of Ambergris in plenty from around the Laccadive islands in ancient times. The present finding may prove to be a 'treasure' to the economy of the islands.