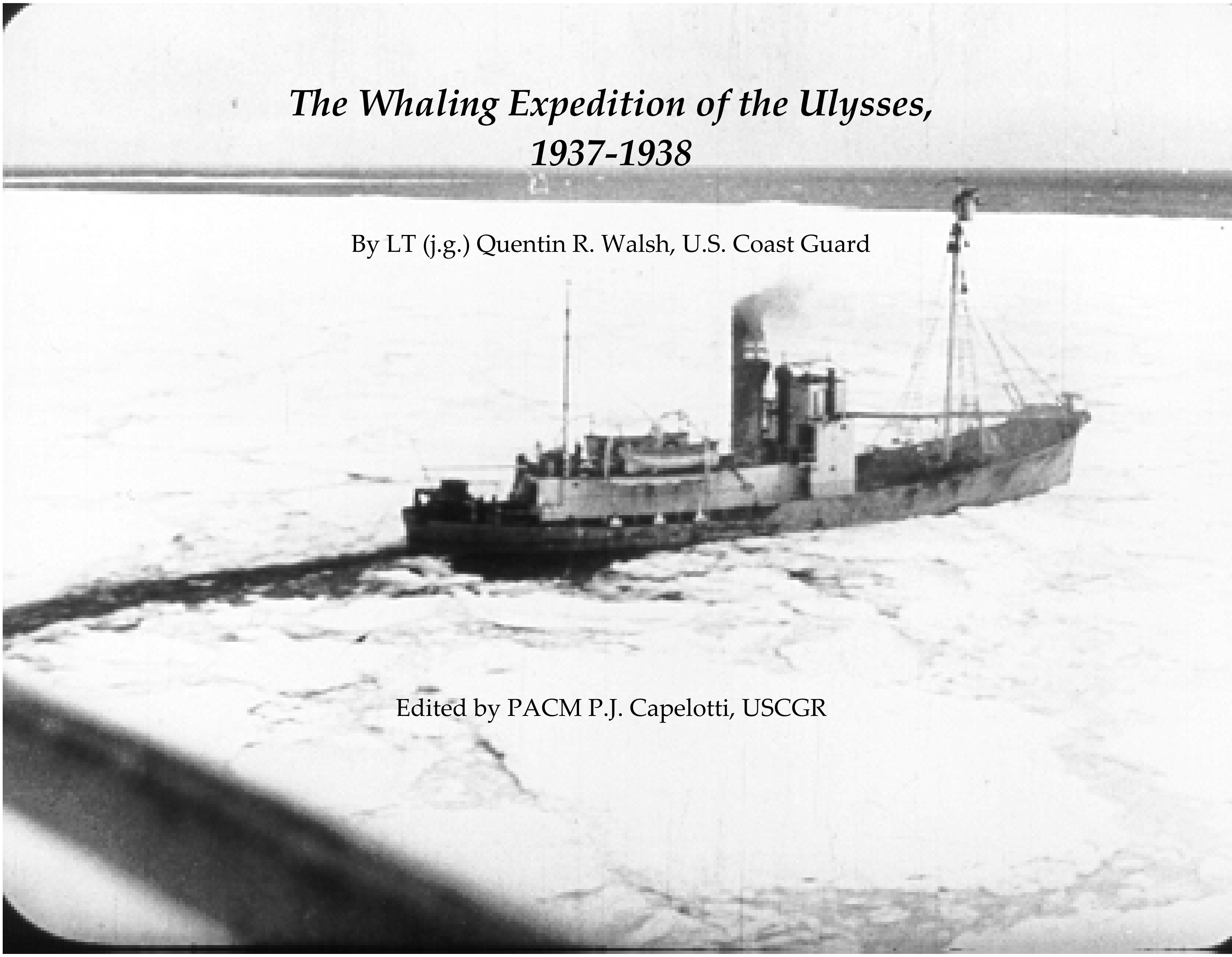
The Whaling Expedition of the Ulysses, 1937-1938

By LT (j.g.) Quentin R. Walsh, U.S. Coast Guard

Edited by PACM P.J. Capelotti, USCGR



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2. Whaling factory ships with whale killer boats tied up alongside. "Modern killer boats are steel-hulled vessels, many well over 150 feet in length and powered by powerful steam engines that drive then through the water at speeds around sixteen knots. They are self-sustaining units and carry crews of twelve or more men each. Their one and only function is to kill whales and deliver them to the factory."

3. The deck of the *Ulysses*. "The *Ulysses* [was] one of the two floating factories registered under the American flag, the other being the *Frango*. The *Ulysses* [was] a 12,395 ton vessel and is 514 feet in length. The *Frango* [was] 6,400 tons, length 401 feet. Floating factories [were] in operation [in the 1930s] of over 30,000 tons. These vessels with their fleet of six or more fast killer boats, explosive harpoons, modern equipment, and great cruising radius are a far cry from the old New Bedford whalers. Some of the larger factory vessels with their capacity of over 2,500 barrels of oil per day capture more in two days than the original floating factories of 1904 were able to carry away with them in an entire season. One modern factory ship can take more whales in one season than the entire American whaling fleet of 1846 which number over 700 vessels."

4. Whale killer boats alongside a factory ship.

5. A whale killer operating in rough seas.

6. A whale killer operating in the ice. Once a whale was killed a flag was driven into it. "The whale is cast adrift [with its flag stocking out of it] while the killer boat continues the hunt. The whale will be picked up later."

7. “Eight killer boats and one factory ship constitute the whaling fleet. Each killer boat mounts a gun like this one, ready to shoot a harpoon into the target.” “This 3.5” cannon fires a harpoon six feet in length and weighing between 100 and 200 pounds. The harpoon is pointed with a hollow cast iron bomb which is filled with black blasting powder. This bomb is exploded in the whale’s vitals by a time fuse that ignites the powder three seconds after the harpoon has left the gun. The harpoon line coiled on the pan [at the bow] is connected to 1,000 or more fathoms of heavier manila hawser in the forward hold.”

8. “One of the killer ships brings in a whale and ties the carcass with others at the factory ship anchored in the Antarctic… The struggling whale is relentlessly worked close to the bow and finished with a killer harpoon. The vitality of these huge animals is amazing and it is often necessary to fire three or more harpoons into them before they are finally dispatched.”

9. “The dead whales are inflated with air, the flukes secured alongside the bow and trimmed, and the tow back to the factory ship started.”

10. “These whales, moored astern before being drawn aboard the factory ship, total plenty of tonnage—and also attract plenty of birds.”

11. A whale is dragged up the slipway and onto the cutting (flensing) deck of the *Ulysses*.

12. “A whale arrives on the flensing deck. “A huge four ton claw is used to haul the whale up the slipway. This claw is so constructed that the greater the weight of the whale the tighter the jaws grip the flukes.”

13. “Shows manner in which the claw is attached to the whale’s tail.”

14. “Three long slits are cut in the blubber from head to tail. This virtually separates the blubber into three longitudinal strips, upon one of which the whale is resting.”

15. “The flensers use a razor sharp knife which is curved and attached to a long wooden handle and can best be likened to a hockey stick.”

16. “The two free strips of blubber are simultaneously peeled off by wires from steam winches.”

17. “By means of the flensing knives the workers loosen enough blubber at the head end for the attachment of the wires, and separate it from the flesh as it is hauled away.”

18. “The carcass is next rolled over by means of a tackle passed over the shoulder and attached to the lower flipper, and the third strip of blubber is removed in the same way.”

19. “The blubber is drawn away to the sides of the flensing deck where it is cut into smaller pieces and then dumped into the cookers or blubber boilers which line both sides of the deck. A number of steam jets open into the cookers, and these rapidly melt out the oil.”

20. “After the blubber has been stripped from the whale the carcass is pulled forward to the cutting deck where it is dismembered.”

21. “The carcass is practically torn apart by the use of steel wires attached to powerful winches. True, the flensing knives play an important part, as the workers know just where to cut when a strain is taken on the carcass, but brute force is the most important factor.”

22. A whale jawbone on the cutting deck of the *Ulysses*, alongside a strip of blubber.

23. “The carcass has now been torn apart and the workers are busily engaged in cutting the meat and sawing the bones into pieces small enough to fit into the cookers.”

24. “Oil can be boiled in varying quantities from the whole carcass, excepting the baleen in the whale’s mouth.”

25. A killer whale caught by the *Ulysses*, wounds visible along its underbelly, jaw winched open.

26. “The killer whale is the wolf of the sea,” wrote Lt. Walsh. “It hunts in packs of twenty of more individuals. They will attack and devour almost anything that swims… Their capacity is almost unbelievable, and there is a record of thirteen porpoises and fourteen seals being taken from the stomach of a twenty-one foot specimen. Killers have even been known to attack and kill the huge blue whale. Their method of attack is to harry and worry their victim until he is exhausted, and then to force open the whale’s mouth and eat out its tongue.”

Editor's Note

By PACM P.J. Capelotti, USCGR

This report was originally three distinct documents all written by Quentin R. Walsh. The first two, comprising the bulk of the report, were the volumes Walsh wrote immediately after returning from Antarctica on board the whaling factory ship *Ulysses*. The third document is a shorter, more general history of whaling that Walsh wrote in later years, which incorporated much of his earlier experiences on *Ulysses*.

In editing these three documents into one cohesive report, no substantive content have been omitted. Walsh repeated material in several instances, and such repetition has been eliminated as much as possible without compromising the integrity of the original work. In so doing, the nineteen sections and later history have been condensed here to fifteen sections and a preface.

Walsh's extensive commentary on the history behind the *Ulysses* expedition and the way in which it was ostensibly owned by an American corporation but entirely run by Anders Jahre of Norway, are detailed in the preface. The more general history, along with similar elements from the original report, has been combined into a unified "brief history of American whaling," which comprise Section 1.

The history of the expedition itself and the results of its whale hunt in both Western Australia and Antarctica are covered in sections 2-4. Walsh's extensive cultural anthropology on Norwegian whaling ships, crew, equipment and the whales they pursued is the subject of sections 5-9.

Sections 10-15 contain a natural history of the whales hunted by the Norwegians during Walsh's tour on board *Ulysses*, with a brief concluding section on how these whales met their end on the cutting deck and in the processing systems of the factory ship. Three appendices include a chronology of Walsh's year, his daily record of whales killed and processed during the Antarctic season, and annotated sketches of whales and whale-killing and –processing technologies.

Aside from correcting minor glitches in grammar, a few spellings have been changed. Gothenburg, Sweden, has been changed to the Swedish *Göteborg*; 'Knol whale' and ' blavale' have been changed to the Norwegian *knølhval* and *blåhval*. On the other hand, Walsh's use of the terms 'anteriorly' and 'posteriorly,' to indicate the direction of a particular feature on a whale's body, have been retained.

Acknowledgements

To digitize and edit this report occupied the editor for more than a decade—and nearly one-half of his career in the Coast Guard Reserve. The work was interrupted several times during that period, first by 9/11 and the operations Enduring Freedom and Iraqi Freedom that followed, then by other pressing historical projects, then by hurricanes Katrina, Rita, and Ike.

The editor is grateful to Dr. Susan Barr of Riksantikvaren in Oslo for help with the occasional Norwegian reference, and to Dr. Dennis Noble for pointing him toward the remarkable career of Charles Melville Scammon, which both parallels and diverges from Quentin Walsh's in fascinating ways.

At Penn State Abington College, several independent study students working with the editor over several years worked diligently in the long process of digitizing the report. Because only faint copies survived, it was impossible to use optical character recognition software and thus the nearly 120,000 words of the report had to be copied one at a time. These students were Susan Hulme, Alia Tahvildaran, Autumn Zellers, and Joseph McLaughlin. Without their heroic efforts, the heroic story of Lieutenant Walsh's year with the Norwegian whalers would still be on a bookshelf at Coast Guard Headquarters. Now, it is available on the internet and, soon, in book form.

The editor interviewed Captain Walsh directly on the subject on 7 April 2000. The captain had recently turned 90 years of age, and passed away barely a month later, on 18 May 2000. It was one of Captain Walsh's last goals to see his report published, and now, nearly ten years later, the work stands as a remarkable testament to the diligence and integrity of a determined junior officer under circumstances that can only be described as extreme in every conceivable manner.

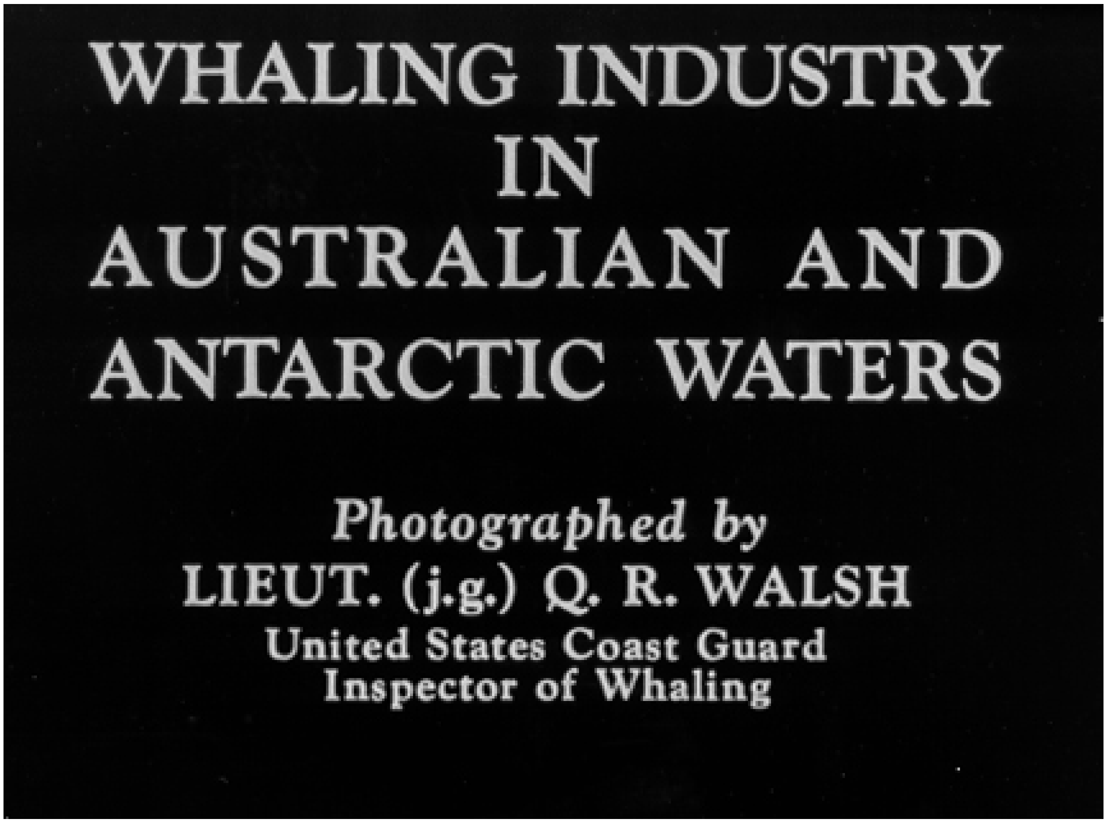


Fig. 1. "Whaling Industry in Australian and Antarctic Waters," Photographed by Lieut. (j.g.) Q.R. Walsh, United States Coast Guard, Inspector of Whaling. "The *Ulysses* Expedition of 1937-1938 was at sea ten months, cruised 30,000 miles, and obtained 191,030 barrels of oil from a kill of 3,600 whales. The *Frango* Expedition of 1938 was at sea seven months, cruised 23,000 miles, and obtained 42,300 barrels of oil from a kill of 950 whales. The Antarctic expeditions for the season 1938-1939 numbered thirty-five floating factories and two shore stations. With whale oil in past seasons worth from $20 to $30 per barrel, modern whaling is indeed a million dollar industry."

Preface: The *Ulysses* Expedition

The expedition was owned (allegedly) and operated by the Western Operating Corporation of Wilmington, Delaware, under United States Whaling License #28. The corporation's headquarters were on Lower Broadway, New York City, at the Isbrandtsen Steamship Company [in 1937, this would have been the Isbrandtsen-Møller Company; it became Isbrandtsen Steamship Company in 1943—ed.] Lord, Day and Lord of New York City were their legal representatives. The enterprise was formed to carry out pelagic [open ocean] operations under the United States Flag and the license was obtained under the pretext of resurrecting whaling in the United States.

This was emphasized to me in April, 1937, when I met with the principals fostering the expedition on this side of the Atlantic in New York City. They suggested I expedite my departure from the United States for Göteborg, Sweden, where a vessel was being converted to a whaling factory ship and was just about ready for a cruise to the Indian Ocean and then to the Ross Sea, Antarctica. I believe it was at this time I learned that the cost of outfitting the expedition was two million dollars.

Sailing from New York on the *Gripsholm*, I arrived in Göteborg on May 11, 1937. It was there that I first went aboard the *Ulysses* at the local ship yard. It was readily apparent that the ship was not ready for sea, being still in dry-dock. Everything to convert the ship from an oil tanker to a whaling factory ship was late in arriving from

Norway. There was no water, living quarters or food facilities. The yard was working 24 hours per day to get the ship out. I had to live ashore in a local hotel.

The master, a Captain Hans Mikkelsen, was a naturalized U.S. citizen of Norwegian ancestry. He never heard of the people in New York, nor did the crew. They thought I was telling them a joke when I stated the ship was going to the Ross Sea after being in Australia.

I soon learned that the people in New York did not know what they were talking about concerning the itinerary of the ship nor its operations even though they claimed they had invested two million dollars. The only name I heard in Sweden controlling the outfitting of *Ulysses* was a person by the name of Anders Jahre. I soon learned he was a whaling tycoon in Sandefjord, Norway, owned several factory ships and practically controlled Norwegian whaling. He was running the show. [Anders A. Jahre (1891-1982) was indeed a Norwegian shipping magnate, a lawyer who founded several companies including the whaling company Kosmos and the whale blubber processing company Jahres Fabrikker A/S. He was both a great patron of the whaling city of Sandefjord and a controversial figure on account of alleged schemes to shield overseas income from Norwegian taxation (See *Aftenposten* 1997)—ed.]

The entire expedition was made up of Norwegians. I was the only native born American. All hands signed on in foreign ports. The situation aroused my suspicions that this was not a United States flag operation.

On May 26, 1937, Jahre ordered the *Ulysses* to sail regardless of her condition, because she was supposes to be on the Australian whaling grounds by June 1937. In my estimation, the ship was not ready for sea. We sailed all right on the 26th of May but tugs had to pull her out of dry-dock. She immediately listed about thirty-five degrees to starboard. Cargo piled high on deck rolled over the side. We just missed several ferries in the harbor. Proceeding precariously, we anchored five miles outside the port. The ship flopped from starboard to port while anchored. We lost all power. I went back to Göteborg.

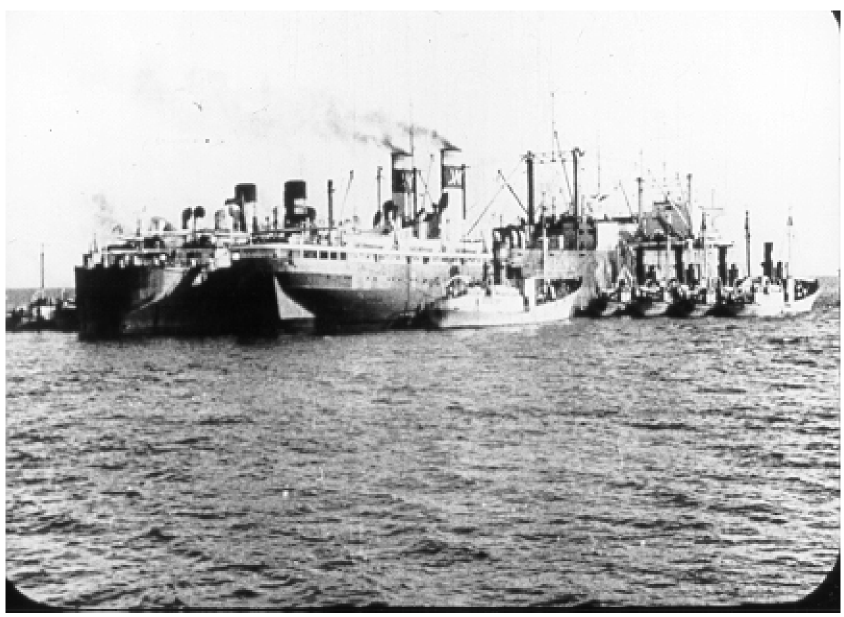


Fig. 2. Whaling factory ships with whale killer boats tied up alongside. "Modern killer boats are steel-hulled vessels, many well over 150 feet in length and powered by powerful steam engines that drive then through the water at speeds around sixteen knots. They are self-sustaining units and carry crews of twelve or more men each. Their one and only function is to kill whales and deliver them to the factory."

The ship itself was forced to return to the shipyard for about two weeks while they added 800 tons of ballast to her starboard quarter to make her seaworthy and stable. After this ballast was added in the stern, we finally sailed for Sandefjord on June 11, 1937.

And what did we find out eventually was behind all this turmoil?! Here it is:

The *Anglo-Nors*k expedition exploited Shark Bay in 1936 without an Australian license. This ship flew the British flag, had a Norwegian crew and was owned by a company in the Falkland Islands. At the conclusion of these operations this expedition crossed the Pacific, hunted sperm whales off Peru and then went to Panama for recreation after laying up her killer boats at the Galapagos Islands. It was intended to send the *Anglo-Norsk* to Shark Bay in 1937 again because Anders Jahre had obtained an Australian license to hunt whales in Australian waters. The license was obtained by a man named Melsom, a Norwegian, who became a naturalized Australian. The *Ulysses* took the place of the *Anglo-Norsk* and went to Shark Bay.

This situation created a difference of opinion between Jahre and Lars Christensen of Sandefjord, Norway, another Norwegian whaling tycoon, who had an interest in a factory ship by the name of *Frango*. Christensen threatened to send one of his modern factory ships to Shark Bay and Jahre retaliated by planning to send one of his huge Kosmos corporation factory ships. Such a course of action would have just about exterminated the whales on the west coast of Australia in one season. [Lars Christensen (1884-1965) engaged in whaling but also significantly in Norwegian exploration of Antarctica, financing a ship and seaplane expedition to the continent in the 1930s. He also helped found the whaling museum in Sandefjord and return to Norway and preserve the famous polar expedition ship *Fram*—ed.]

A compromise was reached between Jahre and Christensen. Jahre would send the *Ulysses* as planned, and Christensen would send the *Frango* but only after Jahre and his associates had agreed to pay Christensen some money for using a smaller factory ship. Thus, the *Ulysses* went to Shark Bay and the *Frango* went north but in Australian coastal waters. This arrangement was made because the *Ulysses* oil could be introduced into the United States duty free (she was under our flag) and a larger profit could be realized than if the *Anglo-Norsk* had gone to Shark Bay for the 1937 season.

The fact that Jahre was running the Western Operating Corporation, became apparent by the way he controlled the *Ulysses* and issued all the orders governing her operations. Anders Jahre was the boss. Therefore, it did not take long to confirm my suspicions that the expedition was a farce under the U.S. flag; that the purpose was to run it as a Norwegian business under the U.S. whaling license in order to dump the oil duty free in the United States.

Fig. 3. The deck of the *Ulysses*. "The *Ulysses* [was] one of the two floating factories registered under the American flag, the other being the *Frango*. The *Ulysses* [was] a 12,395 ton vessel and is 514 feet in length. The *Frango* [was] 6,400 tons, length 401 feet. Floating factories [were] in operation [in the 1930s] of over 30,000 tons. These vessels with their fleet of six or more fast killer boats, explosive harpoons, modern equipment, and great cruising radius are a far cry from the old New Bedford whalers. Some of the larger factory vessels with their capacity of over 2,500 barrels of oil per day capture more in two days than the original floating factories of 1904 were able to carry away with them in an entire season. One modern factory ship can take more whales in one season than the entire American whaling fleet of 1846 which number over 700 vessels."

If this expedition had been run by Americans under the U.S. flag, they would not have had access to the Norwegian whale gunners, the killer boats, nor the factory workers on the *Ulysses* that processed the whales. The Norwegian Whaling Union would not have allowed it.

The gunner's contract was drawn up for the killing of whales according to Norwegian law and not the United States laws. Norwegian law allowed 30 ft. humpbacks to be killed. The United States law allowed only 35 ft. This caused a great deal of confusion before I made them abide by the 35 ft. limit. Jahre and Mikkelsen did not like it but finally agreed to do it and only after Washington backed me up. It was a helluva mess and led to numerous heated discussions between me and Mikkelsen. However, I realized Mikkelsen's position. He had to produce for Jahre or he would have been replaced in short order.

I want to point out at this time that the Norwegians learned their lesson by cooperating with Japan years ago when Japan wanted to start whaling and got the Norwegians to indoctrinate and train them in all aspects of whaling. The Norwegians cooperated fully. Then after several years the Japanese got rid of the Norwegians and ran their own whaling operations. The Norwegians never forgot this double-cross. And this is why the Norwegian Whaling Union made sure that their members worked expeditions controlled from Norway.

I have no animosity towards the Norwegians on the *Ulysses* for what transpired. You could not meet more pleasant, more respectable, finer, hard-working people. My relations were friendly and pleasant with all ship personnel. Most of the Norwegians could speak some English. I learned from frequent and long conversations with them that most appeared to be home-loving people who missed their families. They go to sea because they have to make a living. Norway has a long coastline. A large part of the country is above the Arctic Circle. According to my Norwegian friends, the southern part of the country supports the rest which is barren and bleak. Seafaring becomes one of the few outlets for their economic endeavors.

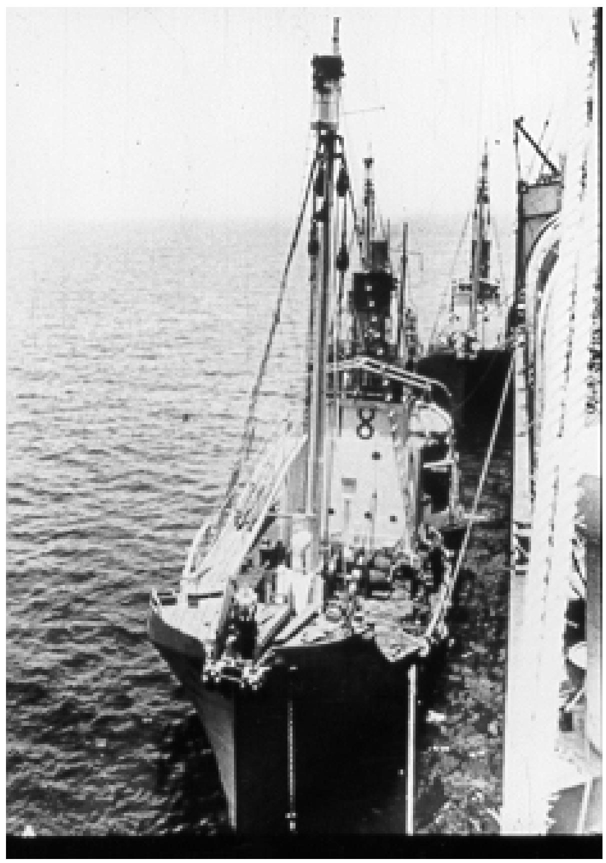


Fig. 4. Whale killer boats alongside a factory ship

However, Mikkelsen and his corporation were out to make money. Walsh was out to enforce the law. When the law conflicted with their pocketbooks, the Norwegians favored their pocketbooks. Being the only inspector aboard, I know they processed illegal whales and threw the meat overboard, instead of boiling it down, when I was not present. When whales were available the ship operated twenty-four hours per day.

The Australian inspector, aboard during the Shark Bay season as required by the Australian license, was a useless individual. In all frankness, he did nothing. He was not aware of the Australian law, even though we were in Australian waters from July 24 to October 8, 1937.

I enjoyed what may be described as an "antagonistic friendly relationship" with all hands. I would deal only with Mikkelsen in solving problems. There were many occasions when we had some heated discussions, to put it mildly. He was told he was responsible to observe the United States whaling laws and would have to answer for it when the ship returned to the United States.

He realized I was going to enforce the law. I think his attitude, on the surface, was to cooperate with me when he had to, while planning to let the owners and their lawyers take care of him when he returned to the United States to face the violations. There were frictional moments but under such circumstance, that had to be expected. Off the whaling grounds Mikkelsen and I socially accepted each other, but guardedly.

I was aboard the *Ulysses* for ten months. We cruised 29,350 miles. I got ashore three times in Carnarvon, Australia. It had a population of about 700 people. While in Simons Town, South Africa, for nine days, I visited Cape Town for five days. While in Walvis Bay for two weeks, I got ashore twice. What a helluva place. There were a few houses built in sand dunes, no trees. Wild dogs were outside the town. It was a port of call for ships connected with whaling.

There were about two hundred white people and eight hundred Hottentots [native black African Khoikhoi; 'Hottentot' is now considered an offensive term—ed.] as residents. Sand storms were frequent. The cold Benguela current flows northward along the coast producing a miserable climate along with the Kalahari Desert to the east which has diamonds in large quantities but is patrolled by Camel Corps law officers [personnel mounted on camels for travel across deserts—ed.]. While in Walvis Bay, about fifty per cent of the crew contracted severe colds and many suffered from influenza. None of the crew was allowed ashore. The town's electric lights were turned on from 5:30 p.m. to 10:00 p.m. daily.

While in Carnarvon, [Western Australia], in August 1937, I visited the Boolathana Sheep Station which had 350,000 acres and sixty thousand sheep. My host was Major Chenery who won the Victoria Cross in WWI. [Ernest Chenery (1892-1958), won not the Victoria but the Military Cross as an artilleryman with the Australian

Imperial Force. He served in the Second World War also, as a transport officer (see Carr, web citation)—ed.]

He challenged me to ride his horses during my visit. I took the challenge and am documented as an Australian cowboy in the local newspaper, *The Northern Times of Carnarvon* dated August 21, 1937, a copy of which is found in my whaling report. I left 14 square inches of my hide on Chenery's saddle. While in Carnarvon, I ate kangaroo meat and drank Australian beer. Both were enjoyable.

From June 12, 1937, upon leaving Sandefjord, Norway, to November 1, 1937, upon arrival Simon's Town, S.A., I was ashore a total of thirty-two hours. This cruise was not a sinecure for Walsh. A Skein, Norway newspaper dated October 30, 1937, published letters from the factory ship's crew, which documented three big fires on the *Ulysses*.

The first occurred by pure negligence in the Bay of Biscay after we left Southampton, England. They had failed to remove the wooden structure over the boilers which had been constructed during the ship's conversion to a factory ship. After we got underway the heat of the boilers set the wood afire. The crew finally got the fire out after about one hour. Captain Mikkelsen told me he was about to send an SOS.

The second fire occurred in the Red Sea when the cork insulator caught fire while they were cutting a large hole in the side of the ship to lower the temperature below decks, which was over 130 degrees. This fire lasted about an hour.

The third fire occurred about 2:00 a.m. on the morning of October 5, 1937, which almost terminated the cruise of the *Ulysses* in a catastrophe. Two cases of powder exploded in the amidships powder magazine on the weather deck of the ship. The explosion sent forty foot flames in the air and set fire to the magazine's interior which contained five tons of black and smokeless powder in one hundred twenty-two cases. Fortunately the magazines' door had not been fully "dogged" [securely closed] and was blown off, allowing one of the crew to pour water into the magazine from a deck hose. This stopped the rest of the powder from exploding, which, if it had occurred, would have blown the *Ulysses* out of the water. The explosion occurred when the smokeless powder broke down because it was stored in high temperature with no ventilation. During this time the temperature was 86 degrees to 120 degrees F. during the day and night.

There was a friendly rivalry between me and the ship's officers concerning our navigational results involving the ship's nautical position. I took sun and star sights daily. The ship's officers took only sun sights. They put more faith in my positions after I plotted twelve miles ahead on making the Chagos Archipelago for the landfall at Diego Garcia, which came at dawn. (I am going to be immodest here with a little bragging. I was the only officer who got a perfect mark on the navigation promotion exam about October 1939.)

Strange as it may seem, the Norwegian master gunner controlled the expedition during the Antarctic season. He gave the orders for positioning the factory ship, deployed the killer boats and determined how many whales should be taken daily. This situation arose because he was considered the leader from his previous excellent performance on other expeditions.

I want to point out at this time that, in my opinion, Norwegian whaling in 1937-1938 was to Norway what the auto industry was to this country. In my opinion, it was the backbone of their economic life. It was therefore with reluctance that I predicted its decline in 1938 and stated it would eventually disappear. And it did.

When my suspicions were confirmed that the legal operations of the ship were questionable, I notified Coast Guard Headquarters in Washington via the code I had with me. Lt. Comdr. Merlin O'Neill (later Commandant) had a purview of the situation from Headquarters. All hell broke loose in Washington. Congress, the State Department, and Customs became involved along with Congressman [Schuyler O.] Bland of Virginia [Bland (1872-1950), was a Chairman of the Committee on Merchant Marine and Fisheries during his time in Congress]. He was interested in the cotton seed and fish oil interests.

In the end, some of the whale oil being transported from the *Ulysses* to the United States via tankers was not allowed to enter until a bond covering the value of the cargo was posted by the corporation. The State Department and the Federal Court in

Norfolk, Virginia, were involved eventually with the legal aspects. Illegal whales had been killed and navigation laws of the U.S. had been broken. The Western Operating Corporation eventually had to pay a fine for short whales killed in violation of the law. Regardless, the corporation made a two million dollar net profit on their investment in 1937-1938.

* * *

When I was assigned to this duty, Lt. Comdr. O'Neill, who was number two man in Operations at Headquarters under Commander Derby, directed that I not only enforce the whaling laws but I was to make a detailed report to reflect all aspects of pelagic whaling. O'Neill stated the Coast Guard and the government did not know anything about such operations. They had to be indoctrinated. This report is the result of O'Neill's request.

Because of these experiences, in 1939 I became one of three delegates appointed by the State Department to attend the International Whaling Conference, July 17-20, 1939, in London, England. The other delegates were Lieutenant Commander Alfred C. Richmond, USCG (later Commandant) and Herschell V. Johnson, counselor, American Embassy, London, England. It was at this time I sowed the seeds that eventually led to the demise of pelagic whaling under the United States flag. Because the *Ulysses* made two more trips, but she did not make "two seasons" on either of these voyages.

By "two seasons" I mean that the *Ulysses* would go to the Indian Ocean, then proceed and outfit in a foreign port for the Antarctic without returning to a United States port. Then she would come to the United States at the end of the Antarctic season. This arrangement saved money in travel time, simplified the signing on of personnel for the expedition, all of whom were Norwegian. Also, it prevented trouble with United States navigation laws and the Norwegian Whaling Unions.

A "one season" arrangement allowed the ship to go to either the Indian Ocean or the Antarctic from the United States; then she had to return to the United States. She could not go to the Indian Ocean and then to the Antarctic as she did when I was aboard. In short, the company running the expedition could not make as large a profit. Financial profits were the governing factor, and not the preservation of the whales.

There is no doubt the whales were becoming scarce. Between 1937 and 1939, Norwegian, German, British, Japanese and Russian expeditions were slaughtering them by the thousands each season in the Ross and Weddell seas. Eventually, the expeditions resorted to the use of airplanes and sonar to locate whales. If the *Ulysses* was capable of producing more fresh water during 1937-38, we could have killed another five hundred to a thousand whales. These were mainly baleen whales. We only took a few sperm whales to use as fenders while loading or unloading the killer boats, etc. alongside.

I was aboard the *Ulysses* for ten months. We cruised 29,950 miles and killed 3,665 whales. While in Shark Bay, I visited Carnarvon, Australia three times and stayed ashore only one night. While the ship was in Simons Town, South Africa for nine days, I visited Cape Town for five days. The ship was in Walvis Bay, South West Africa, for two weeks. I got ashore twice.

The Antarctic season ended March 16, 1938. The *Ulysses* factory workers were transferred to other Norwegian factory ships in the area for the voyage to Norway, accompanied by our killer boats which we had fueled and provisioned prior to their departure.

The *Ulysses* had departed Cape Town December 1, 1937, for the Weddell Sea and left there March 16, 1938. We proceeded directly to New York and did not see land until we sighted Sandy Hook, New Jersey, on April 11, 1938. Thus, we were 132 days at sea and never saw land. This might be some kind of a record for a Coast Guard officer to be at sea without making a landfall or entering a port for 132 days.

* * *

After only four months aboard the *Ulysses* off Australia, I learned that my assignment to the expedition was to be classified as "special duty" and not "sea duty." I got word to Headquarters that if any of those gold-bedecked bastards did not think I was on sea duty, then I wanted those sons of bitches to try and walk ashore. I learned later the letter was received with a great deal of humor and hilarity. It was duplicated and circulated widely. I was told that a copy of it got to the Academy where it was read by one of the instructors to his cadet classes.

Anyway, I got credit for sea duty. Headquarters assigned me to the Academy on temporary duty for three weeks to write this report. Fort Trumbull base was to furnish a chief yeoman for dictation, typing and duplication. They called every day to find out when they were going to get their man back.

I look back on this assignment with a great deal of satisfaction and a feeling of accomplishment. In the long haul, I was instrumental in stopping pelagic whaling under the U.S. flag. Pelagic whaling stopped when it was no longer commercially profitable. Eventually this helped to save some of the baleen whales from extinction.

Section 1: A Brief History of American Whaling

Part 1: Whales and whaling

To discuss the subject of whales and whaling without including the history of early American whaling would omit an epoch in our country's history. The men who chose to earn a living by spending years away from their home ports, thrusting harpoons into whales at arm's length away, left behind a proud and enduring American legend.

American Indians were the first whalers on our shores, not the settlers from England and Europe. As early as 1650, inhabitants of Nantucket, Martha's Vineyard, and New Bedford, Massachusetts, hired Indians to kill whales for them. Eventually, these citizens replaced the Indians, designed and built better boats, and attached a rope to the harpoon that was secured in the boat after being embedded in the whale.

The earliest organized whaling operations in our country were based on land. Lookouts spotted the whales and gave the alarm; whalers ran down to the shore, launched their boats, gave chase and, if successful, the dead whale was dragged to the shore. Blubber was stripped from the carcass, placed in iron pots and boiled down for oil.

It was not long before these Yankee sailors changed the industry from one of attacking nearby off-shore whales to the worldwide cruising of whaling vessels.

Now, what is a whale—the mammal that caused an industry to flourish for about two centuries in our country? One thing is certain. Sighting a whale is not easy. It requires an attentive, patient lookout to make a scrutinizing search of the ocean surface.

Though possessed of modified body activities, a whale is like a cow or a dog. Its ancestors were terrestrial animals with four legs that went to sea millions of years ago. Hair is present in most whales in the form of bristles on the snout. They also have lice and parasite worms. I kept some whale lice in a match box but eventually lost them.

All whales belong to the order *Cetacea*. *Cetacea* pertains to the animals of the whale class. There are two sub-orders:

1. The whalebone whales (*Mystacoceti*)

and,

2. The toothed whales (*Odontoceti*)

Whalebone whales are composed of seven genera which means they are a sort of species having distinctive characteristics in common. At this point let us be sure we understand what we mean by the expression 'whalebone.' Whalebone is a comb-like mass of horny plates hanging from the upper jaw. It is also known as "baleen." It is not the bone forming the skeleton.

The whale is the largest creature our planet has known, with the exception of the dinosaurs. Whales are huge, warm-blooded mammals: they are born alive, suckle their young with milk, have a fishlike body and horizontal caudal fin (tail). The forelimbs are reduced to side fins called the pectoral fin (fingers, arm bones, etc. are buried in the flesh); hind limbs are not externally visible (they are buried in the posterior under-part of the body and look like two small ham bones. There is a thick layer of blubber (fat) beneath the skin (to keep heat in the body), and the eyes are a little larger than a baseball (two of them were my gift to the Mystic Seaport in Mystic, Connecticut). They have small ears, located adjacent to the eyes (just big enough to hold a pencil); they breathe by lungs and have a peculiar breathing apparatus for inhaling and exhaling, located near the top of their head. The bowhead, right and gray whales do not have dorsal fins.

According to the Norwegians that I sailed with, the biggest whale ever killed and measured was a 110 ft. blue whale, killed and processed at a whaling station in South Georgia about 1920. The *Ulysses* expedition killed a 98-foot pregnant female blue whale. (I actually measured this whale so can verify its length.) It produced about 150 barrels of oil.

A blue whale fetus before it was born was 17 ft. long and weighed 2,443 lbs. These are actual measurements I made. From these measurements it may be stated that a blue whale when born could be 20 or 25 ft. long and weigh approximately two tons. One scientist has estimated that a blue whale calf grows about eight and a half pounds per hour while suckling gallons of fat, rich milk each day, during an estimated six-month nursing period. It is further estimated that mature whales can weigh a ton or more per foot. A full-grown whale consumes tons of food each day and its natural habitat, the ocean, sustains its tremendous size without any physical effort except to swim and breathe.

Many people have asked me how long a whale lives. I do not know. I question if age can be determined with any accuracy. However, there is a theory that allows an estimate to be made of the lifespan of baleen whales by measuring layers of wax in the ear canal. These layers are thought to be deposited in different colored streaks of wax which taken together represent a year's growth. This theory resembles the tree ring theory for determining the age of trees. Unless harpooned or killed by natural means or disease, I would state whales live a lifespan comparable to man.

Now, let's look at what we call whalebone whales. As I have stated before, these whales have horny plates with hairy fringes in the upper jaw in place of teeth. They eat minute animals resembling shrimp which float in thick masses on the ocean surface during the Arctic and Antarctic summer. This food is called krill or britt. I have stood knee-deep in krill in the stomach cavity of a whale being cut-up on the factory ship.

When feeding, the whale swims with its mouth open to take in huge quantities of water and krill. When the mouth cavity is filled, the jaws close and the water is allowed to drain out by the upward movement of the huge tongue in the buccal cavity. The hairy fringes on the whalebone act as a sieve and retain the krill until it can be swallowed. Whalebone was used for making stays, corsets, riding and carriage whips, umbrella handles and other objects requiring both strength and flexibility.

Baleen whales inhale and exhale through two nostrils, or blow holes, which resemble large slits on top of the head. The whale's internal body temperature is high and constant. The hot air when exhaled from the lungs therefore condenses in the atmosphere (like a human's breath on a cold day) as an umbrella-shaped spout which can be seen for miles in calm seas and clear weather. The height and size of the spout depends on the length of time the whale has been below the surface and also on the size and kind of whale.

For purposes of this discussion we are going to consider only seven species of whalebone whales. These whales were commercially hunted for the products that could be derived from them.

Here they are:

Species	Adult Length
Blue	80′ – 98′
Fin	70′ – 79′
Sei	45′ – 55′ (Baleen yellow on one side)
Humpbacks	40′ – 55′
Right	50′ – 55′
Bowhead	50′ – 65′
Gray	40′ – 45′

American whalers generally sought the right, bowhead and sperm because they floated when killed. Occasionally they killed humpback and gray whales. They could not cope with the blue, sei, and fin because they sank when killed and were just too big and cumbersome to handle.

The gray whale, if sought and hunted, was generally killed in the shallow waters of the lower California coast lagoons. This whale is only found in the ocean trough from Japan to California and along our West Coast. Protected for years, it is becoming quite numerous.

The sperm whale, also known as the cachalot, was the one most desired by American whalers. It averaged about 50′, occasionally reached 65′, and produced about 50 barrels of oil. There are 40 to 50 obvious teeth in the lower jaw which fit into the upper jaw. This whale's head is so huge that it appears to be all head, being about one third of its total length. It eats squid and cuttlefish.

This whale produced sperm oil, found in a pure state in its head and of such high quality it required little or no refining before being used for illumination and lubricating purposes. Sperm oil produced wax. Spermaceti, a spongy fatty substance, inodorous and nearly tasteless was extricated from the oily matter of the head and was used to make the finest grades of candles.

It was the sperm whale that produced ambergris, an opaque, ash-colored matter found in rare instances in the intestines of diseased whales. It was believed to be the result of cuttlefish beaks being caught in the whale's intestines. It was used particularly in the making of perfume because it had the property of uniting thoroughly and permanently all the other ingredients. It was also in demand in some oriental countries as an aphrodisiac. It was very valuable owing to its rarity. Only about a ton of it was found by the whole American whaling fleet from 1840 to 1880. It may be identified because it is soluble in alcohol.

It should be noted that the sperm whale exhales at a forty-five degree angle via a single blow hole at the forward part of its head. It resembles more of a forward puff than the umbrella shaped blast produced by the whalebone whales.

Part 2: The Whaling ships

Whaling ships were the ugliest vessels ever built in America. They were as chunky as a loaf of bread. Merchant sailors derided them, stating that they were built by the mile and purchased by the foot if you really wanted to buy one.   However, even though broad beamed and squat, they were suited for the job. They were not built for speed; all they had to do was stay afloat. They were so stoutly built that many cruised the oceans of the world for over fifty years.

They were usually bark rigged, about 110’ long, 25 to 30 feet wide and 20 feet deep; were 200 to 500 tons and carried a crew of about thirty men. They were constructed to carry a large cargo of whale oil, equipment, supplies and food for long voyages.

By bark-rigged we mean a vessel with three masts, which were called fore, main and mizzen, with square sails on the fore and main mast and fore and aft sails on the mizzen. Whaling ships carried four whaleboats, swung in davits on both sides of the vessel. These whaleboats were about thirty feet long, strong but light and shaped to a sharp point at each end for rowing, sailing or paddling. They carried a small mast and sail and a long steering oar which allowed for fast, easy control. A boat crew had six men made up of a boat steerer, who hurled the harpoon and the ship’s mate who handled the steering oar while directing the chase. A boat’s equipment consisted of harpoons, lances, oars, paddles, emergency rations, a compass and two tubs of whale line, one end of which was secured to the harpoon. Four men could row one of these boats at about ten miles per hour.

One important point to remember here is that the old type of harpoon was not used to kill the whale. It was used to attach the whaleboat to the whale after it was imbedded in the animal. After the whale was harpooned it was killed by repeated jabs of a lance by the mate who tried, as soon as possible, to strike some vital organ of the stricken animal as it tried to escape. When harpooned the whale sounded and pulled the boat by the line attached to the harpoon. This was known as a “Nantucket sleigh ride.”

The crew of a whaling ship lived under deplorable conditions. They were housed in a forward section of the ship in a compartment which followed the blunt curves of the bow. It was about thirty feet long. Tough bunks in double tiers were along the hull. The only ventilation was a small hatch overhead to the deck.

Men stood deck watches to handle the sails, two hour wheel watches, and look-out watches of two hours from dawn to dusk at the mast head where on a clear day and calm sea a whale spout could be seen for up to six miles or more.

When the crew was alerted by the lookout’s cry of “Thar she blows,” the captain took charge by directing how the sails were to be handled to maneuver the vessel, followed by orders to lower the boats, and the chase was on.

When one or more whales were killed, the crew worked almost around the clock flensing the whale to remove the blubber from the carcass, then rendering the blubber down in the fired-up try works erected on deck for boiling out the oil. The oil was then cooled and later stowed below in casks. Old time whalers flensed and cut-up the carcass while it was in the water alongside the ship, standing on staging made of planks that formed a platform on the side of the ship. Old time whalers took only the blubber and whalebone from whalebone whales. The carcass was cast adrift.

Part 3: The whaling industry

American whaling was a thriving industry from 1800 to 1860. The peak period may be considered to be 1840 to 1846, when 750 whalers sailed the oceans of the world and 20,000 men and $20,000,000 in capital was involved. From 1800 to 1860 about 293,000 whales were killed, of which 162,000 (55%) were sperm and the rest can be considered to be right, bowhead, gray and humpbacks.

Sperm oil brought $2.00 per gallon (about $55.00 in 2007 dollars) while baleen whale oil was half this price. The great whaling ports were Nantucket, New Bedford, New London, Sag Harbor and Fair Haven. There were a few ports on the West Coast after the Civil War.

From 1850 to 1900 over 700 American Whalers disappeared. What became of them? The industry declined for various reasons, these being: the Civil War; petroleum; financial investments ashore; losses in the Arctic; and the decline in character and efficiency of the whaling crews available to man the vessels.

Let's look at the Civil War.

The Federal government purchased scores of whalers, and filled them with stone to block southern ports like Savannah and Charleston. The Confederate cruisers *Alabama* and *Shenandoah* sank scores of whalers in the Atlantic and even in the Arctic from 1861 to 1865. Many owners transferred their ships to foreign flags or ownership.

Efforts to revive whaling in the Arctic after the Civil War met with disaster in 1876 and 1888 when ships were lost or abandoned due to ice conditions or Arctic gales.

Whaling decline came at a time when amassing wealth on land was unsurpassed because of hectic exploitation of natural resources in this country after the Civil War. Even New England capital, far from the prairies and mines of the West, was invested in cotton mills in place of harpoons and whaling vessels.

The discovery of oil in Pennsylvania in about 1859 was the most potent single cause of whaling decay. Natural gas for illumination purposes supplanted whaling illuminate, and petroleum products replaced whale oil as a lubricant.

The origin of the crews of whaling vessels also began to change in the nineteenth century. At first they were mostly Yankees, mostly from the same ports and many from the same families. But with the passage of time, capital was not the only loss. More and more intelligent and ambitious young men of character and ability refused to go the sea even in New England. This drift from the sea began about 1845 by Americans who were lured by the gold of California and industrial expansion following the Civil War. Their places were filled by criminal, adventurers and outcasts from the merchant services of the Old and New World. Ignorance, incompetence and general insufficiency resulted.

It is too much to say that personnel was the main cause of decline in whaling but the presence of adverse characters added nothing to the effectiveness of an industry that was struggling for survival. It confirmed what was apparent throughout the last quarter of the nineteenth century: American whaling was doomed.

In 1906, sixty years after New England reached its peak of 735 vessels; only forty-two remained afloat. Another decade of disintegration and decay continued and only one whale ship remained. This was the *Charles W. Morgan*, the sole survivor of a fleet which once sailed every ocean. This vessel has been restored and preserved as an exhibit at Mystic Seaport. Built in 1841, the *Morgan* was tied up for good in 1921 after eighty sea-going years. This vessel should be visited to visualize the experience of life aboard an American whaling ship.

Also, we should remember American whaling was the foundation of that masterpiece of prose composition—Herman Melville's immortal *Moby-Dick*. All should read it. And if you think modern whaling was devoid of dangers and near catastrophe, follow me in this volume as we sail on the *Ulysses* expedition of 1937-1938.

Part 4: Earnings of whalers

The whaler was not paid by the day, week, or month. His earnings, known as the "lay," were a fractional share of the total net proceeds of a voyage. The captain, master, boat-steerers and carpenters received "short lays" varying from 1/8 to 1/100 of the net proceeds. The remainder of the crew received "long lays" which varied from 1/160 to 1/250 of the net proceeds. As a general statement, owners got about seventy percent of the net income of the industry and the officers and men got thirty percent. Captains made out better also because they were allowed to run a bartering business in foreign ports of call from their personal investments. In other words, the captain could stash merchandise of his own on his vessel and sell it at exorbitant prices to natives at the ports visited by the vessel to restock water, food and supplies.

The small percent of the voyage net proceeds received by the whalers by no means represented actual cash received. This was reduced in order to pay for numerous personal charges from the ship's so-called slop chest where tobacco, clothing, and so forth, could be purchased during the voyage at exorbitant prices, the profits of which went to the owners. It was not unusual for a prosperous voyage to pay a whaler only about $200 (about $5000 in 2007 dollars).

The most troublesome aspect of the whaling industry was the risk involved. No other industry was subject to financial returns which ranged from ruinous losses to fabulous gains. The owner was a dealer in risk involving the crew, the vessel, and the whale oil market when it came time to sell the products accrued from the voyage. In balance, the risk was against the owner. Everything was uncertain until the end of the voyage when the vessel returned to her home port. Communications between owners and their vessels was practically non-existent and under the best of circumstances were infrequent letters received and sent in far away places.

It is estimated that about ten percent of all voyages represented a net loss to the owner. Consequently, it was common practice to divide the ownership of a vessel among a relatively small group of investors. The single owner could seldom afford the cost of a vessel, equipment and supplies. Spreading risk also applied to insurance.

Let's think of the industry as producing huge profits or ruinous losses.

The owners provided and paid for three meals per day at a cost of about thirty cents per day per man. The daily menu consisted mainly of salt beef or salt pork and hard bread or duff. The officers had about the same but occasionally got soft bread.

Part 5: Scrimshaw

What was scrimshaw? American whaling cannot be discussed without referring to it. Scrimshaw was produced by crew members carving ingenious devices by use of a jackknife out of whalebone or etching designs on a sperm whale's tooth. These carvings were the first American folk art to be collected and good examples found today are both scarce and expensive. Mystic Seaport has a fabulous display. I have a sperm tooth with the name of a ship on it, and the name of the carver, with the date 1873.

Whalebone was used to produce baskets, bird cages and sewing boxes. For examples, visit Mystic Seaport. Scrimshaw was produced generally as presents for loved ones at home.

In 1938, when I returned from the *Ulysses* expedition, I gave the Commandant of the Coast Guard a whale's eye and two sperm whale teeth. He had them mounted on a piece of wood about a foot long with the whale's eye in the center of the two vertically mounted teeth. He presented this to the Secretary of the Treasury as a gift and I saw it in the Main Treasury Building in Washington, D.C., when I was there in 1958.

When the Coast Guard was transferred to the Department of Transportation [in April 1967], I wrote to the Secretary of the Treasury and asked him to send this museum piece to the Coast Guard Academy at New London, Connecticut. After several years of correspondence the Treasury Department had to admit this object had disappeared and could not be found; apparently misplaced or stolen. Any maritime museum would consider this of great value. Where can you find a mounted whale's eye and two sperm whale teeth today in this country?

Part 6: Hazards of whaling

There is a multitude of whaling anecdotes too numerous to recount of occupational disasters and adversity which include mutinies, boats stove by harpooned whales, vessels rammed and sunk by infuriated whales and the loss of all hands when ships foundered in storms or on uncharted reefs.

Voyages to the luxurious South Seas, the voluptuous Orient and the barren waste of the Arctic and Antarctic took their toll against life, health and character. However, it is believed few things can compete with the intensity of the excitement and the accomplishment which comes with the pursuit and capture of the world's largest animal.

Part 7: Modern whaling (1864 – 1938)

We have told you of the rise and fall of the whaling industry in the United States; that the apex of American Whaling come in 1840-1850; that in 1846 the industry was valued at $20,000,000 [over half a billion in 2007 dollars] and employed 20,000 people and that by 1886 we saw the ghost of a fleet that at one time comprised 735 vessels and sailed the seas from Point Barrow to Patagonia and from New Bedford to Japan. That by 1906 American whaling had just about disappeared and only a few vessels remained, which then succumbed to disintegration and decay, with only the *Charles E. Morgan* preserved in Mystic, Connecticut.

While American whaling was disintegrating and disappearing the industry was being developed in Europe. Perhaps the greatest factor contributing to the European establishment was the invention of the whale gun by [the Norwegian] Svend Foyn [1809-1894] in 1864. Late developments are more improved in detail, enlargement and expansion; their introduction depends on, and evolves around Foyn's accomplishment.

Fig. 5. A whale killer operating in rough seas.

The Norwegians commenced active and extensive operations with the introduction of the whale gun. The coast of Norway and northern latitudes were hunted with such alacrity and enthusiasm that the whale stock was noticeably depleted and the whalers came in conflict with the fishermen on the coast; the fishermen accused the whalers of ruining the fisheries. The Norwegian government therefore banned further whaling operations along its coast or territorial waters. The industry was then forced to seek new whaling grounds. As a result, shore stations rapidly appeared in all sections of the world where whales were found but, due to the fact that whales are easily exterminated, and migrate if actively hunted, the success of the various locations in the tropics and temperate latitudes was soon negligible. It was necessary therefore to seek whales elsewhere.

Based on reports from exploring expeditions in the Antarctic, [Norwegian] C. A. Larsen [1860-1924] and others sought and found large numbers of whales in the high southern latitudes. Shore stations were founded at South Georgia, the South Shetlands, and other islands of the far south. As a result, in a quarter of a century over two hundred thousand whales were killed and perhaps three hundred thousand exterminated, if gestating females were considered. This slaughter occurred in the southern latitudes alone. Such extensive operations resulted in the depletion of the whale stock in the vicinity of the shore stations.

This condition produced modern pelagic [open ocean] whaling by factory ships, about 1920, and operations were carried out as far south as seventy five degrees latitude, almost in sight of the bases for the exploration of Antarctica. Here in the Antarctic appeared scores or more of floating factories, ranging from ten thousand to thirty-five thousand tons, sweeping the ice strewn waters for whales between fifty-five degrees south latitude and Antarctica, each factory ship accompanied by five to nine killer boats.

Fig. 6. A whale killer operating in the ice. Once a whale was killed a flag was driven into it. "The whale is cast adrift [with its flag stocking out of it] while the killer boat continues the hunt. The whale will be picked up later."

The areas over which these expeditions moved were devastated by every method and ingenuity that modern scientists could invent and install for the purpose of killing the animals rapidly and hastening the processing systems of the carcass to derive the oil.

Now, let's take a look at this whale gun invented by Foyn, the harpoon that it shoots, the killer boat upon which it was mounted, and the factory ship that processed the results of this invention.

Part 8: The Whale Gun

The whale gun can best be described by stating how it is loaded and fired.

We will discuss the muzzle loading gun which was widely used although the breech loading type was also employed.

Two men loaded the gun. One hundred ninety to two hundred grains of smokeless powder was used for the propelling charge, depending on the wishes of the gunner.

The charge is introduced via the muzzle in a small bag, then a twelve inch wad of cardboard, or any compressed paper that will burn, is inserted. Sometimes the powder is contained in a fastening of paper wadding by means of an elastic arrangement.

A wooden plug is then inserted between the powder and the harpoon, the plug being hammered in tight with a wooden rammer. The harpoon is slid into the gun via the muzzle and brought up just tight against the plug; it is an easy fit.

A detonating fuse is screwed into the nose of the harpoon before the grenade is screwed on the head. It is this fuse that shatters the grenade three seconds after the harpoon leaves the gun. Prior to the securing of the grenade to the harpoon head, approximately one pound of black powder is dumped into its hollow interior.

After the harpoon is placed in the bore, a four inch forerunner line is spliced to a wire traveler that moves in the aperture formed by the double shaft of the harpoon.

Fig. 7. “Eight killer boats and one factory ship constitute the whaling fleet. Each killer boat mounts a gun like this one, ready to shoot a harpoon into the target.” “This 3.5” cannon fires a harpoon six feet in length and weighing between 100 and 200 pounds. The harpoon is pointed with a hollow cast iron bomb which is filled with black blasting powder. This bomb is exploded in the whale’s vitals by a time fuse that ignites the powder three seconds after the harpoon has left the gun. The harpoon line coiled on the pan [at the bow] is connected to 1,000 or more fathoms of heavier manila hawser in the forward hold.”

A piece of small thread is passed around the barbs of the harpoon to keep them in place and a small bight of the same material is passed around the front sight of the gun to keep the projectile from working loose in the bore while the killer boat rolls and pitches in a seaway.

The same procedure and equipment is used in a breech loading gun except the smokeless power, wad, etc. are in a brass cartridge which is inserted in the breech by manipulating a sliding wedge system of breech lock.

Part 9: The Harpoon

Now let's look at the modern harpoon, which is a massive projectile. I presented one of these to the Museum of Natural History in Washington, D.C. as a gift to show my appreciation to Dr. Remington Kellogg [1892-1969], with whom I consulted during the *Ulysses* expedition. [Kellogg was at the time an assistant curator at the Smithsonian Institution—he became director in 1958—and a noted expert on cetaceans—ed.] I also gave him the head of a right whale and the jaws of a killer whale. These gifts will be discussed later.

The harpoon weighs approximately one hundred and fifty pounds; it is five feet long from the posterior end to the threads on the head by which the grenade is attached and is so constructed that for three feet of its length it forms a double shaft. It has a four inch solid base, three and one-half inches in diameter. The forward end of the shaft terminates in an eyelet by which the head is secured; the head has an oval on the after end of it that fits into the eyelet; this method of articulation prevents the head from moving on the shaft until after the harpoon enters the body of the whale.

Fig. 8. "One of the killer ships brings in a whale and ties the carcass with others at the factory ship anchored in the Antarctic… The struggling whale is relentlessly worked close to the bow and finished with a killer harpoon. The vitality of these huge animals is amazing and it is often necessary to fire three or more harpoons into them before they are finally dispatched."

The head of the harpoon is ten inches long. It has a hollow threaded projection two inches long on its anterior end for holding the fuse and by which the grenade is screwed on. It is also equipped with four prongs, 13.6" in length, which have 3.2" barbs on the ends of them. The prongs are attached to the head by means of hinges. They are tied back and parallel to the shaft with a small cord which is passed around the tips of the barbs. After the harpoon enters the whale and a strain is exerted on the harpoon line, this cord is broken, the prongs open up and the harpoon is prevented from drawing out.

The harpoon grenade is a hollow, pointed, cast iron bomb, 15" long with a 4.5" diameter at the base. It weighs fourteen pounds. A threaded section is inserted in the aperture of the base. One pound of black powder, in a small bag, is inserted within this bomb prior to screwing it on the harpoon head.

A fuse is screwed into the hollow cavity of the threaded projection on the forward end of the harpoon for detonating the grenade. This fuse functions in such a manner that it sets off the black powder of the grenade three seconds after the harpoon is fired from the gun. The grenade is thus fragmented within the body of the whale with devastating results.

Part 10: The Killer Boats

After the whale gun and harpoon were invented they had to build a boat upon which to mount the gun. Boats equipped with a whale gun are known as killer boats.

Killer boats employed by expeditions are between one hundred sixty and one hundred eighty feet in length with a sixteen to twenty foot beam. They vary from one hundred sixty to two hundred tons with a speed of eleven to sixteen knots and a cruising radius of three to five thousand miles. Original cost, about 1936, would be around two hundred thousand dollars [about three million dollars in 2007].

The killer boat has an extreme sheer forward that gives the forecastle an extreme angle; the bow is high, sharp and possesses great flare. The gun platform is mounted on the extreme summit of the bow which is reinforced to prevent vibration and thus allows more accurate shooting. This high bow allows a gunner to shoot down and also to obtain greater distance.

The freeboard aft is extremely low; in fact, this part of the vessel is almost always awash even in a slight sea. They have a cruiser stern and are so constructed that the propeller is exceptionally deep in the water and seldom comes out. This is important. These boats can ride any kind of a sea—it is merely a case of how much the crew can endure. Anyone who sails one of these through the "Roaring Forties" can go to sea in anything.

These vessels are oil burners, with a reciprocating drive and are generally equipped with fire tube boilers which are generally less trouble that a water tube boiler.

The killer boats accompany the factory ship to and from the whaling grounds, remaining in sight. The factory ship fuels and provisions them as necessary. They carry a crew varying from 12 to 16 men consisting of a gunner, mate, chief engineer, cook and mess boy; the remainder makes up the deck and engineer's force.

In the majority of cases the gunners do not possess a mate's license in any form but are in command of the vessel. The majority never know where they are, cannot use a sextant and, if they do, the results are worthless for even practical purposes. All navigation is carried on by radio with each boat equipped with a radio phone and key set but the phone is used practically all the time.

Each boat does have a radio direction finder. The navigation system generally used is to run by dead reckoning until a whale is sighted. After the chase, if successful, a killer boat calls the factory ship for a radio bearing, runs it down and makes contact. A loud speaker is installed on the bridge of the boats which allows all boats to listen to the conversation between the factory and her killer boats, between the killer boats themselves, and for instruction from the factory ship.

Crews of killer boats are selected generally on a personal basis by the gunners so they work together as a team season after season. Family relationships are important here. The mate is the one who actually does the work on a killer boat. The gunner kills the whale and then walks off. It is up to the mate to secure the carcass, contact the factory ship, deliver the whale, and so forth. The mate is generally an apprentice gunner and in most cases is a blood relative of the gunner or has some other influence which will eventually make him a gunner. It is a closed shop deal. Blood relatives and family relationships count.

In the Antarctic each killer boat carried about one mile of harpoon line which consisted of one seventy fathom shot of 4.5″ line, one one-hundred twenty fathom shot of 6″ line and six one hundred twenty fathom shots of 7.5″ line. The lines used for humpbacks in Shark Bay were of 5″ and 6″ line because these were smaller whales. Bigger whales required heavier gear on both killer boats and factory ships.

The diagram (App. 3.1) illustrates the general outline of a killer boat and we will try to describe briefly the special tackle and rigging used to eliminate the strain resulting from the harpooning and killing of a whale.

The bins containing the harpoon lines are located below deck in the forward part of the vessel. The 6″ and 7″ lines are carefully flaked down [laid in loose coils to prevent tangles—ed.] in bins. The 4″ forerunner line is coiled down on the ready tray which is located on the bow, below and forward of the gun. The harpoon line is brought from the bin through a hole in the deck, passed about four times around a drum on the deck winch, then taken up through the accumulator block, and down underneath the gun platform where it is spliced to the forerunner line which is then attached to the harpoon shaft by means of a wire runner. The harpoon line thus functions as a gantline [a rope passed through an overhead pulley—ed.] through the accumulator block.

Each killer boat has a large set of springs, generally sixty-four, located in the forward hold and firmly attached to the hull of the vessel. A wire cable has one of its ends attached to the springs and the other end to the accumulator block, after it passes through a stationary block, which is located just below the crow's nest on the foremast. The result is that when a strain is placed on the harpoon line the accumulator moves up and down, parallel to the mast, and compresses the springs via the wire cable. The springs are arranged in eight parallel rows, each row containing eight springs. As one row is compressed, the stress is transmitted to the next by means of a cable. When the harpoon line becomes slack, the accumulator moves up and the strain is removed from the springs. It is by this arrangement that most of the strain is removed from the harpoon line and the killer boat and, if any strain is sustained, it is introduced gradually.

Part 11: The Factory Ship

The *Ulysses* was converted to a whaling factory ship by building a 14 foot superstructure on the hull of an oil tanker to provide the necessary space to install the equipment necessary to extract the oil from the whale carcasses. With a length of 536 ft., a beam of 65 ft., and a 3,000 horsepower propulsion plant, she could make about 16 knots and house a crew of 300 men.

Fig. 9. "The dead whales are inflated with air, the flukes secured alongside the bow and trimmed, and the tow back to the factory ship started."

A ramp was built in the open stern which allowed the dead whales to be pulled aboard by a wire hawser attached to a large hook which grasped the tail. On the flensing deck the blubber was stripped off by using wire hawsers, toggles and men using sharp, two feet long, curved knives with eight foot handles. These were called flensing knives. The stripped blubber was cut into chunks before being put in deck openings to the factory system below, where it was boiled down with water to extract the oil. The baleen was extracted from the mouth and thrown overboard.

With the blubber removed, the carcass was hauled to the cutting deck by a wire hawser attached to a winch where men dismembered it with flensing knives, wire hawsers, toggles and steam saws. The chunks of meat and bone were put in deck openings leading to large revolving drums where it was boiled down with water for about eight hours to extract the oil.

Fig. 10. "These whales, moored astern before being drawn aboard the factory ship, total plenty of tonnage—and also attract plenty of birds."

A ninety foot whale could be flensed and cut-up in about ninety minutes. All parts of the whale were processed for oil except the baleen. After the blubber, meat and bone was boiled down, the equipment was stopped and allowed to stand to allow the water and oil to separate. The oil, forming on top, was drained off to storage tanks. The water and residue was blown overboard. It looked like sawdust.

Fig. 11. A whale is dragged up the slipway and onto the cutting (flensing) deck of the Ulysses.

The three hundred man crew operated the factory ship, processed the whales, provided a medical staff, and provided food, supplies, fuel and equipment for the killer boats besides using tons of meat, flour, and vegetables to feed the crew, using dozens of cooks and mess boys. When whales were available the ship operated twenty-four hours a day in two twelve-hour shifts.

From July 4, 1937 to October 8, 1937, 2,037 humpbacks whales were killed and processed to produce 78,750 barrels of oil or about 13,000 tons, which at the time was worth $150 per ton or a market value of about two million dollars [approximately three million 2007 dollars].

Strange as it may seem, no food was found in the stomachs of the humpback whales killed in Shark Bay or off the West Coast of Australia. Apparently the whales used the area for mating and calving.

The captain with a master's license navigated the ship with three deck officers. The chief engineer was responsible for the engineering and whale factory processing departments. Another man was the so-called factory manager. A ship's purser was responsible for buying, preserving, cooking and serving the food. The head gunner on his own killer boat directed the operation of killer boats, determined where the factory ship was positioned, the area to be hunted for whales and the number of whales to be killed per day in consultation with the factory manager. Needless to say, it was a big operation requiring team work and coordination of all details.

Part 12: Antarctic Operation

We departed Australia on October 9, 1937, and dry-docked in Simons Town, South Africa, on November 3, 1937, because Cape Town did not have a dry-dock large enough to take the *Ulysses*. We left Simons Town on November 10, 1937, and arrived at Walvis Bay, South West Africa, on November 13, 1937, where we re-rigged the killer boats and factory ship for the Antarctic Season in preparation for hunting the massive blue, fin, and sei whales.

Fig. 12. "A whale arrives on the flensing deck. "A huge four ton claw is used to haul the whale up the slipway. This claw is so constructed that the greater the weight of the whale the tighter the jaws grip the flukes."

Walvis Bay weather was awful. Thick fog arrived at sunset and remained until the next mid-morning when the fog lifted and the temperature rose to about 90 degrees and stayed there until the evening fog returned. We left for Cape Town on November 27, 1937, and arrived on November 30th where we took on fuel and stores. We departed Cape Town on December 1, 1937, and traversed the "Roaring Forties," where we were forced to heave to for eight hours on December 5, 1937, due to a full gale with mountainous seas. The killer boats lost life-boats. The factory ship lost several ventilators. We encountered field ice and icebergs on December 7, 1937, and killed our first whales December 8, 1937, about 1,400 miles south of the Cape of Good Hope. This put us in the Weddell Sea area where we remained until March 16, 1938, the factory ship having cruised about five thousand miles by sailing various courses and speeds south and west.

There was an extreme change of temperature after crossing 50 degrees South. The weather was not awfully cold but was disagreeable about ninety per cent of the time due to severe storms, snow and fog, but no rain. The longest period of sunshine occurred for six hours on Christmas Day. The Christmas season was observed on Christmas Eve by stopping work for six hours. It should be noted that this was the only time the crew paused for rest and amusement during the Antarctic season. Daylight lasted twenty-four hours. Accordingly, whales were hunted for twenty-four hours, and the factory ship worked two twelve-hour shifts during the twenty-four hours.

During the Antarctic season we killed 1,628 whales and could have killed at least several hundred more if we had had the fresh water. The *Ulysses* was always short of water in Shark Bay and Antarctica.

Part 13: Discovery Committee "DARTS"

The British had a novel way of checking the growth of whales and their migration habits by firing darts into them from the research ship *R.R.S. William Scoresby*, operated by the Discovery Committee but under the control of the Colonial Office. I think this operation started in 1932. [The *William Scoresby* and other British research vessels were paid for by a tax on whale oil produced at the whaling stations of the Falklands Islands Dependency. They began a scientific program of tagging whales in 1930. See Marsden 2002: 186-195—ed.]

The dart was about six inches long with a pointed solid lead bead attached to a hollow copper tube. Each dart had a number which was recorded when fired by a 12 gauge shotgun into the whale's back; also noting the species of whale, its approximate length and the date and latitude and longitude. Six of these darts were found in the whales' carcasses when cut-up on the factory ship. The required reports were made to the Discovery Committee. I paid five dollars to any man who found a dart and gave it to me. I gave several darts to Mystic Seaport.

Part 14: Hunting Whales—Humpback

We have described the modern harpoon, the modern whale gun and the killer boats. Now let's hunt the whales. First, we will hunt the humpback and then a blue whale. The humpback, being smaller, requires different tactics from those used hunting blur whales.

Fig. 13. "Shows manner in which the claw is attached to the whale's tail."

There must have been four thousand humpbacks in Shark Bay from June to October, 1937. The expedition hunted this area for seventy days and killed 2,037 whales which produced 78,750 barrels of oil. As a general statement, any whale, thirty-five feet and longer, sighted in Shark Bay was a dead whale. Thirty-five feet was the legal limit.

The stalking method was used in Shark Bay. This method is used when killer boats cannot make more than about 12 knots. When hunting, the killer boat has a look-out in the crow's nest and another on the bridge wings to scan the beams. In the generally calm waters of Shark Bay the spout can be sighted under ordinary weather conditions at three to five miles. Sometimes the whale is sighted because he "breeches" or "lobtails."

When the whale is sighted, the crews man their stations without command regardless of whether they just came off watch or not. One man goes halfway up to the crow's nest. The Chief Engineer operates the windlass on the forecastle which allows the whales to be played by controlling the harpoon line which has a turn on the windlass. The gun is already loaded with the harpoon ready for firing. The man on the wheel issues orders to the engine room by voice tube after he gets them from the gunner who is at the gun. In fact, all noise is avoided so as not to alarm the whale.

As the killer boat comes near the whale it can be followed by the gunner and the look-outs who see the dark-colored hulk coming up from the depths to break the ocean surface, followed almost immediately by the umbrella-shaped spout. The long line of the whale's back appears, tipped by the dorsal fin as it rolls up obliquely. The body disappears, the flukes go up in the air like a giant butterfly on the water and the whale dives. The whale soon realizes it is being chased but has to come to the surface every few minutes to breathe. The pursuit is relentless to keep the whale ahead of the bow.

Fig. 14. “Three long slits are cut in the blubber from head to tail. This virtually separates the blubber into three longitudinal strips, upon one of which the whale is resting.”

The whale eventually tires. The killer boat practically runs it down. Finally the whale surfaces off the port or starboard bow at a distance of ten to forty feet with a rush and a puff of vaporized breath. The snout comes clear of the surface and it blows. The dorsal fin appears and the gunner fires, aiming, if at all possible, so the harpoon enters close to the pectoral fin. This allows the harpoon to penetrate the lungs where the harpoon’s cast iron grenade explodes by its fuse in three seconds. If the harpoon goes straight to its mark, the stricken animal sounds. The harpoon line tears through the blocks at terrific speed and disappears in the depths where the whale dove. After a short interval the whale comes to the surface, its distance depending on the size of the animal, scope of harpoon line, etc. It blows every few minutes and attempts to swim away. The engines are kept going astern to keep the animal near the bow and the harpoon line clear of the propeller. While on the surface the animal lashes in all direction with its flukes and pectoral fins.

If the whale starts blowing blood it will be dead in a few minutes; the grenade has destroyed the lungs. However, if the harpoon is imbedded back of the dorsal fin, or failed to deliver a death blow, the harpoon line becomes taunt as the whale tries to escape. The animal is allowed to struggle at the end of the line; the engines are kept in reverse, and the gun is reloaded. While the whale is being played by use of the winch and allowed to exhaust itself, very little strain is placed on the running gear or any part of the ship's superstructure, because of the special tackle on the foremast activating the springs along the keel in the bottom of the killer boat.

After the whale's struggle becomes weaker it is hove close to the bow by means of the deck winch. The gunner kills the whale by firing a killer iron just back of the pectoral fin so a grenade enters the lung area. The killer iron hardly strikes the animal before there is a muffled explosion as the grenade goes off with devastating results. The whale dies almost immediately with its entire weight supported by the harpoon line. Otherwise, it would sink.

Fig. 15. "The flensers use a razor sharp knife which is curved and attached to a long wooden handle and can best be likened to a hockey stick."

A killer iron is similar to a harpoon except it has no line attached to it.

The carcass is brought alongside, a perforated iron pipe, about three feet long, is plunged into the abdominal cavity by means of a long pole. Compressed air is forced through the perforated pipe into the abdominal area to make it float. The perforated pipe is removed and the hole is plugged with wadding made from unlaid [untwisted] rope to prevent the air from escaping.

A chain is passed around the small of the body just forward of the flukes to form a strap. This is brought through chocks in the side of the boat and made fast. The line is cut free from the imbedded harpoon, which, with the killer iron, is generally recovered on the factory ship when the whale is cut-up.

The chain allows the whale to be towed alongside the killer boat with the tail lashed near the bow and the head pointed aft. This prevents the whale's mouth from opening while the being towed.

A wire strap is also passed around the small of the body to allow the carcass to be pulled aboard the ramp in the factory ship's stern. This wire has two eyes spliced at its end and inserted in holes cut in the flukes. It is important this strap be properly adjusted and the holes in the flukes properly located so the carcass can be pulled on its back through the ramp to the flensing deck. Small mistakes or omissions can lead to trouble when landing these large animals in rough seas.

The tips of the caudal fin are cut off to avoid towing problems. The number or name of the killer boat is carved on the ventral surface of the flukes to enable the factory ship to determine who killed the whale.

When the carcass is secured for towing, the harpoon gun is reloaded and made ready for the next whale. Sometimes the dead whale is flagged and set adrift instead of being towed while hunting continues. When this happens the same procedure is followed as before except a thirty foot pointed staff is imbedded in the carcass. This staff has a flag and lantern attached allowing recovery by day or night unless sharks or killer whales intervene.

Fig. 16. "The two free strips of blubber are simultaneously peeled off by wires from steam winches."

Whales are flagged when plentiful in the area and hunting continues only on orders of the factory ship when too many carcasses are tied astern unprocessed.

When the harpoon gun is fired it is possible to see the harpoon flung through the air with the harpoon line snaking out behind it. Then comes the roar of the gun and the muzzle smoke blinds you. When you look toward the spot where the whale was last seen only a vaporous cloud hangs suspended above the churned up water to indicate where the beast disappeared.

While on a killer boat during one hunt I was struck by the vapor that results when the whale exhaled. The whale broke water and blew about thirty feet from the side of the killer boat but too far astern for the gunner to shoot. The wind carried the vaporized breath across the ramp, leading from the bridge to the gun platform on which I was standing with a camera. It covered me and the camera with a light film of vapor that apparently contained oil because it took considerable time to clean the camera lens. The whale also possessed an advanced case of halitosis because of the sickening odor I experienced.

Part 15: The Antics of Whales

Here are some of the antics performed by whales:

Breeches -	Whale projects itself head-first vertically one-half it's length out of the water with great velocity and falls back in the water with a huge splash.
Lobtails -	Whale hangs vertically in the water, head submerged, and sweeps its tail back and forth in the air.
Flukes -	Whale strikes the water with flat surface of its tail.
Sounds -	Whale lifts forward part of its body out of the water a few feet, spouts, arches

	its back, throws tail in the air, and dives beneath the water in a perpendicular descent. The tail may appear as a giant butterfly on the water just before it disappears below the surface. When a whale sounds it is generally an indication it will be under water for an extended period of time. However, I have never seen a whale below the surface for more than twenty minutes.
Settles -	Whale slides beneath surface in gliding motion without changing horizontal motion of its body. This is what whale generally does between breaths and indicates it will be only a short time below the surface of the water.

Part 16: Hunting the Blue Whale

This species is the largest animal known in the history of the world. Experts believe it took twenty million years for whales to evolve from their land ancestors. It is hunted by one of two methods. First, the stalking method.

This is used when the gunner has a slow killer boat capable of up to eleven knots. This is tiring, long and requires abundant patience. It is similar to hunting the humpback already described. It is now discarded with the introduction of the modern killer boats capable of fourteen to eighteen knots, like the ones used in the Antarctic.

Second, the “come up and out method,” with the killer boat going at fourteen to eighteen knots, fine judgment of species and habits, and long patient stalking is not necessary.

Fig. 17. “By means of the flensing knives the workers loosen enough blubber at the head end for the attachment of the wires, and separate it from the flesh as it is hauled away.”

The killer boat maintains full speed at all times. The whale comes up for breath but is forced below before completing its respiration by the boat charging down on it. The tactics are followed for perhaps half an hour or longer, the whale trying to get its breath and the determined action of the gunner to keep it down. The whale acts terrified, short of breath and commences to swim rapidly. This increases its need for air. The situation develops into a chase with the animal breaking the surface at full speed, exhaling and inhaling in a split second, then diving. The whale does not travel very deep under these circumstances and is generally visible to the crew of the killer boat which remains as close as possible. Even the blue whale cannot endure this type of pursuit more than about thirty minutes without showing signs of fatigue. The animal commences to tire, loses its speed, and surfaces more frequently for air. Finally the killer boat overtakes the quarry, the whale surfaces within gun range, then the harpoon is imbedded as close to the pectoral fin as possible.

It is this type of whaling that led to the extermination of so many blue, fin, and sei whales. The whales had no chance. They are smothered into exhaustion and then killed. It is a rare occurrence, once a blue whale's large umbrella spout is sighted, that the animal escapes a modern killer boat under command of a good gunner unless ice, sea conditions or the weather intervene.

Once a harpoon is imbedded, one of two procedures may be followed.

The gunner allows the harpooned whale to take out plenty of line, even up to a quarter or one-third of a mile in length, which is controlled by the deck winch. The killer boat engines are stopped or going slowly astern to keep the line out of the propeller. There is no strain on the killer boat because the pull of the whale is transferred by the running rigging on the foremast to the springs in the bottom of the killer boat. The whale is allowed to exhaust itself, if still alive, and is then hauled in by the winch or the killer boat advancing on it. The animal is hauled under the bow and dispatched with a killer iron.

After a big whale is harpooned, another method may be used in dispatching it.

Here the whale is chased down and harpooned. Immediately the killer boat is swung away and at right angles to the direction taken by the whale. The whale is taking out line and the killer boat is paying it out also by steaming at full speed away from the animal. After a long scope of line is out, the killer boat swings parallel to the course taken by the whale. This results in a long bight of line in the water with the whale towing one end of it and the boat paying out but towing the other end. This maneuver soon exhausts and slows down the whale from the sheer weight and drag of the line. The boat now heads toward the whale, practically completing a circle from the area where the harpoon was imbedded. A killer iron finishes the whale.

This method is fast but puts more of a strain on the running rigging of the vessel and requires care in keeping the line out of the propeller.

After the blue, fin and sei whales are killed, the procedure for towing them to the factory ship is the same as for humpbacks or for flagging the carcasses for later recovery.

On one occasion in the Weddell Sea I went whaling with a gunner who had been hunting whales with modern killer boats for about twenty years in the Antarctic. He told me that in the 1920s the factory ships used to stay in open water on the edge of the field ice and the killer boats killed and delivered the whales to the factory ship which remained in sight. In 1937-1938 we had to go miles away and out of sight of the factory ships.

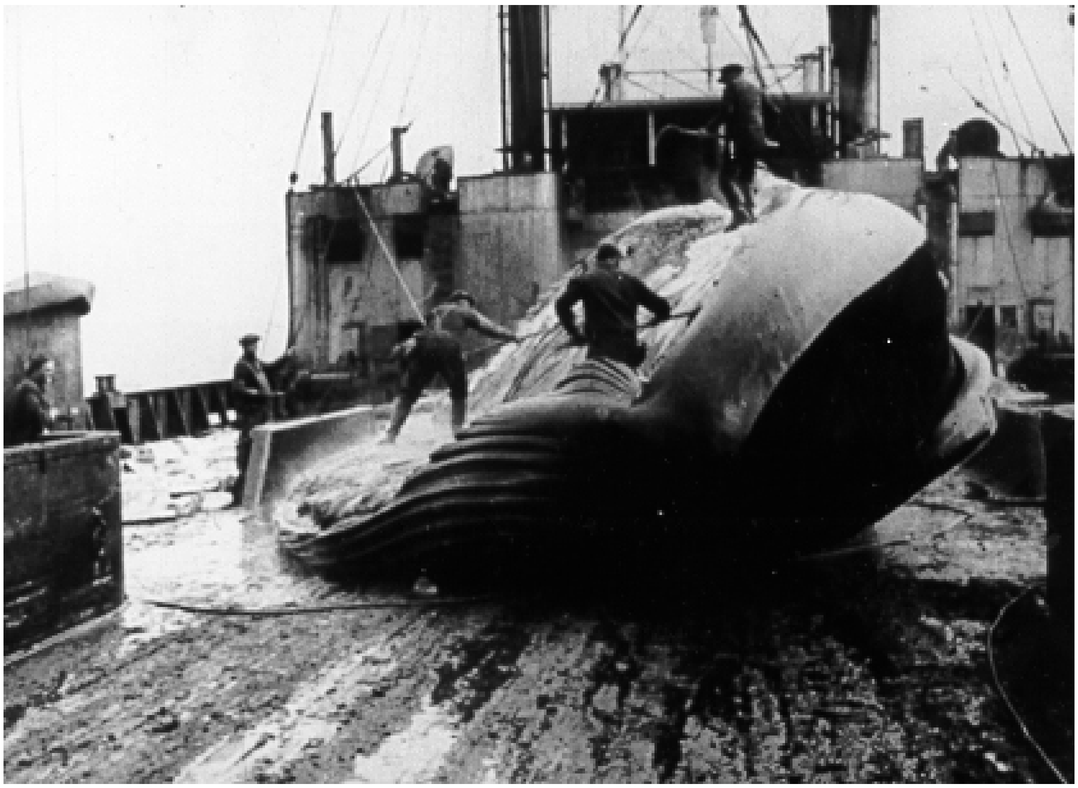


Fig. 18. "The carcass is next rolled over by means of a tackle passed over the shoulder and attached to the lower flipper, and the third strip of blubber is removed in the same way."

On this trip we sighted a large fin whale, about 80 feet long. We had a fairly strong wind blowing on a clear cold day with fairly rough seas when clear of field ice. The harpoon hit this whale in the back by the caudal fin which did little harm to the whale and above all did not impair his ability to swim. The whale took off at tremendous speed, heading for some field ice. The killer boat engines were put full astern but the whale just towed the killer boat and into the field ice we went. I just wrapped myself around a stanchion on the bridge along with the rest of the crew because it was impossible to stand up without support. The whale literally just dragged us through the field ice on a zigzag course as we bumped from one chunk of ice to another with the engines at full astern, we must have been making six or seven knots through the water. Finally the whale towed us free of the stretch of ice and several harpoons were put in it when we were in clear water. All told it must have taken over two hours before we had a dead whale. This episode showed what a misplaced harpoon can do besides showing the strength of these animals.

I think I can say without being egotistical that I witnessed the slaughter of more whales in the history of American modern whaling than any other native born in the United States. My duty on the expedition was to ensure that the whaling laws of the United States were observed. It was not my duty to interfere with the slaughter so long as the killing was carried out legally. The expedition was out to make money. My duty was to see that the profit was legal.

Japan today still kills about two thousand per year and consumes tons of whale meat in their daily diet. But even the Japanese realize now that the end of whaling is in sight. [Commercial whaling was banned by the International Whaling Commission

(IWC) in 1985. However, Japanese whaling continues under a program of "scientific research," involving the killing of hundreds of whales—primarily minke whales and primarily in Antarctic waters—ed.]

Fig. 19. "The blubber is drawn away to the sides of the flensing deck where it is cut into smaller pieces and then dumped into the cookers or blubber boilers which line both sides of the deck. A number of steam jets open into the cookers, and these rapidly melt out the oil."

The oil was used in European countries for commercial purposes and to supplement dietary requirements. Most of the whale oil coming to this country was used to produce expensive soaps. Some of the whale oil coming to this country, however, competed with peanut, cotton seed, and menhaden oil and this created friction with these products.

After the Second World War, several nations made efforts to revive pelagic whaling. They introduced bigger and faster killer boats, more efficient factory ships, search planes and employed sonar and radar. However, the big whales were too scarce to guarantee a profit against the high cost of fitting out a big commercial expedition. Only Japan, Russia and Iceland persisted. But even they had to resort to killing the smaller species or almost anything else that produced oil. Another factor curtailing Norwegian whaling was the fact Norway could not use all the whale oil it produced and had to sell it on the foreign market. But the Japanese could produce it and sell it about $7/ton cheaper than the Norwegians.

Part 17: Right Whale Head for Museum

A gunner killed a right whale by mistake. The killing was illegal but excusable under the circumstances of the weather, ice, and sea conditions. To make amends the expedition gave me the head of this whale and I in turn gave it to Dr. Kellogg at the Museum of Natural History in Washington, D.C. As I recall however, Dr. Kellogg told me that if a right whale was killed, whether legally or illegally, he wanted the head for the Smithsonian. Strange as it may seem the killer boat and factory ship had never seen a right whale before and did not know what kind of whale it was until I identified it for them.

Fig. 20. “After the blubber has been stripped from the whale the carcass is pulled forward to the cutting deck where it is dismembered.”

This whale, called the right whale, got its name from the early American whalers who believed it to be the “right” whale to kill because it seam slowly, was easy to approach and kill, and did not sink when dead. They may reach 50 to 60 feet and run about a ton to the foot. It yielded plenty of valuable oil and large baleen slabs from its arched head. Baleen of a right whale is much larger than in blue or fins. It is a series of long horny plates or slabs that form a square footage surface that act as teeth. These plates hang from the upper jaws and are finely fringed on the tongue side. Anytime a baleen whale shuts its mouth to squish out the sea water while retaining krill, it has the same effect as casting a large net in the water for its food. It has a barnacle-infested "bonnet" on its head in front of its blow holes. It does not have a dorsal fin.

The complete head was placed on deck. On the 7,000 mile, twenty-seven day voyage from the Weddell Sea to New York, I spent most of my time separating the flesh from the head bones with a hand knife, flensing knife and steam hose. Then the head was crated for shipment from New York to Washington, D.C. Crated for shipment, it weighed several tons.

On arrival in Washington the head was to be taken apart. The bones were to be placed in sand for several years and then several more years in a running brook. This was to remove all the oil from the bones. It should be remembered that any part of a whale is full of oil.

After the sand and water treatment the head was reassembled for exhibit. To assemble the head without first removing the oil would eventually cause the specimen to rot and fall apart.

I gave a fully assembled harpoon to the Smithsonian as well. Besides the right whale head and harpoon, I also gave the jaws of a killer whale to Dr. Kellogg.

Fig. 21. "The carcass is practically torn apart by the use of steel wires attached to powerful winches. True, the flensing knives play an important part, as the workers know just where to cut when a strain is taken on the carcass, but brute force is the most important factor."

Part 18: Killer Whale Jaws for Museum of Natural History

The killer whale is also known as the Orca. They run anywhere from 20 to 30 feet in length; are generally recognized by their black and white markings from the lower jaws to anus, extending along their sides and all topped by a tall erect dorsal fin, which may be several feet high.

This whale is seen frequently on display in aquariums performing acrobatic feats for the public's enjoyment. But in their native habitat they are different. Here they possess ferocious feeding habits. While traveling in groups they actually attack, mutilate, and even kill baleen whales. They also kill seals, fish, squid, sea turtles and sea birds. In attacking a baleen whale they lacerate its hide and frequently mortally wound the animal by ganging up on it until it is exhausted and then tearing out its huge tongue.

Fig. 22. A whale jawbone on the cutting deck of the *Ulysses*, alongside a strip of blubber.

There are Antarctic expedition records which note that killer whales have attempted to attack men and sledge dogs on ice flows. Whalers do not like them and are extremely cautious when in their presence. They have a broad, rounded head, large mouth, and big numerous, sharp pointed teeth in the upper and lower jaws, which, as I recall, are so placed that they mesh when the jaws are closed to produce a rendering capability. In other words, the teeth allow them to tear apart whatever they attack.

Only the jaw bones and teeth were given to the Museum.

Part 19: Whale Meat

We ate quite a bit of whale meat during the Antarctic catch. The meat itself was sort of stringy and resembled pot-roast when cooked. The meat came from fin whales early in the season before the whale started to get fat. A strip of meat, about eight feet long, two feet wide, and several inches thick would be stripped from the whale's back; then hung in the rigging for about a week or ten days. Here it turned a black-brown color in the sterile atmosphere. When removed to the galley the meat was cut into steaks and then soaked in vinegar while treated with salt and pepper for about a week. It was very good when served broiled or fried. I enjoyed it. You would never know it was whale meat. Of course the secret of making it edible was to take it off the whale before the whale got fat and the meat became oily.

Fig. 23. “The carcass has now been torn apart and the workers are busily engaged in cutting the meat and sawing the bones into pieces small enough to fit into the cookers.”

Part 20: Whale Milk

I did not drink the milk but I did taste a small bit of it. Unfortunately it came from a dead female which had been killed several hours before.

The two teats of a female whale are in two slits on the side of the female opening located on the underside of the body's posterior section.

Part 21: Whale Data – General Information

Ulysses departed Cape Town December 1, 1937 and was in the Weddell Sea until March 16, 1938. It then proceeded 7,000 miles directly to New York where she arrived April 11, 1938. Sandy Hook, N.J. was the first land sighted since leaving the Cape of Good Hope December 1, 1937. The *Ulysses* arrived in New York ten months after leaving Sandefjord, Norway, June 12, 1937. During these eight months the ship was in port eight days, cruised 30,000 miles, killed 3,665 whales and obtained 191,030 barrels of whale oil.

Legal Limits

Legal Limits for Killing – 1937

Whale	Legal Length
Blue	70 ft.
Fin	55 ft.
Humpback	35 ft.
Sperm	35 ft.

Length of Whales

Whale	Average Length	Largest
Blue	80 ft.	110 ft.
Fin	70 ft.	84 ft.
Sei	45 ft.	62 ft.
Humpback	38 ft.	50 ft.

Weight – Estimated

Whale	Length	Weight/Foot
Blue	80 ft.	1 ¼ ton/ft.
Fin	70 ft.	1 ton/ft.

Sei	62 ft.	¾ ton/ft.
Humpback	40 ft.	¾ ton/ft.

Some scientists believe a whale's blubber can sustain it for months without food. A Dutch scientist estimates that a blue whale calf grows about eight and one-half pounds per hour during its seven month nursing period when it gets 130 gallons of fat-rich milk a day from its mother. Do not forget, by actual measurement, a blue whale fetus, before it is born, can be 17′ long and weigh 2,443 pounds.

Barrels of Oil/Whale/Foot

Whale	Barrels of Oil – Month of March
90′ Blue – Male	125
90′ Blue – Female (pregnant)	225
70′ Fin	70

- Rough Estimate 1.5 barrels/ft.: Blue Whale 80′
- Rough Estimate 1.0 barrels/ft.: 70′ Fin Whale
- Estimate 37.4 barrels per whale in Shark Bay

In Shark Bay, fifty per cent of the oil came from blubber and the tongue; fifty per cent came from bone and meat. Whales were fat having migrated from the pastures in Antarctica where they had consumed tons of krill.

It is estimated that a blue whale may eat 200 tons of krill/day or about 4% of its body weight. This krill is near the surface during the Antarctic summer. Whales are believed to migrate to warm waters only to mate. This is why apparently I never saw food in the whale stomachs in Shark Bay.

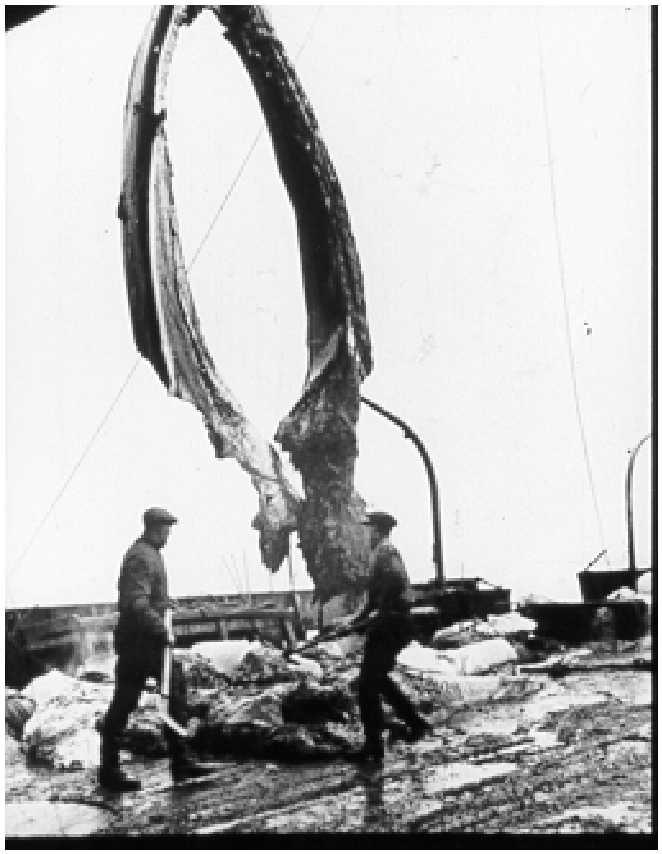


Fig. 24. "Oil can be boiled in varying quantities from the whole carcass, excepting the baleen in the whale's mouth."

Ulysses could only make 160 tons of water per day when she needed 400 tons per day. This cut production of whale oil from roughly 1,800 barrels/day to 1,600 barrels/day. The market value of whale oil during Shark Bay season was $100/ton if I recall correctly (approximately $1,500 in 2007). A modern whaling factory ship requires one barrel of water for every barrel of oil derived from the whale. *Ulysses* was always short of water.

The expedition could legally dispose of only the following parts of the whale: internal organs; baleen; pectoral fins.

Recapitulation of Catch

Whales Killed	Oil Obtained – Barrels	
Shark Bay	Shark Bay	78,750
Antarctic	Antarctic	112,280
Total	TOTAL:	191,030

There were thousands of humpbacks in Shark Bay on July 24, 1937, when we started killing them. On August 30, the ship had 26 whales secured astern at noon waiting to be flensed. On August 31, there were 21 astern. On both occasions the killer boats had stopped hunting for the day. An experienced gunner told me he had never realized whales could exist in such numbers. He estimated 4,000 whales were in Shark Bay in July 1937.

During the Shark Bay season it cost the Western Operating Corporation approximately five thousand dollars per day to operate the entire expedition. The *Ulysses* is alleged to have paid for the cost of the expedition after 70,000 barrels of oil had been obtained.

By arriving late in Shark Bay, and being short of water due to evaporator troubles, the *Ulysses* lost hundred of thousands of dollars because she could have doubled the number of whales killed during the 70 days of operation.

Fig. 25. A killer whale caught by the *Ulysses*, wounds visible along its underbelly, jaw winched open

Part 22: Casualties

One man died from natural causes and was buried at sea July 4, 1937 after the government of Aden refused our request for permission to land him ashore.

A man was killed instantly on a killer boat in Shark Bay when struck by the tail of a whale alongside the killer boat when he was passing a towing chain around the carcass just forward of the tail. The whale appeared to be dead but apparently was not.

After spending months in the warm dry climate bordering the Tropic of Capricorn in Australia, the miserable climate of Walvis Bay and the cold Benguela Current took its toll on personnel. At least fifty per cent of the personnel contracted severe colds and many suffered from a chest condition similar to influenza according to the doctor.

Any open cut, scratch, or severe bruise became infected if it came in contact with any part of a dead whale. First aid was administered immediately and daily checks followed for several weeks by the doctor. In one instance a man came in contact with the blade of a deck steam saw. He tore his pants but only scratched his leg. He failed to report it. Subsequently a severe infection followed which lasted several months.

Part 23: Whale Population: Past and Present

There is no doubt that at one time there were hundreds of thousands of whales of different species in the oceans of the world. Commercial whaling decimated them. However, recent statistics seem to take an optimistic view that current hunting quotas established by international agreement will protect some species from extinction. But it must be accepted that surveying the oceans of the world is vague for detecting how many whales may still exist. They roam over extensive regions and are hidden from view even during a diligent search. It is questionable whether any estimates will ever be accepted without contention by commercial interests or conservationists.

Fig. 26. "The killer whale is the wolf of the sea," wrote Lt. Walsh. "It hunts in packs of twenty of more individuals. They will attack and devour almost anything that swims… Their capacity is almost unbelievable, and there is a record of thirteen porpoises and fourteen seals being taken from the stomach of a twenty-one foot specimen. Killers have even been known to attack and kill the huge blue whale. Their method of attack is to harry and worry their victim until he is exhausted, and then to force open the whale's mouth and eat out its tongue."

The blue, fin, sei, and humpback population has been fragmented when compared to their former numbers. Can they stand any more ravaging? How about the toll from natural enemies and diseases? Strange as it may seem, whales are subject to many internal diseases and parasitic worms. They have tumors, pneumonia and stomach ulcers.

It is my opinion when the big whale species are found again to be in such numbers that will make pelagic whaling profitable for Norway, Japan, the Soviet Union and Iceland, then pelagic whaling will return and be governed only by profits, economics and politics. I question whether legal quotas will be observed.

I question whether the United States will become involved again in pelagic whaling.

Section 2: The *Ulysses* and her cruise

The *Ulysses* was built at Sparrows Point, Maryland, in 1915; it is an ex-navy ship and is supposed to have been designed and built as a sister ship of the *Cyclops* and *Jupiter*; the *Cyclops* was mysteriously lost off the coast of South America during the Great War; the *Jupiter* eventually broke her back because of structural failure. Statements have been made that the *Ulysses* was a collier and tanker before she was converted to a whaling factory. Records indicate that the vessel's build was changed before the Western Operating Corporation became the owners, but the date of change is unknown.

The *Ulysses* was an oil tanker when purchased by the Western Operating Corporation. As this type of vessel, it is reputed to have been a source of trouble because of lists and the inability to trim her properly. The Western Operating Corporation bought the *Ulysses* from the American Tanker Corporation. When inspected at Philadelphia, Pennsylvania on December 5, 1936, Albert Peyser was the master; she carried a crew of forty-nine men, four lifeboat men, and did not possess a fuel oil permit. The vessel apparently left the United States in January 1937 because she was in Göteborg, Sweden in February 1937 when the work of converting her to a whaling factory commenced at Gortaverken Shipyard, Göteborg, Sweden.

The *Ulysses* was purchased by the Western Operating Corporation for approximately $850,000. The company bought the vessel because:

1. They did not have time to build a regular whaling factory.
2. The *Ulysses* was originally built in the United States and possessed an American registry.
3. The company could operate her in the coasting trade when she was not employed in whaling.

The *Ulysses* was converted to a whaling factory in Göteborg, Sweden, because:

1. There were no shipyards in the United States familiar with the work.
2. The labor could be done in Sweden at one-half the cost it would require in the United States.
3. The whaling equipment and apparatus installed came from Norway; most of the factory equipment being removed from one of the *Kosmos* ships, owned by Anders Jahre of Sandefjord, Norway, and placed aboard the *Ulysses.*
4. The personnel manning the *Ulysses* were to be Norwegians by design and not by circumstance of departing from a foreign port.

The plans for conversion were drawn by a firm in Sandefjord, Norway, which has converted many vessels for this industry and built many whaling factories; the work of converting actually took place at Gortaverken Shipyard, Göteborg, Sweden.

Before being converted to whaling, the *Ulysses* was a tank ship of 10,780 gross tons; home port and port of registry was New York; the official number was 231,028, and was last inspected in Philadelphia, Pennsylvania, on May 13, 1937.

After being converted the *Ulysses* is 536′ 4″ overall, 514′ between perpendiculars, has a beam of 65′, draft 33′ and is 14,950 tons. The total capacity of her cargo tanks is 589,575 cubic feet; she was originally designed to accommodate 90,000 barrels of whale oil, but 800 tons of ballast in the form of pig iron and cement, and 1600 tons of bad water in her bottom tanks reduced her capacity to 60,000 barrels.

The *Ulysses* has two 3,000 horsepower triple expansion reciprocating engines of 27 ½, 46, and 76 inches with a four foot stroke of piston; she is supposed to make fourteen knots but cannot attain over eleven point five without excessive vibration and a decided working of the entire vessel. If a person stands on the bridge and looks aft when the vessel is underway at more than eleven knots, the amidships structure can be observed to move up and down while the stern sways from side to side. The first assistant engineer has made the statement that the engines are too powerful for the hull.

The *Ulysses* was practically taken apart and rebuilt during the process of conversion. The vessel was built up fourteen feet on the old hull; the bridge was moved well forward and the engine room remained aft. All boilers and machinery were overhauled; the bow was practically rebuilt. The plan of construction is that the old part of the hull that had been used as a tanker is now to be used as a storage space for whale oil; the fourteen feet that have been built on the tanker hull encloses the factory system. The factory section occupies approximately fifty per cent of the vessel's length. The first quarter of the hull is composed of crew's quarters, storage holds, etc. The last quarter of the length comprises the crew's quarters, store rooms, mess rooms, engine and fire room, etc.; the middle of the vessel is devoted to the factory apparatus and represents a large compartment filled with scores of tanks and different cooking systems for deriving the oil from the whales. The result is tons of weight in the bow and stern and nothing, comparatively speaking, in the amidships section of the vessel.

From the moment the idea of whaling under the American registry was conceived the Western Operating Corporation was competing against time. The *Ulysses* was supposed to be on the Australian whaling grounds by June, 1937, but, apparently, the idea for sending out the expedition did not originate until the autumn of 1936, and plans commenced to bring active results about January, 1937. The owners were trying to get the ship out in five months when, under ordinary conditions, it takes a regular whaling factory, built and equipped for whaling, approximately three months to get ready for a season if the factory has been laid up between seasons. There were occasional delays in obtaining the steel plates for the hull; the factory cooking apparatus was delayed in arriving from Norway; practically all the whaling material used in preparing the *Ulysses* for the expedition came from one of the *Kosmos* factories. Because of the delay in getting the factory equipment and steel plates, the hull had to be left open. This delayed the installation of winches, masts, and all the whaling gear on the weather deck, and even the building of the forward structure which houses the officers' living quarters and bridge. It is interesting to note these conditions after the information submitted to Headquarters by the Western Operating Corporation stated that the *Ulysses* would depart Göteborg by May 11, 1937 at the latest date. It is apparent that the persons representing the company in New York were not familiar with the conditions prevailing in fitting out the expedition.

I arrived in Göteborg, Sweden, on May 11, 1937. Living quarters were not available on the factory ship therefore it was necessary to live ashore. I visited the *Ulysses* on the day of my arrival in Sweden. The vessel was in dry dock, the propellers were off, the bridge structure was incomplete, the weather deck had not been completed; everything was in turmoil. The ship was approximately fifty percent ready for sea. A casual examination indicated that the factory would be delayed at least a month. The officers attached to the ship predicted the vessel would be out in two weeks. Workmen were busy day and night; fifteen hundred men were employed, directly or indirectly, in getting the vessel ready. The shipyard wanted to get rid of the vessel, it was delaying their other work; the owners were complaining about the delay because valuable time was passing and the factory would be late for the Australian season. Mr. Anders Jahre of Sandefjord, Norway was in constant touch with Captain H. M. Mikkelsen, concerning the vessel's progress; it was Jahre who issued the orders that the ship must leave Göteborg, Sweden by May 26, 1937, regardless of her condition for sea.

As a result of these orders the *Ulysses* attempted to sail from Göteborg on May 26, 1937, when only about seventy-five percent ready for sea. Scores of workmen accompanied the vessel from the shipyard to work on her while she was underway; taking some of these men as far as Port Said, Egypt, was contemplated in order to get the more essential equipment of the ship operating properly. There was no fresh water aboard, no means of cooking food, no sleeping accommodations for the crew, the life boats were not ready for lowering; no toilet accommodations were available; the plumbing was not completed; there was no running water; approximately 800 tons of stores were piled on the weather deck in a loose condition; the living accommodations of the master and other officers were not completed; the radio equipment was not completely installed, although a small emergency set was available. The only food available was milk, beer, and sandwiches, which had been ordered as subsistence for the personnel while bound for Sandefjord, Norway. The vessel was decidedly not ready for sea. I reported aboard the *Ulysses* at 0700, May 26, 1937.

Three tugs pulled the *Ulysses* from the dry dock, which had been flooded. It took the tugs about twenty minutes to start the vessel in motion because she was resting heavily on the keel blocks. When the ship commenced to leave the dock the jarring could be distinctly noticed as the bottom dropped from one set of blocks to the next. As the *Ulysses* moved out of the dock she commenced to list to port (the list increasing as the vessel left the blocks) until she was over to approximately fifteen degrees. Part of the cargo commenced to shift to the port side. The vessel proceeded down the narrow harbor, narrowly missed a ferry in its slip, and forced all the passengers ashore. While maneuvering the vessel it commenced to go to starboard; this might have been caused by the use of too much rudder or faulty manipulation while flooding the tanks below in an effort to correct the port list. As the vessel heeled dangerously to starboard the cargo shifted on deck and went down to the rail, some of it going over the side. It is believed the vessel struck bottom on the left side of the channel at this time. The cargo continued to move to starboard until the list was between thirty and forty degrees. Fortunately the chief officer and several men secured a large number of oil drums that had been loosely stowed amidships and stopped them from shifting to starboard. The cargo booms were swinging madly in the air. It is believed if the vessel heeled back to port at this time she would have foundered because tons of cargo on deck would have returned to the port side in one mass.

At this time, although it was not known on deck, the fire room and engine room were flooded; the men on duty in these compartments were working in water up to their knees. The flooding out of the after part of the vessel was caused by a sea connection being left open after the vessel had been converted and repairs completed. The open sea connection was located on the port side; it may be that the chief engineer flooded the starboard tanks to eliminate the port list and thus prevent the water from entering and, in so doing, created the extreme starboard list.

The *Ulysses* continued out of the harbor with the starboard list as the tugs cleared traffic ahead; the ship was practically helpless from the consideration of being able to properly conduct her own maneuvers. Hundreds of people followed along the banks of the harbor to see what was going to happen next.

The vessel proceeded outside the harbor and anchored. Some of the cargo was stowed below and efforts were made to bring the vessel to an even keel by flooding the various tanks. Those corrective measures continued throughout the night but to no avail. The vessel would move from a port list to an even keel and immediately fall over to starboard. Then the same procedure would occur in the opposite direction as they attempted to get rid of the starboard list. This falling from side to side occurred throughout the night, the list varying from twenty to thirty-five degrees, and cargo was still being rolled over the side from the extreme list. Sleep was out of the question.

The next morning, May 27, 1937, some tugs brought out some lighters to remove the cargo. The shipyard workmen and some of the crew left the vessel and went aboard the lighters, refusing to return aboard the *Ulysses*. I left the vessel at 1100 on May 27, 1937, after being informed by Captain Mikkelsen that the vessel would have to return to Göteborg for repairs. The *Ulysses* returned to Göteborg on May 30, 1937, and anchored in the channel until June 2, when she returned and was moored at Gortaverken shipyard.

On or about June 4, 1937, Mr. Corcoran, United States Consul at Göteborg, requested that I call the consulate. I did so, and, at his request, I stated all the details involving the *Ulysses* in practically the same form they are presented here. The consul was also informed of various and sundry rumors I heard from several guests at the Hotel Goteborg concerning sabotage being suspected by ship chandlers, marine workers, shipyards, and other such places that knew the *Ulysses* was engaged for whaling under United States registry. I do not know how true these rumors were and stated that fact to Consul Corcoran. He stated that he suspected as much himself. These conditions were reported to Lieutenant Commander O'Neill, who had requested all the circumstances. Lieutenant Commander O'Neill was at the United States embassy in London, at this time. The details were also noted in a report to Headquarters from Göteborg.

After the return of the *Ulysses* to Göteborg, the second and third officers circulated a petition among the crew to force Consul Corcoran to have the ship surveyed on the grounds that she was not seaworthy and not safe. I am not acquainted with the developments of the situation, but I know that the survey did not take place and that the second and third officers, the chief carpenter, second and third engineers, and several of the crew left the vessel while in Göteborg.

I returned aboard the *Ulysses* at 1600 on June 10, 1937. A stability test was conducted the same date to check the vessel's characteristics. A metacentric height [the distance between the center of gravity of a vessel and its 'metacenter,' a calculation made to determine the stability of the floating body—ed.] of nine inches was supposed to have been found on this test. The stability test had not been given the *Ulysses* after her conversion to a factory ship because the engineers took it for granted that her characteristics were satisfactory. Eight hundred tons of ballast in the form of pig iron and cement had been added in the after part of the vessel on her return to the shipyard. However, the chief officer stated that he had sounded all around the vessel that afternoon that the test was conducted and believed the ship was resting on the bottom.

The *Ulysses* departed Göteborg, Sweden, at 1630 on June 11, 1937, bound for Sandefjord, Norway, one hundred ten miles away. The vessel still possessed a slight list. She arrived in Sandefjord at 1000 on June 12 and loaded whaling gear, stores, powder, and took approximately two hundred men that were to actually perform the whaling operations aboard the factory ship. While in Sandefjord, Mr. Anders Jahre came aboard to inspect the vessel. He had previously visited her in Göteborg after the failure of the ship to sail on May 26, 1937.

The *Ulysses* departed Sandefjord at midnight on June 12, 1937, bound for Southampton, England. This was a change from the original itinerary as it had been planned for the *Ulysses* to bunker at Flushing, Holland. The ship arrived in

Southampton, England at 1500 on June 15, 1937, and took on 1500 tons of fuel oil via oil barges. No one was allowed ashore. She departed Southampton at 0030 on June 16, 1937, having completed bunkering at 2330 of June 15.

On the morning of June 17, 1937, while in the Bay of Biscay, a fire occurred of rather large proportions. This was the second fire to date; the first one was only a trivial affair. This particular fire lasted for about forty-five minutes. It was caused by negligence. Due to the haste in getting away from the shipyard some of the staging had not been removed above the boilers; this caught fire and set other material on fire that had not been cleared away from that vicinity when construction work was completed. Most of the bakery and part of the galley were burned out; the asphalt deck melted in the crew's quarters from the heat, the flames burned away all the paint work in the passage to the sleeping quarters on the port side; and steam had to be taken off all the boilers except two. If the fire had continued for fifteen more minutes the ship would have had to secure all boilers with the loss of steam to the fire pumps. For about twenty minutes it looked as if a general conflagration would take place in the after part of the ship.

The *Ulysses* passed Gibraltar at 0700 on June 20, 1937. Two insurgent armed Spanish trawlers came close aboard to inspect for name, nationality, and home port, but did not require the vessel to heave to.

The steaming characteristics of the *Ulysses* were checked for the first time while bound from Gibraltar to Port Said, Egypt. The working of the ship and the vibration were excessive. The mid-ship structure actually humped. It was at this time that the ridge was formed in the deck of the blacksmith shop located amidships on the port side because of the excessive working of the vessel. The working commenced at eleven knots and became exaggerated as the speed increased. It was this motion that caused leaks in the vessel's structure and certain tanks to open up, allowing fuel oil to contaminate the 1600 tons of fresh water in the bottom tanks.

The *Ulysses* arrived at Port Said, Egypt, at 1500 on June 26, 1937. No one was allowed ashore. The passage through the Suez Canal commenced the same date at 2330; the vessel did not have to wait her regular time because of the large quantity of gun powder aboard. The passage of the Canal was completed and she arrived at Suez, Egypt at 1700 on June 27. The *Ulysses* was aground for over an hour in the Suez Canal. The pilot that took the vessel through stated she was the most unstable vessel he ever piloted; the *Ulysses* possessed either a port or starboard list throughout the passage of the canal.

The vessel departed Suez at 1800 on June 27 and commenced the passage of the Red Sea. This was the most unpleasant part of the voyage. The temperature never went below 86°F. day or night, and ranged as high as 96°F. in the day time. There was not a breath of wind. The ship missed a sandstorm by only a few hours on June 30, in the position 18-00 N; 39-50 E; the sun disappeared in a gray haze at 1500; fine dust settled on the ship but could not be seen in the air.

On July 1, 1937, the *Ulysses* contacted and moored alongside the Dutch tanker *Macoma* in position 12-50 N; 43-25 E. This position is at the southern end of the Red Sea, approximately ten miles off the coast of Yemen and northeast of Perim [an island in the Strait of Mandeb at the southern entrance to the Red Sea—ed.]. The *Ulysses* took 12,000 tons of fuel oil from the *Macoma* and completed fueling at 1300 on July 3, 1937; the vessel sailed immediately, passed the Strait of Bab el-Mandeb at 1500 and entered the Gulf of Aden.

The course had been set for Aden to put a sick man ashore, but the man died at 1530 on July 3. The ship's doctor diagnosed the case as tuberculosis. The master of the *Ulysses* received word early the same evening that the health authorities would not allow the patient to be taken ashore at that port. The deceased was buried at sea at sunrise on July 4.

The Fourth of July occurred Sunday but the master did not allow an observance of the day on Monday because the crew enjoyed a holiday on June 24, 1937, which is midsummer's day in Norway and is nationally observed in that country. [Known as 'Jonsok,' or John's wake, this is a particularly important celebratory day in northern countries. In a rote dating to pagan times, the summer solstice is marked feasts and evening bonfires—ed.]

The *Ulysses* passed out of the Gulf of Aden and into the Indian Ocean on rounding Cape Guardafui, Italian Somaliland [Somalia], at 0500 on July 5, 1937. The strong southwest monsoons were immediately encountered. The ship changed course and headed northeast, leaving [the island of] Socotra to the southward. This maneuver took place to repair leaks, which had occurred in the forward hold. Socotra was passed on July 16, and the course laid for the Chagos Archipelago; strong southwest winds were experienced almost the entire distance. The equator was crossed at 0630 on July 10, 1937 at 66°11′E. The *Ulysses* arrived at Diego Garcia, Chagos Archipelago, at 1400 on July 12.

Five killer boats were awaiting the arrival of the *Ulysses* at Diego Garcia. These boats had previously crossed from Durban, South Africa, via Mauritius. The flotilla was in charge of Mr. Hansen, who came aboard the *Ulysses* as manager, and Mr. Friestedt, who came aboard the *Ulysses* as second officer. Both these men were formerly employed by Mr. Jahre on the factory ship *Fraternatus* in the same capacity they assumed on the *Ulysses*. The *Fraternatus* was sold by Mr. Jahre to a South African company so Hansen and Friestedt transferred to the *Ulysses*.

The draft of the *Ulysses* was too great for the lagoon at Diego Garcia, and the water outside was too deep for anchoring; the killer boats were therefore fueled and provisioned while drifting. No one was allowed ashore. All operations were completed at 2230 on the same date of arrival at Diego Garcia, and the expedition sailed for Australia.

The expedition arrived in Shark Bay, Western Australia, at 1345 on July 24, 1937, and the *Ulysses* anchored in position 24°51′ S; 113°15′ E. Mr. Hutchinson, the Australian inspector, and Captain Melson, the Western Operating Corporation's agent in Australia, came aboard the *Ulysses* immediately after the ship anchored; they had previously arrived at Shark Bay via killer boats that came up from Perth, Australia; the *H. J. Bull* and three smaller boats had fueled and provisioned at Perth after crossing from Africa. Whaling operations actually commenced aboard the *Ulysses* at 1600 24 July 24, 1937.

When the *Ulysses* passed Cape Ronsard and entered Shark Bay via Geographe Channel a large number of whales could be seen spouting in all directions. Mr. Martinsen, one of the best known whale gunners in Norway, stated that he had never seen such a large number of whales in such a small area in all his experience.

The third fire to date occurred on the evening of July 25. This was caused by sheer negligence and almost led to serious consequences. During the afternoon, Captain Mikkelsen and Manager Hansen ascertained the temperature in the factory and found it to be 160°F.; eight men had been overcome with the heat while working in the factory. It was decided, therefore, to cut holes in the side of the ship and in the weather deck to provide hatches for ventilation. The engineer's force was ordered to carry out the plan but, in so doing, they attempted to burn through woodwork with their acetylene torches; the fire was the result. A factory worker happened to be passing, saw the blaze, grabbed a bucket of what he thought was water and threw it on the flames. The bucket did not contain water but was full of kerosene; a conflagration was the result. The fire was subdued in about thirty minutes. This particular blaze occurred almost directly under the mid-ship powder magazine. As a result, the crew requested that the powder, approximately two hundred cases, be shifted from the mid-ship magazine to the one located in the stern of the vessel. The request was refused.

While in Shark Bay, hatches were inserted in the decks and sides of the ship to reduce the extreme temperature in the factory, but the lowest temperature recorded while the plant was in full operation was 120° F. Between 1600 on July 24 and midnight on July 26, fourteen men had been overcome from the heat in the factory. I visited the plant on one occasion when the temperature was 128° F. It was almost unbearable; obnoxious, penetrating fumes pervaded everywhere, which affected breathing and caused severe irritation of the eyes. The killer boat *H. J. Bull* (one of the largest of its type in the world and which acted as scout boat in Australia) kept the factory ship broadside to the wind until the hatches were completed. The inserted ventilation and three eight-hour shifts instead of two twelve-hour shifts remedied the situation although the conditions were never completely satisfactory. It was quite remarkable to note the rapidity with which the men accustomed themselves to the adverse conditions.

It is rather puzzling how any shipyard or engineer could expect a factory, such as that of the *Ulysses*, to function in the tropics when means for ventilating the vessel had been neglected. The *Ulysses* possessed twenty-seven pieces of equipment in her factory that required steam at sixty pounds pressure; there were hundreds of feet of piping. Neither the piping nor the factory system was lagged; the apparatus functioned twenty-four hours a day, week after week. The factory ventilation at the beginning of the season consisted of the companion way hatches; there were no factory ventilators installed on deck. The conditions that resulted may easily be imagined. Eventually, six hatches were cut in the weather deck and several more in the side of the ship; these improvements eased the situations but were inadequate for the amount of heat that was generated by the cooking apparatus.

The conditions surrounding whaling are still fraught with dangers, especially on the factory ships. There were numerous narrow escapes from accidents that would have proved fatal. Many men received severe cuts while working the whales; for instance, one man had a flensing knife driven through the side of his knee, he will have a stiff leg the rest of his life; another man slipped off a pile of meat and under a bone saw, the blade missed his head but inflicted a severe laceration on his thigh; another man had his arm caught in the harpoon line after the harpoon had been imbedded in the whale, if the whale had sounded the man would have been dragged to his death;

another man was struck in the chest by the pectoral fin of a dead whale and received three cracked ribs.

There were scores of infections from minor cuts because the blood or dead flesh of a whale is extremely infectious if introduced to an open wound. The chief officer was scratched on the leg by a bone saw blade that had been placed on deck but had not been cleaned. He did not bother with taking precautions against infection. Three weeks later these scratches had become deep holes in his leg, he had to be relieved of all duty and hospitalized for over a month. He never recovered fully from the infection and that was one of the reasons he left the vessel in Walvis Bay.

On August 23, 1937, the first death occurred from whaling operations. The accident happened on killer boat *Kos II*, Gunner Iversen in command. A whale had been harpooned and was believed dead. The carcass was taken alongside the killer boat and the air line was inserted in the abdominal region by four men. Suddenly the whale gave a last convulsive swing of its caudal fin. Three of the men saw the powerful tail coming up and over the ship's rail, they fell flat on deck. The flukes struck the fourth man full on the head. The man never regained consciousness. The accident occurred at 1600, the man died aboard the *Ulysses* at 2200 the same night and was later buried at sea.

The *Bulysses*, a British tanker, came alongside the *Ulysses* on August 29, to take 1500 tons of fuel oil from the factory ship. Due to the fact that the *Ulysses* had produced so much whale oil she had no place to store it, consequently she had to get rid of her fuel oil to acquire more storage tanks. On August 20, three killer boats took approximately five hundred tons of fuel oil from the factory ship and dumped it overboard thirty-five miles to the westward of Cox Island; this was well out to sea. It is a common occurrence for whaling factory ships to pump fuel oil overboard when their production of whale oil becomes so great that they require storage tanks immediately. The *Frango* did this right in Shark Bay during the 1936 season. The *Bulysses* departed Shark Bay on the morning of August 30, 1937.

The Norwegian tanker *Charles Racine* arrived in Shark Bay on September 13, 1937, to take the cargo of *Ulysses* whale oil to the United States. The *Racine* was built in Denmark; her home port is Stavanger, Norway, and she was chartered by Anders Jahre of Sandefjord. Mr. Schmidt, the chief engineer of the *Ulysses,* is a large shareholder in the *Charles Racine*. The *Racine* departed Shark Bay for the United States at 1745 on October 1, 1937; she took 12,537 tons of whale oil from the *Ulysses* according to the ship's records. Captain Mikkelsen, Chief Officer Bjorgesgaard, and Chief Engineer Schmidt were sworn to the truth of statements on the Custom's Form 3295 pertaining to the entry of the whale oil into the United States via the *Charles Racine*. The oath was administered to these gentlemen by the inspector on the evening, but after the departure of the *Racine* for New York.

Seventy rolls of film and the Coast Guard copies of the Form WI-1 were forwarded to the United States via the master of the *Charles Racine.*

Mr. Hansen, manager of the *Ulysses*, failed to notify the Australian inspector how much oil had been discharged to the *Racine*, although the government of Western Australia was collecting on each barrel of whale oil produced by the *Ulysses* in Shark Bay. It was impossible to determine what the agreement was between the Western Operating Corporation and the government of Western Australia. Mr. Hutchinson, the Australian inspector, was not acquainted with the agreement, but he believed the Western Operating Corporation was paying the Western Australian government a lump sum of money as a guarantee and that after a certain quantity of oil had been acquired the company had to pay so much per barrel thereafter. This agreement always remained obscure and was never discussed.

I endeavored to acquire all the information that could be obtained while appearing quite disinterested; my duties were to enforce the United States requirement. When in doubt, I never attempted to obtain information not directly pertaining to my duties by direct inquiries.

An incident occurred on the morning of October 5, 1937, which almost terminated the cruise of the *Ulysses* in a catastrophe. Two cases of powder exploded in the mid-ship magazines and set fire to the interior; this magazine contained five tons of black and smokeless powders; it was stored in tin cans, two cans to a case and there were approximately one hundred seventy-two cases. The fire burned about twenty minutes before being extinguished. If the magazine door had not been blown off by the first explosion, the flames and gases would have been unable to escape to the extent that they did; this would have undoubtedly set off the remainder of the explosives which would have evidently blown the *Ulysses* out of the water. A detailed explanation is necessary to fully realize the seriousness of the incident and the causes of it.

The magazine was located amidships on the starboard side in the section that forms a foundation for the mid-ship winch platform. The separating room is located on the outboard side of the magazine; this room contains the separators through which the oil is passed on the way to the measuring tanks; the temperature of the compartment never went below 90° F. while the *Ulysses* was working Shark Bay. A hatch leading down into the factory from the weather deck was on the forward side of the magazine. The inboard side of the magazine formed the starboard side of the aperture through which the whales were pulled from the flensing to the cutting deck. The factory was located beneath the magazine; the temperature of the factory varies between 120° F. and 160° F. during the equatorial season. The top of the magazine formed the platform on which the mid-ship winches were located. There was no form of ventilation to this powder store house; a thin veneer of cork insulation covered its interior. To my knowledge the temperature of this chamber had never been recorded. The temperature sometimes reached 112° F. in the sun during the hottest part of the day. Due to the extreme temperature in the factory six ventilator hatches had been cut in the weather deck; one of these had been inserted directly in front of the magazine door, approximately four feet from it. The net result of the location of this magazine was that it was literally an oven. On both ends of the chamber hot air was escaping from the factory at a temperature of at least 120° F.; on the outboard side the temperature never went below 90° F.; underneath, the temperature varied from 120° F. to 160° F.; on top, the temperature sometimes reached 112° F., at least during the daytime, due to the hot sun. Thus, out of the six sides forming the magazine, only one was located to offer a normal temperature. Any person with a slight knowledge of smokeless powder characteristics knows that the substance breaks down when subjected to a high-sustained temperature. This is what is believed to have caused the two cases of smokeless powder to blowup. The powder broke down gradually under weeks of sustained high temperature and on the night in question the decomposition had reached the stage where the equilibrium of the explosive had been destroyed; the explosion was the result.

A detailed explanation of my own personal actions in connection with the incident is set forth as follows:

I was awakened about 0215 on the morning of October 5, 1937. I do not know what awakened me but I had been jarred out of a sound sleep; apparently by the first explosion. The fire bell started ringing at the same moment that I sat up in my bunk.

On rising and raising the shade of the port hole that commands a view of the whole working deck, I saw a huge flame about forty feet in the air; it appeared to be coming from the starboard after side of the mid-ship structure so it was concluded that the separating room had caught fire. After getting dressed and going aft I saw that it was the powder magazine; its interior was a mass of flame. Two men couched up against the side of the bulkhead and held a hose up against the opening to the compartment. The big flame had died down; all the fire was now inside the magazine, presumably the boxes that contained the rest of the powder was burning at this time. The fire was extinguished in approximately twenty minutes from the time of the first explosion. The first explosion blew the door off the magazine and sent a thirty foot flame along the deck; this was followed by a second explosion, which sent a huge flame into the air by way of the open magazine door. After the fire was extinguished the remainder of the powder was taken out and placed on decks. The next morning I went aft and inspected the cases. Some of them were charred black from the flames and were hot to the touch; I broke open a can of black powder, it was wet and soggy. It was about 0900 in the morning and the hot sun was shining on the already hot powder, but no cover had been provided for it. I told Mr. Hansen, manager of the *Ulysses,* and Captain Mikkelsen, that the powder should be covered and that it was no longer safe due to the hot condition of the smokeless powder and the wet condition of the black powder. Mr. Hutchinson, the Australian inspector, was present during this discussion. After some deliberation a tarpaulin was placed over the powder. Later the same morning this powder was carried to the forward part of the vessel where it was to be stored in the bow of the ship on the weather deck. During the transfer two men worked with acetylene torches on opposite sides of the deck, the men carrying the powder walked between the two of them. Finally the Australian inspector told the two men that were welding to stop their work while the powder was being moved. In the afternoon the cases were broken open and the powder was thrown overboard. Its approximate value was $15,000.

It is believed that the decision to dispose of the powder was due to the attitude of the crew. They held two meetings after the incident and requested that the powder be thrown overboard. The captain and the manager did not wish to do this. The crew had previously requested the transfer of the powder from this particular magazine after the fire on the evening of July 25 but, as stated before, this request had been refused.

Efforts were made to get the eight killer boats alongside during the fire but not a single boat responded to our signals by radio and whistle; they were all drifting within two miles of the *Ulysses*. Apparently not a single man was on duty on these boats during the night. The Australian inspector was quite perturbed over this matter because passenger ships travel through Shark Bay on their way to and from Carnarvon, West Australia.

Whaling operations ceased on the evening of October 8, 1937. The Australian inspector left the *Ulysses* at 0100 on October 9, and the factory ship departed Shark Bay for Cape Town, South Africa at 1600 on the same afternoon. The *Ulysses* was accompanied by seven killer boats on the voyage across the Indian Ocean. It was necessary to stop and fuel these boats on two occasions during the passage. The killer boats later proceeded to Walvis Bay when the *Ulysses* stopped at Simon's Town.

The *H. J. Bull* and the *Ross I* had left the expedition on October 4, bound for Walvis Bay, South West Africa. The *Ross I* had been sold by Anders Jahre to a German whaling company so the *H. J. Bull* accompanied the *Ross I* on the passage to Africa as a fuel and convoy ship.

The voyage from Shark Bay to Cape Town was uneventful. Fine weather prevailed. While en route to Cape Town the *Ulysses* received orders from Sandefjord, Norway, directing her to dry dock in Simon's Town. Mr. Hansen, who acted as manager on the *Ulysses* during the Shark Bay season, accepted a new position as captain-manager with a South African whaling company operated by Mr. Larsen of Durban, South Africa. He departed the *Ulysses* via the *Uni 2*, a killer boat belonging to the South African expedition; on the evening of October 28, while about fifty miles off the southeast coast of Africa. It is interesting to note that his resignation and all the discussion pertaining thereto were directed to Anders Jahre of Sandefjord.

The *Ulysses* arrived in False Bay, off Simon's Town, South Africa at 0900 on November 1, 1937, and remained anchored there until November 3, when she entered the dry dock at the British naval base. A southerly gale struck the harbor the day the factory ship arrived; this prevented all boats from coming alongside to take any persons ashore although the crew had been aboard since leaving Sandefjord, Norway, on June 12, 1937.

Two reasons were given for dry docking the vessel. One was because the bottom had become quite fouled while in Shark Bay; the second reason was because the insurance companies wanted to inspect the hull. It is believed that Lloyds insured the *Ulysses* (about 75%) but only after some Norwegian company had assumed the first risk (about 25%). This policy is generally adopted by the majority of Norwegian whaling companies to prevent the charging of prohibitive rates. The findings and recommendations of the insurance inspectors are unknown, but they were apparently satisfied because no adverse reports emanated from their investigation.

A great deal of trouble was experienced in getting the ship in dry dock. It was impossible to maintain her on an even keel. The dock master stated it was the most difficult task he had ever undertaken at the navy yard in Simon's Town; he had dry docked scores of vessels there during his tour of duty. The *Ulysses* left the dry dock at 1100 on November 8, 1937, sailed from Simon's Town at 1630 on November 10, rounded the Cape of Good Hope at 1700 the same afternoon, and arrived in Walvis Bay, Southwest Africa, at 0940 on November 13, 1937.

Walvis Bay is a settlement of four hundred white persons and eight hundred Hottentots. There is not a single tree or grassy vegetation of any kind; nothing but miles of shifting sand dunes. There are no streets. The electric lights in the town are turned on from 1730 to 2200 daily. The place is frequently swept by sand storms when the wind blows from the east; the Namib Desert lies to the eastward of the settlement. The cold Benguela current flows northward along the coast creating a miserable climatic condition; fog occurs daily, commencing about 0400 and continuing until late in the morning. The tropical sun burns the fog away about 1100; then the afternoon is sweltering hot. The evenings are cold and damp with a heavy fall of dew.

As a result of the changing conditions approximately fifty per cent of the expedition's personnel contracted severe colds and many suffered from influenza. It was a most unfavorable place for any expedition to remain for any length of time. None of the crew was allowed ashore.

Walvis Bay is the last port of call for practically all Norwegian whaling expeditions bound from Norway to the Antarctic. A Norwegian whaling station was formerly located there but the whales were exterminated in that area; the station was then transformed into a repair depot and base for laying up killer boats between seasons. A marine railroad capable of handling three boats at a time is also located here. All the *An* and *Kos* killer boats are laid up in Walvis Bay. Several Norwegian companies were shareholders in this enterprise, but today Anders Jahre controls the interest. All his factory ships and killer boats, besides those of other companies, call in at this port for a short period while final preparations are completed before going south.

Mr. Bull, the Norwegian consul at Walvis Bay, is Jahre's business manager at the depot. All the personnel employed at the repair base are Norwegians.

The following factories arrived and departed while the *Ulysses* was in Walvis Bay:

Factory Ship	Approximate Tonnage	Crew	Flag Flown	Owners
Ross	22,000	Norwegian	Norwegian	Norwegians
Kosmos II	25,000	Norwegian	Norwegian	Norwegians (Jahre)
Pelagos	18,000	Norwegian	Norwegian	Norwegians (Jahre)
C. A. Larsen	20,000	Norwegian	Norwegian	Germans
Skytteren	18,000	Norwegian	Norwegian	Germans
Vestfold	24,000	Norwegian	Panamanian	Norwegians
Vikingen	- - -	Norwegian	Panamanian	Norwegians

Seventy killer boats were counted in Walvis Bay at one time.

Chief Officer N. Bjornsgaard left the vessel in Walvis Bay, Southwest Africa, and returned to Norway at the company's expense. Although Mr. Bjornsgaard was chief officer, and there were three other officers besides him, he had to stand eight hours of watch when the vessel was underway and twelve hours out of twenty-four when the factory was on the whaling grounds. Captain Mikkelsen was forever finding fault with this officer and his manner was always unpropitious towards him. Observations indicated that the conditions were being made purposely difficult for Bjornsgaard.

Bjornsgaard accepted the chief officer's position after he had originally applied for the command of the *Ulysses.* Bjornsgaard had replied to a newspaper advertisement in a Norwegian newspaper which stated that the officers desired for the *Ulysses* had to be naturalized American citizens and speak Norwegian proficiently. It seemed to be a case of putting American licensed officers on the *Ulysses* only to get the ship out under American registry. When the objectives of the company had been accomplished in getting the vessel cleared under the American flag they were not particular whether American citizens were officers or not. As it was, the *Ulysses* returned to the United States with only one licensed officer on deck, and that was the master.

Immediately after the departure of Mr. Bjornsgaard, Mr. Friestedt was appointed chief officer although he held no form of license and was a Norwegian citizen; he had never been employed on anything bigger than a killer boat prior to his promotion to chief officer of the *Ulysses*. This officer had no watches to stand, underway or on the whaling grounds, and seldom appeared on the bridge. It was remarkable to note the difference in the treatment accorded to this man in contrast to that shown Mr. Bjornsgaard.

The new manager for the *Ulysses*, Mr. Nicolai B. Herlofson, came aboard in Walvis Bay on the morning of November 13, 1937. He was a Norwegian and was formerly the fourth officer on the *Pelagos* and later served as captain of the *Anglo-Norsk*. His uncle had a large interest in Norwegian whaling and owns a large share of the stock in the *Pelagos* and *Anglo-Norsk*. The new manager was appointed by Anders Jahre because Jahre had disregarded and broke the contract he had with Herlofson to take the *Anglo-Norsk* into Shark Bay for the season of 1937. The *Ulysses* used the *Anglo-Norsk* license; the *Anglo-Norsk* was laid-up and Herlofson lost his position. Therefore, Jahre endeavored to reimburse Herlofson by sending him to the *Ulysses*.

The *Ulysses* came alongside the *Kosmos II* at 2200 on the evening of November 13; the *Kosmos II* arrived in Walvis Bay from Norway at 1900 on that date. The *Kosmos II* is a 25,000 ton factory ship built in Belfast, Ireland. Owned by Anders Jahre, it is capable of making 2,200 barrels of oil in twenty-four hours; with her eight killer boats she was valued at 4.5 million dollars. The *Ulysses* received tons of provisions and tons of whaling gear from the *Kosmos*. Also, some more Norwegian personnel arrangements were made and completed for taking approximately 5,000 tons of fuel oil from the *Kosmos II;* but early in the morning of November 14, 1937, orders were received from Norway to stop fueling. All sorts of rumors developed; reports were circulated that the whale oil on the *Charles Racine* was found to be bad because it had fuel oil in it; another rumor stated that the *Ulysses* was going sperm whaling off Peru. Regardless of the rumors, it was learned that the *Charles Racine* was not allowed to discharge her cargo in Norfolk, Virginia, and that she was at sea off the Virginia Capes; also that the United States Government had refused to grant licenses to the new killer boats that the *Ulysses* had received in Walvis Bay which were to be used in the Antarctic.

The *Kosmos II* expedition departed Walvis Bay for the Antarctic at 1030 on 19 November 19, 1937. Word was received on the *Ulysses* that the *Racine* entered Norfolk, Virginia on November 24, but the expedition still remained at anchor; the captain, manager, crew, nor anyone else had the slightest ideas what was actually delaying the sailing orders. The *An* and *Kos* killer boats that had been used in Australia had been decommissioned and laid-up; the new boats, *Kos 21, Kos 23*, etc., had arrived in Walvis Bay and were ready to sail. At 1630 on November 27, the *Ulysses* received word to proceed to Cape Town, South Africa, for fuel, and from there to the Antarctic. The killer boats without American licenses were ordered to join the *Kosmos II* expedition and those that had American licenses were ordered over to the *Ulysses*. The result was that several of the killer boats that had been used in Australia and laid-up had to be taken out and refitted for another season in the ice.

The *Kos 6, 7, 11, 21, 22*, and *23* accompanied the *Ulysses* when she sailed from Walvis Bay at 2230 on November 27 for Cape Town.

On November 28, the *Ulysses* received a dispatch from Anders Jahre requesting that I notify the Bureau of Fisheries in Washington, D. C. of the difficulty encountered in determining the lengths of whales while shooting them. Captain Mikkelsen was informed that such information had been sent to Coast Guard Headquarters in September, 1937, and that Mr. Jahre could assume the Bureau of Fisheries was acquainted with the situation.

Whaling Factory Ship *Ulysses*,
Bound Walvis Bay to Cape Town
November 28, 1937

Captain H. M. Mikkelsen,
S. S. ULYSSES.

Dear Sir:

With reference to the inquiries made by Mr. Jahre, you are advised that the United States Coast Guard was informed last Sep., 1937 of the difficulty in ascertaining the lengths of whales while shooting them. The department was also advised that Manager Hansen informed me that the gunners were not being paid for whales under thirty-five feet in length, and that the gunners had been cognizant of this limit from the commencement of operations.

The first report also contained the information that out of fairness to the expedition no short whales were checked against the gunners during the first week in order to allow them to become acquainted with the legal length without penalty.

It can be presumed that such information was forwarded to the Bureau of Fisheries.

Q. R. WALSH, Lieut. (j.g.) U.S.C.G.
Inspector.

The *Ulysses* arrived in Cape Town at 1230 on November 30, took on approximately five thousand tons of fuel oil, and sailed at 0330 on December 1, 1937, for the Antarctic. The killer boats remained outside the port while the factory ship was taking oil; these boats were fueled when the *Ulysses* came out of Cape Town. The fueling was completed by 1100 and the expedition left the vicinity of the Cape of Good Hope. The boats scheduled to join the *Kosmos II* expedition left the *Ulysses* at this time.

On December 2, a discussion took place between the captain and the manager of the *Ulysses* and the inspector concerning the interpretation that was to be placed on Section Six of The Whaling Treaty Act. Manager Herlofson was particularly interested in the amount of meat and bone that the law required to be processed. He was informed that not only were the specific parts of the carcass to be used set forth in the subject section, but that the spirit of the law required the *Ulysses* to utilize as much of the carcass as would yield oil. The *Ulysses* commenced operations in the Antarctic by adhering to The Whaling Treaty Act of 1936 and agreed to abide by the International Agreement for the Regulation of Whaling on December 13, 1937. However, the factory failed to adhere to the new law that the owners had voluntarily promised to accept.

On December 5, in position 49°34′ S; 18°46′ E, the expedition encountered a severe storm. The factory ship lost a ventilator on the weather side and killer boat *Kos 6* lost her lifeboats. A mountainous sea was running with a southwest wind of gale force;

the expedition hove to for about eight hours. An extreme change in the temperature was noted after crossing 50° S. The expedition encountered pack ice and table bergs on December 7 in 53°20 S; 14° 58 E.

The *Ulysses* commenced the Antarctic season at 1000 on December 8, 1937, in a position approximately fourteen hundred miles south of the Cape of Good Hope; the *Ulysses* worked south and west for ninety-eight days, concluding operations on March 15, 1938, in position 63°43′ S; 26°01′ W. During the entire period in the Antarctic, the expedition stopped work for only six hours—Christmas Eve; the factory worked twenty-four hours a day with the crew operating in two watches of twelve hours on and twelve hours off, nothing was allowed to interfere with the routine and nothing broke the monotony.

On December 29, 1937, the *Ulysses* was nipped by the ice and had a hole stove in her port side amidships in the vicinity of the water line; the hole was three feet long and two inches wide. Repairs could not be made. According to a statement made to me by the manager, three thousand barrels of oil leaked through this hole; a storage tank was located at the point where the damage occurred. The loss of this oil was sheer negligence on the part of those in charge of operations. The oil should have been pumped from the damaged tank to another compartment, and then back to the separating room to the purifiers. The water could have been removed at the separators and the oil could have been saved.

The *Ulysses* had need of transports throughout her operations in the Antarctic. The *Vikingen* came alongside the *Ulysses* on December 30, 1937, in 57°06′ S; 12°06′ E and gave the factory nine hundred tons of fresh water. The *Vikingen* is a modern whaling factory that is owned by Norwegians, but flies the Panamanian flag. The persons controlling the whaling industry in Norway decided the *Vikingen* was not to work the 1937-1938 Antarctic season because of the large number of expeditions already down there; the vessel thereby acted as a transport to the various Norwegian expeditions; carrying water and provisions where necessary and taking whale oil to Holland in exchange. The *Vikingen* left the *Ulysses* at 0130 on January 2, 1938. It is fortunate that the *Vikingen* was present at such an early date. The *Kosmos* coming from Norway with fuel oil for the expeditions later developed boiler trouble and had to be repaired in Rio de Janeiro, Brazil.

The *Florida*, an oil tanker owned and operated by the Texas Oil Company of the United States, contacted the *Ulysses* on the morning of January 17, 1938, in 58°04′ S;07° 30′ E. The *Florida* had previously carried a cargo of gasoline from Texas to South Africa, discharged her cargo, and took on five thousand tons of fresh water at Durban, South Africa; she departed Durban on January 9. From conversations with the crew and officers of this ship it seems that a rather harrowing experience was encountered when the *Florida* met the ice and fog of the Antarctic.

The *Florida* endeavored to maintain her speed to keep her schedule with the *Ulysses*. It was necessary that this transport reach the *Ulysses* at an early date in order to take whale oil and give fresh water to the expedition. The *Florida* was alongside the *Ulysses* about four hours when a gale struck. In standing off, the *Florida* smashed in the factory's starboard quarter and sprung several of her own bulkheads, besides smashing her port quarter. An effort had been made to transfer cargoes in the open sea. As a result of the storm, the expedition and the *Florida* commenced to run south to find the ice. This led to a controversy between the gunners and the master of the *Ulysses*.

The gunners wanted to hunt whales and were not interested in any other phase of the operations. The manager and captain of the *Ulysses* wished to find the pack ice and contact the *Florida*, discharge the whale oil and take on the fresh water; they were not vitally interested in the whale catch at that time, but only wished to discharge the *Florida*. It was stated that the Western Operating Corporation was paying one thousand dollars a day for the services of the transport after the tenth day that the *Florida* contacted the expedition. To carry out the plan of the master meant loss of money to the gunners but a saving to the owners.

In the difference of opinion that occurred, the gunner-leader of the expedition, Martinsen of the *H. J. Bull*, apparently had more authority because the expedition followed his orders. The result was that the *Ulysses* did not contact the *Florida* (to allow that vessel to depart as expeditiously as could have been arranged,) and the gunners did not get many whales because the *H. J. Bull* was the only one adapted to hunting the fast swimming fin whale in the open sea. This led to a controversy between the rest of the gunners and Martinsen. It was merely a case of the gunner-leader sacrificing the interest of the entire expedition for his own personal gain. This circumstance was openly discussed by the master and manager of the *Ulysses*. Captain Mikkelsen's position as master of the ship degenerated to the point where he merely had the United States license and followed the instructions issued by Martinsen, who was leader of the expedition by contract to Anders Jahre. Several instances arose where Mikkelsen accepted the instructions of Martinsen even though they were against his better judgment. Occasionally the situation developed where neither the master nor the manager knew where the expedition was going; they were following the killer boats under Martinsen.

The killer boats finally got some whales for fenders and the *Florida* again contacted the *Ulysses* on January 20, 1938, in 61°45′ S; 8°00′ E, remaining alongside until the morning of January 22, when she departed and the *Vikingen* came alongside the *Ulysses*. The *Vikingen* discharged fuel oil and departed January 23.

The *Ulysses* expedition worked in harmony with the *Kosmos II* expedition. Whaling and weather information were exchanged almost daily; the catch records and production data were exchanged frequently. Both expeditions used the same code;

observations indicated that both factories were working under the same principles to fulfill a common mission with the same interest.

The *Florida* again contacted the *Ulysses* at 1700 on February 3, in 61°26′ S; 19°12′ E and obtained the last of 11,526 tons of whale oil. The tanker sailed for the United States on the morning of February 5. Captain Mikkelsen, Chief Officer Friestedt, and Chief Enginemen Schmidt were sworn to the truth of Customs Form 3295 prior to the departure of the transport for the United States.

After discharging her cargo to the *Florida*, the *Ulysses* possessed a list to either port or starboard for several days. Such a condition is an annoyance and is dangerous on a factory ship because the carcasses have to be lashed down before they are worked. If this precaution is not taken the carcasses slide to one side of the vessel as it rolls and pitches in a seaway.

As the season advanced, the difference of opinion between Martinsen and the other members of the expedition became more acute. Captain Mikkelsen and Manager Herlofson wished to remain near the ice to give the gunners with the slow boats more of a chance in the hunting; here they would have a greater opportunity of getting more blue than fin whales. Martinsen wished to work north and west to open water, but he was one of the few gunners equipped with a killer boat for that type of hunting. The expedition worked as Martinsen directed but it is believed the financial returns suffered as a result. Manager Herlofson had been directed by persons in Norway to work south and east when he joined the expedition whereas Martinsen worked the opposite direction.

A certain three-way tension develops between a master of the ship, a manager of the factory, and a gunner-leader. The master is interested in the safety of the ship, the manager is concerned with production results, and the gunner-leader thinks only of finding and killing whales. For all practical purposes a manager can be dispensed with; he does nothing on the ship that has any important bearing on the production or results attained. If truth be told, the master can do the manager's work without inconvenience. Concerning the gunner-leader, he stays on his own boat, has no idea how the work is progressing on the factory, and does not know where the other boats may be, or what their catch is; in general, he is out of touch with details which he should know. An expedition should be controlled by a combination captain-manager, and if a decision arises contrary to the opinion of the gunner-leader the captain should decide the issue. Modern whaling expeditions seem to be encumbered by persons in high salaried positions who are friends or relations of influential people. The Western Operating Corporation would benefit if they turned the control of their enterprise over to Captain Mikkelsen and discharged those with high salaries, but whom are doing little, mentally or otherwise, to aid production.

This opinion may seem a bit candid but the situation exists as explained. Captain Mikkelsen is not averse to disregarding legal requirements and restrictions, but he has the interest of the company foremost in his mind at all times. The manager, chief officer, and ship's secretary, not only failed to recompense the company for their salaries, but their presence on such an expedition is entirely needless.

The *Ulysses* frequently sent a killer boat off on a scouting trip or other mission. The departure and return of these boats were never made known to the inspector, nor were the results and scouted areas discussed in his presence; in fact, the incidents and all the surrounding circumstances were never mentioned. The movements of these boats were easily checked, because one of the three radio men had to be detached from the factory ship to make the voyages. In this way it was possible to not only check the departure and return of the boats, but in general to learn what the purpose of the journey was and what was accomplished. The reason for surreptitiousness in conducting this phase of operations is still unknown.

The *Kosmos* again contacted the *Ulysses* on 19 February 19, in 62°35′ S; 20°44′ W and transferred tons of provisions, whaling gear, and fuel oil to the expedition. The *Kosmos* departed on February 22, 1938.

As the Antarctic season drew to a close, there was much curious discussion concerning the future plans of the expedition. Rumors were rampant. Apparently, it was the intention of the owners to send the killer boats back to Walvis Bay, Southwest Africa and allow them to be made ready for future operations; the factory ship was to proceed to Rio de Janeiro, discharge her remaining whale oil to an American tanker, perhaps take on some American personnel, and cross to Durban, South Africa, for repairs. Upon completing repairs, the factory was to meet her killer boats and proceed to Australia for another season of whaling. The personnel on the *Ulysses* at the end of the Antarctic season were to be given a choice. They could go home via the *Kosmos* or ship over for another season in Australia at reduced wages. The crew was given two and a half hours notice to make their choice. A few signed for another season but the majority agreed not to sign until approval was given by the Norwegian Whaling Union concerning the reduced wages. The Union refused to let the crew sign for another season at reduced wages so approximately one hundred eighty-seven men were transferred to the *Kosmos* on March 16, 1938 in 63°43′ S; 26°01′ W.

Apparently this is exactly what the Western Operating Corporation wanted; they had to get rid of the Norwegian personnel if American seamen were to be shipped to Rio or elsewhere before the beginning of the next season. However, it is known from conversations with Manager Herlofson that Anders Jahre exerted a tremendous influence on certain persons in the Norwegian Whaling Union; the same influence must have been exerted when Jahre had the *Ulysses* changed from a "B" class to an "A" class ship previous to departure for the Antarctic. Regardless of the wage controversy, the whaling crew from the *Ulysses*, those who wanted another season and those who wanted to go home, were ordered aboard the *Kosmos* on the morning of March 16. The objective of the owners was accomplished; the factory no longer had her whaling crew aboard and could take American seamen at Rio, proceed to New York, or go to Australia after taking another crew. Fifty-seven men remained aboard the *Ulysses*, fifty-three of which were Norwegian citizens.

The manner and legality of this transfer, the method of payment, and all other details should be thoroughly checked to determine if the navigational laws were observed.

The *Ulysses* departed the whaling ground at 1215 on March 16, 1938, passed one hundred thirty miles to the eastward of South Georgia, and steered a course allowing her to make Rio de Janeiro or Pernambuca, Brazil, depending on future orders. On March 18, 1938 the *Ulysses* received orders to proceed to New York. The vessel rounded Cape San Rogue, Brazil on March 29, crossed the equator at 39° W on March 31, and arrived in New York at 2212 on April 11, 1938. A distance of approximately seven thousand miles was traversed on the voyage from the Weddell Sea to New York; Sandy Hook was the first land sighted since leaving the Cape of Good Hope on December 1, 1937.

The *Ulysses* arrived in New York exactly ten months after her departure from Sandefjord, Norway. During these ten months the factory was actually in port eight days, cruised 29,950 miles, killed 3,596 whales, and obtained 191,030 barrels of oil.

Section 3: The Shark Bay season

The *Ulysses* expedition killed two thousand thirty-seven whales and processed approximately seventy-nine thousand barrels of oil in Shark Bay, Australia, during the equatorial season.

Shark Bay is located on the west coast of Australia just south of the Tropic of Capricorn in the territory of Western Australia. The bay is formed on the west between Bernier, Dorre, and Dirk Hartogs islands, which extend in a north-south direction and lie approximately twenty-six miles off the mainland, and on the east and south by the low mainland for a distance of about one hundred thirty miles southward from Charles Point. The greater and southern portion of the bay is divided into two arms by Peron Peninsula, the western leading through Denham Sound, between many shoals, into Freycinet Estuary and some un-navigable inlets, and the eastern through Hopeless Reach, towards Hamelin Pool. The northern portion of the bay is deep and available to all classes of vessels. The southern end is shallow and available to only killer boats of whaling expeditions.

Bernier Island is the northernmost of the three principal islands forming the western side of Shark Bay; the island is fifteen miles long and two miles wide. The northern end of Bernier Island, Cape Ronsard, is twenty miles southeastward from

Charles Point, which is on the mainland. Geographe Channel lies between Cape Ronsard and Point Charles. Dorre Island is separated from the southern end of Bernier Island by a rocky impassable channel about one mile wide. This island is seventeen miles long and two miles wide; Cape St. Cricq is located at the southern end. Naturaliste Channel runs between Cape St. Cricq and Cape Inscription which is on the northern end of Dirk Hartogs Island. Dirk Hartogs Island runs north and south below Naturaliste Channel and stands to the north of Edel Land. There is a small unnavigable passage between Dirk Hartogs Island and Edel Land. The southern end of Shark Bay is formed by the coast of Australia jutting out to form the peninsula of Peron Land. Denham Sound lies to the west of Peron Peninsula while Hopeless Reach is located to the east of it. Peron Flats lie off the northern end of Peron Peninsula.

There are two main ship channels to Shark Bay. Geographe Channel, the northern entrance, is twenty miles wide between Charles Point on the east and Cape Ronsard, the northern end of Bernier Island, on the west. The depth of this channel varies from twenty to thirty fathoms in the fairway. Naturaliste Channel is the western and southern entrance to the bay, is fourteen miles wide, has a depth of thirty-six fathoms, and extends from Cape St. Cricq to Cape Inscription.

The *Ulysses* processed her whales and manufactured the whale oil within the territorial limits of Australia and within the port limits of Carnarvon, Western Australia. Carnarvon, the chief town of the large pastoral district of Gascoyne, is situated on the southern bank of the Gascoyne River. The population of Carnarvon is approximately seven hundred persons.

The port limits of Carnarvon are determined as follows:

A line southwestward from Charles Point to Cape Ronsard (24°46′ S; 113°09′ E); the western coast of Bernier and Dorre Islands to Cape St. Cricq; a straight line to Cape Inscription; the western coasts of Dirk Hartogs Island to Surf Point; a straight line to Steep Point on the mainland and the southern and eastern shores of Shark Bay from Steep Point to Charles Point.

The *Ulysses* entered Shark Bay via Geographe Channel at 1345 on July 24, 1937, and anchored in position 24°51′ S; 113°15′ E. This position is twenty-one miles off the coast of Australia and five miles to the eastward of Bernier Island. The first whale was taken aboard the factory ship at 1600 on July 24.

On the voyage from Chagos Archipelago to Australia a memorandum was submitted to Captain Mikkelsen concerning the lengths of the whales that could be legally captured by the expedition. The *Ulysses* did not possess a copy of the United States Whaling Regulations. However, a pamphlet containing those regulations was given to Captain Mikkelsen before the vessel arrived in Shark Bay. The laws governing the taking of the whales and the amount of the carcass that was to be utilized was also explained to Mr. Hansen, factory manager of the *Ulysses*. Therefore, both Captain Mikkelsen and Manager Hansen were acquainted with the requirements of the United

States whaling laws prior to the arrival of the *Ulysses* in Shark Bay. Inquiries indicated that the gunners were not being paid by the number of whales captured, but by the quantity of oil produced. At this time a strong tendency was noted to cite the requirements of the Norwegian whaling regulations, but it was not known nor was any mention made of the fact that the gunners had contracts with the company. The impression was created that the gunners were merely signed on like the rest of the crew, deriving a certain salary and so much per barrel of whale oil obtained.

When operations commenced, it was realized that the gunners might kill some short whales by misjudgment. Although possible it, is very difficult to ascertain the length of a whale as one comes to the surface since it remains in sight for only a few seconds. Therefore, during the first week permission was granted to change the lengths of three undersize whales that were inspected to thirty-five feet. These particular whales varied from thirty-two to thirty-four feet in length. Any whales that were taken aboard after the first week that were below thirty-five feet in length were noted regardless of the circumstances. There were twenty-six short whales killed the first month. The inspector is prone to vouch for the accuracy of the records only for the time that he was on deck, although some short whales were noted during the night when he was not on deck.

On August 10, the manager was queried concerning the size of whales that were being taken aboard. He spoke to the gunners about the matter and ordered them to take only the big ones because they were not getting paid for the small ones under thirty-five feet.

Lieutenant Craik came aboard the *Ulysses* from the whaling factory ship *Frango* on the night of August 12. [James D. Craik was a 1932 graduate of the Coast Guard Academy. Unlike Walsh, who was called the living embodiment of the exclamation point, Craik was described in his class yearbook as "the strong, silent man of the East." Like Walsh, Craik spent eight months on board a whaling factory ship. In fact, Craik was the first Coast Guard officer selected for this duty (*Coast Guard Magazine* 10 (6): 10). He learned Norwegian, and afterwards reported that: "In one season in the Antarctic a modern whaler can get as much whaling oil as the old-fashioned boats got in 30 years of whaling (*Coast Guard Magazine* 11 (4): 16). Craik retired in the 1960s as a Rear Admiral—ed.]

Views and details of the duty were exchanged and he informed me of the orders that he had received from Headquarters pertaining to the operations of the *Ulysses* and the *Frango* concerning the observance of the United States regulations regardless of where the ships were operating or what flag the killer boats were flying. Lieutenant Craik also stated that he had definite information that the gunners of Western Operating Corporation expedition had contracts for a thirty foot limit on humpback whales and the gunners were under the impression they were being paid for the short ones. Captain Mikkelsen was interviewed on the morning of August 13, 1937, concerning those agreements and the request was made that he produce the contracts. He exhibited the agreements and translated them; they were written in Norwegian. The clause specifying thirty foot humpbacks as a legal catch was contained in the contract. He stated, however, that the gunners were not getting paid for whales under thirty-five feet and that they had been informed of this matter before the commencement of operations. The illegal contracts were reported to Headquarters with the suggestion that a satisfactory explanation be obtained from the Western Operating Corporation concerning the contracts. If the explanation was not satisfactory all the products derived from the short whales should be confiscated and the corporation fined in accordance with Section Ten and Section Eleven of the whaling regulations as issued by the Department of Commerce.

However, the existence of the contracts had no effect on the enforcement of the Unites States regulations at any time of operations. All whales inspected below thirty-five feet were noted and a check was maintained to see that the requirements were carried out concerning the parts of the carcass to be used. There was no difficulty enforcing this phase of the law. Every part of the whale was used except the baleen and the radius-ulna section of the pectoral fin.

It should be noted at this time that the persons in authority on this expedition were apparently not vitally interested in adhering to the requirements of the United States whaling regulations. The greatest care was taken at all times to strictly conform with the Norwegian laws but the attitude was prevalent that the United States requirements could be entirely disregarded, conformed to at leisure, or complied with only when remonstrations were made by the inspector. For instance, the captain of the ship personally kept records most scrupulously to satisfy the Norwegian laws, but the United States requirements would have been greatly in error if daily notes and a rough copy of Form WI-1(Department of Commerce) had not been kept by the inspector for his own personal information. The Australian forms for keeping the records of the catch and the information required by the Norwegian laws were compiled by the ship's secretary. It was necessary for the inspector to keep a rough copy of Form WI-1, and from this record the radio operator made the official copy that was sent to the Bureau of Fisheries. It was apparent that those in clerical and authoritative positions were most careful to see that all the records pertaining to the operations were scrupulously kept, except those concerning the United States laws. These records were given over to the radio department for maintenance and for the inspector to record although it was only his duty to see that the records were accurately kept and the laws obeyed.

It was necessary to interview the captain on three different occasions concerning the preservation of the stomach contents in formalin before this requirement was finally and correctly carried out. The ship's secretary was under the impression that this was the duty of the United States inspector. The ship's records were grossly in error during the first month of operations since only half the short whales had been recorded; this situation was finally corrected by a letter to the manager.

These facts are all stated to portray to what extent the United States laws were respected on a whaling ship of United States registry, but fully manned by Norwegians.

During the Shark Bay season extra precautions were taken to maintain Form WI-1 as correctly as possible because they had to be approved before forwarding to Washington, D.C.; a different attitude was assumed during the Antarctic season.

It was impossible for one inspector to check the complete operations of a factory ship as large as the *Ulysses*. From the time of the arrival of the expedition in Shark Bay the factory operated twenty-four hours a day, seven days a week. The inspector was on deck from eight thirty in the morning until five thirty in the afternoon. He had an hour for lunch and one-half hour for coffee with the rest of the ship's complement. Practically all the time on deck had to be spent at the stern of the vessel checking the lengths of the whales when they were hauled aboard. The ship flensed as many as forty-four whales in twenty-four hours or twenty hours of actual working time. Due to the continuous system, only about forty per cent of the whales taken in Shark Bay were actually checked.

The system used in measuring was carefully carried out. The ramp in the stern of the vessel by which the whales are pulled aboard to the flensing deck was marked off in feet. By standing on the side of the ramp it was possible to ascertain the length of the whale as it was pulled to the flensing deck. If the whale was above thirty-five feet no further check was made, but if the whale was approximately thirty-five feet or shorter a hand measuring rod was used by the foreman in my presence. The length, sex, and species of the whales were then noted on a tally board which also contained the lists of killer boats. The information from this board was noted by the ship's secretary at 0600 and 1800 daily. These figures were checked daily and kept on my rough copy of Form WI-1. In this way a check could be made at the end of the month from my own records and various notes. It may seem peculiar that groups of whales appear on or about thirty-five feet on the record sheets, but whales have been checked coming aboard, four or five in succession, that were thirty-five feet or just longer. Absolutely no change in the figures concerning the lengths occurred after the first week if my records indicated a short whale; towards the latter part of the season one gunner brought in five whales; three of them were below thirty-five feet and were noted accordingly. Needless to say, the gunner was quite chagrined; this particular incident occurred on killer boat *Ross I.*

There was no difficulty in enforcing the clause concerning the proper use of certain sections of the carcass. The humpback whales were in such fine condition at the beginning of the season that it paid the factory to use all of the whale. Estimated figures indicate that they were deriving fifty per cent of the oil from the blubber and tongue and fifty per cent from the bone and meat. The whales were so numerous at the beginning of the season that the manager had to limit the daily catch. Some restraint was necessary because humpbacks commence to deteriorate rapidly if not processed within thirty-six hours after being killed. The *Ulysses* was having difficulty with her water supply and this hindered the operations continually. By early afternoon the inspector would have seen tons of meat waiting to be put into the cooking system; flensed whales covering the flensing deck, preventing any more whales from being worked; twenty-three dead whales secured astern; and the killer boats were drifting, their work done for the day. There must have been thousands of whales in Shark Bay during the months of July and August.

Various reports came to the *Ulysses* via the Australian newspapers concerning the stranding of dead whales on the shores of Shark Bay. These whales were not seen, nor was it possible to check their identity by examining the harpoon numbers to ascertain what boats killed them. It is believed that these carcasses might have drifted ashore before the killer boats could retrieve them. It is routine of killer boats to flag a whale after it is killed; they always flag the whale and cast it adrift if they are towing it alongside when another whale is sighted which they wish to hunt. Carcasses are liable to drift ashore because of such procedure. From the large number of whales killed in Shark Bay and brought to the factory, the *Ulysses* failed to process only seven of them. Some of these whales were mangled by sharks to the extent that they could not be handled; others were used as fenders between the factory ship and those vessels that came alongside. However, all the whales not processed were towed out to sea. The Australian inspector was very particular about this requirement.

Observations indicate that there was a growing animosity towards whaling ships of foreign registry operating off the Australian coast. The Australians were deriving very little financial return from the two expeditions when it was considered that the whaling ships were making thousand of dollars daily off the coast. The *Ulysses* bought tons of provisions and tons of water while off Australia. The business firms appreciated this, but the majority of people held a different attitude. For instance, the town of Carnarvon was selling tons of water to the Western Operating Corporation expedition and yet the people in the town were so short of water they were allowed to water their gardens at only certain periods of the day. The *Ulysses* expedition did not use their radio equipment any more than was absolutely necessary, but it is understood that their communication interfered with the broadcast receptions ashore. The *Frango* expedition was more responsible for this feeling of animosity than the *Ulysses* outfit. During the season of 1936, the *Frango* anchored in Shark Bay and processed hundreds of whales when she had no right to be within these waters because she had no license. They stripped the blubber from the whales and cast the carcasses adrift. The carcasses drifted ashore and became the breeding place for a certain species of fly that infects sheep. The sheep ranches along the mainland were subjected to having their flocks infected as a result. One rancher took pictures and noted various other information concerning these conditions and sent them to the Australian capital at Canberra with a protest against foreign whaling off the coast. The various business concerns noted that the *Frango* failed to buy any provisions while off the coast of Australia; they assumed that expedition was getting all they could from Australia and giving nothing in return.

Mr. A. Hutchinson, the Australian inspector who by vocation is master of a dredge in Freemantle, came aboard the *Ulysses* the day the vessel arrived in Shark Bay. He was assigned by the Bureau of Fisheries of Western Australia to cover the whaling operations merely because the government wanted to give him a position during the period that his dredge was not operating. He was given verbal instructions when first assigned to the duty to protect "immature whales," females with calves, and to observe that no dead whales were allowed to strand on the coast. The Australian law forbids compensation to a gunner if a female with milk present is killed. The ship's secretary was supposed to keep a list of milk whales reported by the flensing deck foreman, but when the season was half over Mr. Hutchinson found that this list was not being kept by the ship. About the middle of September, 1937, Mr. Hutchinson received instructions from his department that the Australian law forbade the killing of humpback whales below thirty-five feet in length and that the Western Australian Government had decided to abide by the International Whaling Convention. Although it makes no material difference it has been impossible to determine whether this convention was the one approved by the United States in 1936 or the one ratified by the

United States on August 5, 1937. Mr. Hutchinson was given the assignment merely because someone had to fill the position; he left the *Ulysses* knowing as much about whaling and whales as he did when he first came aboard. The gunners were paid for the milk whales and the Australian government did not seem vitally interested in any of the legal phases as long as the *Ulysses* produced her oil and paid the duty on it.

The Australian license is reputed to be issued by the government of Western Australia, not by the Commonwealth Government. The license was purchased by Anders Jahre through Captain Melsom of Perth, Australia. Melsom was born in Norway but had lived in Australia for over thirty years and had become a citizen of that country. Melsom assumed the name of the Western Operating Corporation's agent in Australia and received a certain sum of money per barrel of oil produced. The exact clauses of this particular agreement are unknown. The Western Operating Corporation has the right to work the Shark Bay area for two seasons; a season consists of one hundred five days with the right to a three year extension.

From various sources it is understood that the Australian license required the killer boats to hunt within three miles of the land forming Shark Bay and that the *Ulysses* was supposed to remain outside. However, the *Ulysses* anchored in Shark Bay and killer boats hunted at any place or time they sighted whales. Under ordinary circumstances, the *Ulysses* was supposed to pay the Australian government duty for all the provisions consumed by the expedition during the sojourn in Shark Bay. This duty was not paid. It is believed that special privileges entered into the granting of the Australian license to a certain extent and that certain requirements were overlooked where the Western Operating Corporation expedition was concerned.

The Australian license was never examined, nor was the Australian inspector familiar with its requirements; he had never seen the license. Strictly speaking, this document is of no particular interest to the American inspector. The attitude was assumed that the *Ulysses* and her killer boats were to abide by the United States regulations regardless of the geographical position of the expedition. When incidents occurred that involved the United States requirements the matter was investigated immediately by direct inquiries to those in authority. Needless to say, it would have been quite enlightening to have examined the Australian license.

It is estimated that the *Ulysses* lost approximately sixty-five thousand barrels of oil by arriving at such a late date in Shark Bay and because the factory was short of water during the period of operations when the whales were most abundant. The first whale was killed in Shark Bay on June 16, 1937, by one of the *Frango* killer boats. Persons familiar with the area state that the whales came about two weeks early for the 1937 season and departed early. The *Ulysses* arrived at the height of the season. When the whales were most abundant the production was hampered by the extreme heat in the factory and as previously stated, the shortage of water. The heat below decks was partly eliminated by the construction of hatches but the water problem remained acute.

Hundreds of dollars were spent in radio messages between Mr. Jahre in Sandefjord and Mr. Hansen, the factory manager, concerning this problem. Mr. Jahre wanted to send a man from Norway to Australia via plane to investigate the trouble, but the man refused to make the trip; this man was employed by the company that installed the evaporators on the *Ulysses*. The killer boat *H. J. Bull* transported tons of water from Carnarvon, West Australia; it cost the Western Operating Corporation thousands of dollars for the supply. The *Bull* could only transport about two hundred fifty tons every third day—this was not sufficient. A modern whaling factory requires one barrel of water to every barrel of oil derived from the whale. The *Ulysses* could manufacture approximately one hundred sixty tons with her own evaporators; she required about three hundred tons of water per day. When production was at its maximum she was producing sixteen hundred barrels of whale oil per day and could have made eighteen hundred barrels a day if the supply of water was unlimited. The *Ulysses* should have had evaporators with an output of four hundred tons to adequately supply all the needs of the factory, provide for the killer boats, and produce the whale oil. The engineers of the *Ulysses* are partially responsible for the shortage of water. The evaporators were not kept clean; they were partly plugged up with dirt. A three and one-half inch pipe conducted steam from the boilers to the evaporators but there were numerous connections attached to this line that carried steam to winches, galley, etc. The net result was that by the time the steam pressure got to the evaporators it was approximately two pounds instead of the required six; and even this pressure varied. The man from the factory checked the production of the evaporators in Walvis Bay, South West Africa. He derived about two hundred tons of water under the same conditions as when the ship obtained only one hundred and sixty tons in Shark Bay. This matter should have been checked in Göteborg, Sweden, before the departure of the factory ship but haste to get the ship out overruled all better judgment with the result that it cost the owners thousands of dollars needlessly. During the period in Shark Bay, the *H. J. Bull* transported thirty-seven hundred tons of water at a cost of approximately two thousand dollars; by lack of water the Western Operating Corporation lost over one hundred fifty thousand dollars, and by arriving late they lost approximately one million dollars. Modern whaling is conducted at tremendous expense but the financial returns are enormous. The losses enumerated above can be approximately determined as follows:

<u>The water loss:</u>

The expedition was in Shark Bay exactly seventy days. In half this time the *Ulysses* could have made eighteen hundred barrels of oil if her water supply had been ample. Therefore, seven thousand barrels of oil, or approximately one thousand tons were lost from lack of water. One thousand tons multiplied by the market price, which was about one hundred fifty dollars while the ship was in Australia, this illustrates the financial loss. In addition, the two thousand dollars for the water purchased in

Carnarvon, the cost of all the radio messages to Norway, and the expense of bringing the man to Walvis Bay from the factory to check the evaporators must be noted. The entire loss amounted to approximately one hundred fifty thousand dollars [approximate $2,200,000 in 2007 dollars].

<u>Loss due to arriving late:</u>

It is estimated that the *Ulysses* arrived in Shark Bay between four and six weeks too late; the company had originally planned to have her on the Australian coast by the middle of June at the latest. Therefore, it is estimated that the expedition lost thirty days during which time they could have averaged approximately twelve hundred barrels of oil per day. This loss multiplied by the market price totals approximately one million dollars [approximately $15,000,000 in 2007 dollars].

During the Shark Bay season the *Ulysses* used eight killer boats and one scout boat, the *H. J. Bull*. This vessel acted not only as a scout but as a general dispatch boat, transport, and also performed any other details that might be required of her. She is one of the biggest killer boats in the world; she was not rigged for hunting during the equatorial season. The reason why the *Bull* was not used on the Australian coast is that a Norwegian whaling regulation would have prevented her employment by Mr. Jahre when he sent his whaling factory ship *Kosmos II* to the Antarctic. This Norwegian law is supposed to prohibit a vessel from working the equatorial waters and the Antarctic in succession. However, later developments indicated that this law was not enforced. The only time the *Bull* took whales from the other killer boats in Shark Bay was when she was coming alongside the factory ship with the dead whales acting as fenders.

The following killer boats were used by the *Ulysses* in Shark Bay:

Killer Boat	Gunner	Flag Flown	U.S.License Number	Nationality Of Crew
Ross I	S. Jahre	Norwegian	28	Norwegian
Hval I	D. Hansen	Norwegian	27	Norwegian
A.N. I	Barth	English	31	Norwegian
A.N. 4	Evensen	English	25	Norwegian
A.N. 5	T. Hansen	English	26	Norwegian
Kos. I	Martinsen	Norwegian	29	Norwegian
Kos. II	Iversen	Norwegian	30	Norwegian
Kos. IX	Fagerli	Norwegian	33*	Norwegian

*This boat substituted for *A.N.II*, which did not come to Australia; licensed issued to *A.N.II* but used by *Kos. IX.*

It is interesting to note that the crews of the killer boats were Norwegians. All these boats were chartered by the Western Operating Corporation through Anders Jahre. The license for these boats came to the factory ship via Jahre's office in Norway. The boats designated by *A.N.* belong to the Anglo-Norsk outfit. It is not known who owns this particular whaling corporation, but the factory flies the British flag, has a Norwegian crew, and sails under the ownership of the Falkland Island Whaling Company or some similar name. The real owners, it is believed, are Norwegians. It is a common occurrence for Norwegians engaged in whaling to have their factory ships registered under a foreign flag and to keep their financial accounts in another country so that they will not have to pay taxes to Norway.

The boats designated by *Kos* are owned by Jahre; they are attached ordinarily to his two whaling factories *Kosmos I* and *Kosmos II*. The *Kosmos II* went to the Antarctic during the 1937-38 season, but the *Kosmos I* was engaged as an oil tanker which is a common trade for factory ships between the whaling seasons.

There must have been at least four thousand whales in Shark Bay between the periods of June, 1937, and October, 1937. When the *Ulysses* rounded Cape Ronsard and entered Shark Bay there were scores of whales spouting in all directions. Twenty-two whales were delivered to the factory ship upon her arrival by the four killer boats that had come up from Perth, Australia. They commenced hunting at dawn on July 24, 1937, and ceased operations by noon because they had obtained all the whales they could properly manage. The *Ulysses* commenced working the whales at 1600 on the day of her arrival and had disposed of fourteen humpbacks by midnight.

During the equatorial season the killer boats started out at dawn. The manager would issue the orders daily as to the number of whales to be killed and whether they were to be towed in immediately or delivered in a group. During the first part of the season the boats were not allowed to kill more than six whales each, sometimes they could take only two. The boats would generally have their quota and be drifting near the factory ship by early afternoon with their work done for the day. The manager did not allow a free catch for the killer boats until during the second week in August, 1937; then the system alternated from a free catch to a specified number for the day. This system had to be enforced because of the larger number of whales present and because of the limited capacity of the factory ship. A strict check was kept on the gunners by the manager to enforce his orders. For example, some of the rules governing the hunting in Shark Bay were that no gunner got paid for more whales than he was ordered to bring in, and if a gunner killed a whale one day and flagged it and failed to retrieve it before dark the same day he could not take any whales the next day until he had found the drifting whale. Concerning the latter situation it was impossible to enforce this rule because the gunners unquestionably did not report the whales that they had flagged and failed to find; if a flagged whale was found after noon of the next day the gunner that brought it to the factory got credit for the catch just as if he had harpooned it. These restrictions alone serve to indicate the abundance of the whales; if a free catch was allowed at all times the factory would not have been able to handle the large number of whales obtained.

The manager had to control the killing of the whales according to the progress made on the factory in disposing of the carcasses. The manager also abided by the Norwegian regulation that prohibits more whales to be killed than can be efficiently processed in thirty-six hours. As a result of the heat conditions in the factory, lack of water, and limited production of the plant, the *Ulysses* expedition killed just about one-half the number of whales that could have been slaughtered if an unlimited catch had been allowed the gunners during their hunting when the whales were most abundant.

The killer boats encountered their first adverse weather conditions on August 9, 1937. The weather was hazy, a strong wind prevailed, and the sea conditions were quite rough. Such conditions hampered operations to the extent that a free catch was requested by the boats. As a result the manager was interviewed concerning the size of the whales obtained; three short ones were found. He notified the gunners accordingly and told several of them in my presence while on the stern of the vessel that they were not being paid for the whales under thirty-five feet. These remarks are important from the consideration that the gunners experience more difficulty during bad weather in determining the size of the whales, and it indicates that the gunners were informed of the thirty-five foot limit even though subsequent events divulged a thirty foot limit in their contracts.

The deck force of the *Ulysses* worked in twelve hour shifts. One shift commenced at six o'clock in the morning and worked until breakfast from 0800 to 0830, one hour was taken for lunch at noon, and a half hour was allowed at 1500 for coffee. The shift changed at 1800 wherein the night shift had breakfast at 2000 until 2030, dinner at midnight for one hour, and coffee in the morning from 0300 until 0330. The shifts changed again at 0600. The two groups changed half way through the season, the night force came on during the day and the day shift went on nights.

When the season commenced the factory workers were also in two shifts for twelve hours each, but this system had to be broken into three watches of eight hours because of the extreme heat and high temperature in the factory. The men could not work for twelve hours under the conditions. The *Ulysses* did not use all the factory system during the Shark Bay season. It is estimated that about eighty percent of it was in use.

The same routine went on for seventy days in Australia with absolutely no recreation of any kind. There were no broadcast radios, no daily newspapers, except a small radio news bulletin, no recreation room for the men, they could not use the ship's library (all the books were in the Norwegian language) during the period that whaling operations were actually in progress. It must be remembered that out of over two hundred men on the factory ship not a single person was allowed ashore in Australia except the captain, the manager, and the inspector, whom went ashore thirty-two hours from the time the *Ulysses* sailed from Sandefjord, Norway on June 12, 1937 until the vessel arrived in Simon's Town, South Africa on November 1, 1937. Modern whaling is the acme of monotony and isolation.

The life on the killer boats was not much better than it was on the factory ship. Both the deck and the engineering force of these boats stood watch and watch. When a whale was sighted the deck force was immediately notified; it made no difference whether a man had just come off watch or not, he had to come on deck. Thirteen men compose the crew of an average killer boat. It should also be noted that the gunner is also the captain. There are five in the engineers force, five on deck, a cook, and a mess boy. The life on the killer boats was considered very pleasant during the equatorial season because the boats spent a large part of the day drifting after they had obtained their daily quota of whales, and because they could not hunt at night. In the Antarctic where it is daylight for practically twenty-four hours the killer boats never stop. The gunners and their crews never get out of their clothes for weeks at a time.

Three small rain squalls occurred during the seventy days that the *Ulysses* remained in Shark Bay. There was no cloudy or rainy weather but there were periods of very strong winds from the south accompanied by haze and poor visibility. The days were generally hot, the nights cool and refreshing.

The inspector has stood on the cutting deck of the *Ulysses* when the temperature was one hundred twelve degrees in the sun. The whale meat was actually cooking on deck; it had turned black and the oil was bubbling out of it. Such a sight is interesting to see but indicates inefficiency from a whaling point of view because the oil is lost to a considerable extent. It also indicates that the manager has too many whales flensed and dissected without precautions being taken to properly process them.

The *Ulysses* had all the whales she could possibly use for the first six weeks. Very rarely were there were days when the boats did not come in with enough whales. These conditions generally resulted from hazy or windy weather making it difficult to see the spout of the whales. The whales also shifted position to various sections of the bay. The season commenced with an abundance of whales all over the area; then they shifted to the southern end of the bay in the vicinity of Peron Flats and Naturaliste Channel; then to the banks on the eastern side of the bay; and then to the vicinity of Geographe Channel. It would take the boats about a day to find out where the whales had migrated to and then they would hunt the new section until the whales moved again. This system continued throughout the first two months with the whales moving from point to point in Shark Bay.

There were very few whales outside the islands. They seem to enter Shark Bay through Geographe Channel coming in from a southwest direction and staying within the enclosed waters of the bay; apparently very few of them continued out through the northern end through Naturaliste Channel. When the three killer boats and the *H. J. Bull* were coming up from Perth, Australia to join the *Ulysses* in Shark Bay, whales were not sighted until position 31°50′ S; 113°00′ E. The whales were seen from this point on, in large numbers up to Cape Inscription which lies on the southern side of Naturaliste Channel. On July 31, the *H. J. Bull* went on a scouting cruise (incidentally to locate the *Frango* expedition also, if possible). She rounded Cape Ronsard, the northern end of Bernier Island and stood to the southward, keeping about two miles to the westward of Bernier Dorre Islands. No whales were sighted down to a position in approximately 25°00′ S. Odd pairs were then seen until opposite Cape St. Cricq (25°18′ S; 113°04′ E).

Rounding Cape St. Cricq, the *Bull* stood through Naturaliste Channel keeping to the northern side and headed SSE. Whales were now sighted in large numbers jumping out of the water and sporting about in general. In some areas the whales were very numerous. The *Bull* continued on to a point off Peron Peninsula and then came NNE. The whales continued to be sighted in large numbers for the next ten miles then gradually became less numerous although they were plentiful all over the bay. At this time the whales seemed to be traveling to the north. It can almost be definitely established that the whales enter this body of water form the south by coming through Naturaliste Channel because they were sighted in the largest numbers around the entrance and continued to be seen in large groups for about ten miles. Then they had an opportunity to disperse and spread out in the bay often traveling in pairs.

The basis for contending that the whales approach Naturaliste Channel from a southwest direction is based on the reports of the killer boats that came up to Shark Bay from the southward while maintaining a close watch for whales while en route. Also, the dart No. 5240 that was found in humpback whale killed in Shark Bay had been fired into the whale by the *R.R.S. William Scoresby* in position 62°19′ S ;88°46′ E on January 31, 1936. This information was also obtained from the Discovery Committee via the Colonial Office. Information was also obtained that the *Anglo-Norsk* expedition, which exploited the waters of Shark Bay during July and August of 1936, had killed humpbacks that contained darts fired into them by the *Scoresby* in the following positions and on these specified dates:

Date	Position
December 28, 1934	60°45′ S; 97°06′ E
February 5, 1936	63°37.5′ S; 93°19′ E
February 6, 1936	62°41′ S; 95°55′ E
February 8, 1936	62°25′ S; 98°54′ E

It is believed that the humpbacks commenced going south about August 20, 1937; up to this time they had been observed coming through Naturaliste Channel apparently traveling in a northerly direction in Shark Bay, but on this date whales were sighted going south. It seems the young humpbacks leave first. The cows remain with the calves after the younger whales and the mating pairs have departed. The cows and calves then disappear leaving only the bigger specimens which apparently gather in gams [herd] for the journey south. This was apparent in Shark Bay because some gunners would not even sight a whale during the course of a day late in the season, while another gunner would shoot three or four, all about the same size, that were apparently all traveling together.

On September 10, 1937, the majority of the killer boats shifted to the northern end of Shark Bay in the vicinity of Geographe Channel; the animals were getting scarce in the bay and seemed to be coming through the northern channel on their way south. On September 18, the gunners reported that the cows and calves were getting scarce. Many persons believe this specimen does not like to be near rocks or shore line when a gale comes up; for this reason many thought the humpbacks become restless in Shark Bay when the strong southerly winds commenced to blow and this caused them to move out of the enclosed waters. On October 2, some of the killer boats ventured approximately ten miles to the westward of Shark Bay out into the Indian Ocean in their quest for whales but very few were obtained or even sighted. The whales sighted were reported to be extremely large and traveling south at a fast speed. If the gunner missed on the first shot the whale was generally lost because becoming aware that it was being pursued the animal commenced to swim faster and gained the surface less frequently for breath; this procedure allowed the gunner less opportunity for a shot and involved a long, irksome, tiring chase.

* * *

On August 30, 1937, the *Ulysses* had twenty-six whales secured astern at 1300 waiting to be flensed; on August 31, the factory had twenty-one astern at noon; on both occasions killer boats had stopped hunting for the day. These remarks are noted to portray the abundance of the animals in Shark Bay.

* * *

According to the persons conducting the operations of the *Ulysses* in Shark Bay, the factory could operate at a profit if only seven humpbacks were taken daily. It is roughly estimated that it cost the Western Operating Corporation five thousand dollars a day to operate the entire expedition during the Australian season. The *Ulysses* is supposed to have paid for herself and the cost of the expedition after 70,000 barrels were obtained.

* * *

The following remarks were noted from conversations with rather authentic sources; the information is submitted for the perusal of Headquarters because it is believed to be part of the Shark Bay operations report.

The *Anglo-Norsk* expedition exploited the waters of Shark Bay during the season of 1936 without the privileges of an Australian license. At the conclusion of operations the expedition crossed the Pacific, hunted sperm whales off Peru, and then went to Panama for recreation after laying up the killer boats at the Galapagos Islands. It was the intention of the owners of this factory to return it to Shark Bay for the season of 1937; the license that Anders Jahre had obtained was to allow the expedition to work within Australian territory.

While the *Anglo-Norsk* was in Panama orders were received to proceed to Norway because the expedition was not going back to Australia. The *Ulysses* took the place of the *Anglo-Norsk* and hunted Shark Bay as a result. Such a situation created a difference of opinion between Lars Christensen of Sandefjord, Norway, who was supposed to be interested in the *Frango*, and Anders Jahre. Christensen threatened to send one of his modern factories to Shark Bay and Jahre retaliated and planned to send one of the *Kosmos* ships if such a course was taken. Such a procedure would have practically exterminated the humpbacks of the west coast of Australia in one season with the resulting accumulation of whale oil on the market. Therefore, a compromise was reached between the two factions; Jahre introduced the *Ulysses* as planned and Christensen sent out the *Frango*, but only after Jahre and his associates had agreed to pay Christensen a certain sum of money as compensation for using a smaller expedition. This compensation is supposed to have equaled a sum of money running into millions of dollars. The *Ulysses* thus worked Shark Bay and the *Frango* worked north of the coast.

This arrangement is supposed to have been formulated because the *Ulysses* oil could be introduced into the United States duty free and a larger profit could be realized than if the *Anglo-Norsk* expedition had returned for the season of 1937.

* * *

The *Ulysses* expedition hunted the Shark Bay region for exactly seventy days. During that time 2036 humpbacks and one fin whale were slain and 78,750 barrels of oil were obtained. If all the whales killed in Shark Bay were arranged in a line, head to tail, they would extend for over fifteen miles. The attached sheets enumerate in detail the catch records for the entire season.

* * *

RECORD FROM JULY 24, 1937 to AUGUST 23, 1937

Date July	Whales Killed	Whales Flensed	Whales in Water/0600	Barrels of Oil/Day	Length Av./Daily	Violations Daily
24	28	17	None	80*	38.8	None
25	22	27	6	960	37.3	None
26	29	25	10	880	39.4	None
27	18	28	None	1120	38.5	None
28	41	38	3	1120	38.3	None
29	41	34	10	1200	39.7	None
30	31	37	4	1280	37.4	None
31	41	34	11	1120	38.8	None
1st wk.	251	230		7760	38.6	None
Aug.						
1	37	38	10	1360	38.7	None
2	35	34	11	1200	41.4	1
3	47	36	22	1280	39.6	None
4	25	32	15	1440	40.4	None
5	30	39	7	1360	39.6	None
6	39	33	13	1360	39.5	None
7	32	43	2	1520	39.3	None
2nd wk.	246	255		9520	39.8	1
Total	497	495		17280	39.2	1
8	38	39	1	1600	38.3	1
9	51	31	21	1040	38.2	3
10	39	40	20	1600	39.4	None
11	39	44	15	1600	39.0	4
12	44	40	19	1600	39.3	1
13	39	39	19	1360	39.2	None
14	28	37	10	1520	39.8	1

3rd wk.	278	270		10320	39.0	10
Total	775	765		27600	39.1	11
15	43	40	13	1600	39.8	None
16	38	31	20	1440	40.8	1
17	30	36	14	1440	40.0	3
18	40	35	19	1440	39.4	None
19	32	35	16	1680	40.7	2
20	32	34	14	1360	40.0	1
21	38	40	12	1600	39.0	1
4th wk.	253	251		10560	39.9	8
Total	1028	1016		38160	39.2	19
22	41	41	12	1520	38.8	1
23	43	39	16	1440	41.5	6
Total	84	80		2960	40.1	7
Grand Total						
For the period.		1096	(flensed)			
		16	(in water)			
	1112	1112		41120	39.4	26

*Operations actually commenced at 1600 July 24, 1937. Position of the factory at this time was 24°51′ S; 113°15′ E in Shark Bay, West Australia. On August 18, the factory moved to 25°05′30″ S; 113°19′00″ E; still within the limits of Shark Bay. All whales caught the first month were within the limits of Shark Bay. The small amount of oil shown for the first day is the result of filling the pipes, settling tanks and other parts of the system.

Six fetuses were caught the first month. The stomach contents are a green semi-solid substance. One whale was found with fish tangled in part of the intestines that had protruded from the harpoon wound in the side of the body. There was no fish in the stomach. The same green substance was found in this stomach as in the others. It might be that the air forced in to the body to keep it afloat has something to do with the stomach being void of food.

Two arrows were found in the bodies of two of the whales. The numbers are as noted. These arrows are believed to be fired by the *Discovery Second*, the British scientific vessel that aids in the research studies.

By allowing five hundred barrels as still in the system, this ship is averaging about thirty-seven point four barrels per whale.

Boat	Gunner	Violations	Whales/Boat	Av. Length Total catch/boat
KOS I	Martinsen	2	147	38.1
KOS II	Iversen	1	139	39.4
KOS IX	Fagerli	2	125	38.6
ROSS I	S. Jahre	3	154	38.3
HVAL I	D. Hansen	3	153	38.4
A.N. I	Barth	2	117	38.1
A.N. IV	Evensen	6	118	38.0
A.N. V	T. Hansen	7	152	36.5
		26	1105	Av. 38.1
			7 (dead whales picked up)	
			1112	

RECORD FROM AUGUST 24, 1937 to SEPTEMBER 23, 1937

Date	Whales	Whales	Whales in	Barrels of	Length**	Violations	
Aug.	Killed	Flensed	Water/0600	Oil/Day	Av./Daily	Daily	
24	39	41	14	1600	39.7	4	
25	41	38	17	1360	39.0	1	K1-6
26	24	39	2	1680	40.5	6	K2-2
27	33	31	4	1280	41.4	2	K9-2
28	44	23	25	960	40.2	1	Va1-1
29	29	32	24*	1360	39.3	3	$-1
30	29	32	21	1360	40.4	None	A4-None
31							A5-5
	10	31	***None***	1360	41.0	1	
5th wk.	249	267		10960	40.2	18	A1-1
Total	1361	1363		52080	39.5	44	
1 Sep.	42	26	16	880	39.8	1	K1-3
2	44	35	26*	1280	38.6	None	K2-1
3	31	44	14*	1600	40.1	8	K9-1
4	29	33	10	1280	38.9	5	A1-6
5	31	31	11*	1120	39.0	2	A4-4
6	12	21	2	1120	39.1	2	A5-2
7							R1-None
	21	23	***None***	640	38.0	1	
6th wk.	210	213		7920	39.0	19	Va1-2
Total	1571	1576		60000	39.3	63	
8	26	14	13*	560	41.0	None	
9	9	22	None	1200	40.8	None	
10	20	13	7	240	39.8	None	
11	29	26	10	960	39.8	None	R1-2
12	27	31	6	1280	40.8	None	Va1-1
13	25	25	8*#	960	40.1	2	
14	26	28	6	1120	39.7	1	
7th wk.	162	159		6320	40.3	3	
Total	1733	1735		66320	39.8	66	
15	27	23	10	1040	40.8	1	K1-None
16	4	11	3	800	39.4	2	KII-I
17	10	9	4	160	40.0	1	K9-1
18	5	5	4	240	42.0	3	A1-None
19	12	13	3	240	40.2	None	A4-1
20	17	20	None	640	42.0	None	A5-None
21	17	13	4	640	40.4		R1-4
						None	
8th wk.	92	94		3760	40.7	3	Va1-None
Total	1825	1829		70080	40.2	73	

22	21	17	8	560	40.7	None	
23	6	11	3	800	40.8	***None***	
Total/ Month	740	761		30320	40.2	47	**Legal catch *Dead whales picked up
Total/ To date	1852 8* 1860	1857 ___3_(whales in water) 1860		71440	39.8	73	#Fin Whale

Boat	Gunner	Violations		Total Whales/Boat	Total catch/boat Av. Length	Vio.	Total
KOS I	Martinsen	9	9730	255	38.2	11	11
KOS II	Iversen	4	9250	234	39.5	5	5
KOS 9	Fagerli	4	8152	211	38.6	6	6
A.N. I	Barth	7	7710	206	37.4	9	9
A.N. 4	Evensen	5	7806	208	37.5	11	14
A.N. 5	T. Hansen	7	9492	254	37.3	14	16
Ross I	S. Jahre	7	9832	259	37.9	10	10
Hval I	D. Hansen	4	9869	258	38.2	7	8

The figures above this line
are for 25 Sep., 1937.

Total whales 1885 Total Feet 71841 Average 38.1

This month's operations commenced with the ship in position 25°05'30" S; 113°19'00" E. On September 18, 1937, the *Ulysses* shifted to position 25°23' S; 113°25' E to transfer the whale oil to the *Charles Racine*. This position is still within the limits of Shark Bay.

Fifteen fetuses were found the second month of operations. The same green substance was found the second month that was present the first month therefore no samples were taken. The whales are apparently not feeding in these waters. Four arrows were found the second month; two were found in the flesh of whales and the other two were found free, one was in the bone presser, the other found in the refuse on deck. Proper notations are found in the remarks column concerning these particular dates. Also, one fin whale was killed the second month. Notations are found in the remarks column concerning this whale.

Samples of the parasite found on the fin whale and also those found on the humpbacks were taken and forwarded to Washington, D. C. this month. The stomach contents were forwarded by the *Charles Racine*.

RECORD FROM SEPTEMBER 24, 1937 to OCTOBER 8, 1937

Date SEP.	Whales Killed	Whales Flensed	Whales in Water/0600	Barrels of Oil/Day	Length Av./Daily	Violations Daily
24	11	10	4	240	41.0	None
25	19	10	13	400	41.1	None
26	17	22	8	720	40.3	2
27	9	16	1	640	42.4	None
28	1	1	1	320	43.0	None
29	2	1	2	80	42.0	None
30	15	15	2	240	41.8	None
1 Oct.	15	13	4	640	40.7	None
9th wk.	89	88		3280	41.5	2
Total	1931	1945		74720	40.8	75
OCT.						
2.	15	16	3	560	40.0	1
3	13	14	2	640	42.4	None
4	17	11	8	400	42.9	None
5	20	23	5	800	40.6	3
6	7	11	1	720	42.7	None
7	10	10	1	240	43.6	None
8	6	7	None	400	43.8	None
10th wk.	88	92		3760	42.3	4
Total	2019	2037		78480	41.5	79
	18*					
	2037	2037	*	* Whales picked up by one boat but killed by another.		
	7**					
	2030 whales processed			** Whales that were used as fenders, had become blasted, and were		

towed out to sea.

The measuring tanks show 78,480 barrels of oil, but final records on the factory indicate 78,750 barrels. However, there is no manner of actually getting the exact figures until the transport ship *Charles Racine* discharges this vessel's cargo in the United States.

FINAL RESULTS OF THE AUSTRALIAN SEASON

						Total		***Total Violations***
No. of Whales	Under 30 ft.	No. of Whales	Under 35 ft.	No. of Whales	Over 35 ft.	No. of Whales	Feet	Per boat for season
A.N.I; Gunner Barth.								
1	28′	8	244′	210	8257′	219	8529′	9
A.N.IV; Gunner Evensen.								
4	106′	10	314′	211	8368′	225	8789′	14
Hval I; Gunner D. Hansen.								
2	57′	6	193′	268	10582′	276	10832′	8
A.N.V; Gunner T. Hansen.								
2	55′	14	452′	259	10215′	275	10722′	16
Ross I; Gunner S. Jahre.								
1	28′	9	287′	262	10383′	272	10698′	10
Kos I; Gunner Martensen.								
1	28′	10	316′	263	10529′	274	10873′	11
Kos II; Gunner Iversen.								
		5	160′	252	10201′	257	10361′	5
Kos IX; Gunner Fagerli.								
		6	192′	233	9344′	239	9536′	6
11	302′	68	2158′	1958	77880′	2037	80340′	79

78,750 barrels of oil were obtained according to the records of this ship, however; the exact capacity of the tanks is unknown. Therefore it is necessary to await the unloading of the tanker *Charles Racine*, which carried this vessel's cargo to the United States, before an exact total can be estimated.

Section 4: The Shark Bay records; the Antarctic records

Part 1: The Shark Bay Records

The inspector practically kept the government records for the Shark Bay season. The factory ship's version of the catch data as set forth on the Australian government records was altered to agree with the inspector's daily observations in order to maintain Form WI-1 accurately. The method of recording the data is in need of some explanation.

Virtually all the whales obtained in Shark Bay were delivered to the factory ship on the same date as killed; toward the end of the season some carcasses were delivered after midnight, but the instances were comparatively few and no exceptions were made on the records. The expedition's killer boats were allowed to take only an allotted number of whales daily; the number being determined by the factory shop manager. This system prevailed most of the season. The use of radio or telephone was kept at a minimum in order to eliminate interference with the Australian broadcasting systems. The killer boats did not report their operations by radio; written instructions were issued to them by the factory at scheduled intervals. As a result the *Ulysses* did not maintain any records except when the killer boats delivered their whales to the factory ship. Whales could be killed by the hunting boats and then lost without indications being made that such incidents occurred.

When a killer boat delivered its whales to the factory the bridge was notified by telephone and the watch officer noted the time of delivery, the name of the killer boat, and the number of carcasses; it was not necessary to record the species because with one exception all the whales killed in Shark Bay were humpbacks.

When a carcass was taken aboard the flensing deck, foreman notified the bridge which recorded the time and the killer boat to which the particular whale belonged. The whale was then measured, generally by the scale painted on the sides of the ramp unless the specimen was close to the legal limit, then the foreman used a hand measuring rod. Immediately after measuring the whale the foreman recorded the data on a black board; these entries contained the name of the killer boat that obtained the specimen, sex of the whale, its length, and the species. The ship's secretary took the information from the black board twice daily; six o'clock in the morning and six o'clock at night. With this information the secretary made out the records required by the Australian government; the Australian records required practically the same data as Form WI-1 in addition to the number of barrels of oil produced each week. The Australian form required that the master of the *Ulysses* certify it as true and correct while the Australian inspector merely approved it.

The Australian record was examined every morning by the American inspector; if the data did not agree with his observations and notations that were taken on deck the required changes were made before the information was inserted on his own copy of Form WI-1 which was maintained in ink. The changes made constituted alterations in the lengths of mature whales, the lengths of fetuses and the cows to which they belonged, and the insertion of detailed information concerning the finding of darts in certain carcasses and on deck. It was from the inspector's copy of Form WI-1 that the radio operator made the report that was submitted to the Bureau of Fisheries.

Therefore strictly speaking, the *Ulysses* had little to do with the actual formulation of Form WI-1 as an official record for the United States government. The task of typing out the sheet was assigned to the American radio operator who performed the work while standing his regular watches in the radio room; he also used the inspector's own personal records in transcribing the finished report for Washington. The ship's secretary did not make out this form nor was any interest manifested in its maintenance by the master of the factory ship.

The Australian inspector manifested little interest in the accuracy of his records; he seldom appeared on the working decks, his observations were few, and he did not maintain any notes. He signed his records daily and submitted them at the end of each week to the Bureau of Fisheries, Perth, Australia. However, these records were not correct and did not represent the true results of the operations. On several occasions late in the season the Australian inspector checked copies of his reports, (that had already been submitted), with the United States records and endeavored to have the Australian data changed by correspondence with Perth, Australia; these changes concerned fetal data and the lengths of mature specimens. However, the Australian government appeared more interested in the barrels of oil that were being produced than in the actual details of the catch. On several occasions the Australian government questioned the integrity of the oil production figures as submitted by the Australian inspector on his reports, but the final issue of this matter is unknown.

The Form WI-1 could have been maintained correctly by the *Ulysses* if it had been placed on the bridge and the proper interest exerted to insert the required data but such procedure or interest was never entertained. The inspector endeavored to keep the form as accurately as possible with the sole purpose of submitting accurate figures of the catch to the Bureau of Fisheries. Form WI-1 is adapted to operations in restricted areas, such as Shark Bay, and can be accurately maintained under such conditions. It is rather puzzling that the Western Operating Corporation should agree to maintain accurate catch records and then have the factory ship personnel carry out the requirements in such a lax, indifferent, irresponsible manner.

Part 2: Records in the Antarctic

On December 13, 1937, five days after the *Ulysses* commenced operations in the Antarctic, Captain Mikkelsen agreed to control the operations of the factory in accordance with the International Agreement for the Regulations of Whaling. However, the *Ulysses* did not abide by the regulations of this agreement; the gunner's contracts already agreed with the length requirements, but the factory did not adhere to the legal sections requiring full utilization of the carcass. Without concern for which one of the two laws the government was intending to require strict compliance with, the inspector proceeded to observe violations of the International Agreement for the Regulation of Whaling as well as those of the Whaling Treaty Act.

Practically the same conditions prevailed in the Antarctic that existed during Australian season. It was impossible for one inspector to continually observe the complete operations of the factory. However, checking the lengths of the whales in the ice was not as difficult as in Australia because the gunner's contracts for the Antarctic season adhered to the length requirements set forth in the International Agreement for the Regulation of Whaling as promulgated at London, England on 8 June, 1937. The United States law is based on the Whaling Treaty Act of 1936 and allowed the gunners a much more liberal length on the whales killed than required in their contracts. The difference between the lengths demanded in the contracts and those required by the law was so large that the gunners enjoyed an ample margin before the law was broken; even though the whales obtained were shorter than their contracts demanded.

As for observation during Antarctic operations, the main sources of difficulty included observing the amount of whale carcass that was being utilized; observing that the ship recorded biological data concerning fetuses found; and of noting the complete disregard that was manifested in maintaining the catch sheet, Form WI-1, in an accurate manner.

The only concern of the *Ulysses* expedition during the Antarctic season was to obtain whale oil regardless of the legal restrictions, the requests of the inspector, or any other factor detrimental to the manner in which the operations were being directed and performed. A large cargo of whale oil was the ultimate aim; nothing else, legal or otherwise, was given consideration or allowed to interfere; the law was subverted for the convenience of the whaling operations. The policy adopted was an effort to make the law conform to the requirements of production; the operations were not subservient to the law.

The attitude was apparent that the commercial policy requiring profits was going to be adhered to regardless of the consequences. The law was not considered, abided by, not apparently known, nor consulted; if a loss was to be sustained by legal operations and the paramount purpose of the expedition to be thwarted by restrictions or a profit made by disregarding the law, then the law was disregarded.

The opinion is submitted that there is not a single accurate record of the catch for the Antarctic season. The secretary of the ship kept a daily catch log which recorded the species, the number of whales, and the total footage for each killer boat; this record was totaled for each day, each week, and each month.

The footage log was maintained from the data obtained by the foreman at the ramp and from the bridge sheet that indicated the whale killed and delivered. If a whale was killed, but later lost by the factory, or if used as a fender, then the factory assigned a length that offered compensation to the gunner. Before this log could be examined at the end of the season it was taken aboard the *Kosmos* by the secretary for delivery to Sandefjord, Norway. Not even a copy of this record remained on the *Ulysses*. Strictly speaking, it is now impossible for the government to determine whether the gunners were paid for their short whales or not.

The *Ulysses* maintained a daily sheet for the bridge records; copies of this form were sent to the master and the manager each morning. This sheet contained meteorological information, ice conditions, whales killed by each boat, etc. This record was full of errors and did not accurately account for each whale. If the figures of this form did not balance they were added erroneously to make them check; the bridge record is worthless from a consideration requiring accuracy in accounting for the whales killed and flensed.

When all the other records had been completed the secretary of the ship finally condescended to jot down whatever information he deemed necessary to fill up the spaces of Form WI-1, whether the data was right or wrong, whether it was what the data columns of the sheet demanded or not. If the operations of the ship were conducted in such a manner that the accurate information could not be obtained, or if the data required could not be readily formulated, anything was jotted down without considering its correctness or the exactness with which the data was supposed to be recorded. Form WI-1 was filled out completely in the secretary's room; it was formulated from a conglomeration of various and sundry notes that consisted of rough memorandum jotted down by the factory workers when time allowed from other duties; the persons that made up these remarks were scattered from the stern to the bridge of the factory. Such a system of recording data could not possibly be considered even the least bit reasonably accurate.

As far as the American records are concerned there was no system or even an attempt at a system, of recording the whales killed one day from those killed on another date; or, in determining the date killed from the date delivered to the factory, or on which the carcass was flensed. The records forwarded to the government merely indicate the date on which the carcass was flensed.

There is a method employed by the *Ulysses* in gathering its data. When the whale was taken through the ramp, the foreman noted the species, gender, and the boat that killed it; (gunners have the number of their boat cut into the ventral surface of the flukes allowing the foreman to determine the killer boat merely by glancing at the caudal fin.) This information was telephoned to the bridge where the watch officer noted the remarks on a sheet of paper that also required the time the whale was measured. The length was generally determined by the footage lines on the sides of the ramp; but if a whale was extremely large or near the legal limit the foreman used a hand measuring rod. (At least this is the procedure adopted when the inspector was present.) The foreman then entered the remarks in his pocket notebook; these included the length, species, and killer boat. As a result of this system if the inspector wanted to know the length of a specimen he could only obtain such information from the foreman at the ramp.

Such a system allowed the foreman to record any length if the inspector was not actually present when the animal was measured, or if the inspector did not happen to observe the whale while it was being worked on deck. The foreman could credit the gunners with a whale above the legal limit even when the specimen was short; unless the inspector inquired about a particular whale there was no way of ascertaining if the foreman was maintaining the lengths actually measured. If the inspector asked the foreman directly about a particular whale's length the foreman could give him the correct length, short or otherwise, and change his records to make them agree with his statement. This situation happened occasionally concerning blue whale data. The correct procedure should have been to put the length records on a board (as in Australia), directly on Form WI-1, or telephone the measurements to the bridge; then the inspector would not have had to make inquiries, but merely examine the records to determine if they agreed with his observations.

The notations made by the foreman were given to the ship's secretary at six o'clock in the morning and at night. If a fetus was found after a carcass reached the cutting deck no effort was made to determine the exact length of the cow from whence it came or the number of the whale for that date. The foreman in charge of the cutting deck merely made a notation that a fetus had been found and gathered his data from a most casual examination. The length was determined by stepping off the distance from the head to the tail; feet were the closest approximation used, inches were considered too trivial. The fetus data was given to the secretary and he assigned the fetus to any cow which he imagined might have been in calf. It can be safely stated that seventy-five per cent of the fetuses found in the Antarctic were erroneously recorded. Numerous fetuses were found that were never even recorded and were dumped overboard; this procedure occurred most frequently at night, but occasionally in the daytime. The attitude was prevalent that regardless of what requirements were made, no matter how trivial, if they did not directly concern the production of oil and the processing of whales they were too laborious and exacting for the personnel to undertake on the assumption that it was not required and interfered with operations.

When whales were delivered to the factory ship by the killer boats the information was telephoned to the bridge indicating the species and boat that killed it. There were thus two separate and distinct records maintained on the bridge by the watch officer. One set indicated how many dead whales had been delivered, the boats that killed them, and the species. The other set indicated the whales that had been flensed, the time which they were taken aboard, the species, gender, and the boat to which the flensed whale belonged. By these records it was possible for the ship to determine how many whales had been killed and delivered, and how many had been flensed; the difference between the two records indicated the whales in the water waiting to be flensed.

Another set of records was maintained in the radio room; this data indicated the number and species of whales killed and reported by radio, but not delivered to the factory. This set was totaled daily and at the end of each week.

From these various sets of records the factory derived whatever information needed for their records, being extremely careful to keep the footage log balanced, and thus credit the whales to the hunting boats that obtained them. The gunners did not care what became of a whale after they killed it and delivered it to the ship; they were credited with the whales thereafter whether it was flensed, or otherwise utilized.

This was the greatest fault on the part of the factory; the records maintained for the Bureau of Fisheries merely indicated the number of whales flensed, not those killed.

If a specimen was killed but lost, used as a fender, or cast adrift, the data noted on Form WI-1 did not indicate such a procedure. The government records indicated only those taken through the ramp. The result of such a system was that the returns would have indicated 1540 whales killed and flensed when there had been 1560 whales killed but only 1540 flensed. A difference of twenty whales is not a case of unavoidable errors; it is an example of carelessness, inaccuracy, inexcusable lack of cooperation. Also, it demonstrates the flagrant lack of provision to keep the records accurately as the Western Operating Corporation had agreed to do when they requested their license.

Form WI-1 was made up from the bridge records by taking the flensed whale data; however the bridge records were in error with the result that the government data could not be correct. The secretary of the ship merely manipulated figures by adding or subtracting flensed whales at random when it was necessary to make the number of flensed whales agree with the figures he assumed to be correct.

The fundamental cause of the inaccuracies was that the factory did not provide or make any effort in keeping Form WI-1 in strict accordance with its requirements; instead of being given the foremost consideration for correctness it was relegated to the position of being unimportant.

Another factor contributing for inaccuracy was the manner in which the factory ship recorded the date. According to the ship's system of keeping records the day commenced at six o'clock in the morning and continued for twenty-four hours, ending at six o'clock the next morning. Such a system is impractical, but may be accepted if understood and explained in the records. Regardless of the date system used, the *Ulysses* was treating the information for the date column of Form WI-1 as one item of information when it is two separate and distinct requirements with no connection between them. However, there are some mitigating circumstances to be explained concerning this date issue for Antarctic pelagic whaling. Again the ship's secretary erred by beginning with one date and part way through the season shifted over to the date on which he was copying the data. Such a change left one day during the season absolutely unrecorded and if carried to the end of the season would have indicated that the factory killed and flensed whales one day after the season was closed by law. This mistake might have been accepted if proper notations had been made in the remarks column but such memoranda were not entered. If the records were submitted to Washington for examination by persons unfamiliar with the date system used, the manner of keeping the records, or the circumstances involved, they would be at a loss to comprehend just what had occurred. The secretary was informed on two occasions that his records were inaccurate and practically worthless because of errors, and that he should use the remarks column for any detailed explanation required to make the records understood by any persons that examined them. Such a procedure was impossible because this person did not have the proper command of the English language to express himself as he so desired, or to keep the records as they should have been kept in English.

The Western Operating Corporation also agreed to gather the stomach contents, but the ship never took these samples unless the inspector requested that it be done. A large majority of the stomach contents taken in Australia were personally obtained by the inspector with the idea of gathering data of biological interest for the Bureau of Fisheries. The personnel of the factory were under the impression that this was the duty of the inspector, but this misapprehension was soon dispelled. The stomach samples taken in the Antarctic were actually taken by ship personnel, but only after the inspector made the request and directed the cutting deck foreman to the place where the material could be obtained. The opinion is stated that if the taking of these samples depended on the voluntary initiative of the *Ulysses*, they would have never been obtained. As with all the other requirements, no provision or routine had been made on the ship for actually taking these samples. All the stomach contents examined in the Antarctic were the same, so the few samples taken indicate the food of the various species that frequent those waters.

The position given in the location of catch column on Form WI-1 is the noon latitude and longitude of the factory ship. It is practically an impossibility in Antarctic pelagic whaling to record the position in which a whale had been killed unless the data is transmitted by radio, but even then the information cannot be accepted as accurate because the killer boats usually only have a general idea of where they are; celestial observations are seldom and difficult to obtain; navigation is conducted by dead reckoning and radio direction finders. The hunting boats merely cruise on various courses until the whales are sighted, then the chase commences. Afterwards, the boat calls the factory ship for a radio bearing and runs it down for contact. Even then the passage cannot be direct because of ice bergs and ice floes. Under such circumstances it is feasible to accept the noon position of the factory because it is the most exact obtainable and close enough for practical purposes to the point where the actual killing took place.

There was justifiable complaint on the part of the factory ship concerning the size of Form WI-1. The sheet is too wide for practical use aboard ship, and is a source of annoyance because it has to be folded in the course of entering the data. The sheet can and should be made more suitable for ordinary typewriter frames such as generally found on ships.

There are some mitigating circumstances in connection with making out Form WI-1; it apparently requires data to be recorded in a manner hitherto un-experienced by the *Ulysses* personnel. The difficulty of gathering accurate information from extended operations is obvious to any observer. The sheet might be changed to the form of a log requiring data that is more parallel with the operations and less difficult to obtain; coinciding more with the data that is readily available to the factory. The person (secretary of the ship) directly responsible for making out the records was the complete antithesis of what he should have been for such a position; it was his first year as a secretary on a factory, he was unfamiliar with typewriting, clerical work in general, and extremely careless. The sources of information were available but not utilized. The records would have required constant checking by a conscientious person; the ship's secretary did not possess this quality. The inspector approved the form at the end of the season with full knowledge of what had transpired. The details and circumstances are enumerated. If the Bureau of Fisheries wishes to accept the sheets after reading this report, the decision rests with that department, not the inspector. The *Ulysses* procedure of maintaining records is apparently pursued by all the other factories; this fact is mentioned merely with the idea that the inspector anticipated more exact records than may be generally submitted. If the Bureau of Fisheries does not concur with his opinions, the decision rests with that department as to the course of action to be taken. An effort was made to observe that the regulations were scrupulously observed at all times and under all circumstances.

Regardless of the difficulties encountered on the whaling grounds, the Western Operating Corporation agreed to keep the records accurately. However, observations indicate that such provisions had not been provided for on the factory ship, and that the person that did maintain them was not capable of keeping them accurately or intelligently in the English language. It should have been the policy of the ship to make out the Form WI-1 as correctly as possible, explaining slight inaccuracies by proper remarks. In addition, when the records were submitted at the end of the season a letter of explanation could have accompanied them to acquaint the Bureau of Fisheries with the mistakes, omissions, and difficulties of acquiring the data, but such a procedure was never entertained by the *Ulysses*. When all other records had been completed the official records were haphazardly formulated without regard for accuracy or data required, or even the condescension to explain where discrepancies in the data. The *Ulysses* did not keep, or attempt to keep Form WI-1 in an accurate manner.

Although no interest was manifested by the master of the *Ulysses*, nor any other persons for that matter, in maintaining the government records, the master of the ship personally maintained a set of records in a log book such as required by the Norwegian government from all Norwegian whaling factories. This record was never examined by the inspector, but is known to contain practically all the details required by the International Whaling Bureau in Sandefjord, Norway. It is rather interesting to note that such data was kept by the master when the records that should have been maintained accurately, and in accordance with the agreement of the Western Operating Corporation to do so, were neglected and maintained erroneously.

A daily record was maintained by the inspector in the best manner possible under the circumstances. The object of this log was to account for all whales killed and whether they were flensed, lost, or otherwise utilized. It also was to record the biological data, material loadings to the factory system, make various and sundry remarks of any violations or incidents that would prove of interest, aid in changing or modifying the law under Antarctic conditions, and to note information what would be of aid in acquainting authorities with the changes that were to be recommended. To the best of knowledge every whale killed by the expedition is properly accounted for in this log. The whales flensed, lost, or cast adrift as blasted fenders, were continually balanced against the whales killed; this accounted for every whale. The log, its information, and remarks are submitted under separate cover and are self-explanatory. All notations, biological, or otherwise, are set forth as they were noted on the whaling grounds. An examination of this record indicates that the government should adopt some other record sheet for pelagic whaling if detailed and valuable information is to be obtained. The log should be read before accepting any changes recommended in order to gain a complete understanding of the purpose to be accomplished by changing the present law, record forms, etc.

The point to be considered is whether Form WI-1 could have been maintained more accurately without requiring undue work on the ship while gathering the information. The statement can be made without doubt or hesitation that the sheet could have been unquestionably more accurate if provisions had been made to even make the attempt at formulating the notations; the errors are not entirely caused by difficulty in getting the data, they are the result of no effort to obtain it, or because provisions were never made to obtain such data.

As with everything connected with the operations, it appeared that certain persons in the United States that acted as representatives for the Western Operating Corporation were ready to fulfill any requirement or request of the United States government in order to obtain the necessary licenses, but this is as far as the observance of the law proceeded. Either the United States representatives of the Western Operating Corporation failed to issue the orders for the observance of the United States laws or they were unable to issue them because the policy of conducting the operations was being decided in Norway. The attitude of the *Ulysses* seemed to be that it was not interested in obtaining an accurate record for the government; if the data used in making up the various records kept by the ship could be entered on Form WI-1, then the information was noted, but if the sheet required any specific information that the factory was not interested in, then the notations were not obtained and any figures might be entered.

Even though sheet WI-1 was kept in the secretary's room at all times, the only columns that should have caused any difficulty concerning their accuracy was the date column and the location of catch column. The date column required the information when the whale was killed and when the whale was received at the factory. The information of the fetus column was available on the factory if the necessary steps had been taken to gather it. The record kept in the radio room indicated the date, the species of whale killed, and the boat that killed it. One of the bridge sheets, maintained by the officer on watch, indicated the time when a dead whale was delivered to the factory, species of whales, and the boat that killed it. The secretary of the ship could have examined these two records and obtained the information necessary to make out the date column. The whale column, requiring sex and length, could have been filled out from the memoranda submitted by the foreman at the ramp. Slight inaccuracies might have resulted here when the sex and length were noted against the whales in the date column, but this would only occur when the daily catch was extremely large, the number of errors would have been negligible for the entire catch, and perhaps completely avoided, if the footage log maintained by the ship was consulted as a further check. The location data of the catch column might have been maintained if the factory required the position of the catch to be reported by radio at the time the boat reported a whale killed. However, such a report should never be required because it divulges information to rival expeditions; and then the position received would be the dead reckoning location, and even for practical purposes could be considered as vastly in error most of the time. The location of catch can be, and was better located by acceptance of the noon position of the factory ship; at least this data is the most accurate and obtainable. The boats generally operate within five to one hundred miles of the factory ship; the areas within large numbers of whales are found is the object of plotting catch records, not the exact spot which obtained.

The detailed information that has been enumerated was mentioned in conjunction with the location of the record sheet in the secretary's office, and that it was made up from various records brought to him by different persons; this is the situation that existed on the *Ulysses*. It is quite clear that accurate records cannot be maintained if they are formulated from various slipshod memoranda made by disinterested persons, especially when the information recorded involves different species, various killer boats, changing positions, etc. Form WI-1 could have been, and should have been, located where all the data could have been entered by one person. The sheet should have been located on the bridge where the watch officer was enabled to enter the data as he received it; the ship's secretary could have taken each sheet when completed and made the smooth copy, this would have allowed the rough copy and the smooth copy to exist as records; now there is only one copy of Form WI-1, the one sent to the Bureau of Fisheries.

The issue might be raised that the watch officer did not have time to record such data, but such an assertion is fallacious because this particular person maintained two separate and distinct records that were required by the ship. If time could be allotted to maintain two records the situation could have been simplified by the maintenance of a single sheet and the information would have been more in keeping with the government request concerning the catch and its accompanying data.

Before operations commenced in the Antarctic, a suggestion (it might be called a request,) was made that Form WI-1 should be kept on the bridge. This remark was based on the supposition that the record could be kept more accurately because it was realized that the Antarctic season was going to be very different from the conditions that existed in Australia; the hunting boats were to be widely scattered, different species of whales were going to be obtained; observations indicated that the records were going to be very difficult to maintain correctly. However, the master of the *Ulysses* stated that such a thing could not be done, and that the records would be kept in the manner provided for by the factory. As a result, the inspector refused to have anything to do with the maintenance of the records; the obligation had been fully assumed by the *Ulysses* and onus was on the ship to observe the requirements. Therefore, a conglomeration of figures was thrown together without concern for accuracy. If the factory had vouchsafed at least to keep the form on the bridge the inspector would have been willing to cooperate to the fullest extent. On the refusal of the ship to do so, the inspector decided to keep his own log as a separate and distinct record (this is submitted under separate cover for the use of the service only.)

The master of the ship and the manager received copies of the record sheets that were sent to the bridge each morning, but apparently did not examine the reports very carefully, because the errors made by the ship's secretary still existed after their perusal. There was apparently little or no interest displayed by these two persons in the United States records which remained in the secretary's room and obviously cause little concern.

The catch sheet, Form WI-1, appears convenient for working in restricted bodies of water; for instance, Shark Bay, Australia, where the operations of the killer boats are restricted to limited areas allowing the whales to be delivered to the factory on the same date that they are killed. The form may also be satisfactory for expeditions that experience small catches, enabling a more accurate record to be maintained. The sheet is apparently made up, and appears well adapted, for the use of shore stations, but it is not well suited for pelagic whaling such as carried on in the Antarctic at the present time. A log book would be much more practical, efficient, and enduring as a detailed record of what operations occurred. This log should be arranged to require information of value to the Bureau of Fisheries; such as biological, factory apparatus fillings, oil derived, short whales, milk whales, positions, whales killed daily, whales flensed daily, etc. Form WI-1 is merely a summary of the whales killed. To understand and become acquainted with the operations of a modern floating factory requires more information than the itemizations of the whales obtained. The data can only be secured by requiring a detailed report to be maintained accurately, and with the responsibility for its correctness devolving on the ship's master; the information required may be practically the same that is available to and acquired by the factory. To state this information in a brief, accurate report that requires daily maintenance would allow the operations to be reviewed for each day with an intelligent understanding of the proceedings.

With such a report in mind, the enclosed form is submitted as an example of what might be required. The data required is available on any floating factory ship because such information is gathered for the ship's records.

[See App. 3.14.: Walsh's proposed "Daily Whale Log Form"

The log form requirements are explained at this time:

The "flensed whale serial number" is the number assigned to each whale as it is taken aboard. The "whale" and "fetus" column are self-explanatory. The "killer boat" column should contain the name of the boat under the command of the gunner that actually performed the killing. The "name of the gunner" column should contain the name of the gunner that actually does the shooting. The "legal footage" section allows the entry of the daily footage per species obtained by each gunner. The factory "noon position" is the latitude and longitude of the vessel at noon. The barometer, temperature of air, temperature of water, wind, sea, sky, and ice can be entered as observed at noon. This data has an important bearing on modern whaling operations. The "factory apparatus" is an important requirement. The "equipment" is the

Hartman, bone presser, or Kværner. The "fillings" is the number of fillings of whale material actually made in the equipment during the course of twenty-four hours. The "tonnage" is the computed capacity of the cooking out equipment and should represent the amount that can actually be held and cooked out. "Whales killed" represents number of whales killed on that date. "Whales flensed" represents whales taken aboard and flensed. "Whales lost" represents whales killed, but never taken aboard factory ship. "Fenders" are the whales secured alongside as fenders. "In water" represents whales secured astern and waiting to be flensed. The material under "to date" allows a concise survey of the catch up to any particular date.

The responsibility for keeping this form should devolve on the master of the factory ship. He should certify the record as true and correct by noon of the following date. The date should represent a calendar day regardless of the system employed on the factory ship. The inspector should inspect and approve the daily sheet by noon of the following day. The log should be returned to the Coast Guard or Bureau of Fisheries at the end of the season. The various and sundry data required by other interested persons can then be distributed.

Stomach contents, scientific data, or other remarks can be inserted on the back of the sheet and represents data collected for the indicated date. The impression might be created that the required form is too detailed and laborious in its requirements, but the material is readily available on any factory ship, and is practically the same data that is being required by the Norwegian government for whaling vessels of that registry. The idea of the log form is to gather any information that will be of interest to the government departments or scientific groups that might be studying this industry.

The submitted form is merely an example of what should be required; its structure should be rearranged or revamped to fit the desired conditions. As stated before, Form WI-1 is adaptable for restricted operations and for shore stations, but it should be changed for pelagic whaling. The following changes are suggested for consideration: the "whale serial number" should be the number assigned to each whale as it is taken aboard to be flensed. The "date column" should contain the date on which the carcass is taken aboard to be flensed. A separate entry should be made to indicate the whales killed on a certain date. The "species" section should be reduced to a single column and a key used to indicate the species of whales obtained. The key might be: H = humpbacks, F = fin whales, S = sperm whales, B = blue whales, and Se = sei whales. The other species noted can be omitted, or if killed, they may be carried under remarks. The use of the key reduces the space required to indicate the species. The "stomach contents" column might be omitted and the proper notations indicating the required data entered. The "location of catch" should indicate the body of water if operations are restricted within certain geographical limits; or the noon position of the factory ship if the operations are performed over extended areas. The "remarks" should be inserted on the back of the sheet.

The form should be maintained by the master of the factory ship and he should certify it as true and correct. The inspector should approve the report. A strict check should be made to determine if the records are being maintained accurately and as required, otherwise they are worthless from a consideration requiring accuracy, and from which logical conclusions may be determined.

By comparing the data required on the suggested new form, and the data noted on Form WI-1, allows a conception of what information might be obtained and that which is being gathered at the present time. Form WI-1 does not require enough information to review a season's operations nor derive sufficient conclusions to understand the operations that transpired.

At the conclusion of the season it was found that Form WI-1, as maintained by the *Ulysses,* accounted for only 1540 whales when there had been 1560 whales killed by the expedition. Also, fetal data was missing, and the number of flensed whales recorded for certain dates did not agree with the whales actually flensed by that ship on those dates. The factory was carrying a large number of whales as fenders even though these whales had been cast adrift months before; notations were completely missing concerning the whale lost or those cast adrift as blasted fenders. An explanation of the right whale killing was missing and, to sum up the situation, the entire records indicated nothing of value for the Antarctic season. In order to account for the twenty missing whales, Captain Mikkelsen, master of the *Ulysses,* and the new ship's secretary that replaced the one transferred to the *Kosmos*, spent two days going over the forms and attempting to rectify them. It was futile because they used the bridge record sheets, already in error, to make the changes at random. The statement of the records at the present time cannot possibly allow a determination of the footage obtained by each killer boat because all the lengths are not specifically credited to the gunners that killed them. The record that was sent to Sandefjord, Norway, may be as exact as any record could be in accounting for each whale killed, and delivered to the factory. Some boat had to get credit, unless the carcass was lost, but this log merely indicated the species, footage, gunner that killed, and the date. The record was maintained only for the information of the company, and for purposes of emolument.

Section 5: The classification of factory ships

Part 1: A Modern whaling factory

The general arrangement of *Ulysses* was typical of any modern pelagic whaling factory. The forward part of the vessel contains the bridge, radio room, officers' quarters, crew's quarters, store rooms, etc. The after part possessed the engine room, fire rooms, pump rooms, engineer's quarters, galley, messing facilities, and some of the crew's quarters. The small amidships structure contains the separating room, powder magazines, smithy, and small coal bunkers.

The flensing deck plan is especially interesting; flensing deck is the term applied to the weather deck of any factory ship. "Flensing platform" is the term generally applied to the after part of the flensing deck; it is just forward of the skidway. "Cutting platform" is the name designated for that section of the flensing deck contained between the amidships structure and living quarters forward.

It is via the skidway, connecting the opening in the stern with the flensing deck, that the carcass is pulled from the water to the flensing platform. After the blubber is removed, and dumped into the Hartman and grinders, located on the sides of the flensing platform, the carcass is pulled forward to the cutting platform. Three bone saws are located on the cutting platform, but only two were actually used by the *Ulysses*. Here, on the platform, the whale is dissected and dumped into the bone pressers and grinders, located on the sides and ends of the cutting platform respectively.

The *Ulysses* had ten cargo booms, and thirty winches and capstans for flensing, dissecting, and introducing the whales to the factory system. It was possible to produce between 160 and 200 tons of fresh water daily, but this was insufficient. The ship could produce 1800 barrels of whale oil, but generally averaged between 1200 to 1600 per day when whales were abundant.

The *Ulysses* possessed the following factory equipment, and approximate daily tonnage:

Equipment	Amount	Capacity (tons)	Daily fillings	Daily capacity
Bone pressers	15	15	2 ½	562
Hartmans	2	3	24	144
Grinders	10	25	5	1250
			Total	1956 tons

For all practical purposes, therefore, the *Ulysses* could handle between 1800 and 2000 tons of whales per twenty-four hours; this was maximum and a very liberal estimate.

By knowing the amount of equipment installed in a factory, the number of evaporators, and the approximate weight per foot of blue, fin, and hump back whales, a practical estimate may be deduced as to just how many whales a factory can process in twenty-four hours. It is possible, therefore, under such conditions to determine whether the law is being observed within reasonable limits.

Part 2: Classification of factory ships

Modern pelagic factory ships are generally divided into five classes according to their capacity to produce a certain amount of oil. The classes and their ratings are:

Class	Barrels to be attained per season
"A"	105,000
"B"	90,000
"C"	80,000
"D"	70,000
"E"	53,000

This classification is determined by:

1. The processing equipment installed.
    - (a) Number of Kværners.
    - (b) Number of bone pressers.
    - (c) Number of Hartmans.
    - (d) Water, steam, etc., facilities of the factory
2. The number of killer boats to work with the factory.
3. Any other details that tend to increase or reduce the number of whales to be killed and processed.

The classification is determined and agreed upon by the owners of the ships and the Norwegian whaling unions. All class "A" factories are supposed to be able to attain 105,000 barrels at least, during the course of a season; the other classes are supposed to produce their quotas accordingly. This method of segregating the factories allows the crews employed on the various classed ships to derive approximately the same financial returns over the course of a season. The wages on all factories are the same, but the share per barrel on the lower classed ships is relatively higher; this allows the crews of smaller ships a greater share for barrels of oil obtained, which, because of the low share on the bigger factories, allows all the crews to receive practically the same salary for their efforts, regardless of the factory to which they are attached.

As an example of how this system functions, the following figures are set forth. This is a hypothetical case: A man on a class "A" ship obtains five cents per barrel, therefore he receives $5,250 for his share if the factory produces to its exact requirement. To get the same share, a man on a class "B" ship would have to receive five and eight-tenths cents and an employee of a class "C" ship would have to get six and five-tenths cents. In this manner of share payment, if the factories attained their classification limit at the end of the season the crews would receive the same amount of pay because their wages are identical. Of course the factor of chance must be considered. If a small or a big factory does not come up to, or if they gain more than the allotted barrels, the crews benefit or lose accordingly on the share. It generally happens that the lower classed vessels produce more oil than their classification requires; the crews of these vessels are therefore more liberally compensated.

The classification of the factories is supposed to be as theoretically correct as it can possibly be, but it does not work out in practice. Some of these divergences are so extensive that factors other than oil production must be considered by the unions and the owners when the designation of a factory ship is considered. The *Pelagos*, for instance, is a "B" class ship but she is reputed to have produced 132,000 barrels during the Antarctic season of 1937-1938; 42,000 barrels of oil over the required class limit is too much difference for even practical and theoretical computations. The *Ulysses* worked Shark Bay as a class "B" factory, but was changed to a class "A" prior to the beginning of the Antarctic season. The *Ulysses* is a class "B" ship; she cannot use all the carcass of the blue and fin as required by law and still produce the oil required of "A" class factories. The *Ulysses* was considered in the same category as the *Kosmos*, a 22,000 ton ship, which can produce 2,200 barrels of oil daily. The *Ulysses* will not attain "A" class rating until more factory equipment is installed, the evaporator capacity increased, and even then difficulties will be encountered because the ship is too narrow. It cannot allow more than one blue or two small fins on the flensing deck at one time, and only one specimen can be dissected at a time on the cutting deck. When the carcass is cut-up on the cutting deck the narrow beam of the vessel does not allow the huge sections to be pulled free and worked simultaneously. The resulting congestion therefore delays the work. During the 1937-1938 season the *Ulysses* dumped tons of whale carcass overboard in order to make way for the large number of whales which the killer boats were delivering to the factory. Such a procedure was not in accordance with the Norwegian whaling union agreement and several members of this union complained to the inspector and repeatedly called his attention to the large waste that was taking place. These men were, of course, naturally protecting their own interest; they could not resign themselves to accept the *Ulysses* as a class "A" factory which indicated that they had to obtain more oil than the ship was adequately and theoretically equipped to manufacture. How and why the *Ulysses* was accorded "A" class rating is unknown, but it is believed other factors than mere oil production entered into the consideration between the owners and the whaling unions.

The factories carrying Norwegian personnel have their crews assigned to them by the Norwegian whaling unions after agreement and acceptance by the owners. Once a man is assigned to a factory he remains with that ship season after season and cannot be discharged or replaced as long as the factory operates, and he performs his duties according to his contract and the best of his ability. Each factory worker receives a certain wage in accordance with his particular employment and he is not allowed to perform any other work except that designated in his contract. There are certain key positions on a factory ship acquired by men that have served an apprenticeship in that particular section of the trade; seniority is considered in advancement also.

Section 6: Norwegian whale gunners and how they are paid

In the past, whale gunners were paid for each whale killed regardless of its size. The various species were given different values, but the same sum was received for killing a calf as for a mature specimen. Such a remunerative system encouraged the gunner to kill any type or size of whale encountered, because regardless of the size the pay was the same when the carcass was delivered for processing. With the introduction of international legislation for protecting the whales, it was required that the gunners be compensated to a considerable extent upon such factors as the species, size and oil yield of the whales captured, and not merely upon the number obtained.

In order to pay the gunners in accordance with the legal requirements, a unit of measurement had to be determined that gave consideration to the species obtained, the length, and the amount of oil derived. The unit of measurement selected was the "beregnent" whale. It is a mythical whale derived for each different species and is expressed in terms of feet. It allows the gunner to be compensated in terms more liberal for the more valuable whales obtained. A gunner's contract generally contains the clause of so many barrels per "beregnent" whale besides a stipulation setting forth the pecuniary amount per barrel of oil, depending on the articles of the agreement. In accordance with their commercial estimate the most valuable specimens are set forth with their length units opposite:

1.	Blue Whale	- 75 feet	-	beregnent whale.
2.	Fin whale	- 110 feet	-	beregnent whale.
3.	Sperm whale	- 110 feet	-	beregnent whale.
4.	Humpback whale	- 120 feet	-	beregnent whale.
5.	Sei whale	- 200 feet	-	beregnent whale.

These are the five species most actively sought today. The blue whale is the most valuable specimen hunted, because it contains the most oil; the others are arranged according to their commercial value. It should be noted that the blue whale is classed at the lowest foot limit, 75 feet, in determining the "beregnent" units; this system allows the gunner to obtain more beregnent units per blue whale killed, and consequently more barrels of oil with a resulting increase in remuneration. As a matter of comparison, the sei whale is the least valuable; this has the highest foot limit for beregnent whales with a resulting diminution of units which reduces the amount of oil to be determined with a resulting smaller compensation.

To determine the number of beregnent whales, the total footage of the different species must be obtained; the various footage totals divided by the beregnent units for the different species allows the determination of the total beregnent whales. The total number of beregnent whales divided into the total barrels of oil derived from all the whales allows the determination of the barrels of oil in a beregnent whale.

Thus:

$\dfrac{\text{Total footage of all blue whales}}{75}$	=	number of beregnent blue whales or the blue whales expressed in beregnent units.
$\dfrac{\text{Total footage of all fin whales}}{110}$	=	number of beregnent fin whales or the fin whales expressed in beregnent units
$\dfrac{\text{Total footage of all sperm whales}}{110}$	=	number of beregnent sperm whales or the sperm whales expressed in beregnent units
$\dfrac{\text{Total footage of all humpback whales}}{120}$	=	number of beregnent humpback whales or the humpback whales expressed in beregnent units
$\dfrac{\text{Total footage of all sei whales}}{200}$	=	number of beregnent sei whales or the sei whales expressed in beregnent units

The number of beregnent whales derived for each species is determined and these totaled are equivalent to the total of beregnent whales for the entire expedition. The total beregnent whales are then divided into the total barrels of oil obtained, thus:

$$\frac{\text{Total barrels of oil obtained by expedition}}{\text{Total beregnent whales obtained by expedition}} = \text{the barrels of oil per beregnent whales}$$

When the number of barrels of oil per beregnent whale is determined, the catch of the individual boats is considered.

The number of beregnent whales is found for each boat by determining the total footage of each species and then dividing by the beregnent unit allotted for that type of whale, thus:

$$\frac{\text{Total footage of blue whales obtained by killer boat}}{75} = \text{number of beregnent blue whales for that killer boat}$$

$$\frac{\text{Total footage of fin whales obtained by killer boat}}{110} = \text{number of beregnent fin whales for that killer boat}$$

The same computation is performed for the sperm, humpback, and sei, using their respective beregnent units. The total number of beregnent whales killed by each gunner is thus determined by adding up the beregnent units derived from each species which he has killed for the season. The number of barrels of oil contained in a beregnent whale has been determined; by multiplying this by the beregnent whales obtained by a gunner, allows the determination of the number of barrels of oil for which the gunner is to be paid thus: the number of beregnent whales obtained by a gunner multiplied by the barrels of oil in a beregnent whale equals the barrels of oil for which the gunner is to be paid.

The present rate of pay requires that each gunner obtain fifty cents per barrel of oil and $125 per month while he is home and not actually working. If a gunner is a "gunner leader," or in some similar capacity where he practically controls and directs the operations of the expedition, he receives bonuses from various sources connected with the enterprise. It is these bonuses that allow the leading gunners to get such large sums of money for their work. Martinsen, for instance, gunner leader of the *Ulysses* expedition, received approximately four thousand dollars merely because he was detached from the *Kosmos* expedition and shifted to the *Ulysses* after he had been contracted to the *Kosmos* for the season 1937-1938. This sum of money was in addition to his shares, bonuses, etc., that he received under ordinary conditions. Martinsen is reputed to have made sixty thousand dollars for the season of 1937-1938. In the past, some Norwegian gunners have made as much as a quarter of a million dollars in one season when operations were unrestricted and the market demand for whale oil was large.

It is my personal opinion that Norwegian whale gunners are grossly overpaid. The gunner's union in Norway is a capable and powerful organization; they practically make their terms and these are generally accepted by the factory owners. All the gunners receive the same amount per barrel of oil obtained, and for each month they are at home if they are under contract to some particular company. At the end of a season if a gunner is not notified within a month by the owners of the expedition for which he hunts that he is to be retained for another season, then he loses his position and is free to seek another contract.

Shooting a whale by modern methods is not an exacting or difficult task; anybody endowed with even ordinary ability to shoot can become a gunner with a little practice, experience is the important requirement. To know how to handle the whale after it is harpooned, and the habits of the various species are the important factors in modern whale hunting. An intelligent person can acquire this knowledge in a very short time, but he may never become a gunner merely because Norwegian gunners are not selected by ability, but by personal influence or blood relationships. This is common knowledge and openly admitted by the gunners themselves. They endeavor to make their vocation a restricted profession whereby only friends or relatives may be admitted. The result is that some men, having gained their position by influence, merely enhance their opportunities by their own natural ability and go on to become expert hunters. On the other hand, there are scores of men serving on killer boats today that have the qualifications to become gunners but do not possess the influence, or have not had the opportunity to shoot and become gunners. The opportunity to shoot a whale is something that never transcends below the mate of a killer boat, and he is generally a relation in some way or other to the gunner.

The gunners seldom possess any knowledge of anything pertaining to the industry except the ability to shoot and handle the whales; the majority of them cannot navigate for even practical results; their knowledge of what actually happens during the processing of the whale ceases when the carcass is delivered to the factory. Many of these men possess the reputation of knowing where the whales are and where they can be found with certainty, but it is believed that this ability is exaggerated in most cases. Whales are found over extended areas in the Antarctic and elsewhere, if anybody sweeps these regions with an expedition they are bound to find the animals, if present. This is the method employed today in finding whales. If the animals are harassed to any great extent, the food becomes scarce, or other conditions arise prompting a migration, the expeditions spread their killer boats over large tracts until the animals are again contacted. Whales are not naturally gregarious, but are generally found in large numbers merely because the circumstances providing for food bring them together.

One of the greatest attributes required of a gunner is physical endurance, but even this requirement is being modified by modern whaling methods. The Antarctic season is the great test at the present time. It taxes hunting ability and physical strength to the utmost. Many men are considered proficient gunners in equatorial waters, but fail during the ice season because they do not possess the all around ability required in hunting blue, fin, and humpbacks, or because their strength is not equivalent to the demands. The ability is in full demand because the various species possess characteristics which must be known to carry the hunt to a successful conclusion; the physical requirements must be possessed because the animals are hunted while daylight allows them to be seen. Some of the gunners and their crews never get out of their clothes for weeks at a time during the Antarctic season.

However, it is believed that any man of ordinary physical endurance and with moderate ability to hunt and shoot can be taught to be a whale gunner in a normal period of time. Experience and practice are the two factors that make successful gunners.

Section 7: Killer boats, the harpoon, the killer iron and modern whale gun

Part 1: Killer boats

The killer boats employed by a modern expedition are between one hundred sixty and one hundred eighty-five feet in length with a sixteen to twenty foot beam. They vary from one hundred sixty to two hundred tons; have a speed of eleven to sixteen knots, and a cruising radius from three thousand to five thousand miles. Some of these are built in Germany, but the majority of killer boats are constructed in Norway and England. A modern boat costs approximately two hundred thousand dollars; this represents the best in this type of craft.

The killer boat possesses an extreme sheer forward that gives the forecastle an extreme angle; the bow is high, sharp, and possesses great flare. The gun platform is mounted on the extreme summit of the bow, which is reinforced to eliminate vibration and thus allow more accurate shooting. Whale gunners figure that a new boat is one hundred whales better during the course of a season's hunt than the old type, that is, those boats ten to fifteen years old. The high bow allows a gunner to shoot down and obtain greater distance. The new boats naturally have greater speed and maneuverability than the old type.

The freeboard aft is extremely low; in fact, this part of the vessel is almost always awash even in a slight swell. Most of the modern boats possess a cruiser stern; it is so constructed that the propeller is exceptionally deep in the water and never comes out. This is important. These boats can ride any kind of a sea; it is merely a case of how much the crew can endure. Any one that sails on one of these boats through the "Roaring Forties" can go to sea on anything.

The killer boats are oil burners, have a reciprocating drive, and are generally equipped with fire tube boilers. Recently a few were equipped with water tube boilers, but trouble has been experienced so it is believed they will be eliminated in the near future.

When the expedition is underway, to and from the whaling grounds, the killer boats accompany the factory ship, generally remaining in sight. The factory ship fuels and provisions these vessels when necessary. The boats possess a crew varying from twelve to sixteen men, consisting of the gunner, mate, chief engineer, cook, and mess boy; the remainder is made up of the deck and engineers force.

In the majority of cases, the gunners do not possess a mate's license in any form, but they are generally in command of the ship. The majority never knows where they are, cannot use a sextant, and if they do their results are worthless for even practical purposes. All navigation is carried on by radio. Each boat is equipped with a radio phone and key set, but the phone is used practically all the time; a radio direction finder is also installed on each boat. The navigation system generally used is to run by dead reckoning until a whale is sighted. After the chase, if successful, the killer boat calls the factory for a radio bearing, runs it down, and makes contact. A loud speaker is installed on the bridge of the boats allowing each boat to listen to the conversation between the factory and the boats, or just between the boats, and also allowing them to listen for the factory calling them.

The crews of the boats generally arrange to sail together year after year; the gunner usually selects the men that he wishes to go with him. Once the crew is completed it remains intact season after season. The mate is the one that actually does the work on the killer boat. The gunner kills the whale and then walks off; it is up to the mate to secure the carcass, contact the factory, deliver the whales, etc. All the gunners do not take this attitude, but this is the general condition. The first mate is generally an apprentice gunner. In most cases, he is a relative of the gunner or has some other influence which will eventually bring him to a gunner's position.

In the Antarctic, each killer boat carried approximately one mile of harpoon line which consisted of one seventy fathom shot of four and one-half inch line, one one hundred twenty fathom shot of six inch line, and six one hundred twenty fathom shots of seven and one-half inch line. The lines used in Shark Bay consisted of five and six inch because only the humpback species was obtained there.

The accompanying diagram illustrates the general outline of a killer boat (App. 3.1).

An effort is made at this time to describe briefly the special tackle used in eliminating the strain that results from the procedure of harpooning and killing the whale.

The bins containing the harpoon line are located in the forward part of the vessel; the six and seven inch lines are carefully flanked down in these bins, the four inch forerunner line is coiled down on the ready tray, which is located on the bow, below and forward of the gun. The line is brought from the bins through an eye in the deck, passed approximately four times around the winch, then taken up through the accumulator block and down underneath the gun platform where it is spliced to the forerunner line. This line is in turn attached to the harpoon shaft by means of a wire runner. The harpoon line thus functions as a gantline through the accumulator. Each killer boat is equipped with a large set of springs, generally sixty-four, located in the forward hold and firmly attached to the hull of the vessel. A wire cable has one of its ends attached to the springs and the other to the accumulator after it passes through the stationary block, which is just below the crow's nest on the foremast. The result is that when a strain is placed on the harpoon line the accumulator moves down, parallel to the mast, and compresses the springs via the wire cable; the springs are arranged in eight parallel rows, each row containing eight springs; as one row is compressed, the stress is transmitted to the next by means of a cable. When the harpoon line becomes slack, the accumulator moves up and the strain is removed from the springs. It is by this arrangement that most of the strain is removed from the harpoon line, and if it does sustain any it is introduced gradually.

It is by these springs that the harpoon line withstands the heavy pull of the blue and fin whales. When hunting humpbacks the accumulator hardly moves, when hunting fins it is pulled half way down; the big blue whales pull it all the way to the deck. The accumulator performs its most important function in the few seconds that elapse after the harpoon has become imbedded; the harpoon line could not withstand the initial strain without the aid of the special tackle.

It is the modern killer boat that is responsible for the possible extermination of the whales. With their speed, maneuverability, and long cruising radius, whale hunting has transcended to the point where it is practically slaughter, and unless weather, ice, or sea conditions interfere, ninety-five per cent of the whales sighted can be figured as practically dead. The speed of these boats is equivalent to or greater than the maximum swimming speed of the hump, blue, or fin whale; using its utmost exertions, the animal cannot elude the boat, becomes exhausted and eventually shot.

Most of the expeditions are accompanied by six to ten of these crafts, depending on the size of the factory ship; they do not hunt the areas over which they traverse, they just about sweep them clean of any whales that may be found. During the 1937-1938 Antarctic season there were approximately three hundred of these boats employed in the area bounded by the Weddell and Ross Seas and 60° S. A rough estimate would indicate that approximately forty-eight thousand whales were killed, while sixty thousand were exterminated if unborn calves are to be considered.

If conservation is to be given consideration, the number of boats employed by expeditions should be reduced and the speed of these ships should be lowered to prevent them from exceeding the maximum efforts of the whales to escape. If such regulations are adopted, the gunner is forced to rely on his experience and judgment to outwit the animal; present day methods condone the system of pursuing the animal until it is exhausted and then slaughtering it. Extermination cannot be avoided if this type of vessel continues to be built larger and speedier, they should be required to be smaller and slower.

Part 2: The harpoon

The modern harpoon is a massive projectile. It weighs approximately one hundred fifty pounds, is five feet long from the posterior end to the threads on the head by which the bomb is attached, and is so constructed that for three feet of its length it forms a double shaft. It has a four inch solid base, three and one-half inches in diameter; the forward end of the shaft terminates in an eyelet by which the head is secured; the head has an oval on the after end of it that fits into this eyelet; this method of articulation prevents the head from moving on the shaft until after the iron has entered the body of the whale. The head of the harpoon is ten inches long and has a hollow threaded projection two inches long on its anterior end for holding the fuse and by which the grenade is screwed on. It is also equipped with four prongs, thirteen point six inches in length, which have three point two inch barbs on the ends of them. The prongs are attached to the head by means of hinges. They are tied back and parallel to the shaft with a small cord which is passed around the tips of the barbs. After the harpoon enters the body of the whale and a strain is exerted on the harpoon line, the cord is broken, the prongs open up, and the iron is prevented from drawing out.

The harpoon bomb is a hollow, pointed, cast iron grenade, fifteen inches long with a four and one-half inch diameter at the base. It weighs fourteen pounds. A threaded section is inserted in the aperture of the base. In a small bag one pound of black powder is inserted within the bomb prior to screwing it on the harpoon head. A fuse is screwed into the hollow cavity of the threaded projection on the forward end of the head for detonating the grenade. This fuse functions in such a manner that it sets off the black powder of the bomb three seconds after the harpoon is fired from the gun. The grenade is thus fragmented within the body of the whale with devastating results.

Part 3: The killer iron

A killer iron is five feet four inches from the posterior end to the threads on the head for securing the bomb; it is so constructed that for three feet three inches of its length it forms a double shaft with a solid four inch base, three and one-half inches in diameter. The iron weighs one hundred thirty pounds. The head of the killer iron is firmly attached to the shaft, is sixteen inches long and is equipped with two seven and one-half inch prongs that are firmly set at an angle of forty-five degrees to the shaft. These prongs have no barbs and are imbedded in a posterior-anterior direction, directly opposite to the prongs on the harpoon, with the idea of preventing the iron from going too deep into the body of the whale. The killer iron is used to introduce the explosive grenades into the body of the whale after it has been harpooned, and the first wound fails to prove fatal. This iron is used today instead of the antiquated lance. The same type of grenade is used on the killer iron as on the harpoon. Both projectiles are fired from the same gun. A harpoon fully loaded and ready for firing weighs approximately one hundred seventy pounds. A killer iron ready in all respects for firing weighs approximately one hundred fifty pounds.

Part 4: Loading a modern whale gun

Two men generally load the harpoon gun. The muzzle loading gun is still the most widely used, although the breech loading type is supplanting it. Most gunners still prefer the muzzle loading cannon. When preparing the muzzle loading type, one hundred ninety to two hundred grains of smokeless powder are used for the propelling charge. The amount used depends on the gunner. This charge is introduced via the muzzle in a small bag, then a twelve inch wad of cardboard or any compressed paper that will not burn is inserted. Sometimes for this type of gun the powder is contained in a fastening of the paper wadding by means of an elastic arrangement.

A wooden plug is later inserted between the powder and the harpoon. The wooden plug is hammered in tight by means of a wooden rammer. The harpoon is slid into the gun and brought up just tight against the plug; it is an easy fit.

A detonating fuse is screwed into the nose of the harpoon before the grenade is screwed on the head. It is this fuse that shatters the grenade three seconds after the harpoon leaves the gun. Prior to securing the grenade to the harpoon head, approximately one pound of black powder is dumped into its hollow interior.

After the harpoon is placed in the bore, the four inch fore runner line is spliced to a wire traveler that moves in the aperture joining the double shaft of the harpoon. The other end of the four inch line is later spliced to the regular harpoon line, the size of which depends on the species being hunted.

A piece of small thread is passed around the barbs of the harpoon to keep them in place, and a small bight of the same material is passed around the front sight of the gun to keep the projectile from working loose in the bore while the boat rolls and pitches in a seaway.

The same procedure and equipment is used in the breech loading gun except that the smokeless powder, wad, etc., are all contained in a brass cartridge case which is inserted in the breech by manipulating the sliding wedge system of breech block.

Section 8: The factory equipment: the Grinder, Hartman and Bone systems

Part 1: The Grinder or Kværner system

The grinder or Kværner system is the "cooking out" equipment for driving the oil from the meat, intestines, and some bone (App. 3.5). The grinder or Kværner systems are made for various capacities. They are generally the ten, fifteen, and twenty-eight ton sizes. The *Ulysses* was equipped with twenty-eight ton grinders, but their working volume was estimated at twenty-five tons. The Kværner derives its name from the manufacturers that construct them; grinder is the more practical name.

The Kværner and Compton systems are the same in principle of operation, capacity, efficiency, and production. The Compton merely differs from the Kværner in the patent device that is used in closing and sealing the deck apertures of the system after the whale material has been introduced for processing.

The Kværner system is sealed by drawing two horizontal sliding perforated gates together, and then pulling a horizontal moving circular plate over the perforated slides. Three removable iron bars act as fastenings for drawing the plate up tight against the surface of the circular opening to form a water-tight seal; the bars have projections on both ends that rest on a projecting lip of the opening; by means of the lug fastenings the disc is pulled up tight and an air-tight fitting is made.

The Compton system is sealed by swinging a horizontal sliding disc into position to close the opening, and then setting up on screw fittings located on the side of the aperture. Such an arrangement saves time and less trouble is encountered because it avoids misplacing the bolts, nuts, and fastening bars of the Kværner system.

The grinder systems can be constructed for placing in a horizontal or perpendicular position; depending on the space allotted for their erection and the requirements of the factory ship. A twenty-eight ton grinder is approximately thirty feet long with a twelve foot diameter.

The apparatus consists of a heavy exterior covering of sheet iron; underneath this outer metal covering is a layer of insulating material about four inches thick. The insulation covers the container, which is a heavy iron drum; inside the drum is a perforated chamber capable of being rotated; the perforated chamber has numerous circular holes through its sides about two inches in diameter; there are no such openings on the end surfaces. Angle irons are installed on the interior surface of the rotating drum to aid in keeping the contents in circulation.

The interior perforated chamber is the section of the equipment that actually holds the material to be processed; it is made to revolve inside the heavy drum by means of a belted gear drive located on one end of the grinder. Steam enters the revolving drum at sixty pounds pressure per square inch; the whale material is being continually circulated by the motion of the container and acted on by the steam; this causes the substance to disintegrate so that the perforated revolving chamber eventually holds water, steam, oil, and decomposed whales substance. These constituents are drawn off by a connection at the lower part of the equipment and are sent to the separating tank where the oil, water, and waste material are separated and properly disposed of by a factory worker.

The apparatus is simple in design, construction, and operation. Two circular apertures that are about four feet in diameter are located on the upper surface, (which are openings to the deck,) and it is by these that the material is dumped from the deck into the grinder. A steam line, with connections properly arranged to allow the steam to enter the top and bottom of the equipment, conducts the steam to the apparatus at sixty pounds pressure per square inch. A large gear drive, actuated by a belt pulley, is located on one end of the grinder. It is this gear drive that rotates the interior drum. A small pipe connection is installed on a manifold on the bottom of the apparatus; this leads overboard and is used merely for cleaning purposes, or to blow heavy refuse overboard if desired; it has no connection with the processing routine. A second, but larger connection is also located on the bottom manifold. This line conducts the oil, water, steam, and disintegrated material to the separating tank for separation and disposal. Nothing goes overboard directly from this system unless the apparatus gets fouled, or it is desired to blow heavy material overboard. After the material has been subjected to the revolving action of the interior drum and steam at sixty pounds pressure per square inch for approximately four hours, it has disintegrated to a condition that allows its exit from the grinder with the steam, oil, and water.

Meat is the material generally processed in the grinder system; the blubber from the ventral region is also cooked out in this equipment. Rib bones, caudal and pectoral fins, and the scapulas are also dumped into this apparatus. The head bones, back bones, etc., are generally put into the bone presser, but the grinder can process them. The grinder will work with increased efficiency if a small amount of bone is introduced with the material to be processed.

It takes approximately one hour to fill and four hours to derive all the oil from a grinder with a twenty-eight ton capacity. Sixty pounds steam pressure is used; this is considered the most practical pressure; sometimes the grinders are run at seventy pounds pressure, but the oil is slightly burnt as a result.

The oil derived from this equipment has a yellowish cast when examined at the separators in the separating room; the oil from the Hartman system is more of a white-gray color. When the oil from the grinders goes to the separating tanks and passes the sight glass on its way from the latter apparatus to the settling tank, it has a blood red color if meat is being processed; a brown-yellow color if bone, meat, and blubber are being processed.

When blasted whales are processed in any equipment the amount of water and waste far exceeds the amount of oil derived, or the quantity of water and waste exuded under ordinary conditions. The amount of water and waste present is indicated in the gage glass on the side of the separating tanks. While working blasted or poor condition whales the separator tank must be repeatedly blown down due to the large amount of water and waste that rapidly accumulates in the system. Because of the meager amount of oil obtained, and due to the continual blowing down of the system, the factory ships do not like to process blasted whales, or the meat and bone of whales that are in poor condition. In such instances the amount of oil derived is not beneficially proportional to the quantity of steam and water going into the processing, and when the system requires extra blowing down, which entails further expenditure of water and steam, the cost of production exceeds all derivative gains from the oil obtained because of the tremendous drain on the water, steam, and factory equipment resources.

The meat from the carcass is a source of annoyance at all times on factory ships; they dislike processing the meat even when it is endowed with oil because of the large amount from each carcass, because of its weight and difficulty of handling, because it occupies so much of the factory system, and most importantly because the meat is practically always processed in the grinder and this system uses a tremendous amount of steam. For the amount of oil taken from the meat and the quantity of steam and water that has entered the factory equipment to derive it, it can be stated that for all practical purposes it hardly pays the factory to cook out the meat for average conditions, unless the whales are in extremely fine condition. The meat of the caudal section is generally the part that contains oil, if any is in the meat, and is the heaviest endowed when oil is found all through the meat. The meat of the back is the area most devoid of oil; it is from this region that most of the meat is derived from the carcass and whales have to be in excellent condition before the flesh of the back region becomes endowed with enough oil to make it commercially profitable for processing purposes. For conservative considerations and for all practical purposes, figure forty per cent of the oil as coming from the blubber, thirty per cent from the bone, and fifteen per cent from the meat. Fifteen per cent is lost in working the whales on deck, in faulty manipulation of the cooking system, in the decomposition of the carcass after the whale is dead, etc. From all blubber processed, estimate sixty per cent is water and waste from the bone processed, estimate seventy per cent as water and waste; and from the meat figure eighty-five per cent is water and waste. These percentages were generated by the *Ulysses* factory system foreman.

The only care that has to be exercised in introducing the material to this system is that it has to be cut into pieces small enough to get through the deck openings. The meat is generally dragged to the apertures by a large hook attached to the steel hawser of a deck capstan; it is then cut into large chunks and dumped into the grinder. Pectoral fins, bones of the pectoral girdle, and the ribs processed in the system, are dumped into the grinder practically in one piece. Due to the haphazard manner in which the system is loaded it is impossible to fill it to its maximum capacity; in the twenty-eight ton grinders it is estimated they held twenty-five tons at a filling. When the grinder is loaded the apertures are sealed and the deck notifies the factory via a voice tube. The steam is then turned into the apparatus and the material is allowed to be thoroughly impregnated with the steam. After a short interval of time the gear system is set in motion, and the perforated chamber which actually holds the material commences to rotate inside the drum. Under the action of the steam and rotating motion the material disintegrates into molten mass of flesh and pulp; the flesh, pulp, exuded oil, water, steam, and the other material that has resulted from the steam working on the organic material is conducted via a pipe from the grinder to the separating tank. The steam pressure in the separating tank is sixty pounds per square inch, the same as in the grinder. The first oil can be tapped off the Kværner one and a half hours after the steam is first introduced.

On reaching the separating tank the oil, water, and disintegrated material is separated. The oil is drawn off to settling tanks; the water, refuse, etc., is blown overboard.

When it is observed that all the oil is derived from the substance, the whole system is blown down until empty. The grinder is stopped, the steam shut off, and the deck is notified via voice tube. The seals on the opening to the deck are then broken. This act causes a large amount of steam to flow from the openings and spread over the working deck. It is impossible to approach the system, or commence the filling again, for at least twenty minutes. The steam that belches from this apparatus is nauseating, and even the most experienced whalers cannot stand its penetrating, sickening effect, regardless of how often they are subjected to its odor, nor how long they have been whaling. It positively coats the olfactory system, and if inhaled for any length of time causes a severe headache. A person unfamiliar with its effects may even become nauseated immediately. This steam is nothing more than a heavy vapor laden with minute particles of dead whale that has been disintegrated by hot steam.

As a matter of economy the steam of a grinder that is practically empty and about to be blown down is directed into another grinder operating under full load; this procedure is adopted to save water and steam. Practically the last vestige of steam is removed from this apparatus by a special blow off valve after the line to the separating tank has been closed; however, it is impossible to exclude all the steam so the deck apertures allow the system to be completely vacated.

The disadvantages of the grinders are few:

(a) It is impossible to fill the apparatus without blowing it down completely and opening it. This results in loss of steam, water, time, and thermal efficiency.

(b) This equipment uses a large amount of steam that cannot be reclaimed; the result is a tremendous drain on the water supply of the factory, which is one of the most irksome problems confronting modern pelagic whaling factories.

(c) This equipment uses a large amount of steam.

(d) The oil derived is not of the best, being generally grade two, but then the material processed is not the choice section of the carcass either; meat, ventral blubber, etc., are practically always sent to this system. However, if the same grade of blubber is sent to the grinder and the Hartman, the resulting oil from the Hartman is superior; this is due to the fact that sixty pounds pressure is used on the steam to the grinder while forty-five or fifty is used in the Hartman.

(e) Because of its large size and weight this apparatus takes up a large amount of space, and frequently works loose on its foundations, especially if installed on a factory that is subjected to excessive vibration.

The advantages are:

(a) It is easily and rapidly filled.

(b) It holds a large quantity of material.

(c) It will process any part of the carcass introduced to it; the meat, blubber, and bone are all disintegrated with the same ease.

Regardless of what section of the whale is processed in this apparatus, it is reduced to a permeated mass devoid of any solid particles, and when blown overboard appears as a brown heavy liquid mass accompanied by a large volume of the same material in vaporized form. Occasionally a few bits of material remain in the grinder when the system has been emptied, but for all practical purposes it may be considered that all the substances have been reduced to a malleable sodden mass completely devoid of oil.

Part 2: The separating tank of the factory system

The separating tank is merely a link in the cooking out system whereby the oil is separated from the disintegrated material resulting from the action of the Hartman or grinder equipment. A detailed explanation is necessary to fully explain the function of this unit.

The separating tank for the grinder and Hartman systems is the same in principle and design. It consists of a large cylindrical tank approximately fifteen feet high with a ten foot diameter. The essential purpose of this piece of equipment is to separate the oil, water, and whale material that has entered from the grinder or Hartman systems.

A detailed explanation of the manipulation and functioning of this apparatus is necessary. An externally driven belt works on the wheel *x*; this wheel is attached at a shaft that extends to the interior of the tank. A worm-gear is situated at *t*, which actuates a vertical shaft *z* that has two horizontally built arms *y* at its lower extremities. These arms are in continual motion and keep the contents of the tank circulating, especially that material that has a tendency to settle to the lower levels.

Steam at sixty pounds pressure per square inch, water, oil, and the whale material that has been disintegrated in the grinder or Hartman, enter the separating tank at *a*. They emerge from the conducting pipe into a funnel shaped flue that extends approximately two-thirds of the tank depth; emerging from the flue, and due to the churning effect of its rotating horizontal arms, these constituents decompose the oil gathering at the upper region of the tank, the water at the middle area, and the heavier material in the lower regions. By examining the contents of the gage glass *g*, located on the side of the tank, and by testing the appearance of the material that passes the sight glass *l*, the factory worker can determine when to remove the oil from the upper portion of the tank via the pipe line *p* by operating the valve *e*. If the liquid passing *l* appears a light yellow, deep orange, or red, depending on what part of the whale is being processed in the grinder or Hartman, the worker allows the liquid to pass to the settling tank. If the material appears as a dark brown or black substance the worker keeps *e* closed and examines the gage glass *g* to determine the proportions of material still remaining that might contain oil. It is necessary to use *l* and *g* concurrently to operate the equipment efficiently. When it is apparent that all the oil has been extracted, or in the case of the grinder or Kværner that the apparatus is empty, the worker proceeds to blow down the settling tank and empties the apparatus by blowing its contents overboard.

The pipe *o* runs at a forty-five degree angle from the center of the tank. At its lower extremity this pipe is connected to the interior of the cylinder by a circular opening about two inches wide. This opening is formed by a metal disc located at the lower end of *z*; this disc has an inch clearance on the foundation for the arm *y* and forms the opening by which *o* is connected to the interior. At its upper end, *o* is attached to the side of the tank and its operation is controlled by the valve *v*.

When the factory worker wishes to blow the apparatus down he merely closes the valve *e*, opens valve *v*, and the material is driven through the two inch opening, the pipe *o*, and overboard. If the grinder or Kværner is empty and is to be re-filled all the contents of the settling tank are discharged; this is indicated by examining *g*. If a limited amount of substance is to be discharged with the idea of extracting more oil from that which is remaining, the worker operates *v* while examining *g*. With the desired conditions attained being indicated by *g*, the valve *v* is closed and the material continuing to enter the settling tank is churned to more complete disintegration and the oil quality tested again at *l* with a complete repetition of operations.

When the separating tank is used in conjunction with the Hartman it can still function and allow oil to be drawn off while the Hartman is being filled; when used with the Kværner or Compton the production of the separating tank is interrupted while these pieces of apparatus are being filled.

Part 3: Hartman system

The Hartman equipment is used for deriving oil from the blubber (App. 3.4). The system is of German manufacture and pattern. Efforts have been made by the manufacturers of Kværner and Compton systems to copy the constant pressure fixture of the Hartman, but legal action has prevented this duplication.

With few exceptions this system is found on all pelagic whaling factories at the present time. Its advantages are numerous, the most important of which being the ease and speed with which it derives the oil from the blubber. Practically all Hartman systems are employed for boiling out blubber only; meat and bone may be processed in this equipment, but with neither the ease, nor the speed attained on the external covering.

When the whales are in good condition and the blubber is thick and oily, the Hartman can be filled every thirty to forty-five minutes if the exterior covering from the dorsal region and sides of the body are introduced; the system on the *Ulysses* held three tons per filling. If the whales are in poor condition—the blubber being thin, devoid of oil, and has meat adhering to it, it is necessary to boil for one hour. The same condition applies to the blubber taken from the bottom of the mouth, chest, and belly; this blubber is the thinnest obtained and can only be removed with a thin layer of meat adhering to it unless precautions are taken to avoid this in the process of flensing.

The best procedure to follow when whales are abundant, and the one generally observed on the *Ulysses*, is to put the thick blubber of the back, sides, and caudal region in the Hartman system, and the thin blubber of the ventral region with its slight stratum of flesh in the grinder system. The oil from the meat does not mix with the oil from the good blubber when this routine is adopted, nor is the rapid functioning of the Hartman impaired. The grinders on the *Ulysses* held twenty-five tons at a filling and required four hours to boil out one holding of material. The blubber from the ventral surfaces of several whales was allowed to accumulate and was then dumped to the Kværner system at the next opening of that apparatus. The blubber of the dorsal and caudal areas, and the sides, was cut into squares immediately on removal from the carcass for introduction to the Hartman.

The Hartman system of the *Ulysses* was composed of two units, each having two apertures, and was located on one side of the flensing deck. Two Kværners were located on the flensing deck also. This equipment handled practically all the blubber obtained on the factory. Frequently, some ventral region blubber was put into the amidships grinder on the port side when whales were abundant.

The advantages of the Hartman system are many:

1. It gives good oil. The oil from the blubber is the best derived from the carcass. If the Hartman operates at fifty to sixty pounds of steam pressure the oil does not burn and become yellow in color, but appears a light gray at the

separators. If the pressure exceeds sixty pounds the oil may burn and it is yellowish in color, even in the Hartman.

2. The system can be kept in operation during the procedure of filling it with blubber. This is important because it saves time, steam, and water; its thermal efficiency is greater also because the system does not cool off and require a complete re-heating as in the Kværner.
3. The Hartman functions very rapidly while boiling the oil from the blubber. If the material is in good condition and not from the ventral region of the carcass the system can accommodate a three ton load every thirty to forty-five minutes. It can handle three tons of any blubber in one hour, maximum time.
4. The Hartman system uses less steam and water than the Kværner, the Compton, or the bone pressers.
5. It is possible to blow your oil off to the separators and blow refuse overboard at the same time. This is a time-saving factor.
6. The system is very economical when considering steam and water that is required for its operation.
7. The system is automatic to a certain extent in conveying the blubber through the boiling out process. One man can operate both pieces of equipment.

The disadvantages of the system are few:

1. The blubber has to be cut into pieces, approximately two feet square.
2. Blubber is the only material that is practical to boil out in this apparatus.
3. Meat and bone may be used in the system but has to be chopped up into very small pieces. It takes several hours to boil the oil from this material.
4. The apparatus is small; it should have a larger capacity.

The essential features of the equipment are the same on all factories. It is arranged in various positions according to the space allotted and to suit the conditions on different ships.

The system consists of a three ton cylindrical container, vertically arranged; this opens to the deck by two apertures at its upper end. The blubber, after being cut into squares, is introduced directly to this container. Steam enters this chamber at fifty-five pounds pressure; a belt pulley rotates a horizontal arm within the container which causes the blubber to circulate and become thoroughly impregnated with steam; it also prevents the blubber from forming a solid mass and plugging up the apparatus, and aids in moving the blubber to the next chamber when the valve opens.

The vertical cylinder is connected to a horizontal cylindrical chamber. The connection between the two is closed by a weighted valve which functions automatically in accordance with the weight of blubber and steam pressure. When the valve opens, the entire contents of the vertical chamber move into the horizontal chamber. Steam enters this container at fifty-five pounds pressure also. A belt pulley causes the interior of this chamber and its contents to revolve; the blubber moving from the point of entrance to the opposite end under the action of the rotating motion. At the opposite end the entire contents leave the horizontal chamber and move through a pipe to another vertical container, which is the separating tank. The pressure remains at fifty-five pounds per square inch. As the partly decomposed blubber, steam, water, oil, and refuse enter the extracting chamber the refuse settles to the bottom, the oil collects at the top and the water forms at the middle section between the other materials. A belt pulley causes arms to rotate within the container that keeps the contents in continual motion. By watching a gage glass on the side of the chamber a factory worker can determine when the oil is ready to be taken off and sent to the separator. When the film of oil is removed, water and refuse appear in the sight glass located in the oil line that formerly indicated oil. The oil line is closed, the water and refuse blown down and overboard, the pressure allowed to rise, and the oil to accumulate. The procedure is then repeated, the process being continuous as material keeps entering the extracting chamber in an unbroken supply.

Part 4: Actual working of the Hartman

The blubber is introduced to “A” through two apertures located in entrance *a′*. When “A” is filled to capacity the apertures are sealed from deck by screw fittings; the factory is notified, and steam is turned into “A” by valve *v*. The blubber revolves in “A” by the action of the belt pulley and becomes thoroughly impregnated with steam. As the steam pressure builds up it combines with the weight of the blubber to open the butterfly valve *w*, which is held closed by the weight *x*. With the opening of the valve the blubber passes from “A” through the passage and into “B”. When the blubber has left “A” the steam pressure is unable to keep the valve open so it closes automatically. The steam is then turned off at *v*, the deck force is notified, the seals on the apertures of *a′* are broken and “a” is filled again with blubber from the flensing deck. The same routine is repeated continuously.

After entering “B” the blubber is in continuous rotation because the rotation of the chamber revolving under the action of the belt forces the contents to move in the direction of the arrow. The decomposing blubber, steam, oil, water, and refuse leave at *b′* and pass to “C”. The oil, water, and refuse settle out as shown. All material is kept in motion by rotating arms functioning under the action of a belt pulley. The gage glass g enables a factory worker to determine the amount of oil, water, and refuse that has gathered in the chamber. When a sufficient quantity of oil accumulates on the surface and the pressure attains fifty-five pounds, the worker draws the oil off through opening *o*, and into the pipe line that contains the sight glass *e*. By watching the color of the oil flowing past *e*, the steam pressure on gage *x*, and the contents of the glass at *g*, the worker knows when the oil has been removed. He then closes the valve *z* and allows the oil to form again on the surface under the action of the rotating arms working on the enclosed material, or blows the water and refuse overboard by suitable fixtures through the pipe *p* if it is apparent that all oil is removed and too much water and refuse are present.

After the oil leaves "C" it goes to a settling tank, then to a separating room which contains six De Laval separators, then to the measuring storage tanks, and then to the ship's tanks. The oil from the bone, meat, and blubber is mixed in the measuring tanks which held eighty barrels on the *Ulysses*.

"B" is continuously loaded with material from "A", chamber "C" is continuously supplied with material from "B" via pipe *b'*; oil, refuse, and water are being continuously separated in "C" and properly disposed of. It is this continuous system that makes the Hartman so valuable and practicable.

Part 5: The Bone Presser

The apparatus for deriving oil from the bones is known as a bone presser (App. 3.6). It is constructed in the form of a perpendicular, cylindrical, steel tank, approximately fourteen feet high with an eight foot diameter. The size installed on the *Ulysses* had an estimated capacity of sixteen tons at a filling.

The tank possesses a double bottom, the inner section of which is represented by a perforated plate raised about one foot above the real bottom; the perforated plate supports the material to be processed while allowing a free circulation of steam, hot water, and oil; the arrangement also admits the introduction of hot salt water through the bottom of the tank.

The opening for filling the equipment is located at the top in connection with the deck; this aperture is approximately three feet in diameter. Pipe fixtures are arranged at various heights on the sides of the tank to draw off the oil as it accumulates at various levels after leaving the bones and separating from the remaining contents of the tank. A water-tight door, approximately two feet square, is located on one side of the tank near the base. This door is opened after the processing is completed and the presser is blown down to allow what remains of the bone material to be dumped on a moving belt, and conveyed overboard through an opening in the side of the ship.

The head bones, back bones, and ribs of the whale are processed in the bone pressers. Before entering the presser the head bones and back bone have to be cut into pieces small enough to pass through the deck entrance; the ribs are dumped in as they are separated from each other while cutting up the sides of the carcass. The back bone and head bones are cut into chunks by steam saws. The material is loaded into the apparatus by a group of men equipped with bone hooks, and is dragged across the deck to the opening and allowed to fall haphazardly into the presser. It takes approximately one hour to empty the apparatus after the oil has been derived, refill it, and prepare it for the next cooking. The equipment may be considered fast, efficient, and economical; repair and maintenance are negligible; the system is simple in its construction, and operation. Upon completion of the loading, the deck aperture is sealed by inserting a circular plate across the opening and drawing it up against a projecting lip by means of angle bars and screw fittings to form a water-tight fit. The factory is then notified by voice tube.

A factory attendant fills the lower section of the tank with approximately three feet of boiling salt water; the proper amount of water is indicated by an exterior fitting in the form of a perforated pipe; the blubbering of the pipe denotes the height of the water which enters through the bottom of the presser and rises above the level of the perforated plate to inundate the bones in the lower portion of the tank. After the introduction of the water, steam is injected at sixty pounds per square inch; the steam lines are arranged at the top and bottom of the tank to insure thorough contact with the bone material. The steam and water are allowed to act on the bone for approximately four hours before the first attempt is made to tap off oil. The pipe fixtures for drawing off the oil are arranged at various heights on the side of the tank. They enable the oil to be tapped off as it forms at various levels as a result of the frequent and necessary blowing down of the system occasioned by the disintegration of the bone and the formation of waste material.

To obtain the oil the factory worker merely manipulates the different oil taps until the proper one is selected that conveys oil past the sight glass. By examining and judging the appearance of the material that passes the glass it can be determined whether to draw off the oil from the settling tank, or to blow down the equipment to eliminate superfluous material, water, and steam.

Unless conditions arise that stipulate differently, the first attempt to draw off the oil is made four hours after the apparatus has been filled; the second attempt is generally made about eight hours after the processing commences. After subjecting the bone to steam pressure for approximately nine hours the material disintegrates to form a soft, spongy mass, practically devoid of oil; this condition is indicated by the appearance of the material passing the sight glass. When oil passes, a deep yellow or orange color can be observed; when oil, water, and a small amount of refuse pass, a gray color is noticed; when refuse passes the glass, a brown or black brown color is seen. This is an indication at the end of nine hours that all oil has been derived and the system is ready for a complete blowing down for refilling.

The fluid contents are blown overboard by a separate discharge, the apparatus is blown down until approximately four feet of liquid remains in the bottom of the press; this liquid consists of lime water, oil, and bone in a mushy condition. This substance is drawn off after the overboard discharge is closed and sent to a small settling tank, and then to a separator where the oil is taken from the lime water. The lime water is discarded and the oil is sent to the separating room to pass through the centrifugal separators.

When the apparatus has been emptied of its fluid contents the deck is notified and the water-tight seal is broken; this allows the equipment to cool while the last remaining vapors are escaping. After ten or fifteen minutes the dogs are loosened on the water-tight door at the lower section of the tank and that aperture is opened. By means of a long handled shovel a factory worker removes the pulverized bones and fragments from the bottom of the press where the material has collected in a soft, spongy mass as a result of the processing. The substance is dumped on a continually moving belt that passes close to the base of the presser; the belt conveys the material overboard. This bone material is a soft, mealy mass, devoid of oil and solid matter, and generally shatters into fragments on striking the water.

The oil tapped off from the bone presser is sent to a settling tank and from there to the centrifugal separators in the separating room; from the separating room the oil goes to the measuring tanks, and then to the ship's storage tanks where it is mixed with the oil from the meat and blubber. Many ships store the oil from the blubber, meat, and bone in separate tanks, but the *Ulysses* mixed her cargo regardless of its grade or the section of the carcass from which obtained.

The oil obtained from the bone is of better grade than that taken from the meat, but is inferior to that derived from the blubber; for all practical purposes, and for all general conditions, it can be considered grade two oil.

Section 9: The location of whales in the Antarctic

Those expeditions working the Ross Sea generally take departure from New Zealand or that vicinity. Expeditions working the Weddell Sea area generally depart from a South American port. However, many of the expeditions go straight south from the Cape of Good Hope enter the pack ice, contact the whales, and then pursue their operations in an easterly or westerly direction, (but working to the southward as the season advances,) depending on the species to be obtained and the number of surrounding expeditions that will cause crowded conditions.

Expeditions have learned by experience that heavy ice outside the Ross Sea indicates very few whales in that body of water. Norwegian expeditions therefore do not force the pack, but enter the Ross Sea only if mild conditions prevail. The Japanese frequently work this area. The blue whale is reported to be the only commercial species in the Ross Sea.

It is believed that most of the expeditions working the Antarctic for 1937-1938 were between 30° S and 130° E; the Japanese were believed to be either in or just outside the Ross Sea. In determining where whales may be found in the Antarctic the following information is relied on to locate the animals.

1. The past experience of the gunner leaders.

2. The color of the water; it should be gray, not blue.

3. The presence of "Krill pigeons"; birds about the size of ordinary pigeons, but light gray in color.

4. The areas covered by former expeditions and the results obtained.

5. The hunting grounds determined by plotting catch data obtained over an extended period.

6. Intercepted radio messages from surrounding expeditions divulging information concerning the number of whales present in the neighboring areas.

7. Ice conditions in general.

At the present time it is impossible to state without a doubt that certain species of whales are located within restricted limits. However, it is possible to locate the areas within which whales may be found if past records can be obtained that indicate correct results over an extended period. If this animal has been observed in large numbers within certain localities over an extended period it is a practical supposition to accept that it will continue to frequent the areas unless exterminated, or persecuted to the extent that transition is necessary.

The following information is submitted and concerns the location of certain species in the Antarctic. The charts and material are based on data obtained from rather authentic sources, and it is this information that is generally used in planning the expeditions of modern whaling factories to the Antarctic.

The months of October and November

The catch of October and November is based on the records of 1929, ‘30, ‘32, ‘33, and ‘34 and records the areas with which 17,304 blue whales, 920 fin whales, and 381 hump backs were obtained. During these months most of the whales are taken between 50° S and 60° S and 20° W to 180° E.

The blue whales are generally found between 50° S and 60° S and 20° W to 70° E, being most abundant between 20° W to 20° E, to the south and west of Bouvet Island. The blue thins out between 20° E to 100° E, being scarce from 100° E to 160° E. Near the Ross Sea, this species is found between 160° E and 180° E between 60° S to 70° S. The fin whales are found to the westward from 0° longitude to 30° W; also from 20° E to 50° E and from 80° E to 100° E. Very few hump backs are found these months. They are scarce between 0° longitude and 20° W; are frequent between 20° E and 40° E. The largest concentrations appear between 80° E to 100° E and between 150° E to 180° E. This may indicate that this species comes south from the Indian Ocean and the waters around New Zealand.

For general considerations it is estimated that whales are most abundant these months between 50° S to 60° S from 20° W to 100° E. The blue whales are the most numerous and are nearest the ice or farthest south. The fins are next in abundance and away from the ice. The humpbacks are not very numerous, but when found are more to the eastward.

The Month of December

The catch of December is based on the records of 1929, '30, '32, '33, and '34 and records the areas within which 21,639 blue whales, 2,282 fin whales, and 1,253 hump backs were obtained.

During this month the whales are found between 50° S and 60° S and 30° W to 50° E. Most of the specimens are located between 55° S and 60° S and 20° W to 40° E. From 50° E and 105° E the animals are found between the Antarctic continent and 60° S. Few whales are found between 110° E and 140° E, but are frequent again from 140° E to 150° E along 65° S, and between 170° E to 180° E at 65° to 70° S; they are missing from 150° E to 170° E.

For this month, the blue whales appear frequently between 55° S and 60° S and 30° W to 50° E; also between Antarctic and 60° S, from 50° E to 105° E. The heaviest concentrations appear to be from 0° longitude to 40° E at 55° S to 60° S; and from 50° E to 105° E between Antarctic and 60°S. The fins are more numerous than in past months. They are spread out among the blue whales between 30° W and 105° E, but are away from the ice, and in lower latitudes than the blue species. The hump backs are spread also, but are most frequent between 80° E and 100° E, and from 170° E to 180° E.

The Month of January

The catch of January is based on the records of 1930, '31, '33, '34, and '35 and records the areas within which 14,275 blue whales, 6,799 fin whales, and 851 hump backs were obtained.

The catch appears to be well scattered with more fins present than in past months and the blues not so numerous, but apparently more to the eastward. All whales are farther south, the blue species being up near the Antarctic continent at Enderby Land, King Leopold Land, Kaiser Wilhelm Land, and Dronning Maud Land.

During this month some blue and fin whales are found between 40° W and 10° E at 57° S to 63° S; this sector also shows a very small number of hump backs. Numerous fin and blue are found between 30° E to 60° E and to 70° S; also from 80° E to 100° E between Antarctic and 60° S, especially along 68° S. A few blue and fin are found between 100° E and 120° E at 64° to 68° S, also at 66° S, 140° E. Blue, fin, and hump, are found near the Ross Sea at 180° E between 66° S and 69° S.

The blues have apparently moved eastward showing the heaviest concentrations above 60° S between 30° E and 60° E and 80° E to 100° E. The fins are more numerous this month especially between 30° W and 60° E, having moved farther south from 60° S to between 60° S and 65° S. The hump backs are few between 0 ° longitude and 30° W along 58° S; they are numerous between 70° E and 85° E along 65° S. Some humps are found near the Ross Sea behind the blue and fin at 180° E, 66° S.

The Month of February

The catch of February is based on the records of 1930, ‘31, ‘33, ‘34, and ‘35 and records the areas within which 11,190 blue whales, 9,356 fin whales, and 690 hump backs were obtained. For general considerations the blue whales may be considered less numerous, while the fin and humps are more frequent. All species are farther south and seem to concentrate at certain areas, these being:

Numerous fins, some blue, and a few humps are found between 20° W and 50° W and 59°S to 65° S, being mostly fin on 60° S between 20° W to 40° W. Blue, fin, and humps are found from 20° E to 60° E between 60° S and 70° S, or the Antarctic continent. Large numbers of fin and blue are between 60° S and 70° S at 30° E and 50° E. The three species are also found between 80° E and 100° E between 60° S and Antarctica, and outside the Ross Sea between 170° E and 180° E between 68° S and 70° S. Some blue and fins are found also a 0° longitude to 13° W at 65° to 70° S.

The blue whales may be considered about as far south as they can go this month, being right up to the Antarctic continent, and are more easterly, being around 30° E to 50° E and 80° E to 100° E. Blue whales are also outside the Ross Sea. The fins are found mostly between 20° W to 50° W and 58° S to 65° S; between 30° E to 60° E at 60° S and 65° S; also at 80° E to 103° E between 62° S to 65° S. The fin whales are not as far south as the blue species. The humps are most numerous now at 30° E to 50° E between 60° S and 63° S; also at 80° E to 100° E between 62° and 65° S.

For general conditions the fin whales may always be considered to be back from the ice and apparently prefer the open water. The blue whales generally frequent ice filled water or the edge of the ice.

The months of March, April and May

The catch of March, April, and May is based on the records of 1930, '31, '33, '34, and '35 and records the areas within which 6,556 blue whales, 8,001 fin whales, and 246 hump backs were obtained.

Several considerations indicate that all whales are between 60° S and 70° S with the heaviest concentrations at 10° E to 50° E and 65° S to 70° S; the fin whales are apparently the most abundant species late in the season. Extending from 10° E to 90° E blue and fins are found, with a thinning out after passing 50° E; a few fin and blue with frequent hump backs extend from 50° E to 90° E along 66° S.

A few blue whales are found between 30° W and 50° W at 65° S, but most of them are to the eastward between 10° E and 50° E above 65° S and extending to Antarctica. The blue whales are most numerous between 10° E and 50° E and 66° S and 70° S; they have apparently remained in about the same locality as during the month of February between 10° E and 50° E, being a little farther south and less numerous.

The fin whales are scattered outside the Weddell Sea from 0° longitude to 55° W between 60° S and 67° S; scattered blue whales are located also. The fin whales are also scattered from 10° E to 90° E, being along 65° S between 10° E and 50° E and along 67° S between 50° E and 90° E.

This species is still farther away from the ice than the blue whale. From a comparison with past months this species has apparently moved farther west between 0° longitude and 55° W, but has remained the same between 10° E and 50° E, being in general less numerous and farther south.

The hump backs are quite numerous from 20° E to 50° E along 62° S to 65° S; a few, but not many, are around 80° E to 90° E and 67° S. Some hump, blue, and fin are located between 67° S to 69° S at 170° E.

Section 10: A brief description of whales in general and their external forms

All animals higher in the scale of evolution than the fish are air breathers. A number have returned to the sea to spend their lives in it, some always near or on the surface, but others capable of diving to considerable depths, though always compelled to return to the surface from time to time to obtain air. Such are the mammalia. In the mammalia there are many kinds of whales, dolphins, and porpoises which constitute the cetacea. They spend their entire existence in the sea.

The order of cetacea includes all the species of mammalia which have been created for inhabiting the water only. Their form bears a strong resemblance to those of the ordinary fish, but they are not members of the piscatory tribe. They are in a position remote from all other members of the vertebrates, such as the amphibians, reptiles, and birds. The different species of cetaceans are numerous and have been divided into various groups, the most prominent of which are the whalebone whales, the toothed whales, the porpoises, and the dolphins.

It is the purpose at this time to discuss only whales sought commercially, the dolphins and porpoises are, therefore, omitted from further description, or explanation.

Whales are warm blooded creatures. They breathe by means of lungs which are in a definite chest cavity, shut off from the rest of the body cavity, which contains the intestines, liver, etc., by a muscular partition known as the diaphragm. They have a large head mounted on a fish-like form. The bones of the skull are the same as in other animals, but differ in their relative arrangement. The brain is large and convoluted. The epiglottis and the arytenoids are prolonged and embraced by the soft palate, forming a continuous tube for the passage of air from the nasal cavity to the trachea. Teeth may be absent and their place taken by baleen or whalebone; when present they may be numerous and homodont, or less numerous and heterodont. The rostrum is long with nostrils represented by two lateral external apertures, or a single median. The pectoral limbs are paddle-shaped, the pelvis limbs are absent externally. A horizontal caudal fin and a vertical dorsal fin are present. The cervical region of the spinal column is very short with its vertebrae usually completely united. Clavicles are absent. The humerus is freely moveable at the shoulder, but all other articulations of the limb are imperfect. The phalanges of the second and third digit always exceed the number three normal in the mammalia. The pelvis is represented by a pair of bones that are only vestiges of former limbs.

Although the bodily activities of the whale have become somewhat modified, they are nevertheless the same as those of a camel, dog, or cow, and when treating this animal the most important thing to remember is that it was formerly a land animal that took up its abode in the sea.

Whales must come to the surface to respire. The nostrils are situated on top of the head. Through these the breath is ejected to the atmosphere to various heights, depending on the species and other factors. Through these same orifices a fresh supply of air is taken into the lungs and it is necessary that it be held below the surface of the water; if water were to enter the lungs the whale would drown. (In fact, it is possible for a gunner to drown a whale under certain circumstances). Thus, as soon as the animal gains the surface its breath is expelled and a fresh supply inhaled before it again seeks the depths; the whale can hold its breath much longer than any other animal that is known and under ordinary conditions the baleen whales remain below for approximately twenty minutes at the longest.

The calf when first born is clothed in fatless blubber with a thick dermis. It follows the mother for several months, depending on the species, and during that time draws its chief sustenance, which is milk, from her. As the young matures, its blubber thickens and becomes fat. All whales produce their young in nearly the same manner as other mammals. The female is known as the cow, while the male is called a bull. The time of gestation is not known, but is believed to be between nine months and a year, depending on the species. They are viviparous and suckle their young with milk. The testes are abdominal. The teats in the female are two, and posterior in position.

All whales lack the fur or hair that acts as a covering for other marine mammals; they have hair but only vestiges in the vicinity of the mouth. As a result the dermis is covered by a smooth transparent skin, and is supported underneath by a layer of fat or blubber which enfolds the whole animal. The flesh, which is underneath the blubber, is dark and sinewy, closely resembling beef.

All whales propel themselves through the water by the action of their caudal and pectoral fins. The individual motions of the various species are the same. Generally a small portion of the head is visible as the animal performs the act of respiration, then, after a few seconds, settling below the surface it rises a little and pitches headlong downward, rounding out parts of its body as it leaves the surface. Each particular species displays its own diving characteristics on leaving the surface to attain any depth.

There seems to be a difference of opinion as to the length of time a whale can remain below the surface of the water. Persons unfamiliar with the habits of the animal generally assign a much longer than it is actually possible for it to stay down. It is generally accepted that the period of submergence depends on the species and size of the specimen. Actual observations indicate that the whale seldom remains below the surface for more than twenty minutes, but instances have been known to occur that were much longer in duration. Perhaps the exaggeration of the whale remaining below for extended periods is due to the fact that they sometimes appear where for hours there has not been a sign of a whale in the vicinity or for miles around. This can easily be explained by the fact that these animals will frequently swim long distances at considerable speed without coming to the surface to blow; when food is scarce or they are traveling, whales frequently appear miles away from the place where they last come up for breath.

For all general considerations it is an impossibility to determine the sex of a whale while it is in the water; a small area of the rostrum may be seen when the breath is ejected, and the dorsal region and the flukes may be observed, but these are the only portions of the body above the surface. Occasionally it is possible to determine the sex, but this happens in only two species, the humpback and the sperm respectively. The humpback male generally travels to the right of the female if they are mates; the sperm female is much smaller than the male, and the male sperm is the only one of this species that frequents ice-strewn waters.

The length of a whale can be determined while it is being hunted, but it requires experience and judgment. The size of the blast, body proportions observed, and other such details allow an approximate estimate to be made, but an exact determination is impossible. For instance, it is possible to determine whether a specimen is thirty or forty feet in length, but it is impossible to decide whether a specimen is thirty-three or thirty-five feet long. Extreme care has to be exerted in deciding the length of any specimen.

After some experience the different species can be recognized in the water. Whale gunners are familiar with the spouting and diving characteristics of each whale and should never mistake one species for another.

Occasionally, but very infrequently, there are excusable circumstances for the killing of a cow when a calf is accompanying her, but for all general conditions this mistake should never occur. The calf is generally close to the side of the female and rises to spout just a second later than the cow; the young one is easily recognized under such circumstances. The extenuating circumstances may occur when the cow and calf are accompanied by other whales; under such conditions the calf may be near the side of any of the mature specimens, and it is impossible for the gunner to determine which the mother is.

It is a mystery when and where whales sleep. The animal has been known to follow ships for days at a time without rest and they have been heard to blow and move through the water at all hours of the night. The theory has been advanced that they sleep while floating at the surface during the day or night, but positive information on this habit has not been obtained. However, some species have been observed laying on the surface absolutely motionless until the observer was practically on top of them, then they sounded and from all appearance, seemed quite startled. On another occasion the animal has been observed at night moving very slowly with undulating motions of the head. Whether the animal was sleeping under the conditions just cited cannot be firmly established.

Most whales engage in antics that take their bodies, or parts of their bodies, out of the water. These playful indulgences are known as 'lobtailing,' 'breaching,' 'bolting,' and 'finning.' When lobtailing the whale literally stands on its head with the posterior part of its body out of the water and the huge tail up in the air which the beast commences to wave back and forth with ever-increasing speed until the surface of the water is lashed to a foam, and spray is scattered in all directions. Sometimes the whale pounds the water right and left for a few seconds and then goes down. In breaching, the whale leaps almost clear of the water. It generally lands on its side when it falls back, with a terrific blow that sends spray in all directions. In bolting, the animal comes out of the water at a slight angle with the surface and returns approximately head first, landing on its side. When finning, it moves just below the surface with the pectoral fin in sight above the water.

The sperm whale is the only species that lives on fish. It is believed that all the baleen whales eat small crustaceans, especially the little plankton animals about three-quarters of an inch in length. These small animals are generally found either on the surface or just below. It is their movements that play such an important part in the locations of the whales. When the whale is feeding, it is quite impervious to danger and pays no attention to the presence of a killer boat. The whale feeds by going ahead through the water at a fairly good rate of speed with its huge mouth wide open, and sucks in the water containing the crustacean. The mouth is closed by bringing the huge lower jaw upwards. In the act of closing its mouth the whale generally turns on its side exposing a fin and parts of the tail. It has been known to roll from side to side while in the act of feeding. The huge, fat, flabby tongue fills the space between the whalebone, expelling the water as the mouth is closed. The little shrimp are retained in the mouth by the bristles on the inner edge of the whalebone. The baleen thus acts as a strainer, it prevents the food from leaving the interior of the mouth, but allows the water to escape. The throat of the baleen whale is not large enough to swallow a big loaf of bread, being about four or five inches in diameter, but the throat of the sperm whale is just about big enough to accommodate the passage of a man.

Information concerning the breeding of all whales is difficult to obtain. The data obtained up to the present time cannot be accepted with absolute certainty. The humpback is rather exceptional in this respect as rather reliable information is available concerning the habits of this whale in general. At the present time it is believed that the period of gestation is from nine months to a year. Whales probably mate in the early spring although it is believed that the pairing of some species may even occur later in the year from the results of fetal specimens obtained. All the large whales generally have but one young at birth, but there have been cases where twins are born, however, this is exceptional. Gestating females always possess very thick, fat blubber, and yield a large amount of oil. The calves are generally one-third to one-quarter the length of the cow when born. The rate of the growth of the calf is exceptionally rapid and it is believed that they can care for themselves soon after birth, approximately six months. It is indefinite at the present time just how long the calf lives on milk, but the maximum period is believed to be about six months. The teats of all whales are concealed in slits on either side of the genital opening; they are the size of a man's thumb and approximately two inches in length. The milk glands are concealed under the blubber and are oval in shape, being located on the ventral side of the body and extending posterior along the belly region to the sex opening. Milk can be excreted in a fair size stream by compressing the surrounding muscles. It is believed that in this manner the calf receives its nourishment. The teat is much too short, and the calf's mouth is not properly constructed to suckle from the mother as in the case of most mammals, so it is generally accepted that the cow lifts the posterior portion of her body out of the water and ejects the milk into the calf's mouth. The milk looks like cow's milk. There is no truth in the statement that whaling ships use whale milk as a form of food, but it can be drunk when fresh, but soon loses its palatable qualities after the animal is dead a few hours. This milk will not mix with water. It appears as a heavy condensed milk.

The skin of whales is thin and smooth, and quite soft. It is about a half inch thick and is very firmly attached to the blubber. The skin is dry and does not possess the ordinary glands for sweat and oil that are usually found in mammals, or hair bearing animals. It is the absence of hair, and the presence of the blubber that makes these glands unnecessary.

Blubber is the fatty overcoat of the whales; it is this covering that contains most of the oil, and that of the best quality. It is a hard, tough, strong substance situated between the flesh of the body and the dermis; it is easily removed from the carcass, much as a peeling is taken from an orange. It is very difficult to separate the dermis from the blubber. A layer of fibrous fat generally adheres to the flesh when the blubber is removed if the animal is in good condition. The quality and thickness of the material depends on the species of the whale, season of the year, where it is captured, and then it may vary with each specimen. Blubber acts as a storehouse for reserve food and as a protection for the body against the cold surroundings. The animal apparently lives on the food reserve in the blubber while migrating, or when food is scarce. Under normal conditions blubber is white or creamy yellow in appearance. The best blubber is generally obtained from gestating females; it is thicker, softer, and yields more oil. For all practical purposes blubber can generally be considered thickest along the dorsal region, especially near the dorsal fin and caudal peduncle, and on the sides. It is thinnest between the shoulders and on the ventral surface. At the thickest regions the blubber may be eighteen inches in depth, while in the thinner regions it may be three to four inches.

The whale is not a ferocious animal. In fact, the very opposite can generally be stated as the prevailing condition. The sperm whale, especially the old bulls that have been driven away and ostracized by their own kind, sometimes seem to accept the belligerent attitude, but even this species is generally taken by modern whalers with little effort and no danger from being attacked. Just before a whale dies it goes into its death flurries and may dash blindly in any direction. Anything in its path is liable to be struck with fatal consequences. At the present time it is generally accepted that all ships, which have been struck and sunk by whales, have been damaged by accident and with no malicious aforethought on the part of the animal. The bad reputation of the gray whale is perhaps due to the fact that the animal was hunted on its breeding grounds, in very shallow, restricted waters. The result was that the whale was practically cornered in the shallow lagoon-like bays and when it went into its death flurry the attacking whalemen had little chance for escape from its mad rushes. The fact that these animals were generally accompanied by their young might have added to their efforts to escape and this led to even greater activity, which made the conditions even more precarious. However, at the present time of modern whaling methods, gray whales have been taken in the waters about Japan with little difficulty.

Certain species of whales have folds on the throat, breast, and abdomen. These ventral grooves commence at the anterior end of the lower jaw and extend toward the posterior. The species in possession of this characteristic differ from one another in the number of folds present, their depth, etc., about it can generally be considered that the folds are approximately one inch in depth, 40 to 100 in number, and terminate in the vicinity of the navel. The purpose of these ventral grooves is still indefinite, but is generally accepted as an adaptation for increasing the mouth capacity, or to allow for greater expansion of the lungs.

Due to the fact that the conditions under which whales live are the same in all oceans, naturalists recognize the fact that the laws of geographical separation do not apply to this mammal to the same extent that it affects the existence of terrestrial animals. In other words, all whales have practically the same structure and external appearance due to the little variation in the conditions of their environment; the sperm is the general exception.

It is now generally believed that if whales are driven away from certain localities they seldom return, and others will not take the place of those that have been killed off. This theory has been demonstrated and found true in the waters where shore whaling stations have been established and also in certain sections of the Antarctic. It seems to be accepted that the sei whale and the fin whale remain longer in certain vicinities while the humpback and the blue whale are the first to leave when persistently hunted.

Whales have but two great enemies. Man and the killer whale, generally called the orca. The killer whale is seldom over one-third or one-half the length of an ordinary full grown whale, the biggest of the species attaining the length of about thirty feet. But as soon as these orcas appear the baleen whales become terrified and practically helpless. They have been known to become paralyzed with fright and lay on the surface, belly up, fins outspread. The killers, getting the whale in this position, force its mouth open and tear out its tongue. Sometimes they tear chunks out of the pectoral fins and the flukes. In some waters when whales are captured and taken to the factory ship everyone will bear the marks of these ferocious beasts. At times, whales will endeavor to combat these foes or to escape, in which case the orcas, that generally travel in small groups, will fling themselves out of the water and land on the whale's back and antagonize it in general until finally the whale lays exhausted on the surface unable to close its mouth from sheer weakness, then the killers proceed to tear out the tongue. It is generally believed that the killers cannot kill a big whale, but they do kill the calves and immature whales. The sperm whale is believed to be the only whale that is more than a match for these killers. Sperm whales never bear any tooth marks, or other signs of having been molested by the orcas; while the fin whales are most frequently scarred.

The hair on whales is in a degenerate condition and has a dead white color similar to a piece of white thread that has been waxed; it does not contain the sebaceous glands. The loss of hair and the existence of a few sparse strands is unquestionably the result of an aquatic life. The blubber performs the function of hair and the outer covering is no longer necessary. The hair of most whales is confined to the vicinity of the snout and skin. It is the presence of this degenerate hair that offers the evidence to the theory that whales once inhabited the land. They can be pulled out of the skin by use of the fingers and appear like a white waxed thread. They are one to two inches in length.

It is possible to ascertain the commercial value of a whale soon after it is dead because fat whales generally lie on their sides; whales in a thin condition lie flat on their backs in the water after death. This characteristic is generally true and has been checked; however, the amount of air in the carcass and the position of the harpoons have a bearing on the position assumed by the carcass while in the water.

Whales are generally divided into two classes. Whalebone or baleen whales, and toothed whale. Whalebone is rather a misleading term. It has no connection to the bone that forms the skeleton of the animal. Whalebone should be considered as a substance entirely different from real bone and should be regarded more as hair, horns, or nails in thinking of its connection with existing animal life. It is located in the mouth and forms a sieve whereby the whale is enabled to drain the water from its capacious mouth while retaining plankton. It is only found in whales that seek plankton as their main constituent of diet.

It is possible for whales to hear both above and below the surface. The ears of a whale are very small external holes just large enough to accommodate the entrance of a lead pencil. They are located on the sides of the head, and are found between the eye and the pectoral fin. Whales have been observed to approach the surface of the water for breath when they suddenly became aware of the presence of the killer boat and, while still at a depth of ten or more feet, they immediately descended into the depths. Whether the animal was depending on its sense of hearing or sight is unascertainable, but it is generally believed that they eyesight of whales is poor. It is highly probable that the whale relies only on its eyesight for the darker and deeper regions of the ocean. Their sense of smell is lacking, or very rudimentary, as it does not possess olfactory nerves. Regardless of the fact that its ear is small, its sense of smell practically non-existent, and its eyesight undeveloped, the whales appear capable of finding one another when miles apart and of coming to the surface at the same time for breath when traveling in groups.

Whales' blood is red; tons of it is found in the carcass.

Whale bone—that is the bone that forms the skeleton structure—has a hard shell-like external surface and a spongy interior. This bone is saturated with oil.

Whale meat is an ordinary article of food on the menu of any whaling ship. However, it is not eaten when the captured whales are exceedingly fat; this makes the flesh too oily for human consumption. If the meat is taken from a young whale within a few hours after being killed, and then properly treated, it is quite palatable. The meat is much coarser than ordinary beef, but it is not tough. It is generally eaten in the form of steaks after being dried out in the air for several weeks and then soaked in vinegar for several hours before being cooked. Whale steaks are generally obtained from specimens that are not fat as this reduces the amount of oil found in the meat.

With the exception of internal and external parasites, whales have but few visible diseases. Worms are the internal parasites. They are generally found in the intestines. Lice and barnacles are the external parasites. Sometimes patches of soft, green, dead flesh are observed which are unquestionably caused from some parasitic creature.

At the present time it is rather difficult to ascertain the length of life of a whale. It is generally believed that large animals live to an old age, but this inference should have no bearing on the life of the whale because they are very large at birth compared with most mammals. The whales that are generally hunted for commercial purposes vary from 16 feet to 23 feet in length when born. The first year of life generally finds them double their length at birth, and some species triple their length. It is believed at the present time that whales do not attain the old age that was formerly attributed to them. The ancients allowed a thousand years as an estimate; present day scientists disagree on this issue and the subject is still open to conjecture. At the present time several methods are used to determine the age of this animal, but it is only a rough criterion and allows merely an approximation; it is possible, for instance, to state that a specimen is more than two or three years old, or between four and eight, but exact statements cannot be made beyond this. The observations to determine the age are based on the size, the number of old scars, the condition of the vertebral epiphyses and the number of corpora lutea in females. For practical considerations, it is believed feasible to estimate the blue whales as mature between 72 and 78 feet, the fin whale between 65 and 70 feet, and the humpback between 37 and 42 feet; the females are normally of greater size than the males at maturity.

In the last ten years there has been a large amount of data gathered concerning the whale life cycle, but information is needed concerning breeding, growth, migration, the seasons and places where breeding and parturition take place, the periods of gestation and lactation, the frequency of pregnancy the rate of growth, and the events and stages of the sexual life. For general consideration at the present time, it can generally be accepted that most whales gestate within a year, produce only one young at a time under normal conditions; that an adult female can at the most produce only one young every two years, that the calf grows to sexual maturity in approximately two years and slightly less than half this time is nourished by the mother, and that in the extermination taking place at the present time a large number of immature whales are being slaughtered, while fifty per cent of any catch is generally represented by females.

External form of whales

Size:

Whales are not only the largest of living mammals, but the largest of all animals, mammalian or otherwise, living or extinct. They are larger even than the colossal

Dinosauria of the Mesozoic Age. Present day scientists accept as an unquestionable fact that no creature, known to man, ever existed which was bigger than the largest whale. Whales sought for commercial purposes vary in length from thirty feet to as much as one hundred and ten feet. The extreme dimension stated is rather unusual, but it exists as a certified length; blue whales frequently attain lengths between ninety and one hundred feet, such dimensions are quite common for this species in the Antarctic. Both modern and ancient writers have grossly exaggerated the lengths of the mammals on several occasions. However, it may be that their statements are based on length measurements that took into account the bulging sides of the beast. Under such conditions ten or twenty feet could be added to that obtained by measuring on a straight line from the snout to the notch of the flukes.

'Colossal' is the most apt word that might be used in describing the size of this animal. For general considerations, and for all practical purposes, the blue whale may be expected to weight between one and two tons per foot; the fin whale averages between three-quarters of a ton and one ton to the foot; the humpback varies from one-half to three-quarters of a ton to the foot, and the sei whale is about the same in weight as the humpback.

Various causes can be cited that contribute to the acquirement of such a massive bulk. First, the medium in which the animal lives is a contributing factor. Less difficulty is experienced by aquatic creatures in sustaining a massive body than have animals which live in a less dense medium. For instance, the size of birds is restricted by the difficulty encountered in sustaining themselves in the air; purely terrestrial animals can attain only a certain bulk before they become unable to support themselves by their appendages, or fall prey to their natural enemies by sheer helplessness in adequately defending themselves. The large size attained by the Dinosauria can be partly attributed to their aquatic-terrestrial life; the frequented, or it is believed they frequented, marshes, estuaries, and other terrain mostly inundated with water in company with the other huge reptiles of the Mesozoic Age. Another factor contributing to the huge size is the abundance of food and the ease in which it is obtained. Barrels of plankton life are sucked in by the whale without expenditure of any great effort. The food upon which whales subsist is abundant in certain oceans that they frequent; they thus sustain life without expenditure of great effort or force. The cetacean method of getting food is quite unique when it is compared to the methods necessarily adopted by terrestrial animals, the lion and tiger for instance; their food is seldom abundant, and when obtained, it is done so by expenditure of force and energy. The last reason for enormous growth can be partly attributed to freedom from foes. The killer whale is the only powerful enemy that is known to molest the whale. The sperm whale is immune to attack from this foe. Consensus of opinion at the present time does not credit the killer whale with the ability to kill full-grown baleen whale; they generally, and have been known to, kill the calves, but they molest the full-grown whales to the extent of tearing out their tongues, biting off their pectoral fins, and other such acts of molestation. A school of orca has been known to kill a mature whale, but it is believed to be so infrequent that for a general condition, the whale may be considered only occasionally molested by these killers and, therefore, the exterminating results are almost negligible.

Shape of the body:

The shape of the whale's body is another uniform characteristic for which the mammal is noted; they all possess a torpedo-shaped form, consisting of a long, tapering, pointed head, elongated body, large flukes, one pair of pectoral fins, no external vestiges of posterior appendages, no superficial ears, small eyes, and black, brown-black, gray or blue-gray, and white, or silver-white, coloration. The impression is created that all useless appendages have been eliminated that might offer resistance to the whale's progress through the water. This uniform shape of body may be attributed to the fact that all whales live in the ocean under practically the same conditions, and most of them subsist on the same type of food, namely, plankton life. However, any difference in habitat or form of food is immediately recognizable by a slight change in physical characteristics. For instance, some whales are restricted in their range, and immediately acquire a specific body characteristic. The bowhead is an example of this, this species being found only in the Arctic. The sperm whale eats fish and octopus; this whale possesses teeth in the lower mandible.

The tail

The tail fin or flukes of the whale are set at right angles to the plane of the body, and not vertically as in fishes. Statements have been made that the two halves of the tail surfaces are not exactly parallel to each other, but have a screw-like form and that the whale generates its slower motions by cutting the water laterally and obliquely downward. Particular care was taken to check this characteristic and it was found that the two lobes of the tail are parallel to each other, although some whales, especially humpbacks, were observed to draw the flukes beneath the surface in such a manner as to create the impression that the caudal fin was being used in sort of a sculling motion. However, such an action is not deemed to exist and it is believed that all the forward motion of the whale, for both slow and fast progression, is generated by powerful strokes against the water, impressed alternately upward and downward; the amount of speed being proportional to the power and length of stroke exerted by the whale. The tail is also used as an aid in balancing, in turning, and as a weapon of offense. In fact, in baleen whales, this is the only appendage that offers a mean of defense.

There are various opinions as to the nature of the whale's tail. Many believe the organ is a degenerate equivalent of a posterior pair of limbs, the bones of the posterior appendages having shrunk while the flesh and skin that covered them remained to form the flukes. There are several analogies to support this theory. For instance, the rudiments of the bones forming the posterior limbs are directed in a posterior or backward direction; and there is a fold of skin on some species just forward of the lower opening that many believe to represent the last vestige of the missing limbs; these folds, however, are completely external, no skeletal formation being present. It is feasible to believe, therefore, that after the adoption of an aquatic existence by this mammal some means of progression had to be acquired, the posterior appendages were no longer of use, and, therefore, with the development of the caudal and pectoral fins, these hind-limbs commenced to recede and finally disappeared leaving only the cartilaginous nodules that are found in various degrees of preservation in different species at the present time. With the disappearance of the limbs the integument that formerly covered the bones finally expanded to form the caudal section of the body and the wide, flat, horizontal cartilaginous flukes. The horizontal characteristic of the tail fin is also in keeping with the whales' adaptation to the water, this property allowing the beast to gain the surface with greater ease for the purpose of breathing; in the Pisces family the tail fin is vertical.

The dorsal fin

Practically all whales possess dorsal fins. The exceptions to this characteristic are found in the right whales and gray whales which are termed smooth whales. The sperm whale has a low irregular hump in place of this fin. When this appendage is present it is of varying size and shape; ranging from the well developed falcate fin of the fin whale to the mere stub or cartilaginous projection of the humpback. This fin is located on the dorsal side of the body, nearer to the posterior than the anterior and reminds the observer of the stubby tail of an Airedale dog. The disappearing tail theory can be accepted if the caudal region of the body can be attributed to the integument left by the bones of the shrinking posterior appendages, and if the ancestors of whales possessed characteristics similar to the characteristics of the Mesozoic reptiles that belonged to the Dinosauria.

The pectoral fin

The anterior pair of appendages of the whale are known as its flippers; they vary in length and shape on the various species, being sometimes long and narrow, and sometimes falcate, or almost round. The pectoral fin of the whale should not be confused with the pectoral fin of fishes. The fish fin, ichthyopterygium, differs radically from the hand-like limb, or cheiropterygium, which is possessed by all vertebrates higher than the Pisces.

The pectoral fin of the whale, which is cheiropterygium, possesses the same regions that would be found in the pectoral appendage of a man namely, the arm, forearm, wrist, and digits. By holding the pectoral fin of a fetal whale up to a strong light one can recognize the humerus bone which articulates with the pectoral girdle; the humerus is followed by the radius and ulna bones of the forearm, and these lead to the small but visible digits which represent the fingers. It is not possible to recognize the several regions of this cheiropterygium limb in a full grown whale by casual examination. However, in the humpback species there are distinct protuberances of cartilaginous flesh at the junction of the humerus with the radius-ulna section; and also at the wrist. These bunches are entirely lacking on the pectoral fins of the blue and fin whales; the edges of which, both posterior and anterior, are entirely smooth. The fish fin does not possess the characteristic of being divided into three distinct regions. It is made up of a number of cartilaginous rods and bony spines that are radially arranged, more than one of which articulates with the pectoral girdle.

The theory in general acceptance concerning the whale's pectoral fin is that the limb was originally an appendage that developed into a swimming organ in the form of a large paddle. The paddle-like structure was created by the spreading out of the phalanges in a divergent manner and then becoming covered with tissues and blubber. The length of the organ became longer by the duplication of the bones in the phalanges. A typical cheiropterygium limb has but three phalanges in the fingers. The whale has a larger, but varying number of phalanges. However, as the animal became more adapted to its aquatic existence and its organogeny progressed, the swimming action was assumed more and more by the tail, until the pectoral fin became only an appendage employed for balancing, turning, and as an aid in gaining and leaving the surface of the water. The assumption of the swimming functions by the caudal section of the body led to a reduction in the size of the fore limb, this receding change is apparent because fetal whales possess certain hand bones in the embryonic stage that are missing in the mature specimens. The reduction in size and shape of the limb is more apparent in some species than in others, but, it is noticed that the limb is smallest on those whales that are inclined to be slender in shape and therefore not greatly in need of a large balancing organ; a large pectoral fin. Examples of this condition can be cited by comparing blue and fin whales, which have small pectoral fins, with the humpback which has an extremely long pectoral fin. The blue and fin whales possess long, tapering, slender bodies; the humpback has a short, thickset, lumpy figure.

As stated before, the pectoral fins of the modern whales are not used as swimming organs; they are pressed close to the body as the caudal fin generates the forward motion. They may aid in turning the body, but it is believed the direction is altered largely by the pointing of the head. These fins have been observed to move laterally with the body as the whale moved up or down with reference to the surface of the water. Such an action may have been the result of the animal holding the anterior edge of the limb higher for the ascent, and obliquely forward for the descent. Another purpose, and it is believed the main function of the pectoral fins, is to maintain the equilibrium of the body; this function has to be assumed by some external surfaces because the back is the heaviest part of the body and tends to turn the animal over. When the whale is dead it turns completely over with the ventral surface upward, or it rests on one side. In life the whale uses the caudal and pectoral fins to keep the dorsal region uppermost.

The nostrils

The heads of blue, fin, and humpback whales can be considered as long and pointed for all general considerations. The facial portion of the skull is elongated. The blow holes are situated on the posterior sections of the rostrum, almost on top of the head, being just forward and above the line of the eye. The nostrils of the whale are located within a slight depression, which is formed at the posterior end of a bony median ridge that extends along the dorsal surface of the rostrum in an anterior-posterior direction. The ridged formation commences near the tip of the snout and becomes more pronounced as it extends back along the rostrum of the skull. It rises gradually to form a slightly raised fork-like structure. It is within the branches of this fork that the cavity rests which shelters the nostrils.

Externally, the spiracles appear as two long apertures, between which is a deep furrow. The blow holes are not parallel to each other, but converge in an anterior direction.

The recession of the nostrils to the summit of the head is another modification that apparently occurred in the structure of the whale as it became more aquatic. In their present position the blow holes appear immediately after the rostrum breaks the surface of the water, this allows the whale to breath while the rest of its body is still submerged.

The nostrils of the sperm whales are represented by a single S-shaped median located on the anterior region of the rostrum, slightly on the left side.

Under normal conditions the whale exhales at the instant the nostrils are above the surface. When the hot breath is emitted, a jet of vapor is formed because the air has become hot while being held in the lungs under pressure and contains the moisture that condenses on contacting the colder atmosphere. The spout appears as a blast of white vapor, its height and shape varies with the species and length of time the animal has been below the surface. Large blue whales can emit a spout at the first exhalation to a height of thirty feet after being submerged for a period of fifteen minutes, the vaporized breath rising in a tall columnar jet; the humpback spout seldom exceeds fifteen feet and is bushier in shape. The vaporous cloud does not immediately disperse even in a strong wind, but lingers a short time as it drifts a short distance with the wind, gradually disappearing.

When observed close aboard the spout is seen to actually form several inches above the head; the emitted breath being accompanied by a puffing snort which sometimes terminates in a whistling sound. The breath is inhaled immediately after the exhalation by the nostrils being projected anteriorly and upwards. It may be that the whistling sound which occasionally accompanies the act of breathing is due to the breath being rapidly sucked in through the distended spiracles. The ejected breath of whales has a very obnoxious odor.

The respiratory act is not always accompanied by a distinct spout. If the whale has been below for any great length of time, the first few breaths are always accompanied by the vaporous formation, but there is no spout if the animal is engaged in surface dives or frequently gaining the surface for breath.

A popular fallacy exists that the spout of the whale is the ejection of water through the spiracles that has been taken in through the mouth. Such a notion is not only erroneous, but an utter impossibility. There is no connection between the buccal and nasal cavities in whales. The posterior section of the mouth does not contain a respiratory opening; the epiglottis joins the soft palate, completely excluding the nasal passages from the mouth. The nostrils form a continuous connection with the wind pipe for the introduction of air to the lungs. Such a construction of the buccal cavity allows the whale to swim with its mouth open while partaking of its food without the danger of strangulation. From observations, it is believed that whales swim with their mouths slightly open at all times; a special arrangement is necessary, therefore, to prevent the water from entering the breathing organs, because such a condition would drown the beast.

The opinion that whales swim with their mouth slightly ajar is based on the observations made while hunting the fin whale. The yellowish white baleen in the upper anterior section of the right jaw of this species was visible at all times while this beast was below the surface of the water.

* * * *

Because it may be incumbent on some unit of the service to remove a dead or stranded whale, the following information is inserted:

If a whale carcass is to be moved or towed, the only feasible manner of performing the task is to tow it by the tail. A strap may be passed around the caudal peduncle just forward of the flukes, and the hawser attached thereto. If the flukes are missing, a strap may be passed around the pectoral fins and the hawser attached. If a strap cannot be made fast around these sections of the body the possibilities of moving the carcass are practically hopeless.

Section 11: The Blue Whale

The Norwegians call this whale the "blåhval," or blue whale, alluding to the light blue-gray color that the species seems to possess when observed in the water (App. 3.13). The Americans call this species the 'sulphur bottom,' but such a synonym is misleading, and should be avoided to prevent erroneous conclusions. With the exception of the ventral surfaces of the pectoral fins, which are white, the entire body and appendages of this whale are one color, namely, blue-gray. However, the animal frequently passes through areas of water that are full of a plankton growth which colors the dermis a yellow hue; it may be that this is the condition that gave rise to the incorrect American name; but if the carcass is carefully examined under such circumstances it will be found that the yellow covering can be easily scraped off, exposing the normal blue-gray color of the dermis. The name 'sulphur bottom' should never be affiliated with this species, except to identify as the American blue whale.

This whale is also known as Sibbald's Rorqual, in honor of Sir Robert Sibbald [a Scottish naturalist who initially studied the whale in 1694—ed.] Cope [the American paleontologist Edward Drinker Cope (1840-1897)—ed.] used the name *Sibbaldius Sulpurius*; Flowers designated it by *Balaenoptera Latirostias*, and [the British zoologist John Edward] Gray [(1800-1875)] called the species *Balaenoptera Sibbaldis* in 1847. In 1822, Desmoulins referred to this whale as *Balaenoptera Australis*, the great southern rorqual or sulphur bottom of the Antarctic whalers, but according to Von Haast, *Balaenoptera Australis* is nothing more than *Balaenoptera Musculus*, the blue whale. This is the term that should be used to correctly designate this species.

During all the centuries of whaling the blue whale is one of the few species that could not be caught in sufficient number to make its taking commercially profitable. The species was too powerful, too huge, and too swift in its movements for antiquated whaling equipment and methods. It also sank when dead, this added to the difficulties of making a chase entirely successful, even if the harpoon was imbedded, because the equipment available was entirely inadequate for raising the carcass to the surface. Relatively speaking, the blue whale, fin whale, and sei whale were unknown to the American whalemen; their prey consisted of sperm whales, right whales, bowheads, a few gray whales and occasionally some humpbacks. It is for this reason that so little is known today of the blue whale's habits, characteristic, and haunts.

Modern whaling methods have made the persecution of this species possible only within the last quarter of a century; the maximum slaughter taking place in the last fifteen years when the hunt for the species commenced in the icy fastness of the Antarctic regions. Even with the introduction of the whale gun, comparatively few blue whales were caught until about 1913, when the humpback fisheries began to decline; the modern whaling industry has improved its equipment and methods since that time and, although the species was taken in fluctuating quantities during the seasons between 1914 and 1920, it is caught today in larger quantities than ever before.

The blue whale is not only the largest species of whale, but it is the biggest specimen of mammal life, living or extinct. It occurs in all oceans of the world, but the largest specimens are found in the Antarctic where they attain an average length of eighty feet and have been authentically measured at one hundred and ten feet; frequent specimens are found between ninety and one hundred feet. The species is generally small in other sections of the world, the biggest specimen for the North Atlantic reaching about eighty-eight feet. The personal opinion is submitted that the immature whales of this species frequent the coastal waters in greater numbers than the mature whales, which remain more in the open water, and the more extreme latitudes; the result is that the average length for the catches around South Africa, South Georgia, South Shetlands, and other shore stations will be found to be smaller than if the animal is hunted more in the open sea, such as the high latitudes of the Antarctic.

Although different names have been given to the blue whales found in various regions of the world, it seems highly probable, and is generally accepted by scientists that there is only one species of this animal in existence. It is believed that there are certain specimens that frequent the southern or northern latitudes almost continuously and seldom cross the equator, but positive statements cannot be made concerning this aspect of definite hemispherical habitats, and whether there is an intermingling of the two groups is still open to the conjecture.

The name generally applied to this species at the present time is blue whale or *Balaenoptera musculus*; it is, therefore, used in this discussion.

The blue whale is a Mystococetti or baleen whale and belongs to family Balaenopteridae, which is characterized by: possessing a head less than one-quarter of the body length; the presence of a dorsal fin; longitudinal grooves on the ventral surface; the bones of the skull being slightly arched; the pectoral fin being narrow; and the baleen plates short.

The Balaenopteridae family is composed of three genera, the Balaenoptera, Megaptera, and Rhachianectes. We are discussing blue whales so the discourse will be confined to the Balaenoptera which, it appears, and it is generally accepted, is composed of four species represented by the blue whale, fin whale, sei whale, and little piked whale.

Balaenoptera musculus is the largest species of this genus. It has a length of from seventy to one hundred and ten feet, a robust form; a color of blue-gray; dark blue-gray baleen and bristles; baleen plates numbering from three hundred to four hundred, their length being between twenty-four and thirty-six inches; a dorsal fin on the last quarter of the body, posterior to a vertical line to the lower opening; relatively small, falcate, bluntly pointed pectoral fins, being approximately 10 to 12 percent of the total body length and one-third as wide at elbow as it is in length; the proportion of height and body length being about 1:6.

The following figures portray and allow a conception of the body outline.

LENGTH OF WHALE	SEX	GIRTH OF BODY AT PECTORAL FIN	GIRTH OF BODY AT GENITAL SLIT	GRITH OF BODY AT “SMALL”
74	-	36	25	12
92	F	52	36	13
94	F	55	-	16
70	M	40	22	10
78	M	42	24	10
93	F	59	26	14
79	M	44	22	11
86	F	44	26	12
70	M	36	18	9
84	M	44	24	12
85	F	48	24	12

The head is large and approximately one-quarter of the body length. The rostrum of the skull is broad and U-shaped. The nostrils are located almost on top of the head, being just forward of the eyes on the medial line of the rostrum. The nasal openings are narrow and pointed anteriorly; they are located within a slight impression of the skull behind a salient bone formation located posteriorly on the rostrum. The cavity that shelters the spiracles is approximately six inches in depth, and eighteen inches long in an anterior-posterior direction. It contains three linear creases in the flesh; the center one is merely a fold in the cuticle; the two outside creases represent the nostrils. They are approximately twelve inches in length on a large specimen.

The blue whale resembles the fin in the general outline of the body, but the blue whale is one tone in color, comparatively more robust in pectoral girth, and does not possess the tapering graceful form of the fin whale. With the exception of the fin whales there is no other species that can be compared to *Balaenoptera musculus*. In size, as well as in color, it differs to the extent that identification is readily possible.

The spout of a blue whale occurs in the form of a tall thick column, the base of which disappears while the summit remains to drift with the wind as a vaporous formation, gradually dispersing. The first blast of the species on gaining the surface may reach a height of twenty to thirty feet; the animal may blow as many as seven times with the height of the blast becoming relatively smaller, until only a puff appears, or the vaporous formation disappears completely. Surface dives occur between each breath. In clear calm weather the spout can be seen at least eight to ten miles, and appears as a jet of white in the atmosphere. Turbulent windy weather interferes with locating the blast, but even then it can be sighted within five miles; the breath of any whale is easy to locate if the sun is low and the observer scans the horizon in that direction, either that, or get the sun at his stern (see App. 3.4).

It is very easy to confuse the blast of a fin whale with that of a blue whale because the general shape of their spouts is the same; the height cannot be depended on, because a big fin will blow higher than a small blue, and a small blue which has been below the water an extended length of time will blow higher than a big fin that has been surface diving. However, the spout of the blue is generally fuller at the base, while the fin whale has a more prominent dorsal fin, swims a more regular course, and is more frequently found in open ice-free waters. These characteristics generally aid in determining the species.

The color of the two species cannot be depended on for identification unless the specimens are observed exceptionally close aboard; then the dorsal region of the fin appears slightly darker than that of the blue. However, the asymmetrical coloration of the head is the best method of determining the fin from the blue when observed nearby; this characteristic can be seen well below the surface of the water, especially when the right side of the head is nearest the observer.

The blue whales are hunted in the same manner as the fins (see the fin whale section of this report for description of this procedure).

The blue whale appears to approach the surface at a much smaller angle than the humpback. The rostrum breaks the surface and is well in sight when the spout is delivered; it forms several inches above the nostrils, which are distended and elevated when the breath is ejected. If it is the first blast the vaporous formation may reach a height of twenty to thirty feet. The animal inhales immediately and surface dives, appearing within a few seconds to repeat the procedure; the vaporous formation becoming relatively smaller with each respiration. The species may blow from three to seven times before sounding, surface dives between each breath, and swims very erratically while submerged; it is this characteristic that makes it more advantageous to hunt this animals with a fast boat; the stalking method is long, tiring, and often unsuccessful. By using a fast boat, speed about fifteen knots, it is possible to make this whale gain the surface more frequently for breath and while endeavoring to get away from the boat it will have a tendency to swim a more regular course. The blue whale's maximum speed is about sixteen knots, and this can be maintained for only a short time before the animal commences to tire. This species has been known to maintain its position at a fixed distance from a killer boat, going slow when the boat went slow, and increasing speed when the boat increased speed. Under these conditions the gunner increases speed while the whale is submerged; the next time the animal breaks the surface the boat is much closer to him and allows the gunner to shoot.

After the respiratory act is completed the rostrum sinks below the water and the dorsal region of the back appears; it is similar to the appearance of the humpback except it is much longer. The dorsal region of the back surmounted by the dorsal fin remains in sight the longest and, if the animal surface dives, moves forward and horizontally to disappear gradually. If the specimen sounds, the dorsal region of the back rises higher out of the water, because the animal comes up more obliquely; the back is arched and revolves, showing the dorsal fin; some of the caudal region of the back is in sight when the whale goes down, but the flukes are not thrown in the air. They have been observed to come in sight, but were dragged along the water as the animal disappeared. This species is reputed to throw its flukes occasionally, and some gunners insist that females do it very frequently, but this information cannot be corroborated. The best method of determining whether this animal is going to sound or not is to observe closely the motions of the dorsal fin and its height above the water.

The longest time a blue whale was observed to remain below after sounding was approximately twenty minutes, and it can be stated that this was exceptionally long, most of the cases observed being much less than this period.

It is frequently possible to trace the course of a blue whale while it is submerged because of the smooth patches of water formed on the surface. These slicks are believed to be formed by the undulating movements of the caudal fin as the animal moves through the water.

The proper time to shoot the blue whale occurs when the dorsal fin is in sight. The point of aim is the elbow of the pectoral fin and the object is to get the iron in the forward part of the body in the hope of penetrating the lungs. It generally takes between two and five harpoons to kill a big blue whale. They have enormous strength and unless struck in a vital region offer a terrific struggle. If ice is present the animal seeks refuge in it or under it, and this adds to the trouble of killing it. A case is known where it required four hours to kill an eighty-nine foot blue whale, and then seven harpoons were used.

This species appears to dive deeper than the fin whale after being harpooned; the fin swims faster and for a greater distance; the blue endeavors to seek the depths and will take out as much as three hundred fathoms of line on sounding. Because of its strength, the blue whale will fight to the limit; its gigantic struggles will practically always pull the accumulator block of the killer boat rigging to the deck, and, when the harpoon line is checked, the killer boat will be towed through the water at a speed of five or seven knots, even with engines going full speed astern.

Many gunners maintain that some blue whales are “seekers.” They have been known to come alongside killer boats during foggy weather and to remain within their vicinity for extended periods. Gunners also maintain that whales are easy to kill during foggy weather if they can be found, because the animal does not seem to be pusillanimous and appears to remain longer on the surface. However, the blue whale, like all whales, is timid and never offensive; its strength is used merely to enhance its efforts to escape.

The dorsal fin of the blue varies in shape and size, ranging from a well-defined falcate fin to a mere stub. On large specimens in the Antarctic this appendage is frequently entirely missing, being represented as a slight boss which appears to be the remains of the fin after the animal chafed it off while traveling through the ice. Under such conditions, this organ does not appear blue-gray, as normally, but as a yellowish-white lump.

The edges of the pectoral and caudal fins are smooth. The caudal fins possess a well-defined notch. The posterior edge of the blue whale's pectoral fin is more curved than is that of the fin whale. The radius-ulna section of the pectoral fin of the latter species roughly forms an isosceles triangle.

Hairs are found on the blue whale at the chin, along the mandibles, and on the rostrum; they grow directly from the epidermis, tubercles are not present on the humpback species. The hairs of the chin are most numerous at the symphysis section, sometimes reaching as many as forty. Frequently there are scattered strands on each ramus of the lower jaw, but they seldom extend past the mid-point. The hairs on the rostrum are well scattered, have no uniform arrangement, and seldom extend as far as the nostrils. Like the hairs found on all whales, these strands are whitish-gray and seldom exceed one or two inches in length.

The baleen of this species is a deep blue in color; its average length is between two and three feet, but it occasionally reaches four feet in the bigger specimens. The whale bone below the snout is represented by course strands so numerous that it is difficult to count them; these are about eight inches in length and extend posteriorly to form gradual sheaves of baleen. The longest baleen is located at the mid section of the palate and from this point it diminishes in length until that in the posterior region is approximately one-third the greatest length found. The bristles are long, sometimes reaching a length of ten inches, and are formed by the fraying of the inner edges of the lamina; the bristles are the same color as the whalebone.

The tongue, palate, and complete interior of the mouth are blue-gray. The tongue possesses an external covering of approximately one-eighth inches in thickness; this is supported by four inches of fat and two inches of meat. This organ contains some of the best oil to be found in the carcass.

Ventral grooves are present on all blue whales, but differ in the number found, generally being from sixty to one hundred on the ventral surface between the pectoral fins. They commence behind the tip of the mandible and extend posteriorly across the ventral region of the mouth, the chest, and abdomen, terminating in the vicinity of the umbilicus; the longest grooves are found at the mid-ventral line, and it is these that reach the region of the navel; the rest become progressively shorter after passing the region of the shoulder. It is difficult to state dimensions here, but the depths of these grooves are approximately one or two inches, and are separated from each other by ridges of blubber one to three inches wide.

Although the head of this animal is just less than one-quarter of the body length and the mouth is slightly smaller than the head, the throat is only about six inches wide.

The epidermis of this species is of paper thickness and can be easily removed exposing a dermis approximately one-quarter of an inch in thickness. It seems to be the epidermis that creates the gray hue of this animal; when it is removed the dermis gives a blue tone to the carcass.

There is no possible method of determining the sex of this animal in the water; in fact, it is difficult for inexperienced observers to decide the sex when the carcass is out of the water if the penis of the male fails to leave its sheath. The quickest and most casual method of checking this factor is to note the distance between the anus and the genital aperture; the anus of the male is located approximately twice as far from the sex opening as that of the female.

The blue whale does not appear to be gregarious in the Antarctic regions, and when found in large numbers it is apparently a case of feeding in the same vicinity. This animal apparently migrates from the high to the low latitudes during the Antarctic winter and returns again for the Antarctic summer, where it feeds and develops an unctuous condition.

When food is abundant, barrels of krill will be found in the stomach; if the abdomen is empty, but the whale has been feeding, a reddish brown exudation will appear at the anus; if food is scarce and the whales are not eating, a green coagulated substance is present either in the stomach or intestines.

The same characteristic exists for this species that occurs in other baleen whales; the female is bigger than the male under average conditions. Definite figures cannot be stated, but it is believed the difference in length will approximate four to ten feet.

The blue whale does not seem to putrefy quite as rapidly as the fin whale, but the amount of oil delivered from a blue whale is governed by the same conditions which exist for the handling of the fin species (refer to the fin whale section of the report for these details).

There were no external parasites or lice on any of the blue whales observed in the Antarctic, but the same parasitic sores or scars were found on the blubber of this species that were observed on the fin whale. These marks were quite numerous on the posterior region of the body, especially on the flanks of the caudal peduncle and dorsal areas. This infection, or whatever it depicts, was represented by an oval white shaped area that contained an axis surrounded by radiating white lines. It was numerous on the larger specimens in a corpulent condition, and became more prevalent as the season advanced. These marks were not, and should not be, confused with the white blotches that frequently appear on the dorsal and ventral regions of this whale; these splashes of white represent some peculiar pigmentation of the cuticle, and are most numerous commencing at the umbilical region and extending posteriorly along the flanks to the caudal fins; they may also be found scattered over other areas of the body, but are more numerous in the sections noted.

The blubber of a blue whale can generally be considered white or slightly yellowish in color; it is white on small lean specimens and yellowish on large corpulent ones. However, on March 1, 1938, an eighty-nine foot male blue whale was found with red blubber. This specimen appeared normal, did not possess external or internal parasites, and was in a rather fat condition, but the blubber, the flesh, bones, tissue structure, stomach, intestines, etc., all possessed a reddish orange hue. The theory is submitted that this may represent a pathological condition as the result of some plankton growth which the animal has eaten. Whalers maintain it is a frequent occurrence in the blue whales found in the Ross Sea, off Patagonia, and near Japan and China; it has also been noted in the gray whales of California. However, no positive explanation can be given that might explain the cause of this condition.

The best oil from the blue whale is found in the tongue and blubber, the oil from the bone is considered next in quality, and the oil from the meat is deemed the most inferior. The same oil and waste percentages apply to processing the various sections of the blue whale carcass that govern the working of the fin; (refer to the fin whale section of this report for these figures).

For all practical considerations the male blue whale may be considered quite scrawny during the month of December in the Antarctic; the females without fetuses are in the same condition. When the females are with fetus they are relatively fat and fine oil producers. Measurements taken in December on various specimens indicate that the blubber is two to three inches thick on the breast, three inches near the nostrils, two inches between the shoulders, four inches on the side of the carcass, five to seven inches on the dorsal region, and about eleven inches near the dorsal fin and extending posteriorly along the caudal peduncle to the tail. Practical estimates for average conditions allow between sixty and one hundred barrels per specimen during the months of December and January. The animals continue to improve their unctuous state and the blubber increases in thickness. The condition and thickness of blubber is the only practical method of estimating the oil producing qualities of any whale at any time. For the months of February and March the oil estimate increases for average conditions, being eighty to one hundred and twenty barrels. However, there are exceptions for this latter period, and some specimens, especially gestating females are found to be extremely fat. Some pregnant females between eighty-five and ninety feet have been examined and experienced estimates have allowed between two and three hundred barrels in them; these specimens were exceptionally fat and every portion of the body seemed heavily endowed with oil. The blubber during February and March may be considered about three inches thick between the shoulders and on the ventral regions, six inches on the sides, and fifteen inches near the dorsal fin and extending posteriorly along the caudal peduncle to the tail. For general considerations it is feasible to allow between one and one and one half barrels per foot of blue whale.

The best blue whales to obtain with the possibility of deriving the greatest amount of oil with the least trouble and effort are between eighty and ninety feet in length. Blue specimens above ninety feet are frequently quite scrawny, and the labor and trouble involved while working them is hardly compensated by the small additional amount of oil obtained.

The amount of meat on the carcass of a blue whale is an irksome and vexing problem for all pelagic whaling factories, especially if they have to process it. Deriving the oil from the meat takes plenty of water, factory space, and time; tons of it comes from the dorsal section of the body especially. It is extremely heavy; a cubic foot of blue whale meat weighs seventy pounds. After the carcass has been dissected and the meat removed from the dorsal section it covers an area on deck, approximately thirty feet long, fifteen feet wide, and two feet deep; hundreds of tons are thrown away because of the small amount of oil present. Under the best conditions this meat does not commence to contain oil until the month of January in the Antarctic; when oil is present the whale is generally in a very fat condition and the color of the meat is of a purple or dark red hue.

Blue whale breeding and mating season

Sufficient data was not obtained and complete observations could not be made to discuss accurately the mating, breeding, birth, and growth of this species. It is believed this phase of the subject is still largely in doubt and positive statements have to be introduced with extreme caution. Various and sundry theories may be advanced, but fundamentally they are based on assumptions that make their acceptance still a matter of conjecture. Detailed and reliable information concerning this phase of the blue and fin whale's existence can only be obtained by making observations in the Antarctic and equatorial regions.

In discussing this species the following remarks are based on various personal observations, and some conclusions that may be generally accepted as quite reliable.

The southern blue whale is generally believed to move between the Antarctic regions and the equator. For general considerations it may be accepted that the species spends the months of October and November in migration from the lower to the high latitudes; it passes the months of December, January, February, and March in the Antarctic regions and then treks back to the equatorial, during the months of April and May. June, July, August, and September are passed in the low latitudes. Some of these periods may overlap slightly, but this is believed to be the general condition, and should suit all practical considerations.

The mating and breeding season is indefinite. From the fetuses obtained it is apparent that mating takes place over an extended period and the time of parturition may vary. However, it is generally accepted that the period of gestation is between ten and twelve months and parturition occurs in the warm water of the equatorial regions. The statement that calving does not take place in the Antarctic is based on the appearance of the females; several fetuses were found that were sixteen to nineteen feet in length but the genital organs of the females were not distended, nor indicated any of the conditions noted for the humpback females in Australia. It is true that these two species may vary in their characteristics, but the conditions occurred as stated.

From the size of the fetuses examined, this animal may vary between twenty and twenty-five feet when born and weigh approximately two or three tons; these statements are based on the specimens weighed and measured, the probable time of birth, and the fact that this whale develops its weight and size so rapidly while still in the fetal stage. The blue whale is supposed to double its length in the first year of growth, undergo a lactery period of about six months, and reach maturity between seventy and eighty feet—a female was never personally observed with a calf below eighty feet.

It is generally believed that most of this species is immature when killed, that the female produces a calf every two or three years after physical maturity is attained, and that fifty percent of any catch involving this whale is represented by females, about forty percent of which are in calf.

The fetus of this species possesses all the external physical characteristics of a mature specimen, with the exception of the color and baleen, by the time it attains a length of two feet; at six feet the color and baleen are present. The following data is submitted to portray the length, girth, and weight of the blue whale fetus.

DIAGRAM TO COPY--yes

BLUE WHALE FOETAL DATA					
	LENGTH	GIRTH AT PECTORAL FINS	GIRTH AT GENITAL OPENING	GIRTH AT "SMALL"	WEIGHT
1	9'7"	6'4"	3'.5"	1'10.5"	538
2	10'11"	6'8"	3'4"	1'8"	580
3	17'2"	10'8"	5'6"	--	2443
4	10'5"	5'4"	3'4"	1'10"	No weight
5	12'2"	6'6"	4'2"	2'1"	No weight

Section 12: The humpback whale

When Norwegians call this whale the 'knølhval,' they allude to the rounded bumps or lumps it has on its head and pectoral fins (App. 3.12). The Germans call this species the 'buckelwal'; the English and the Americans refer to it as the humpback. This name is supposed to have originated from the fact that the dorsal fin is low and placed on a protuberance located on the back about one-quarter the length from the caudal fin. The protuberance is merely a cartilaginous boss that acts as the base for the dorsal fin; it is generally twice as long as the dorsal fin is high. The species is also known as the Bunch Whale, Hump Whale, Hunchbacked Whale, Johnston's Humpback, Bermuda Humpback, Poeskop or Cape Humpback, and the Kuzira.

In 1780, [Danish entomologist Johan Christian] Fabricus [(1745-1808)] used the name *Balaena Boops* for this type of whale that was found at West Greenland. In 1846, when Gray gave the Humpback the family name of Megaptera, they got the name *Megaptera Boops*, used by Van Beneden and Gervais in 1868, consequently this name is found in much of the older literature. Due the fact that Boops had been assigned to another species in discussing calves, it could not be applied to humpbacks, and for the time, therefore, the humpback went under the name of the Longimano. Rudolphi used this term in 1829. When Racovitza saw humpbacks at South Shetland he used the name Megaptera Longimano. The humpback was called *Balaena Nodosa* by Bonnaterra in referring to the species on the New England coast in 1879. In 1904, True [American biologist Frederick W. True (1858-1914)] proved that the American and European humpbacks were one and the same family. The name thus used by Bonnaterra has been given priority and the Latin name for the humpback is now generally accepted as *Megaptera Nodosa*.

True proved that the Humpback found in the North Pacific, to which Cope had given the name *Megaptera Versabilis*, and those found in the Atlantic, which he had named *Megaptera Osphygia, Megaptera Braselianis*, and *Megaptera Bellicosa*, all belonged to the same family as the European humpback. In 1915, Lillie [American biologist Frank Rattray Lillie (1870-1947)] proved that the humpbacks in the Southern waters, which had the names *Megaptera Lalandii* and *Megaptera Noeva Zealandia* were identical with the Northern humpbacks and therefore can have only the one name *Megaptera Nodosa*.

On various occasions this whale has also been known as *Megaptera Americana*, *Megaptera Poeskop*, and *Megaptera Kuzira*.

Even if it is proved, and it seems highly probable, that several gams of humpbacks exist and that those mix with one another only to a limited extent, it must be generally accepted that there is only one kind of humpback in all the waters of the earth.

For general discussion, the whalebone (baleen) whales are considered to be entirely separate from the toothed whales. The two distinct divisions are characterized by the possession of whalebone in the upper jaw of the baleen whales and teeth in the lower jaw of the toothed whales. The baleen whales come under the general heading of Mystacoceti. The toothed whales are segregated under the general heading of Odontoceti.

The Mystacoceti are further divided into two families, the Balaenopteridae and the Balaenidae. The Humpback belongs to the family of Balaenopteridae. This family possesses the following distinguishing characteristics:

A dorsal fin is present, the ventral region has plaits, the bones of the skull are but slightly arched; the head is less than one-quarter the length of the body, the baleen plates are short. The hand (pectoral fin) is narrow.

The Balaenopteridae family is composed of three genera: the Balaenoptera, Megaptera, and Rhachianectes. We are discussing humpbacks so the disputation will be confined to the Megaptera.

The genus Megaptera has the following characteristics:

Average length: forty feet.

A dorsal fin is present, but not very prominent, throat plaits are present and fairly numerous. The pectoral fin is very elongate, being over one-third the length of the body. They are extremely robust in form, with proportions of girth and length being about one to two. The baleen is black, the bristles generally brown; the number of laminae up to four hundred; their length is twenty-four to thirty-six inches. They possess a vent situated in back of the vertical line from posterior margin of dorsal fin.

The Megaptera is not far removed from the Balaenoptera in its internal structural characteristics, but differs to quite an extent in its external appearance. It is to be distinguished by an ungainly, short, thick body with a diminutive section of the caudal region just forward of the flukes that is out of proportion entirely with the rest of its squatty massiveness. The following figures portray and allow a conception of the body outline:

Length of the whale	Sex	Girth of the body at the pectoral fins	Girth at the 'small' (caudal region)
46 ft.	F	28 ft.	7 ft. 4 in.
40 ft.	F	36 ft.	7 ft. 4 in.
45 ft.	F	42 ft.	8 ft. 0 in.
42 ft.	F	36 ft.	8 ft. 3 in.
44 ft.	M	21 ft.	6 ft. 4 in.
47 ft.	F	32 ft.	7 ft. 8 in.

The head is blunt and flat, and decidedly ugly due to the contour of the skull bones and growths found on the external surface. The skull is very broad with an obtuse rostrum. The nasal bones are narrow and pointed anteriorly. They form a salient angle well back on the rostrum which anteriorly shelters a slight impression in the skull within which are located three linear creases in the flesh. The two outside creases are the apertures of the spiracles, the center one is merely a groove or fold in the skin. This impression between the nasal bones that acts as a base for the nostrils is approximately five inches in depth. Compared with the fin whales the humpback appears clumsy, short, and thick.

The humpback does not resemble any other species of whale. In build as well as in color, it differs to the extent that a person will hardly make a mistake in identifying it, even if only occasionally sighted at sea.

The spouting of this whale is also so characteristic that whalers recognize it at a long distance. The humpback spout is about ten or fifteen feet high. On a calm day and at a distance it seems to grow out of the atmosphere; under such conditions it can be seen at least eight miles. If the conditions are windy and visibility poor, this spout is difficult to sight because a turbulent atmosphere soon disperses it. This whale is also located by experienced men scanning the surface of the sea with glasses and spotting the flukes as they are raised in the air while in the act of diving. The playfulness of this whale often betrays his presence to the hunters because they discover the clouds of spray thrown up during the antics long before they would have seen it otherwise.

The pectoral fins are long. They represent twenty-five to thirty-two percent of the animal's total length. Here are some measurements to justify this statement:

Length of whale	Length of pectoral fin
45 ft.	12 ft.
42 ft.	13 ft.
46 ft.	12 ft. 6 in.
44 ft.	13 ft.

From this characteristic it has often been called the 'long-handed whale,' longimano. On fin and blue whales, the pectoral fins may vary from eight to ten percent of the total length. The humpback's pectoral fins are thus approximately three times the length of those of the other species. For instance, the pectoral fin of a fin whale fifty-seven feet in length was five and one-half feet; the pectoral fin of a sixteen foot humpback fetus was four feet. It is by the extreme length of the fore limb that the humpback is most readily identified. The fore limbs of this whale are serrated on both the anterior and posterior margins. The serrations on the anterior edge are formed by the outward bulging expression of the interphangeal cartilages. The fore side of this limb generally possesses two big bumps and seven small bumps. One big bump is located at the elbow where the humerus section joins the radius-ulna portion, and the other big bump is found in the vicinity of the wrist. The seven smaller bumps range from the region of the elbow to the extreme tip of the fin. The posterior section is also crenated but these are formed only in the flesh, bone structure does not cause these notches. The posterior margin appears to be merely frayed out, as if the limb were in the process of slowly getting broader. Circular gaps have been frequently noted on the posterior sections as if the serrations have grown together, leaving a hole completely through the limb.

Many accidents occur after the humpback is harpooned by the pectoral fins striking over the side of the killer boat. The dangerous properties of these limbs are recognized even on the dead whales while hauling and turning the carcass during the process of working it at the factory ship. These limbs are always cut at the elbow at the first opportunity. Men have been known to be struck with these appendages and suffer broken legs or fractured ribs, or their flensing knives have been struck with resulted in themselves or worker close by being severely cut. Those limbs are generally about three feet wide and six inches thick at the elbow on a mature whale.

The dorsal fin is low, thick, and not very prominent. This size and shape differs with each humpback, varying from a well-defined falcate fin to a mere stub, or a notched-hook shaped appendage. The height varies from one to two point five percent of the animal's total length. It is sometimes tipped with white or dark yellow, but such a condition is very infrequent. It may vary from seven to nine inches in height while the protuberance on which it is located may extend along the dorsal region for a distance varying from seventeen to nineteen inches; this boss appears to be part of the dorsal fin and seems to act as an extended base for it. Some actual measurements show a fin seven inches high located on a protuberance that extended along the back for seventeen inches; other fins were found to be seven to eight inches in height with a notch located four inches from the top. The fin may appear as a hook, as stub, or a notched stub. By standing at the head of a humpback that is resting on its stomach and looking along the dorsal region, the dorsal fin appears like the stubby tail of a dog. The dorsal fin of the humpback is located forward of the lower opening.

The caudal fin is extremely broad and serrated on the posterior edge; this crenate formation is not connected with the underlying cartilage. The expanse of the caudal fin represents thirty to forty percent of the animal's length; its width in an anterior-posterior direction is about ten percent of the length. A notch is located at the junction of the two lobes.

The head is studded with tubercles. These growths are about the size of an orange, are one to three inches in height, and cover two to three square inches at the base. In the center of each one is a slight indenture that generally contains a hair. There is generally a row of these tubercles on the middle line of the rostrum between the snout and the nostrils totaling from five to eight in number. A double row of these growths is present on both edges of the rostrum, extending from the snout back to the nostrils. They may total from twenty to forty, making ten to twenty on each side. Sometimes they are in pairs, at other times they occur singly. There seems to be no uniform system of distribution but are scattered about irregularly on each particular whale. On the lower jaw there is a collection of these tubercles in the vicinity of the chin and are scattered posteriorly on both bones that form the lower jaw, but these growths never extend back past the mid-point of the mandibular. The total number of those excrescences may vary from twenty to thirty-two. There are none present at the section of the chin where the bones are joined by symphysis, but on either side of this point there are generally two groups that contain four to six tubercles. These same growths, as to number and arrangement, are found on fetuses about to be born.

As many as twenty-five hairs have been counted in the vicinity of the humpback's chin; they were well scattered. Some of these could be pulled out with the fingers, being as long as two and one-half inches, but the majority would break off, indicating they were not in a dormant condition, although they were of a dead white color; they bore a strong resemblance to a piece of white thread that had been waxed. As many as fifty of these hairs were scattered in the vicinity of the snout. There seems to be no doubt that the obicular growths on the head result from the presence of these hairs, much as a sore is formed on a human being from an ingrown hair. If a longitudinal cut is made through one of these tubercles, a thin vein can be traced through the core of it that generally harbors a strand of hair. Practically every bump has the tip of a hair protruding from the center of it at the top, and they all possess the vein down through the core. It is firmly believed that the excrescences are nothing more than the agitated growths of eburated flesh covered by a thin epidermis. They seldom have parasites attached to them.

A large cartilaginous boss is located two feet from the chin on the ventral surface of the mouth. It is rather irregular in shape, being generally six to ten inches in length, four to seven inches in height, and is six inches at the base, but rises to a distinct ridge with a slight bump on the anterior section. A veneer of epidermis covers this projection. When cut through with a knife, it is a dead white tissue slightly softer than bone; it is generally always covered with the barnacle specie of parasite that infests the humpbacks. This protuberant formation is believed to be the result of the flesh receding from the point of the chin and localizing at the place indicated.

A protuberance is noted sometimes, but not always, on the lower part of the caudal region, just posterior to the anus. However, its prominence or its prevalence is not enough to be noted as a characteristic common to the humpback.

The throat has the longitudinal grooves so characteristic of the Balaenopteridae. These vary in number to a considerable extent, but are never as numerous as those on the blue and fin whale, although they are much broader. These plaits commence about eighteen inches from the mandibular and extend over the throat, chest, and belly to the navel. There is no regularity in the number of folds; some are parallel to each other, while others terminate or cross over to join the others in the region of the chest between the pectoral fins. The presence of these plaits allows the humpbacks to swell their maws while gathering in their food. These folds are in the blubber only, not in the flesh. The plaits on either side of the middle line become shorter as they progress in a posterior direction so that those in the middle of the ventral region are the longest. Between the pectoral fins one may count from twenty-four to thirty-four plaits; if the smaller ones are included there are between thirty and sixty. After the whale is killed and air forced into the carcass to keep it afloat, the purpose of these ventral grooves is well illustrated as the ventral region becomes inflated from the region of the chin to the chest. When the body is thus inflated the plaits have been noted to expand until their dimensions are eight inches across and one inch deep. When the blubber is removed from the body and the grooves measured again they are only one-quarter of an inch in width and slightly over an inch in depth. It is believed that these plaits remain slightly expanded on a live whale and are from two to four inches in width under such conditions.

The baleen of this whale is generally from two to three feet in length. As a generalization it might be described as gray-black in color with light gray or light brown bristles; in the front of the mouth it may be quite light in color, being almost white, creamy yellow, or whitish gray; there is anywhere from 280 to 440 plates of this baleen on one side of the upper jaw.

A laminae of baleen is approximately the shape of a right triangle. The base of the triangle is imbedded transversely in the gum, the hypotenuse being the convex inner margin that is frayed out to form the hair-like mat; the other leg forms the outer edge which is straight, sometimes reaching a length of forty inches. The whalebone that is located in the vicinity of the snout is from four to six inches in length, this extends back about one foot from the nib-end on either side of the jaw where it commences to get longer to form the laminae of the middle of the mouth, which is the longest, sometimes reaching forty inches; then it continues to the hinder part of the jaw where it gradually tapers down to approximately seven to eleven inches in the bigger specimens. As stated, the whalebone is a well-developed right angled scute in the middle of the jaw, but gets shorter, and forms coarse hair-like growths in the front of the mouth. In fact, the baleen directly under the snout is a mass of coarse strands so numerous and thick that it can hardly be counted.

The whalebone is fastened to the jaw bone by a gray pasty substance, similar to putty which covers the alveolar ridges to a depth of three inches. By cutting under the gray matter and separating it from the jawbone it is possible to take the baleen from the jaw in one long trip that extends from the snout to the back of the jaw. By scrutinizing the whalebone from an angle, and close to, when first removed from the mouth, a variety of spectral hues may be seen on the dark colored section. This may be due to the oil from the body of the whale, because it disappears with lapse of time.

The laminae that form the humpback baleen are mostly black on the outer edge and sides, and generally dark brown on the inside margin where it frays out to form an almost impenetrable mat-like surface. In the big specimens, above forty feet in length, this whalebone is striped on the interior mat-like surface in an anterior-posterior direction. Stripes have been noted which were alternately blackish-brown and light brown, counting from the jaw down. By standing off at a distance these stripes are easily discernable and can be distinctly counted. Seven stripes were observed on a humpback forty feet in length. A forty-two foot male had baleen thirty-eight inches long in the middle of the mouth, ten inches in the back of the mouth, and four long in the front of the mouth; seven alternating stripes were present, varying from dark brown to a light brown that was almost gray; creamy white plates were found in the forward part of the mouth about four feet from the nib-end. A forty foot female had baleen thirty-nine inches long in the middle of the mouth and six inches at the front of the jaw; seven stripes were noted of brown, white-bray brown, white-gray, light brown, white, and dark brown. These were counted from the jaw downward. Four hundred and forty laminae were noted to the side.

The young whale of this species has baleen of practically one color which generally appears black with white-gray bristles; this is for whales from thirty to thirty-nine feet in length. A great many of the humpbacks were found to have yellowish-white plates in the anterior or the mouth towards the front of the upper jaw on each side. These were generally most prevalent about eight inches from the end of the snout, however, they sometimes occurred in the whalebone well back in the mouth. A laminae of baleen is 1/32 of an inch in thickness.

It may be that these anterior-posterior stripes of different hues found on the interior surface of the baleen have something to do with indicating the growth of the whale, one stripe representing one year of growth. It has been noted that these stripes do not appear in the baleen of whales under thirty-eight feet in length; it seems to commence when the humpback reaches a length of forty feet. Five stripes have been noted in whale of forty feet, and seven stripes in whale of forty-two feet and longer. No more than seven stripes have been noted on the baleen of any humpback whale. The baleen of whales under thirty-five feet has no stripes but is all one color, being black on the sides and outer edge of the laminae and light brown or whitish-gray on the frayed inner margin. It may be that as the humpback migrates from the cold to the warm areas, the color of the baleen is affected after a certain age is attained.

The color of this whale is generally a combination of black and white. The back of the humpback is always black, black-brown or black-gray, but underneath it has many variations of color between solid white, white with splashes of black, white with patches and rings of black, or it may even be solid black. However, most whales appear black on the posterior region and white to a large extent on the ventral region; but solid black whales have been seen with no white present anywhere except under the pectoral fins. It is under the fore limbs that all humpbacks are white regardless of their other variations. The underside of the flukes is generally white but not always. It is believed that these small white circles, crescents, and other designs so prevalent on the surface of this whale, are due to the parasitic growths that have died and dropped off, the scarred dermis turning white as a result. The pectoral fins can also be mostly white on both sides, but the upper side is generally black. The tail fin is mostly black on the top and white underneath, but it can also be spotted with white on the top. It is the opinion of some persons that the humpback turns white as the age increases. Particular observations were made to substantiate this theory but no adequate evidence was obtained to support it. It has been noticed, however, that all the biggest humpbacks caught in Shark Bay were black and white, while the darker markings on the very small whales that appeared to be quite young, appeared to be gray-black. The conjecture that there are different kinds of humpbacks is not tenable, but it is believed that there are two separate and distinct color markings on this specie. One appears to have the dorsal region black and the ventral region white, the other seems to be mostly black all over the body.

The epidermis of the humpback is as thin as paper, is almost transparent when removed and held up to the light, and under such conditions shows a variety of spectral hues. The dermis is one-third of an inch in thickness; it is like hard rubber. The blubber rests between the flesh and the dermis, sometimes attaining a thickness of seven inches at the thinnest sections. The blubber is thickest on the humpbacks at the neck, around the nostrils, at the dorsal fin, and along the caudal peduncle to the flukes; it is thinnest on the sides, throat, and breast. The color of this blubber is white or yellowish-white. Blubber is a strong, tenacious, tough substance, which might be likened to hard, solidified lard. The dermis can be separated from the blubber only with difficulty. The flesh is coarse and stringy; it may be red, dark, red or of a purple-red hue. The flesh is sometimes heavily veined with streaks of fat. By holding whale flesh in the hand and squeezing it and then letting water run over the hand, allows a person to actually see the large amount of oil that is contained in the flesh of the whale. However, the amount of oil found in a humpback depends on the time of the year, the geographical location, size, and gender of the beast.

The tongue of this cetacean is lead-colored regardless of the body coloration. It is hollow inside. The gray epidermis of the tongue is one-quarter of an inch in thickness; this is supported by a layer of fat four inches thick; underlying the gray epidermis and fat is the bright red flesh of approximately four inches thickness. The tongue is soft and pleasant to touch; it feels like cold stiff satin. It practically fills the entire space between the lower jaw bones. The tip terminates in an elevated ridge that had a slight backward curl to it. The tongue is heavily endowed with oil and tremendously difficult to walk on. The tongue of a full grown humpback would cover the floor of a room ten feet square to a depth of approximately one foot. After the whale is dead and the body blown up with air to keep it afloat, the tongue frequently becomes inflated forming a balloon four of five feet in diameter that protrudes from the mouth. It is with the aid of this massive, fleshy, mobile tongue, that the humpback forces the tiny plankton that have been retained on the baleen after the water is drained off to the throat.

The throat is also lead-colored. It is only three or four inches in diameter. A good size loaf of bread would choke a humpback whale.

The peduncle ridge of the caudal region extending from the dorsal fin to the flukes, has been observed to be distinctly crenated on some humpbacks; on others this section of the body was perfectly smooth; the majority of the specimens observed possessed the unruffled characteristic. This particular section of the body was serrated on all the fetuses examined but, due to the fact that it was not present on all the mature whales, it cannot be noted as a distinguishing feature of the species.

Humpbacks have been killed that were fifty-six feet and fifty-seven feet in length, but such lengths are exceptional for this species. It may be that the measurements taken on these particular whales were made along the curvature of the body and not on a straight line as the present system demands. The humpback is seldom more than fifty feet in length. Out of two thousand killed in Shark Bay, Australia, the average length was forty feet, only two whales reached fifty feet in length.

A most accurate record and system of measurement was used, this may account for the small size as compared with records of the past for average length. When arrived at puberty the majority of females are between forty and fifty feet in length. As is generally the case with baleen whale, the female of this species is generally slightly larger than the male. There is nothing to support the theory that southern humpbacks are larger than those found in northern waters.

It is believed that this whale carries its young for ten to twelve months. Generally one is produced at a time, but twins have been known to be born. There is some relation between size and the time of gestation. When born the calf of this specie is approximately one-quarter to one-third the length of the mother.

The disposition of this cetacean is neither pusillanimous nor belligerent; fighting qualities and ferociousness are entirely lacking. Present day methods of whaling make the capture of this whale very easy. They are not as large as the blue and the fin whales, and therefore lack the strength of these cetaceans. The humpback makes no effort, or is powerless, to pull a modern killer boat through the water, it merely exerts a heavy strain on the harpoon line while endeavoring to keep away and ahead of the vessel; even when being hauled close up under the bow of the killer boat for a second harpoon, they think only of escape. Every heave on the winch finds the animal giving way to the pull on the line, so it is apparent that the specie is quite sensitive to pain. However, the situation cannot be entirely underestimated, there is some danger connected with the extermination of the brute if a person comes to the close quarters with the stricken animal. Nature has endowed this whale with long pectoral fins and broad flukes; after a harpoon is imbedded in the body it is wise to remain clear of the sweeps and blows of these appendages that are dealt in every direction. Here is an incident that actually happened while hunting this specie:

Four men were endeavoring to insert an air pipe into the carcass of an apparently dead whale when suddenly the animal gave a last convulsive lunge; three men saw the huge flukes swinging up towards the rail of the killer boat and fell flat on the deck of the vessel, a fourth man received the full force of the fin blow square on the head. He died a few hours later. Such accidents are liable to happen and make modern whaling a still very dangerous occupation, but the humpback is more fearful than he is feared. Present day whaling never employs the lance in dispatching the whale after it is harpooned; this was a practice only a few years ago. Today, killing irons are used that are fired from the harpoon gun in the same manner as the harpoon.

The humpback is the most playful of all the large whales. Many a gunner has chased this specie for hours hoping to get close enough for a shot. It seems that the situation sometimes develops into a game of tag as far as the whale is concerned. It will come up in the vicinity of the ship, but always in such a location that the gunner cannot bring the gun to bear. At other times they will remain at a fixed distance ahead of the killer boat, just out of range, and all the experience of the gunner, coupled with the maneuverability of the killer boat and its speed, cannot remedy the situation from the whaler's point of view. Gunners have been known to hunt one of these whales for over three hours and then retire from the scene without the opportunity of a shot. On other occasions the beast will either misjudge the situation or allow his curiosity to overrule his better sense, then the results are fatal in a very few moments.

The humpback is much addicted to bolting, breaching, and finning. While breaching and bolting they breathe while clear of the water. During the mating season, it is noted for its amorous antics. At such times their caresses are of the most amusing sort. It is impossible to predict what a specimen is liable to do next. Its gigantic frolics are colossal sights to witness. The huge body beats the sea into foam by lobtailing, breaching, or bolting, or smashing the water with great blows of its flippers and flukes. This cetacean has been observed to come wriggling out of the water straight up in the air to the extent that two-thirds of its body was in view. It returns to the water on its side creating a terrific splash. This particular act of jumping out of the water resembles the antics of many of the game fish off the Florida coast in the Gulf Stream waters. It is also known to lay flat on its back, ventral region protruding just above the surface of the water, pectoral fins outspread, and roll from side to side, smashing the water with great blows at each movement.

The humpback is much more infested with whale lice than the other species of whale. The same regions of the body seem to harbor these parasites on all whales of this type. The areas most affected are the ventral surface of the mouth, the anterior margin and tip of the pectoral fins, the sex opening, and the lower jaw in the vicinity of the chin. There seems to be only three specimens of parasites that infest this whale; all habitat the epidermis. The same kinds of parasites are found on the humpback in northern and southern waters. One is a louse, believed to be identified as *Cyamus Suffuses Dall*; the other two are barnacle or calcerous growths; these are believed to be identified as *Cryptolepas Rachianecti Dall* and *Otion Stimpsoni Dall*. *Cryptolepas Rhachianecti* are found in a large mass on the ventral region of the mouth about three feet back from the chin. There are scores of this parasite in this region forming a solid mass on the blubber from four to eight feet in length and two to five feet in width; they are also found around the sex opening, on the pectoral fins, and a few are located on the flukes. The *Otion Stimpsoni Dall* were found in the largest numbers intermingled with *Cryptolepas Rhachianecti* on the blubber of the ventral region of the mouth. Some were found on the pectoral fins. The lice, *Cyamus Suffuses*, were found in the vicinity of the chin, on the snout, and on the dermis of the body in general. The lice were always found in the neighborhood of *Cryptolepas Rhachianecti*. It may be that the lice breed within the structure of the latter parasite, because scores of tiny white lice were noted in the crevices found in the barnacle-like structure of the larger sycophant. The lice vary in color from white to yellow-white, or rose purple; they are approximately one-half of an inch in length and one-third of an inch in breadth. The male appears bigger than the female, which seldom appeared bigger than one-half an inch in length and one-third of an inch in width. The males are generally rose colored or white, the females appeared to be mostly yellow.

The humpback is considered to be much more intelligent than the other species; his cunning is almost fabulous when he realizes that the killer boat means danger; it soon realizes that it is being chased. Under such conditions they gain the surface only for a second, obtain a breath of air and dive immediately. They do not swim in a steady course but veer in all directions. On the other hand, the humpback has often paid with his life for his innocent curiosity; it is certainly an inquisitive type; they have been noted to linger in the vicinity of a factory ship for hours. This whale is credited with having an organized system for gathering its food; like the other fin whales it generally subsists on plankton. One of the systems supposed to be employed by this whale in gathering its food is to swim in a circle around the krill, beating the water to a foam with its long pectoral fins and broad flukes, this frightens the fry and drives them towards the center of the circle, the humpback then dives, comes to the surface again in the center, fills his mouth with krill and water, rolls over on his side, shuts his mouth and presses the water out between the baleen sheets. The food is retained on the hair-like inner edges of the baleen, and forced back to the throat by the huge tongue. Another method reputed to be used is to swim in a circle a little below the surface of the water, blowing air out of the nostrils at the same time; the discharged air raises bubbles which come to the surface, thereby frightening the plankton, which mass in the center of the circle. The whale then follows the same procedure as before in gathering its food.

Unlimited stories can be told concerning this species regarding the faithfulness of the male to his mate, or the mother to her calf. The maternal instinct is apparently very strong in the species. Tales are enumerated of occasions in the past how when the mother was killed the calf would follow her dead body all the way to the shore station or factory ship. A cow has been observed with her calf, the mother was lying on the surface without the slightest movement, and the calf was frolicking in the water a short distance away. When the presence of the killer boat was noticed, the little one lost no time in gaining the side of its mother for what protection she could afford. Cows have been seen endeavoring to help the calf through the water by extending the pectoral fin to either push or sort of carry the younger one along. On another occasion the female was observed resting in one spot, while the calf leaped and bounced all around her, sometimes going completely over the mother's back and landing on the other side. A cow has been observed beaching, bolting, and lobtailing, with the calf following each antic as if it were being schooled in the proper decorum that all good humpbacks should know. In the past, the gunners would always kill the calf first, knowing that the mother would not leave the body of the little one; then the cow was shot. When a cow is accompanied by a calf she generally comes to the surface of the water very frequently, this might be caused by the fact that the little one cannot stay under the water as long as a mature whale. The calf always gains the surface and blows a very small spout a moment after the cow appears on the surface; the calf is generally close by the side of the mother.

Fortunately the laws of today prohibit the killing of cows if the calf is present, but law or now law, it is not to the credit of any whale gunner to kill a calf whale. The calf cannot swim very fast when young and appears to become panic stricken when chased, because they remain at the surface instead of going below; to shoot it under these circumstances requires no skill, it is like shooting ducks in a gallery. If a calf is chased for any length of time, it sinks rather than dives after each breath, it soon becomes exhausted. Good gunners now, or in the past, never attempt to take a calf whale or kill the mother when the calf is present, because these men know it is the shortest route to take in the extermination of a business that yields large profits for them in particular.

When a humpback sounds it generally always lifts the flukes clear of the water. However this is not always the case. They have been observed to sound and merely pull the caudal fin under the water in a sort of dragging motion. Sometimes one lobe of the flukes touches the water before the other side, at a distance this action looks as if a screw-like motion is in progress. It is believed, however, that the swimming characteristics of this whale are the same as the other species and that all the forward motion is developed by the lateral motion of the tail; the motions of the flukes are perpendicular to the surface of the water. The humpback whale is the same as all the other whales in that it lacks the ability to back up, it can only swim in a forward direction. This was demonstrated when a small whale became ensnared in the huge mouth of a dead whale that was being used as a fender between the factory ship and a killer boat; the young one could not extricate itself, with very motion of its flukes it was becoming more and more enmeshed because its head was being driven farther into the mouth of the dead animal. The orca, or killer whale, is the only specie that is capable of generating a backward motion.

Observations indicate that the humpback approaches the surface of the water for breath at an angle of approximately forty-five degrees. To observe a humpback coming to the surface directly ahead of you makes it appear that it is going straight up in the air. The head breaks the surface first. As soon as the rostrum is clear, the spout is delivered (see Ap. 3.11). The nostrils are elevated high, the breath ejected, the air inhaled, and then the head commences to go under while the back makes its appearance. The spout commences to vaporize a few inches above the head. The humpback has two nostrils but the spout is formed in a single column. The cloud of vapor is narrow at the base but spreads out and soon disperses in the air; it is bushy in form. As soon as the spout is delivered, the long ridge of the back appears as the whale comes up obliquely, arches the back, and begins to revolve, showing the dorsal fin. The ridge of the back and the dorsal fin remain in sight the longest. For a split second it looks like a log with a stub attached to it in the water. Finally the dorsal fin disappears, the flukes are generally drawn out of the water for a moment, they resemble a giant butterfly alighting on the surface just before they go under, and then the beast goes beneath the surface. If the flukes are raised high in the air, it means that the whale has sounded to a great depth; when they are not thrown high out of the water, it indicates that the cetacean has not gone very deep, and that it will appear again in a few moments. It sometimes happens that the humpback will take two or three surface dives, regaining the surface every few seconds for breath, and then finally take a deep dive and remain below for quite a few minutes. It is a popular belief that the humpback can remain below the surface for an extremely long time. This is not true. A humpback seldom stays down more than ten or fifteen minutes at the longest, they have been known to stay down twenty minutes, but this is exceptionally rare, and occurs only when the animal is being chased. However, this specie has been known to spout, sound, and disappear completely without being sighted again. When seen at a distance and not being molested the beast will rise to spout on the average of every two or three minutes, the number of respirations is variable under such conditions. When traveling and coming up for breath every few moments, there is hardly any spout. Whales have been observed under such conditions very close aboard, and it was impossible to see the spout. When this whale gains the surface after a deep dive a well developed spout is issued. Many whalers maintain that the greatest speed this type can develop is between ten and fourteen knots.

The proper time to shoot the humpback is when the dorsal fin appears above the surface; most gunners aim at the elbow of the pectoral fin in their efforts to penetrate the lungs. This of course depends on the distance of the animals from the killer boat, the conditions of the sea, direction of the wind, and certain other variable factors that are known by gunners only through experience. If the whale can be harpooned at the time this fin appears, it is the best time to shoot, because the biggest portion of the body is in sight that will ever appear and it gives the gunner the greatest opportunity to get the harpoon into the lungs. When the iron can be sent directly into the lungs, death is almost instantaneous, because the explosive bomb introduced on the head of the harpoon shatters the breathing organs. This grenade explodes three seconds after leaving the harpoon gun. When the whale blows blood, it is an indication that the lungs are struck and that a death wound has been delivered. Gunners generally shoot when the whale is within fifty to one hundred feet of the bow, and closer if they can make it. However, some humpbacks have been killed at a distance of three hundred feet, but this is extraordinary good shooting. A high bow is a great asset to a gunner in shooting as it affords an opportunity for him to shoot at a greater distance, but most important, it allows him to shoot down and not parallel to or up from the water. The trajectory of a modern harpoon is not constant in any sense of the word, every factor that can be introduced that will allow the gunner to shoot down, aids in making the flight less variable.

If the engines are going slow when the whale is harpooned, they are backed full speed to keep the line out of the propeller and to keep the whale ahead of the boat. If the engines are going full speed ahead when the beast is harpooned, the helm is put hard over so that the stern is thrown away from the line, and at the same time the harpoon gun can be brought to bear again much sooner than if maneuvered otherwise.

When the water is shallow, a humpback can be followed by the disturbance that his swimming motions make on the surface. This disturbance is in the form of smooth patches created at the surface by the undulations of the body as it moves in the depths below. It seems to be the result of an up-welling of the water. The gunner merely follows these patches until the whale is sighted coming to the surface for breath.

There are two big smooth patches of water created where the humpback breaks the surface in the act of breathing. These remain long after the whale has disappeared below again. The water wells upward and flows outward in one of these blotches and flows inward and down in the other one; the outer edges of the formation are rough fringes that have dancing movements similar to tide-rips. These circles are very close together and resemble a figure eight placed in an anterior-posterior direction with reference to the whale. One circle is slightly smaller than the other; this forms at the surface where the whale broke water and the water flows from the center outward. It may be caused by the whale ejecting the breath a split second before it gains the surface. The bigger of the two circles is formed at the point where the water disappears below the surface, in this one the water flows inward. This may be due to the suction action of the body as it leaves the surface. Some gunners maintain that these circles are formed by the action of the flukes. When the whale is coming up he turns the posterior edge of the tail downward, this creates an impulse in the depths that is transmitted and seen on the surface as an agitated condition; when the whale is descending he turns the posterior edge of the tail upward, this tends to pull the water inward at the exact spot where the flukes disappear. As to the cause of these formations on the surface of the water, the latter theory seems to be the most acceptable.

When and where the humpback sleeps is a mystery. They have been observed at night moving very slowly through the water, the dorsal fin and the back remaining out of the water almost continuously, the head having a slight oscillating movement in an up and down direction, the nostrils barely leaving the surface. It may be that the creatures were sleeping.

The orbit of the eye is about five inches in diameter. The eyesight is or appears to be relatively poor. Many whalers believe that this whale can be seen above the surface approximately five hundred yards. On many occasion the humpback has been seen to close his eyes on gaining the surface during the process of respiration, and to open them immediately on descending.

The ear is approximately thirteen inches from the eye and situated on the line from the eye to the shoulder. The external lobe is missing on all whales. The opening of the ear on a humpback is just big enough to insert the tip of a man's finger or the top of a lead pencil. The humpback is credited with being able to hear much farther than he can see, but this is only during fine weather when the water is calm. If the sea is rough and conditions become turbulent in general, the hearing of this whale is believed to be impaired considerably.

By some unknown sense humpbacks join up with each other. Two humpbacks have been seen miles apart and were observed to sound at approximately the same time; when they came up for breath they were close together and broke the surface at the same time. Whether this specie has some unknown means of communication or sense for detecting the presence of another one of their kind, is a mystery.

The pectoral fins of the humpback, as is generally believed to be the case of all whales, are merely used as balancers, not as swimming organs. When this specie is swimming through the water, the forelimbs are pressed closely against the sides of the body. A slight outward movement of these appendages is noticed as the animal commences to ascend. The fin remains away from the body at an angle of thirty to forty-five degrees with the shoulder until the surface is reached. When descending, the limbs are moved against the sides immediately after the dive. It is believed the fore limbs perform two functions; they balance the body, and they turn it, pointing it in the direction that it is desired to go; the caudal fin produces all the forward motion. It is interesting to note that the humpback whale possesses the longest pectoral fin of any species. As their bodies are the shortest and the thickest of all the big whales, the fore limbs are, therefore, the greatest necessity, which seems to agree with the balance theory.

Only a casual examination is necessary to determine the presence of milk in a female humpback. The breasts of the animal are located on the ventral region of the body underneath the blubber, but are only slightly covered with flesh; they commence just behind the pectoral fin, extend down the chest and belly, and terminate in the teats, which are two in number and located on either side of the sex opening; this opening is forward of the anus on the ventral surface, being about one-quarter the animal's length from the caudal fin. The breasts of a humpback are four feet long, being about two and one half feet wide at the forward section; they taper down gradually to about one foot at the posterior end, and terminate in a teat which is the size of a man's thumb, being three and one half inches in length, and one and one quarter inches in diameter. The nipples are exposed through apertures, about eight inches long and five inches wide, on either side of the uterus; they are very prominent if the female has been suckling a calf. Milk appears in pregnant females a short time before the calf is born, but the teats do not protrude, as is the condition after the birth of the offspring. The appearance of the sex opening generally indicates whether the calf has been born or not, even with milk present. Before birth the organ is greatly distended, in one case it was noted to be two feet wide and after the removal of the blubber from the carcass it expanded to four feet. When the calf is on the verge of being born, a serrated membrane protrudes; in one case a fetus was brought forth on deck when a flenser cut this membrane with his knife, apparently this particular calf was about to be born when the mother was killed.

After the birth of the calf, the female then becomes a 'milk whale' in the vernacular of whaling language, the sex opening appears almost normal, but the breasts are full of milk which causes the region on both sides of the genital slit to become elevated and greatly puffed. As a result of this bulging out, and above the surface of the protuberance, the tip of the teat is exposed. Due to the manner in which modern whaling factories treat the carcass on the factory ship during the process of working it; the milk generally exudes from the teats in a fair size steam three or four feet in length. This may account for the manner in which the calf is nursed, which may be done in one of two ways. The first method may be: that the mother lies on her back, raises the posterior section of her body clear of the water, and allows the calf to suckle with its head just above the surface, grasping the tip of the teat with the forward part of its lips. The second method may be: that the female rests normally in the water, the calf suckling by gripping the teat with the forward part of the lips, creating a suction action every few moments by swallowing the milk and forcing any water that might have entered out of the mouth between the baleen sheets, which are very short in a young whale. The first opinion is based on observations made when a young calf was noted attempting to suckle the breast of a dead female that possessed milk, the second theory is based on the observations of gunners who claim that this is the actual procedure.

Humpback milk is a white, heavy fluid, closely resembling condensed milk. If a great length of time elapses between the killing of the whale and the examination of the milk, the fluid appears as a heavy, yellow, pasty substance. This milk is not as disagreeable to the taste as might be imagined, even when sampled from a whale that has been dead a few hours, the liquid being then effected by the gases generated from the dead body; persons have sampled milk from a female that had been recently killed and stated that it is quite palatable. Samples of this fluid have been taken and kept for months in an ice box, at the end of this time it was still in a condition to be tasted; however, if this milk is taken, boiled, and then put away for future sampling, it disintegrates.

If there is any doubt concerning the presence of milk, it is only necessary to puncture the teats with a knife, or better still, wait until the blubber is taken from the carcass, then cut through the flesh, the breast itself can then be examined. The inside of this organ is composed of light brown, coffee-colored flesh, heavily porous with veins of milk; the contents flow freely from the organ after it has been severed. Regardless of whether the teats are in sight or not, if the female has been suckling a calf these appendages protrude immediately on separating the slits. A female that is neither pregnant nor nursing a young one, has the teats withdrawn well up in the body; to examine them it is necessary to reach in and extract them from their shelter.

The sex organs of the male are buried in the carcass; the penis is enclosed in a sheath which holds the appendage sheltered within the body; at a glance, therefore, it is difficult to observe whether the specimen is a male or female, unless some measures are taken to determine it. However, the anus of the female is always located much closer to the sexual opening than the anus of the male. Keeping this characteristic in mind it is possible to tell the gender by casual examination.

All females examined in Shark Bay, Australia, that had milk or were carrying a fetus, were excessively fat. The blubber was above average thickness, being in most cases eight inches at the thinnest sections. A thick layer of fat existed beneath this blubber which sometimes reached a thickness of eight inches. These females just seemed to exude oil from every part of the body. After the blubber was removed and lay on deck, pools of oil several inches in depth would form in the crevices of the covering, oil would drip from the fat as the carcass rested on deck, globules of oil were even noted adhering to the flesh which was permeated with streaks of heavy white fat. It appears that Nature endows the female with a large store of food in preparing her to nourish the young one. It may be that after several months of suckling the calf and traveling from the breeding grounds, the female becomes thin and gaunt, but all conditions noted, either just before or soon after the young one is born, indicate that a pregnant female is the best whale to obtain from the view point of oil production.

It is worthy to note that not a single whale examined in Shark Bay, Australia, had any solid substance in its stomach. The majority of the stomachs, and every single one that was examined, contained a heavy green substance, which might be described as heavy coagulated green paint. This same substance sometimes appeared yellow or yellowish brown. The stomach itself was sometimes void of any content, the green matter was then present in the intestines. The whale gunners also reported they did not see a single whale feeding. There was no indication of krill or other plankton being present in these waters, this form of drifting life forming the main diet for the humpback as well as the other baleen whales; these crustacea sometimes color the waters in certain sections of the world, the Antarctic for instance, with various hues due to their presence in large numbers.

Regardless of the fact that the whales in Shark Bay, Australia, were apparently going without food, their bodies were encased in a layer of fat located between the blubber and the flesh. The presence of this oily tissue was very noticeable during the months of July and August. The carcass of every whale stripped of its blubber presented a glistening white mass of oily fat. By the middle of September a change could be discerned, the unctuous covering was beginning to disappear at certain sections of the body, in the vicinity of the shoulders especially. At the end of September and during October a distinct change in the body's condition could be seen; at this time when the blubber was removed only small patches of fat adhered to the flesh and some of the specimens were getting decidedly lean; the veins of fat that had permeated the flesh were also noticeably scarce, and had disappeared completely in some whales.

It is apparent, therefore, that the humpback migrates for mating and breeding purposes only, not in quest of food. While in the cold higher latitudes the whales apparently eat promiscuously of the plankton that abound in these regions; as a result they become corpulent and provide their bodies with a casing of stored up food and their flesh becomes pervaded with veins of fat, which condition enables them to subsist for months without nourishment. The humpbacks are known to frequent Shark Bay as early as the middle of June, they abound there during the months of July and August, and part of September. During the latter month they commence going south. It is apparent, then, that this whale can go for months without food, living on its corpulent flesh. Such an existence, a far as this specie is concerned, is akin to the cyclic character of the boar's life, which is interrupted by periods of hibernation. As the ocean offers no hibernaeulum for the whale, the animal merely moves to the warmer regions of the earth to pass the winter months in a torpid state as far as the quest of food is concerned, and to mate and to bring forth their young.

Contrary to general opinion, the humpback does not appear to be gregarious; they are not addicted to traveling in large gams. There may be certain gams of them that follow certain routes in their migrations, but they are well scattered while traveling. It is very seldom that more than three are seen together; solitary whales are common, mixed pairs are numerous; sometimes two or three males are seen together. Two cows have been seen together with their calves. A family consisting of a cow, bull, and calf are frequently seen. Small groups have been noted consisting of males, females, and their calves, but this is very infrequent. One instance has been noted where the same female was observed with different males on successive dates. She possessed a white tipped dorsal fin and was accompanied by a calf. The female fickleness of this species could be checked in this instance because the whalers killed the males but spared the cow due to the presence of the calf.

It seems that towards the end of the season when the males commence to leave the breeding grounds they gather in small groups for the migration to the higher latitudes. These whales are all practically the same size, seldom are small ones sighted in the company of bigger ones; it may be that whales of approximately the same age travel or consort together. These were practically the conditions in Shark Bay, Australia; at the beginning of the season in July many single whales and pairs were seen; towards the end of the season in October, the humpbacks appeared to be gathering in gams for the trip south.

When a male and female are traveling together, the female is generally on the left of the male. If stalking two whales under these conditions, it is best to get them on the port bow of the killer boat, because the male generally comes between the female and the danger. By approaching the whales from the port bow, the male is not forced to shift his position and thus inform the female that danger threatens, thus alarming her. If the whales are approached from the starboard bow, the male is forced to shift his position; this excites the female, which generally leads to a long, tiresome chase. By leaving the whales on the port bow, the gunner can shoot over the male and harpoon the female. The male seldom leaves the female while she is alive, and sometimes loiters about after she is dead. It is quite easy to kill the male under these conditions. The male humpback has been known to push against the female and endeavor to release her after she has been harpooned, failing in this, he tried to cover her body with his own. Such faithfulness is generally rewarded with death.

Occasions arise where it is impossible or impracticable to get the whales on the port bow. Under these conditions the male generally comes between the female and the danger, doubling under water if necessary. However, this is not always the case; chivalry among humpbacks is not one hundred percent. Some males have been known to get on the far side of the female and leave her next to the danger. Sometimes, when the female is shot, the male disappears and does not return, but this is not always the case. When such pusillanimous actions are displayed it chagrins the gunners because they only get one whale instead of the pair.

When two males are traveling together, one generally follows in the wake of the other.

It is believed that the humpback attains puberty at a length of forty feet. Some authorities maintain that puberty can be attained at thirty-three feet, and that it is common at thirty-six feet. However, it is believed a near-impossibility at thirty-three feet, and a most rare condition at thirty-six feet.

Not until the length of forty-two feet is attained does the percentage of pregnant females reach an accepted figure as to exclude doubt from the prevalence of puberty, the percentage we might expect when a calf is being produced every third year. Prolific production seems to be attained between the length of forty-two and forty-six feet; or when over one year of age and at least average length for the species. Most of the humpback females may be considered to have arrived at puberty at forty-two feet and only some at the length of forty feet. The females of forty-two feet may be considered as the larger one year olds or smaller mature females of a greater age. At this length the percent for females breeding is twenty-five percent.

Cases have been found where a humpback female had an embryo and a suckling calf at the same time. This indicates, in exceptional cases, that the humpback produces a calf once every year. This condition is highly probable as numerous pairs of males and females were seen in Shark Bay, Australia, during the months of September and October, the females being accompanied by calves; the females had apparently just calved, and possibly mated again, while still suckling the young one. However, under normal conditions, it is believed the humpback has a calf every third year. This third year occurrence may be attained by a female calving one year, and being accompanied from the breeding grounds by the calf, which, it is believed, suckles for about six months; by the time the female migrates to the warmer regions gain during the next year the calf has left her, she then mates again, and leaves for the colder regions. The next time she arrives on the breeding grounds she bears another calf.

As in the case with most species, the humpback seems to breed in ten to twelve months, the calf being approximately sixteen feet in length when born. Twins have occurred in humpbacks, but very rarely.

It is believed that the mating season generally occurs between June and September while the whales are in the warmer waters of the equator. The young are apparently born in the late summer in the same regions.

Observations indicate that the females migrate southward in September, October, and November, accompanied by calves, varying from sixteen feet to twenty-nine feet in length, attaining an average length of approximately twenty feet in November.

Let it be assumed that the fetus is laid out in September or October. This supposition is perfectly proper to accept from the conditions that seemed to exist in

Shark Bay, Australia; which appears to be the breeding ground of a certain gam of this species. The assumption is acceptable from the following facts:

1. That all fetuses found were to be born, apparently, within two to four weeks.
2. That numerous cows were present with very young calves.
3. That numerous pairs of males and females were observed, apparently mating.

Proceeding on this theory, the fetus is about ready to be born in the middle of September, and is approximately sixteen feet long at birth. As stated, females move south with calves in September, October, and November, the average length of the calves sighted in November being about twenty feet. By plotting the data obtained from observations in the Antarctic, and the facts gathered from Shark Bay, it is possible to trace (approximately) the growth of the humpback from the time it is born to the time it is fully grown. Out of 2,036 specimens obtained in Shark Bay, the average length was about forty feet, and the largest killed were fifty feet; the female is generally two feet larger than the male for this whale.

Data shows that:

1. The humpback is about forty feet long at the end of it first year.
2. For all average conditions the specimen has reached its full growth about the end of its first year.

3. In one year the humpback is about 2.5 times its length when born, and about three times its length when born at the end of the third year. It grows approximately two feet per month the first year and, relatively speaking, very little thereafter.

Data indicate that:

1. The whale is mature at the end of its first year.
2. The female attains the age of puberty in about a year.
3. The females commence to produce calves about the end of their first year.
4. The most prolific period of reproduction occurs when the female is forty-two to forty-three feet in length.

It seems that when a length of forty-two feet is attained the beast commences to get large through the body and takes on the thick, squatty, appearance so characteristic of the species. The obtuse appearance is present, but not as noticeable in the young of this whale, that is, those below thirty-nine feet in length.

It is my personal opinion that the female of this species does not calf below forty feet in length. This is based on careful observations. There is something in the appearance of a humpback below thirty-eight feet in length that agrees with the impressions created by casual observations, and seems to indicate that the whale is young and immature. It has been found that a pregnant female of any species of whale has an exudation present at the genital organ which indicates the presence of a fetus. This was never found on a humpback female below forty feet in length. The theory was first suggested in Australia and appeared to check in each instance; it was studied in the Antarctic also. It was while checking this observation in the ice that a six inch blue whale fetus and a ten inch humpback fetus were found after casual search by factory workers indicated that fetuses were not present.

It is interesting to note that there were no females in Australia below forty feet in length that possessed milk; the presence of milk indicated that the females had calved; they were later accidentally killed.

The humpback is known to leave certain localities if severely persecuted for two or three years. Apparently the animal seeks new and more peaceful haunts, returning to its former habitation after a period of ten or fifteen years.

The hunting of this whale on the equator should not be allowed if its extermination is to be prevented. The species appears to be very gregarious when found in the low latitudes and is easily captured with the modern methods employed in hunting. The females are either mating, in calf, or are accompanied by calves. If the female is mating and is killed in company with its mate, the male generally falls easy prey. If the female is killed while in calf, the possibility of extermination is enhanced. If the female is accompanied by a calf and is accidentally killed, the calf later dies from starvation. The results of such hunting can easily be imagined. Extermination is the paramount issue. Nature has never devised a source of unlimited supply, something must be contributed to the original source or extirpation follows. The only contribution that can be made to the source of whales is protection and it should be applied in the equatorial waters. Commercial enterprise can still derive profits in the higher latitudes where the animals are more scattered and there is less possibility of killing gestating females or cows that are accompanied by calves.

The length limit for this specie should be maintained at thirty-five feet. Whaling expeditions can still kill enough specimens above this size to realize a comfortable profit. From a conservation point of view, and to protect immature whales, without regard for commercial exploitation, the length of this species should be raised to forty feet.

It is incumbent on me to state at this time that data submitted to the International Whaling Bureau, at Oslo, Norway, concerning this species may be in error, because the persons gathering the information are not painstaking or particularly observant. Apparently the Bureau accepts the data from the various expeditions without question, and this leads to erroneous conclusions. Specific examples of this can be cited in the records of the *Ulysses* which were faulty for the Australian season and which, if not corrected, will lead to imperfect conclusions. Various and sundry changes had to be made on the United States reports which differ from those submitted to Australia and

Norway. It is known that the government records are correct, because they agree with the inspector's observations which were carefully made at the instant that certain incidents occurred which were worth noting.

The *Ulysses* expedition killed relatively few humpbacks during the Antarctic season when compared to the number obtained in Shark Bay. The specimens obtained, however, did not differ from those taken near the equator in color, size, general appearance, or average amount of oil derived, although the animals did not appear as corpulent as those observed in Shark Bay during July and August.

The sycophantic growths and the lice were the same on the animal in the Antarctic as in Australia. The lice, *Cyamus suffuses*, occupied the same areas on the carcasses as in Shark Bay. The barnacle-life growth, *Cryptolepas Rhachianecti Dall*, and *Otion Stimpsoni Dall* did not appear in such abundance as they did in the equatorial waters. The personal opinion is submitted that this parasite enters the skin of the animal while in the cold waters, develops and grows, and later dies in the warm waters. This opinion is based on the fact that the growths were not as prevalent at the end of the Australian season as they were at the beginning, and there were numerous scars to indicate that the parasite had died and fell off. It is believed that the parasite that causes those hard, shell-like growths enters through the skin and forms an oblong soft, mushy, white sore; the center of this sore contains an incision that indicates the place of original entrance. Later the sore gives rise to a hard rigid structure in the shape of a star; the center of this figure is open and harbors the same parasitic formation observed in Australia. Pictures of this parasite were obtained in both regions and depict various stages of its development.

Data obtained on humpback females and fetuses (Measured during Antarctic season of 1937-38)

Length of fetus	Months	
	January	February
Less than 1 ft.	1	-
1 ft. – 1 ft. 11 in.	-	1
2 ft. – 2 ft. 11 in.	1	-
Total Fetuses	2	1
Average length/month	1 ft 5 in.	1 ft. 10 in.

	Months	
Length of fetus	August	September
11 ft. – 11 ft. 11 in.	1	1
12 ft. – 12 ft. 12 in.	-	1
13 ft. – 13 ft. 11 in.	4	3
14 ft. – 14 ft. 11 in.	6	3
15 ft. – 15 ft. 11 in.	1	1
16 ft – 16 ft. 11 in.	1	-
TOTAL FETUSES	13	9
Average length/month	13 ft. 11 in.	13 ft. 7 in.

NOTE: Unless the months are mentioned there was no data obtained.

Females with calf			
Length	Antarctic, 1937-38	Australia, 1937	Milk whales, Australia, 1937
40	2	-	1
41	-	1	-
42	-	5	2
43	-	5	2
44	-	3	1
45	-	3	2
46	-	2	4
47	-	2	-
48	-	1	-
49	-	-	-
50	1	-	-

Oil derived from a humpback

The humpbacks in Shark Bay were in excellent condition from the consideration of possessing oil. During the months of July and August the whales just seemed to exude oil. The blubber was four to eight inches thick at the thinnest parts of the body and ten to seventeen inches at the thickest sections, especially around the dorsal fin. Each whale was enveloped in a casing of fat located between the blubber and the flesh. After the removal of the blubber, the carcass rested on deck, a glistening mass of fat; this covering sometimes reached eight inches in thickness. The meat was permeated with veins of fat. Oil would flow in the incisions of the blubber while it was being removed and small pools of oil frequently formed in the folds of the blubber while it lay on deck waiting to be dumped into the cooking system.

During the month of September, the whales appeared to be getting thinner. Patches of flesh commenced to appear through the fat after the blubber was removed; the corpulent casing was thinner and on some whales the flesh was merely covered by the blubber. Towards the end of September and the beginning of October the whales were getting decidedly lean. Their spareness could be discerned even before the removal of the blubber, and the extreme girthy appearance in the region of the pectoral fins had commenced to disappear. It is estimated, and it seems highly probably, that these whales had not eaten for over four months. The theory is that they return to the Antarctic sometime in November, feed abundantly for about six months on the krill that abounds there, and then return to the equatorial regions in the early summer. There appears to be no krill in the warm waters; no solid matter resembling food was found in the stomachs of any whales in Shark Bay; the gunners reported the whales were not feeding. The same conditions have been found to exist in the regions of Madagascar, West Coast of Africa, and Peru. It is apparent, therefore, that the whales migrate to the warmer waters to mate and to bring forth their young; not for food.

Humpback whales apparently do not feed on fish because the Shark Bay waters abounded in a small form of Pisces about the size of a herring. Schools of these fish could be seen all over the bay, but not a single trace was found in the stomachs of the whales; their presence could have been easily discerned because whales do not masticate their food, but swallow it in large shoals. One whale had fish in its mouth, and another had fish in a section of its intestines that protruded through a wound in its side, but these are believed to have been scooped up while the dead animal was being towed to the factory ship.

The pregnant females and those possessing milk were the most corpulent specimens observed at any time in Shark Bay.

The quantity of oil derived from this species differs with each specimen and depends on several factors in considering the amount to be processed from each whale. However, as a general condition, it is practical to estimate one barrel of oil per foot of whale or about forty barrels per humpback. It is also practical, for all general considerations, to estimate that the humpback weighs about three-quarters of a ton to the foot.

In working the humpbacks in the equatorial waters it is proper, for all practical purposes, to estimate fifty percent of the oil to be derived from the blubber and fifty per cent to be process from the meat and bones. If a more conservative estimate is required, allow forty percent of the oil from the blubber, thirty percent from the bone, and fifteen percent from the meat; fifteen percent is lost in working the whale on deck, in faulty manipulation of the cooking system, in the decomposition of the carcass, etc. From the blubber processed you can estimate sixty per cent is water and waste; from the bone that is processed estimate seventy percent as water and waste, and from the meat processed it can be figured that eighty five percent is water and waste.

A humpback whale commences to deteriorate rapidly after it is dead thirty-six hours; the acid content rises rapidly and the amount of oil to be obtained diminishes. In fact after thirty-six hours you can figure to derive only fifty percent of the oil that would be normally obtained if the whale were worked within a few hours after being killed. It is not practical to work a humpback for anything but the blubber after forty-eight hours, and there is no use of processing the carcass after seventy-two hours, from the consideration of it being a beneficial proposition.

The oil derived from a humpback depends on:

1. Size.
2. Sex.
3. Time of the year.
4. Location of the catch.
5. Processing at the factory.
6. Length of time between the killing of the whale and the processing of it.
7. Condition of the sea.
8. Amount of air injected into the body.

Size

Naturally, the size of the whale has an important bearing on the amount of oil to be derived from the carcass. It may be generally accepted that if two humpbacks are killed under the same conditions, the bigger specimen will always produce more oil.

Sex

The sex of the humpback is of considerable importance in estimating the quantity of oil to be derived. If a female is not pregnant and does not possess milk, indicating that it has just thrown a calf, it will produce the same amount of oil as a male of the same size; but if a female is pregnant or has just calved, it will contain more oil due to its corpulent condition than another female or male of the same size. This condition is found to be true in the equatorial waters just before or after a female has calved. When a milk or pregnant female is killed near the equator it is practical to figure one-half as much oil again as would be obtained from an ordinary whale. After several months of suckling the calf, the female may become thinner and fail to produce only as much oil as another specimen of the same size. However, the humpback female in caring for its young never attains the scrawny appearance that is so prevalent in some of the other types that are caring for their offspring. During the equatorial season the females that possess a calf or a fetus are the best whales to obtain as they always produce more oil.

Time of the year

The time of the year that the humpback is killed is important in estimating how much oil is to be derived from the body. When the humpback arrives in the warm regions from the Antarctic it is in an exceedingly corpulent condition from feeding abundantly on the food found in the higher latitudes. Therefore, more oil can be processed from these whales when they first arrive in the equatorial waters than if they are obtained after the passing of several months, because their fat has commenced to disappear and they apparently exist without nourishment when sojourning in the lower latitudes. The same condition is comparatively true in the Antarctic; if a humpback is killed in the month of November or December, it will contain less oil than if obtained during the month of March or April. The whales go to the colder regions to feed, the longer they have to nourish their bodies the more corpulent becomes their condition; the more fat that is present on any whale, the greater is the quantity of oil obtained. Generally speaking, the humpback is an excellent oil producer for its size; the quantity of oil derived from this species remains more constant throughout the period of a year than that obtained from the other types of whales. For instance, you can always figure a humpback to produce between thirty and forty five barrels of oil throughout the course of a year while a sei whale produces about twenty barrels of oil at the best time of the season in the Antarctic and about six barrels when obtained around the equator.

Location of the catch

The place where the whale is killed must be considered in estimating the oil to be obtained. This condition is closely related to the time of the year because the whales may be in the equatorial or the colder regions. Therefore, for instance, if the whale is killed in Shark Bay, in October, it will be thinner than if killed in the Antarctic in January. The position where humpback whales are killed is not as important in discussing the oil produced as it is when considering the other species, because, relatively speaking, the humpback is a good oil producer no matter where or when it is killed.

Processing at the factory

Oil production at the factory depends on several variable factors, they are:

(a) Size of the factory ship.

(b) Personnel of the ship.

(c) The efficiency of the factory in handling the whale.

Size of the Factory Ship

It is generally considered that the bigger the factory ship is the less is the amount of oil derived per whale. A big factory ship can handle more whales and produce more oil in a season that a smaller plant, but it has generally been found that the smaller factories obtained more oil per whale than the larger ones. In the big factory ships there are necessarily more losses due to leaks in the pipes and tanks of the cooking system; more oil is erroneously blown overboard because much more boiling down equipment is being manipulated; generally, the personnel of a large factory have to attend to more equipment than the personnel of a smaller ship, this cuts down on the amount of oil derived, because the men have to divide their attention between several boilers instead of concentrating on one piece of equipment.

Personnel of the Ship

The personnel employed in the factory section of a whaling ship have to be experienced men. They have to know when to blow down a tank in order to obtain the maximum amount of oil and the minimum quantity of refuse. If the tank is blown down too early, some whale oil is sent overboard; if the tank is blown down too late refuse and water are mixed with the whale oil, and more fresh water has been used than is actually necessary.

The efficiency of the factory in handling the whale

A careful check has to be made to prevent more whales from being flensed and cut up than can actually be handled in the boiling down systems. If the meat and the blubber of a whale have to be retained on deck for more than two or three hours after the carcass has been flensed and cut up, due to the incapacity of the cooking system to take more meat, bone, and blubber, then it is better policy to let the dead whales remain astern until the factory system is ready to receive more material. When a carcass is cut up the oil commences to flow from the blubber and the meat from that moment until the material is dumped into the boiling down system. In the equatorial regions the oil bubbles out of the meat and exudes from the blubber as these parts rest on deck in the hot sun; all this waste on deck amounts to a considerable quantity of oil when hundreds of whales are being worked and tons of meat and blubber are processed.

Length of time between the killing of the whale and the processing of it

The interval that elapses between the actual killing of the whale and the time it is processed at the factory ship is one of the most important considerations to be kept in mind when estimating the amount of oil to be derived from a carcass. The longer a whale remains intact after being killed, the smaller is the amount of oil to be derived from the carcass. A large amount of gas is generated within the body while it is in the process of decomposition. The carcass commences to become bloated from these gases within twelve hours. While decomposition progresses the amount of oil diminishes and the acidity content increase; in the vernacular of the whalers the carcass is said to be "blasted" and the oil is said to be "burning up." The blubber of a dead humpback commences to turn green within approximately thirty six hours after being killed and the abdominal region becomes quite bloated. The whale is then said to be "blasted." It is useless to process a whale, other than the blubber, after forty-eight hours has elapsed from the time of its death; and of no use to process any of the carcass after seventy-two hours. This is with the idea of obtaining good oil and getting a normal amount from the carcass; of course, the whale can be worked four or five days after it is dead, but the amount of oil is so small and the quality of it so inferior, that it is not considered a paying proposition, and if whales are plentiful it is never done. Needless to say, a badly bloated whale is a great discomfiture to the personnel. There is no smell in the world that can compare with the penetrating, sickening, putrid odor of a dead whale, but it is remarkable to the extent to which a person can become acclimated to it. The oil is derived from a blasted whale lowers the quality of all oil with which it is mixed.

Condition of the Sea

The condition of the sea has a bearing on the amount of oil to be obtained. A rough sea causes the whale to "blast" much faster than a calm sea. When whales are secured at the stern of a factory ship in rough water the carcasses are in continual motion; this working of the carcass in a seaway has much effect in decomposing the body. Strange as it may seem, the whales in Shark Bay did not "blast" as rapidly as the specimens in the Antarctic. This is believed to be partly due to the presence of food in the stomachs of those taken in the ice.

Amount of air injected into the body

The amount of air injected into the body of a whale reduces the amount of oil to be obtained, because too much air aids in, and hastens, the "blasting" of the carcass. The compressed air is warm, and naturally contains oxygen; the resulting influences exerted on the internal organs of the animal can easily be imagined. More air is generally injected into the carcass of a whale when hunting in the ice than in open water, because it inflates the abdominal region of the animal and allows it to be sighted with greater ease.

In Shark Bay, the *Ulysses* used every part of the whale with the exception of the radius-ulna section of the flipper and the baleen. The baleen was used for the first three weeks, but it was found to be clogging up the pipes in the factory system; after that it was cut out of the mouth and thrown overboard.

When the factory system was empty and ready to receive the bone, meat, and blubber of the whale for cooking out purposes, the *Ulysses* could dispose of a humpback in approximately thirty minutes.

In producing whale oil it is necessary to figure one barrel of water to every barrel of oil processed. At the height of the season in Shark Bay, the *Ulysses* required three hundred tons of water per day; it was possible for her to obtain only about two hundred and twenty tons. The engineering plant on the ship could produce approximately one hundred and sixty tons and the *H. J. Bull* was transporting water from Carnarvon every third day at the rate of two hundred and fifty tons. This lack of water not only cut down on the quantity of oil produced, but it reduced the quantity of oil derived from the whales actually processed, because, to save water, many of the boiling down tanks were blown too soon; as a result, several barrels of oil were sacrificed to conserve the water, which was more in demand than the whales.

It is estimated that there must have been at least four thousand whales in Shark Bay during the period from July to the end of September.

The oil derived from the blubber is generally a light gray color; that from the meat and bone may be slightly yellow or very light brown. The cooking systems on the *Ulysses* were run at sixty pounds pressure per square inch; the system could have been operated at seventy pounds pressure but if the pressure is allowed to get too high, the oil is burnt and comes out a light brown in color.

Working a humpback

When the factory ships first inaugurated the era of pelagic whaling, the whales were flensed alongside the ship while still in the water. The blubber was stripped off, hoisted aboard, and boiled down. The carcass was turned adrift. With the introduction of legislation for protecting the whales, laws were passed that made it compulsory to utilize more of the carcass than just the blubber. This was one of the factors that led the present system of whaling. On practically all of the modern whaling factories the whales are taken on deck for working purposes through a specially constructed opening in the stern of the vessel. This is accomplished by means of a tail-hook, steel hawsers, and big winches. To pull a huge whale weighing approximately one ton to the foot, to the deck of a factory ship, sounds rather incredible; to visualize such procedure makes the task seem gigantic, but the act is done with such ease that it is really amazing.

The invention of the tail-hook has been a great boon to modern whaling operations. It is similar in shape and principle to a pair of ice tongs. The implement is constructed in such a manner that it grabs the flukes while fitting snugly along the 'small' of the whale's body. It weighs approximately one and three-quarter tons, and is run back and forth between the opening in the stern and the flensing deck by means of capstans and steel hawsers. The grab is so constructed that it is perfectly balanced. When lifted off the deck, by means of steel hawsers, which pass under a disk at the point of balance and are attached at the closed end, it opens up; when a strain is taken by the big steel hawser at the closed end, the hook closes and grips whatever may be between its sides.

Immediately after the whale has been killed, the crew of the killer boat put a steel strap around the 'small' of the body; one end of this strap is brought out through a hole cut in one side of the flukes; it is important that this aperture be cut at the proper position, otherwise the huge carcass will not turn over when being hauled out of the water.

A steel hawser is made fast to the strap to the 'small' of the body when the carcass is brought to the factory ship by the killer boat. This hawser loads to a winch located on the after part of the factory where the ramp is built in the stern. The whale is hove through the opening in the stern until about one-third of its length is out of the water. The tail-hook is then brought into a position above the flukes, lowered down, and the strain taken on the hawser leading to the amidships winch, which forces the hook to close on the tail. The whale is thus pulled aboard by two hawsers, one attached to the strap on the small of the body and the other made fast to the in-board end of the tail-hook. Most of the strain is taken by the cable attached to the hook, enabling the forty ton amidships winch to do the heaviest work.

The whale is pulled, via the ramp, to the flensing deck. Before the introduction of the tail-hook it was necessary to send men down the steel plated ramp to attach hawsers to the caudal section of the whale. This was dangerous work. Many men lost their lives while performing this particular task, especially in the ice of the Antarctic.

The whale is always pulled up on its back. This position allows the greatest convenience for the flensing operations. Due to its huge bulk, it assumes a position slightly on one side, about one-quarter of the animal's body is in contact with the deck. The carcass is pulled directly to the flensing platform, which is that part of the weather deck of a factory that is located farthest aft. It leads to the opening through which the whales are pulled aboard.

Five men constitute the crew that removes the blubber. One man works while actually standing on the whale, maintaining his precarious position by his long-spiked whaling boots and flensing knife. Two men work on opposite sides of the body, standing on deck. The other two men of the crew run the winches and provide the necessary equipment by placing it in the vicinity where it is to be used and are responsible for the lines being clear from the winches to the point where they are to be inserted in the toggles. The blubber is stripped from the body by means of flensing knives, toggles, winches, and wire straps. The crew can strip the blubber off the body of the whale (humpback) in less than ten minutes from the time that the whale is pulled aboard. These men are experienced whalers, they know the exact procedure to be followed, each has his particular duty to perform. All work is coordinated to the point that orders are unnecessary. The various equipment is brought into action at the very moment that it is needed. The system is fast, precise, and amazing from the viewpoint of efficiency. The carcass hardly reaches the flensing deck before the crew commences their work. The men that remove the blubber are known as 'flensers.'

The following procedure is used in flensing a whale (humpback):

Flensing a humpback

A long gash is made on the side of the body extending from the 'small' to a point about three feet below the dorsal fin (App. 3.7). This incision is approximately six feet in length and is made to prevent the blubber strip from breaking while it is removed from the body. A cut is then made down the middle of the back from just forward of the dorsal fin to the nostrils on top of the head. A cut is then made down the middle of the back from just forward of the dorsal fin to the nostrils on top of the head. Two cuts are also made on the ventral surface. They originate about four feet from the flukes at a common point on the 'small' of the body. These extend from the lower extremity, up along the stomach and chest, under the pectoral fins on their respective sides, and are extended along the ventral surface of the mouth to a point approximately four feet from the end of the chin. Here the two incisions are brought together again. Due to the bulk of the beast about one-quarter of its body is in contact with the deck, resting approximately on one side. One of the pectoral fins is uppermost; the other one is resting on deck underneath the body. A cut is made around the pectoral fin that is uppermost, and is brought down on both sides of the limb so that it joins the nearest incision on the ventral surface. A cut is made now from the nostrils down to the edge of the upper jaw, brought backwards, and passed down between the eye and ear until it joins the cut made around the pectoral fin. The blubber is now ready to be removed from the upper side of the carcass. A small amount of blubber, forming the forward end of the strip, is raised from the body by a flenser with his knife; a square hole is cut in it and a toggle is inserted in the hole. The hook of a steel hawser leading to a deck winch is made fast to the strap of the toggle. The winch commences to pull the blubber from the body. The flenser cuts the blubber free form the underlying fat and flesh as the strain is exerted by the winch. As the blubber is separated from the flesh by the flenser, the winch rolls it back and pulls it free, the flenser merely following along with a few strokes of his knife. The removal of this piece of blubber has left the side of the body stripped from the nostrils on top of the head to the small of the body in length, and from the uppermost pectoral limb to the middle of the back, between the fore limbs, in width. A square hole is now cut in the blubber forming the ventral region of the mouth, the toggle inserted, and the same procedure followed as before. This particular piece of blubber takes practically all the exterior covering from the bottom of the mouth, the entire breast and stomach regions, and most of the tongue. This strip also terminates in the region of the 'small' of the body. A third strip is taken that is much smaller than the others; it removes any vestiges of flesh that remained in the bottom of the mouth and the final portion of the tongue. Up to this point the body has been stripped of three-quarters of its external covering. A wire strap is passed around the shoulder of the pectoral limb that is on the lower side of the body resting on deck. A hook from a boom-winch is made fast to the strap and the whale is turned over, exposing that portion of the body that up to this time had been resting on deck and still in possession of its covering of blubber. Only a few steps remain to complete the task of obtaining the last strip of blubber that will leave the carcass with its external covering entirely gone. The same procedure is followed as before in taking the blubber from the side of the body except that the cut from the nostrils runs to the opposite shoulder.

With the last strip of blubber gone the carcass appears as a white mass of fat that still adheres to the deep red flesh underneath it. The only regions of the body still in possession of dermis are the rostrum of the skull, from the snout to the nostrils, and the section of the body known as the 'small,' between the flukes and the anus. The pectoral fins and the flukes remain intact. This is important to note. It is by these appendages that the whale is moved to various sections of the deck. The carcass is dragged along the working platform by means of winches and the wire strap around the tail. The pectoral fins are allowed to remain on the body because they afford a means of turning the carcass over, moving it sideways, or hoisting massive sections of it into the air where it is cut into pieces small enough to enter the boiling-down tanks.

The baleen, or whalebone, is removed from the upper jaw while the carcass is still on the flensing deck. This is accomplished by a flenser working with the aid of a boom-winch. A wire strap is inserted under the flesh of the baleen at the anterior end of the snout. A hook, attached to the steel hawser of the boom-winch, is inserted in the strap and the forward end of the baleen is raised form the sides of the upper jaw; when the baleen is pulled up the flenser cuts under it and frees it from the roof of the mouth. It is immediately swung over the side of the ship and cut loose. At one time baleen was very valuable. Today it is worthless, except in Japan. Baleen is a source of annoyance on the modern whaling factories at the present time, because it clogs up the pipes of the oil system if run through the processing treatment.

The lower jaw is also cut loose from the carcass while it is on the flensing deck. This detail is performed by a strap being passed around the chin. A hook, attached to the hawser of a boom-winch, is made fast to the strap, and the jaw lifted; this allows the flenser to cut through the soft muscles of the head with his knife thus freeing the mandibular from the skull. The bone is pulled to one of the steam saws and cut into pieces prior to being put into the cooking system.

Blubber

When working the humpback during the Shark Bay season the blubber was removed from the body in long strips, varying from twenty-five to forty-five feet in length, and from four to eight feet in width. After being taken from the carcass, the material was pulled to one side of the flensing deck and allowed to accumulate in heaps where it was handled by a detail of five men. Two of the men were equipped with flensing knives, two other men worked with blubber hooks, and the fifth man operated the winches and assisted with various details in general; these men did nothing but cut the blubber into blocks for introduction to the cooking system.

One strip of blubber was taken at a time and hoisted into the air by means of a boom-winch; while it was being lowered one of the men cut back and forth across the section, severing it into pieces about five feet in the length; as the blubber was cut into pieces, it was grasped by one of the men equipped with a hook who arranged it in flat, neat tiers. Another man cut it into blocks approximately two foot square. The squares were arranged in piles to await the opening of the cooking system. These heaps of glistening white blubber sometimes reached thirty feet in length and four feet in height.

Sometimes it is possible to hoist a whole strip of blubber into the air and plumb the opening to the boiling down system; when this can be done the cutter merely works back and forth across the strip, and severs it into big chunks as it is being lowered into the cooking system.

The blubber detail is notified from the factory below decks by voice tube when the cooking system is blown down, free from water and waste, and ready for the next filling. The system is then opened form the flensing deck and another load introduced.

The Hartman and the Kværner systems were used on the *Ulysses* for the cooking the oil out of the blubber; the Hartman system was used exclusively for the blubber, while the meat and bone were sometimes processed in the Kværner system. There were only two Hartman systems on the *Ulysses*, each one held three tons at a filling and required one hour to cook out the oil.

Cutting up a humpback

When the blubber, lower jaw, and baleen are removed, the tail-hook is taken off the flukes (App. 3.8). This is done by lifting the hook in the air by means of boom-winches. As soon as the strain is taken in an upward direction the grab opens up and release the tail. The implement is run back to the ramp by deck winches and made ready for the next carcass. The flensed whale now goes to the cutting deck; the carcass still remains resting on one side.

After the hook is removed a steel hawser is attached to the strap on the 'small' of the body; this hawser leads to a big winch located well forward on the ship at the head of the cutting deck. The cutting deck is approximately twice as long as the flensing deck. It occupies about forty percent of the weather deck on a modern factory ship; steam saws are generally located at each end, but on opposite sides of this platform.

Four men constitute the crew for dissecting the humpback carcass. These men must be experienced whalers in order to know where to cut. Their experience enables them to penetrate the proper joints and take advantage of the particular characteristics of the whale's skeleton. One man works on the dorsal region, one man works on the ventral region, and one man works on the head. The fourth man handles the wire hawsers, and the meat hooks, besides giving the necessary hand signals to the winch drivers for the proper handling of their machines. It takes these men approximately twenty minute to cut up a humpback. It would take inexperienced persons hours to perform the same task and then they would use six times as many knives. 'Flensers' and 'lemmers' treat their knives with as much care as a tennis player would treat his racket. The same man uses the same knives day after day, utilizing every spare moment to preserve their edge with a whetstone.

The carcass hardly reaches the cutting deck before the cutters commence dissecting it. The pectoral fins are cut at the elbow and the radius-ulna section removed. The shoulder and humerus section are allowed to remain on the body.

An incision is made encircling the 'small' of the body; it penetrates to the caudal region of the backbone, in the region of the anus. A cut is now made anteriorly along the ventral region of the body from the incision on the 'small' up to the chest. This cut is deep and penetrates well into the interior of the body. Advantage is taken of the small breastbone and its flimsy connection with the ribs. In baleen whales the sternum is so reduced that it articulates with only the first pair of ribs. The lower ends of the other ribs remain free. The cutter, therefore, maneuvers his knife along the chest region until he severs the connection between the sternum and the ribs.

At the same time a cut is made from the 'small' down the middle of the back, terminating between the shoulder blades. The backbone is thus laid bare from the caudal to the cervical region. This incision is then brought around the uppermost shoulder blade, down around the shoulder, and connected with the incision that has already split the ventral region of the carcass from the anus to the neck. A strap is made fast to the uppermost pectoral limb, and a steel hawser from a deck winch is secured to this strap by a hook. A strain is taken with the winch and the incision down the back is enlarged. This allows the cutter to get into this opening with his knife to sever the ribs from the backbone. The ribs of the whalebone whales, with the exception of the first two or three, have lost the capitulum, or head, and articulate with the transverse processes of the vertebrae by only the tuberculum. The cutter merely severs the ribs free at the junction of the capitulum and tuberculum with the transverse structure of the vertebrae. It is remarkable to note the ease with which this work is performed. While the ribs are being cut free a steady strain is exerted by the winch. Finally the ribs are severed from the backbone and the winch separates the carcass into two massive pieces; these represent the two halves of the body. One-half contains a shoulder, the backbone, half the ribs, and the entrails; the other half, the part pulled free by the winch, contains the other half of the ribs, the other shoulder, and extends from the neck to the anus in length. This latter portion is given over to another group of workers for dissection. The ribs of the section that remains are separated from the vertebrae in the same manner as before, and this half of the carcass separated from the backbone. This leaves the backbone and the head intact; the remainder of the carcass has been cut loose and pulled away by winches. The head is now cut off just forward of the cervical region. This is accomplished by the head being pulled to one side by a hawser leading to deck winch. When the head is pulled laterally the cutter separates the skull from the neck by going through the soft muscles at the base of the skull. The head is pulled off to one of the steam saws. The meat that still adheres to the backbone is cut off while rolling the backbone over and over by means of a hook inserted in the vertebrae; as the flesh is cut loose the bone is turned over by shifting the position of the hook on the vertebrae. A big mat of meat is the final results. The backbone extending from the neck to the flukes is pulled off to one of the steam saws prior to cutting it up for introduction to the cooking system. The meat is dragged off to be dumped into the Kværner system.

The huge halves of the body, each containing a pectoral fin, shoulder, half the ribs, the contents of the thoracic and abdominal cavities, and extending from the cervical region to the 'small' of the body, are pulled to the forward end of the cutting deck by means of winches. A strap is made fast around the pectoral fin in the vicinity of the shoulder; the massive section is hoisted in the air by a boom-winch and two men cut the entrails and the meat free from the bone. After the meat and entrails are free, the ribs are separated by cutting between them. Finally, nothing remains of the side but the shoulder blade and the humerus section of the pectoral fin. This is lowered down and separated. The result is a huge pile of meat, bones, and entrails. Heaps of cut-up whale have been observed on the *Ulysses* that were eight feet high and over thirty feet long.

Three men are continually occupied in pulling this meat, bone, and entrails from the pile and introducing it to the boiling-down system. One man handles a set of hooks, another man is equipped with a flensing knife, and the third man operates a deck winch. The man with the hooks sinks them into the material to be pulled free from the main pile; the material is then dragged to the entrance of the cooking system by means of the deck winch, and the man with the knife cuts it into sections small enough to enter the boiling down tanks. The meat, rib bones, and trails are all dumped into the Kværner system. The Kværner systems installed on the *Ulysses* were of the large size, they would hold twenty-eight tons, but were filled to only twenty-four tons; it takes approximately four to five hours to boil out a single filling of material in this system. After the head is severed from the backbone, it is pulled directly to a steam saw by means of a deck winch. The saw cuts it into sections small enough to enter the bone pressers. A group of approximately eight men are engaged on the cutting deck in pulling bone, meat, and entrails to the various boiler openings. This group drags the sections of the head from the steam saw to the bone pressers. The bone pressers are vertically built tanks; they hold nine tons at a filling, and take about eight hours to boil all the oil from the bone. There were fifteen bone pressers on the *Ulysses*, all located in that section of the factory below the cutting deck.

After the backbone is free from the head and the meat, it is pulled to a steam saw by means of winches and cut into sections small enough to enter the bone pressers. After the mat of meat that formerly covered the backbone from the neck to the caudal region is cut free, it is dragged to the cooking system by means of winches. This section is a solid mass of meat. It is cut into big chunks and dumped into the Kværner system. The only parts of the humpbacks that were not used in Shark Bay were the baleen of the mouth and the radius-ulna section of the pectoral fin.

The humpback fetus

The humpback fetus is born headfirst. It is attached to the mother by an umbilical cord which easily breaks when the fetus is born on deck; it is unknown how this connection is terminated at birth in life. There is a slight indentation on the abdomen of the mature humpback, it is sort of a fold on the middle line of the belly; this is the navel of the mature specimen.

All the fetuses found in Australia were released from the females by cutting through the abdominal region just forward of the genital opening. Two of the fetuses were on the verge of being born, because they seemed to be slipping from the female on the deck of the factory.

The pregnant female is easily recognized by the bloated appearance of the stomach and the distended condition of the sex opening. When the stomach is cut open, the uterus protrudes; by cutting through this sac shaped shelter, the fetus slips out and to the deck. Apparently the fetuses found in Australia were to be born within a very short time.

The fetus, and it can be generally stated of every young humpback when first born, is black, gray black, or a purple black on the dorsal region. The ventral region is white, silver white, or a creamy pink white. There are variations as to the extent of the ventral coloration moving up on the flanks of the body and the color of the dorsal region moving down. Sometimes, the caudal region of the body is the same colors as the ventral region, at other times it is dark like the dorsal surface. The dorsal surface of the caudal and pectoral fins is generally dark like the dorsal region of the body; the ventral surface of the pectoral fins is always light; in color, the same as the ventral region of the body; and the ventral surface of the flukes is generally light in color, but sometimes dark. The color of the mother has no bearing on the color of the fetus. All the fetuses found had the general tone of color as noted. The general indications seem to leave the impression that the fore part of the dorsal region is dark and that this shade moves posteriorly over the remainder of the dorsal region and down the sides of the body. Here it meets the light color of the ventral surface which predominates in this area and forms a permanent coloration. It may be that several months before the fetus is born, it is lighter in color and the darker shades later develop and commence to envelope the body, starting at the anterior sections of the dorsal region. This agrees with observations in the Antarctic where all the fetuses were white.

The epidermis is a light, transparent gray, about the thickness of paper; it could be cut or scraped off, exposing a dark colored dermis below; this was one-eighth inch in thickness and had the appearance of soft dark rubber. Below the dermis was a thin sheet of white, fatless, oil-less, hard rubber approximately one and one-half inches thick. This was sometimes marked with reddish colored streaks. Beneath the blubber was the hard, white flesh, which sometimes appeared pinkish in color. The same streaks were noted in the flesh as in the blubber. Some of the fetuses appeared to be cloaked in a covering that could be scraped off exposing the real dark dermis. It may be that this covering of silver and black is shed with the outer cloak soon after birth, and the young one assumes its real epidermis and dermis of dark gray on the dorsal region and white on the ventral area, the lighter shades reaching well up the flanks of the body, back of the pectoral fins. The same arrangement of coloring was prevalent on all the small whales killed in Shark Bay; in fact, all the whales examined between twenty-seven and thirty-seven feet, were black and white.

The pectoral fin is extremely long on the fetus. It is white on the ventral region and dark on the dorsal side. The prominent bumps are present, one being at the elbow, and one at the wrist; the seven small bumps ranging from the elbow to the wrist are also present; the posterior edge of the limb is generally serrated, but not always. It is apparent, therefore, that the external characteristics of this fin do not change, except that it grows larger, in the development of this whale from fetus to adult. The interphinal bulging of the bones on the anterior edge are relatively as large on the fetus as they are on the full grown whale. This limb was fully developed on a ten-inch fetus and contained all the characteristics of a mature specimen.

The dorsal fin is variable in shape and on the fetus; ranging from a notched stub to a well-defined falcate fin. On all specimens examined in Shark Bay, this appendage was folded over flat on its side. The same protuberance was present at the base of the fin that was found on the mature whales, being approximately twice as long as the fin was high, which was approximately five and one-half inches on all the fetuses. Due to the fact that this appendage was heavily creased on the fold it must grow to an erect position soon after birth because its conspicuousness was noted on the calves accompanying the females. This fin is relatively well developed on a ten-inch fetus. The flukes of the fetuses found in Shark Bay were approximately four feet in width. The posterior edge was heavily serrated, the extreme outer end of each lobe terminated in a distinct hook-shaped point. A well defined notch was located on the medial line extending from the caudal region where the two lobes of the flukes come together. The ventral surface was generally of a light color, the dorsal surface was always dark. The dorsal surface was heavily marked with indentations that extended in an anterior-posterior direction. These indentations occasionally reached to the serrations on the posterior edge. The impression was created that these indentations were merely the marks left on this fin by the gradual filling in of the crenations on the posterior edge and that the fin was becoming broader in an anterior-posterior direction. The indentations on the surface were never more than about one-inch in length, a fractional part in dept, were haphazardly arranged, and were more noticeable near the edge of the fin than at the anterior portion. They were not present in the region between the notch and the section of the caudal region that divides into the lobes of the appendage. The flukes were soft and flabby and entirely lacking in the stiff cartilage growth that is so prevalent as a foundation in later life; it was possible to fold the two lobes at the notch and bring the dorsal surfaces of those two parts together.

The caudal peduncle, from the flukes to the dorsal fen, was crenated. The serrations extended from the ridge down the sides of the body for several inches, giving this section of the body a rippling appearance. This characteristic was present on the mature whales, but not prevalent enough to be mentioned as a characteristic of the species.

Hairs were found on the fetuses, as in the adults, in the region of the chin, anterior end of the rostrum and in the tubercles. These growths were generally not of the dead white color so noticeable on the mature whales, but were brownish in color.

The tubercles were practically the same in number and arrangement as possessed by the full grown specimens; they were found on the lower jaw, rostrum, and about the head in general. These growths were not as fully developed in neither height nor width as on the mature whales, but appeared as mere lumps; each one contained a hair at the center which protruded much farther than in the mature specimen. On one fetus, four of these tubercles were found back of the nostrils; they contained hair of a silver white color; this is interesting to note as the other hairs were brown. It seems that these growths expand, and grow up and around the hair, until only the tip is exposed by the time the whale reaches maturity. There seems to be no doubt that the presence of these growths is caused directly from the presence of hairs. On the adults, these tubercles are always black; on the fetus, they are gray or white with dark tips.

On the fetuses found, between eleven and sixteen feet in length, the baleen varied from two and one-half inches to three and one-quarter inches at the longer part in the middle of the mouth. It was well-developed into soft triangular laminae in the middle of the palate, but merely a fractional fringed growth in the fore part of the mouth directly below the nib end. On all specimens examined, it was gray or gray with white tips at the longest part and a yellowish tint in the fore part of the mouth; the baleen was soft and pliable; it could be easily removed from the jaw, leaving a surface of transverse lines on the mandible; no rudiments of teeth could be found; they are supposed to exist in the Mystacoceti fetus according to scientists. The fringy hair-like growths in the fore part of the mouth appeared to be nothing more than the fraying out of the flesh or gum; the whalebone appears to grow from the flesh adhering to the jawbone, and as it develops it becomes fastened to that bone more securely.

The tongues of the fetuses were gray or white gray in color.

The same green substance was noticed to exude from the anus of the fetus that was found in the stomachs and intestine of the big whales.

The nostrils were four and one-half inches in length. The three medians were present with the two outer ones representing the breathing apertures. The indentation located behind the nostril bones was present, but not as fully develop as in maturity.

The nostrils of the fetuses were approximately two feet three inches from the end of the snout, the jaw was three feet four inches in length; from the ear to the eye was ten inches, and from the eye to the pectoral fin was seventeen inches. The ear opening was just big enough to insert the lead tip of a pencil. The nostrils of a mature whale are thirteen inches in length.

The ventral grooves were the same in shape, arrangement, and general contour as found in the mature whales. They were generally twenty-four to twenty-six in number and one-half inch in depth. They commenced in the same vicinity and covered the same regions in the fetus as in the adult. These folds were not present on a ten-inch fetus, but had developed in a twenty-five inch specimen.

The fetus is approximately twenty-five to thirty percent of the length of the female when born. They possess the complete external characteristics of a mature humpback, even to the short, squatty appearance of the species that makes the girth at the pectoral fins over fifty per cent of the animal's length.

Here are some of the dimensions of humpback fetuses; the lengths of the mothers are also noted:

No.	Date found	Length of the Mother	Sex of the Fetus	Length of the Fetus	Girth Pec. Fins	Girth at Small	Length of Pec. Fins	Length of Baleen	Length of Flukes
1	8/8/37	43′	F	14′10″	8′4″	2′10″	4′4″	3.25″	4′0″
2	8/11/37	42′	M	14′1″	7′8″	2′8″	4′6″	2.5″	4′2″
3	8/19/37	47′	M	15′3″	8′0″	2′4″	4′6″	-	-
4	8/20/37	43′	M	11′1″	5′8″	2′4″	3′4″	-	-
5	8/28/37	47′*	M	14′5″	9′4″	2′4″	4′8″	2.25″	4′4″
6	8/28/37	46′	F	14′4″	10′5″	2′9″	4′4″	2.25″	3′11″
7	8/30/37	42′	M	13′8″	7′0″	2′8″	4′1″	2.25″	4′0″
8	9/2/37	43′*	M	14′2″	8′4″	2′10″	4′5″	2.25″	4′0″
9	9/5/37	42′	M	13′0″	10′0″	2′8″	4′7″	2.25″	4′2″
10	9/3/37	45′	M	13′10″	-	-	-	-	-
11	8/26/37	46′	M	16′0″	-	-	-	-	-

*About to be born; it is believed all the fetuses would have been born within two weeks.

Hunting the humpback

The following is a description of a hunt that actually occurred in Shark Bay, Australia, on August 4, 1937; it is inserted to portray the details of the procedure.

The "stalking" method was used in hunting the humpback in Shark Bay; this consists of the gunner relying on his judgment and experience to determine the approximate vicinity within which the animal will again reach the surface for breath. This system has to be employed when using boats that do not make more than eleven or twelve knots.

When traversing the waters within which whales are known to be present, a lookout is maintained in the crow's nest and two more are on the bridge; the gunner is generally on the bridge also.

The Hunt

The gunner, who was scanning the surface of the water with glasses, sighted the flukes of a humpback as it sounded; the whale was directly ahead. When the killer boat moved closer, the bushy vaporous spout could be seen rising every few moments above the white caps, a fresh breeze was blowing from the southward; under ordinary weather conditions the spout of a humpback can be sighted three to five miles away. Approaching closer, it was possible to see the animal rise to the surface, blow, roll out his back, expose the dorsal fin, throw his flukes in the air, and sound. The killer boat was getting closer all the time so the gunner went forward and threw off the safety-lock on the gun; the rest of the crew took stations without command. One man went half way up to the crow's nest; the chief engineer operated the specially constructed windlass which allowed the whale to be played by manipulating a lever acting on a brake; the harpoon line passes around the windlass on its way down the rope bins to the accumulator block on the foremast; another man stands near the gun to assist the gunner if need be, and to be present for loading the gun immediately after firing;

another checks the harpoon lines to see that they are clear. By no visible signals the gunner is notified that all is ready.

The information is passed throughout the ship when a whale is sighted; enabling all hands to be at their stations by the time the quarry is close aboard. The crews of the killer boats are generally experienced whalers; they attempt to arrange it in such a way that the same crew works together year after year.

The whale knew it was being pursued, in true humpback fashion it veered to all points of the compass, being first on one bow and then on the other. It would come to the surface for a split second and blow, with a sound like a muffled gasp; this sound might be compared to the result obtained by filling the mouth with air and puffing it out, allowing the lips to part by the force of the ejected air. Regardless of where the whale went, the man in the crow's nest, the man halfway up the rigging, or the gunner saw him approaching the surface in time to have the bow of the ship swing in that direction; this of course allowed the gun to be brought to bear as soon as the animal broke the surface.

The dark-colored hulk can be seen coming up from the depths, then the snout breaks the surface, followed almost immediately by the spout, then the long line of the back comes in view, tipped with the dorsal fin, as it rolls up obliquely; finally the body disappears, the flukes go up in the air and the beast sounds. This continued for about twenty minutes, the whale coming up every few minutes for breath, with the gunner, or the men in the rigging, sighting the animal as it neared the surface, and giving instructions to the man at the wheel for the proper handling of the vessel. The man at the wheel handles the engines also; when actually hunting, the engine-room telegraph is not used, orders are issued by voice tube; in fact all possible noise is eliminated, to avoid alarming the whale as much as possible.

Finally, the whale made the unfortunate maneuver of approaching the surface just off the starboard bow; the gunner was ready for it. The beast came up with a rush and a puff of vaporized breath; the snout shot clear of the surface, then it blew. The dorsal fin had not yet appeared so the gunner held his fire.

When a gun is fired, it is possible to see the harpoon flung through the air with the line snaking out in back of it; then comes the roar of the gun and the smoke blinds you. On recovering and looking towards the spot where the whale was last seen only a vaporous cloud hangs suspended above the churned-up water to indicate where the beast has disappeared. If the harpoon goes straight to its mark, the stricken animal sounds, the harpoon line tears through the blocks at terrific speed, and disappears into the depths at the spot when the animal went down. After a short interval of time, the whale appears on the surface, its distance from the boat depends on the size of the animal, scope of line out, etc.; it blows every few seconds and attempts to swim away from the boat. The engines are kept going astern to keep the animal ahead of the boat and the harpoon line clear of the propeller. While on the surface, the animal lashes in all directions with its flukes and pectoral fins.

In this particular hunt, the iron was imbedded just back of the dorsal fin with the line as rigid as a bar of steel. The beast was allowed to blow and struggle at the end of the line; the engines of the boat were kept going astern while the gun was begin reloaded. The gunner knew it would be necessary to use another harpoon, because the whale was not blowing blood; only this indicates that a death wound has been delivered.

While the whale is being played and allowed to exhaust itself by its own exertions to escape, very little strain is placed on the running gear, or any part of the superstructure, because of the special tackle on the foremast; the strain is taken by specially constructed springs in the bottom of the boat.

After ten or fifteen minutes, the whale was hove towards the vessel by means of the deck winch; at first it resisted, but finally gave way slowly and was hauled in and placed almost broadside on the port bow. The gunner inserted a killer iron just back of the pectoral fin, well into the lungs. The weapon hardly struck the animal before there was a muffled explosion as the grenade went off inside the body with devastating results; the whale died almost immediately, its entire weight being supported by the harpoons and the lines attached to them.

The carcass was brought alongside. A perforated iron pipe, about three feet long, was inserted in the abdominal region by means of a long pole; compressed air was forced into the body. After it becomes inflated, a piece of wadding, made from unlade rope, was inserted in the hole to prevent the air from escaping. A chain was passed around the small of the body to form a strap, brought through two chocks in the side of the vessel, and the ends made fast to separate bitts on deck; the lines were then cut free from the imbedded harpoons. The carcass was towed by means of thick chain. A wire strap was also passed around the small of the body; it was by this that the whale was pulled through the ramp at the factory ship. This strap had two eyes spliced in the ends, after the wire was passed around the small, one eye was passed through the other and then through a hole cut in one lobe of the flukes. It was important that this strap be properly adjusted and the hole in the flukes properly located, otherwise, the carcass could not be pulled up on its back at the factory.

The tips of the caudal fin were cut off; this was done to prevent that appendage from striking the side of the boat during the process of towing. The name of the killer boat was carved in the ventral surface of the flukes to enable the factory ship to determine who killed the whale.

When the details of securing the carcass were completed, the harpoon gun was reloaded, the lines spliced to the harpoon and everything was in readiness for the next whale.

Sometimes the whale is flagged instead of being picked up and made fast to the killer boat. If this is the case, the same procedure is followed as before except a thirty foot staff is imbedded by means of a spear point. This staff has a flag and lantern attached; the flag is used to find the body in the day time and the lantern serves the same purpose at night.

It was on this hunt that the inspector was struck with the vapor that results when the whale exhales. The animal had broke water and blew about thirty feet from the side of the killer boat; it was far too far astern for the gunner to shoot. The wind carried the vaporized breath across the ramp on which the inspector was standing; it covered him and his camera with a light film of vapor that apparently contains some oily product because it took considerable time to get the lens of the camera clean. The whale apparently possessed an advanced case of halitosis because a sickening odor was experienced when the vapor was passing.

Section 13: Fin whales

The fin whale is a Mystacoceti or baleen whale. It belongs to the family Balaenopteridae, which is distinguished by the following characteristics:

A dorsal fin is present; the ventral region of the body has longitudinal folds in the blubber that extend posteriorly from the chin to the abdominal region; head is less than one-quarter of the body length; the skull bones are slightly arched; the baleen is short and coarse; the pectoral fin is tetradactylous and narrow.

This family is composed of the rorquals, genus Balaenoptera; the humpback, genus Megaptera, and the gray whale, Rhachianectes. The rorquals consist of four species; the blue whale, fin whale, sei whale, and the little piked whale. Blue, fin, and sei whales are sometimes referred to as "finners." The rorquals posses the following characteristics:

Throat plaits are numerous; the dorsal fin is present and generally falcate in shape; the body has an elongated shape; they are comparatively fast swimmers; the whalebone is short; the blubber is thin; scattered hairs are found on the head, generally in the vicinity of rostrum and chin, but may reach the nostrils.

The fin whale appears under various synonyms, some of which are: *Balaenoptera musculus* (Linnaeus); *B. Physalus* (Fabricius); *B. Rorqual* (Lacepede); *Physalus antiquoyum*, (Gray); *Balaenoptera velifera* (Cope). Kellogg, Townsend, and Andrews refer to this species as *B. Physalus*.

The common names applied to this whale are:

Finner, common finback, common finner, finback whale, common rorqual, herring whale, razorback, true fin whale, and fin whale.

In this discussion, the species is termed fin whale or *B. Physalus*.

There is believed to be only one true species of fin whale in existence.

It is very difficult to distinguish the fin whale from the blue whale when the spout is the only characteristic available. The height cannot be depended on for identification because the blast of a big fin is higher than the spout of a small blue and the blast of a fin that has just gained the surface is much higher than the blast of a blue that has completed several respirations. However, after some experience, the fin spout can be recognized as it is slightly narrower at the base than is that of the blue. The spout of a mature fin, on first gaining the surface, may reach a height of twenty to thirty feet; it is narrow at the base and spreads out gradually to form a thick column with a vaporous summit; it lacks the bushy appearance of the humpback breath. The lower section of the spout disappears, but the summit drifts away on the wind as a thin veil of moisture that clings together for several seconds before dispersing.

This species may blow from two to seven times at a rising, if unmolested; each breath decreases in height, size, and amount of moisture until only a low puff is ejected above the surface. The animal "surface dives," or just goes under the surface between these respirations; these dives can be detected because the animal does not arch the back; it merely slides the body horizontally beneath the water. On completion of the last breath, the whale arches the back and shows more of the caudal section than on a surface dive; the dorsal fin revolves in a small arch above the surface and the body disappears beneath the water; the dorsal fin and the dorsal region of the caudal peduncle are the last portions to submerge. The fin whale does not throw its flukes out of the water when sounding.

On approaching closer to the whale, it is easily recognized by its high dorsal fin, by the sharp whistling puff emitted with each breath, by the unsymmetrical coloration of the head, and by the blue gray and black gray of its back. The fin apparently swims with its mouth ajar, because the yellow baleen, located on the right side of the head, is in sight when the animal is just below the surface.

The fin whale approaches the surface obliquely; emitting the spout a split second after the rostrum is clear of the water. It is an extremely fast swimmer and generally, unless molested, swims on a straight course.

This species is hunted by one of two methods. If the gunner has a slow boat (eight to eleven knots), he will endeavor to judge the vicinity in which the whale will appear for the next breathing period. This is the procedure used in the past and resembles a condition of stalking the animal. This system is tiring, long, and requires abundant patience; it also requires good judgment and knowledge of the species being hunted. Occasionally a gunner using this method can get within range of a whale after the first spout, before it completes a series of breaths intermingled with surface dives, and again sounds, but the situation generally develops that he must be on the spot where the whale again appears after the deep dive or he will not get a shot. With the development of modern killer boats this method is being discarded.

The second method employed is to make the whale “come up and out.” This requires a killer boat of fourteen to sixteen knots speed, but does not require such fine judgment of species and habits, or long, patient stalking; it is the system that is used by the foremost whale gunners in the world today.

The routine followed is this:

The killer boat maintains full speed at all times. The whale comes up to blow, but it dives below the surface before completing its respirations, because of the approach of the boat that comes charging down on it. The animal then makes another attempt to rise in a few moments but is driven below again after getting in a breath or two. These tactics are followed for perhaps a half an hour or longer, the gunner may get in a harpoon in the early part of the procedure but this seldom happens. After repeated efforts on the part of the whale to get its breath and the determined action of the gunner to keep it below, the animal becomes terrified, short of breath, and commences to swim rapidly. Its actions increase its desire for breath and the whale puts forth its maximum efforts to get away from the boat, and breathe unmolested. The situation develops into a chase with the whale breaking the surface at full speed, exhaling and inhaling in a split second, and then diving again. The animal does not travel very deep under these circumstances, and is always in sight to the crew of the killer boat, which remains as close to the animal as possible. Even the biggest whales cannot endure this type of pursuit for more than twenty to thirty minutes without showing signs of fatigue due to exertion and shortage of breath; the animal commences to tire and loses its speed; it demands more air and attempts to gain the surface more frequently. Finally, the killer boat overtakes the whale, or the beast is forced to the surface within gun range, then the harpoon is imbedded.

It is this type of whaling that is leading to the rapid extermination of this animal. The whale has no chance, it is smothered into exhaustion and then shot. In modern whaling when a blast is sighted there is a very remote possibility that the animal may escape, but this is a rare occurrence; about one whale in fifty can elude a modern killer boat under the command of a good gunner, unless ice, weather conditions, or some other circumstances intervene to halt or delay the chase.

After the first harpoon is imbedded, one or two procedures may be followed; the gunner may allow the animal to take out plenty of line, even as much as a quarter to one-third of a mile in length. The killer boat engines may be stopped or put slowly astern. When the desired scope of line is out, it is checked by the deck winch; the strain is less now because of the length of line out, and because the pull of the animal is transferred by means of the running rigging on the foremast, to the huge springs in the bottom of the killer boat. The whale is allowed to exhaust itself or become quite tired, and then is hauled in by means of winches, or the boat goes ahead and takes in the line gradually. The animal is hauled under the bow and dispatched with another harpoon. This method is generally adhered to by gunners with slow boats.

The other method, and the one generally used by gunners with fast boats, is to bring the animal broad on the port or starboard bow, shoot the harpoon into it, and then swing the killer boat away from and at right angles to the direction taken by the stricken beast. In this manner the whale is taking out line and the killer boat is paying it out also by steaming full speed away from the animal; the line thus goes out much faster than if taken by the whale alone. After a long scope of line is out, the gunner swings the boat parallel to the course taken by the whale. The result is a long bight of line in the water with the whale towing one end and the boat paying out more, but moving rapidly on the other end. The maneuver soon exhausts and slows down the whale from the sheer weight and drag of line in the water. The killer boat is now directed towards the animal, practically completes a circle from the position where the first harpoon was imbedded, and the gunner sends another harpoon into the beast at the first opportunity. This method is fast, but puts a strain on running rigging of the vessel and entails some danger from the possibility of having the harpoon line caught in the propeller.

The fin whale moves faster than any other species when first struck with the harpoon; it not only seeks the depths, but swims at unbelievable speed; the first wild dash of the animal may attain a speed of fifteen to twenty knots. The line fairly whizzes over the winches, through the blocks and out over the bow, but even then it cannot move fast enough to accommodate the speed of the animal and the killer boat is towed through the water with the running block brought halfway to the deck from the top of the mast which indicates that the sixty-four springs in the bottom of the boat are compressed to fifty per cent of their resistance. This tremendous burst of speed and strength may last for approximately five to fifteen minutes depending on the size of the harpooned specimen, then the animal slows down, swims erratically, or gains the surface for breath, amid gigantic blows of its flukes and pectoral fins; or it may gain the surface almost immediately and lay there, blowing with tremendous force and lashing about in all directions with its appendages. The fin is a fast swimmer and moderately strong; it is capable of towing a modern, two hundred ton killer boat for about ten or twenty minutes at a speed of seven to nine knots with the boat’s engines going astern, but it does not possess the strength and staying power of the blue whale. When its strength is expended at the end of its first efforts, the animal is practically exhausted and seldom offers further resistance. It is not belligerent, but, like all whales, its efforts seem to be concentrated on freeing itself; if boats or persons are injured, it is a case of misjudgment on the part of the personnel and sheer unintentional accident on the part of the whale. If a harpooned whale is approached intentionally when attempting to extricate itself and in its death flurry, anything is liable to happen, merely because the stricken beast may charge in any direction, but baleen whales make no effort to attack killer boats; they exert a strain on the line at all times while attempting to escape.

At the conclusion of its first tremendous efforts the fin seldom offers further resistance. However, it does not readily submit to being hauled in by the winch as docilely as the humpback, and it is because of this that most killer boats advance on this species while taking in the slack line created by the vessel's headway. Practically all fin killings require at least two harpoons and generally three; occasionally, but very seldom, a gunner may kill with one iron. The vast majority of cases require three harpoons, not because of poor shooting on the part of the gunner, but because the irons pass through the body and the bomb explodes outside the vital parts. Fin whales require more harpoons to dispatch them than the blue whales. The latter's tremendous bulk offers more resistance to the projectile and allows the bomb to explode within the carcass.

The proper time to shoot the fin is when the dorsal fin is in sight; the largest portion of the carcass is then in view and the most vulnerable parts are exposed during this time; it offers the gunner the best opportunity of penetrating the lungs. The gun is aimed at the pectoral fin which allows the projectile to become imbedded at some point in that area and offers the greatest chance for getting at the breathing cavity. However, the iron may miss its mark and strike in some other section. If it holds only in the blubber an exciting condition issues, because the whale has full command of its strength and vital organs; it is this situation that allows the animal to pull the boat through the water with such great speed, even with the engines going full astern. Under such circumstances, a long scope of line is run out and then held by the winch; the whale is allowed to exhaust itself; no effort is made to approach it, or even haul it in, because of the enormous strain on the gear. Care is taken to keep the animal directly ahead at all time. After an interval of fifteen to thirty minutes, perhaps longer, depending on the size of the animal and the judgment of the gunner, the killer boat cautiously approaches the prey for the killing shot.

If the harpoon becomes imbedded in the forward part of the body and the whale blows blood on gaining the surface, it is an indication that the fatal wound has been inflicted. The whale may expire within a few minutes, or at any rate, its strength wanes rapidly, allowing the final iron to be imbedded within a short time. Occasionally the harpoon strikes the dorsal region of the caudal section; such a wound prevents the animal from swimming although it still possesses great endurance. Under these circumstances it is possible to drown the animal by going full speed astern on the killer boat, thus dragging the animal beneath the surface and preventing it from breathing;

when drowning blue and fin whales a second harpoon is generally used to relieve the strain on a single line. Fin whales have been known to break away under this maneuver when held only by harpoons in the tail; they have been found later, the caudal section completely paralyzed, the animal endeavoring to breath by keeping its nostrils just above the surface by undulating movements of its head.

For the killing shot, the whale is hauled in close under the bow of the killer boat; the iron is placed in the lungs by aiming at the back of the pectoral fin and the grenade, exploding three seconds after entering the body, shatters the breathing organs. The whale dies almost instantly. All harpoons used after the first one are unattached, that is, they have no line attached to them; they are inserted in the gun in the regular manner and fired into the carcass merely to introduce the grenade; a killing iron may be used for the same purpose. A second attached harpoon is used when the gunner thinks the first iron may not hold securely.

When the fin whale is dead it sinks. It is hauled to the surface by means of deck winches and the harpoon line. The air pipe is inserted in the abdominal region, the body inflated with compressed air; the pipe withdrawn and the opening made in the carcass by its entrance is plugged with waste or frayed rope. A weighted loop is thrown over the flukes and wire rope is passed around that fin; the caudal section is then heaved in to the side of the boat, a wire strap is passed around the caudal peduncle and through a hole cut in the flukes; the end of this wire strap is secured on deck, the harpoon line is then cut off close to the body and spliced to the wire runner on the next harpoon to be loaded in the gun. A heavy chain is passed around the caudal peduncle just forward of the flukes; one end of this chain is permanently secured on deck; after being passed around the tail, the other end is secured to towing bitts by a pelican hook for quick releasing at the factory ship. The dead whale is towed alongside the killer boat by means of this chain; the tail of the carcass is secured forward in the vicinity of the bow, the body ranges alongside, head towards the stern. The edges of the tail fin are cut off to prevent their smashing the sides of the vessel in a seaway.

The maternal instinct of this whale is strong; the female will remain by the calf at all times. However, the male will not stay by the female if the latter is harpooned as in the case of the humpback. There is no uniform position of traveling in this species. The male may be on either side of the female; humpback male generally travels to the right of the female.

Fin whales generally appear in large gams or in pairs; but it is believed this animal is not gregarious by nature, and when observed in large numbers, it is merely a case of feeding in the same locality. When food is abundant, scores of them may be found feeding within a range of several specimens without alarming the remainder, which lethargically continue their feeding. On modern expeditions, when large numbers are sighted, several boats converge on the area at once enabling more of the species to be taken than if one boat should commence killing and eventually scatter the gam.

Killer boats generally flag blue and fin whales immediately after killing them when further operations are contemplated. The carcass is flagged by inserting an iron-pointed bamboo pole of twenty to thirty feet in height in the caudal section of the body; the pole is topped by a flag with the number of the killer boat on it for identification. The killer boat loses its maneuverability and speed when towing dead whales; they must be cast adrift when pursuing blue and fins, but occasionally humpbacks can be captured while another carcass is being towed alongside.

When food is scarce, the sea rough, and a strong wind blowing, the fin swims erratically, and its attribute is most pusillanimous; hunting the species under these conditions is practically hopeless; it shies immediately on the approach of a vessel and its rapid swimming movements are irregular; it is impossible to predict its movements or the duration of its respiratory periods. The animal may spout, dive, and then reappear miles away, or disappear completely. Gunners seldom pursue the animal under these circumstances. If a fin whale is observed traveling fast in the same directions as the wind and sea, it is almost hopeless to take up the hunt even with the modern boats. Such weather and feeding conditions do not coincide frequently, but when they do, a shortage of fin whales can be expected at the factory ship.

This species possess a slender tapering form. The average length is approximately sixty-five feet; the maximum is eighty-four feet. The height as to length is one to six.

The following measurements portray the tapering body proportions of this whale:

Sex	Length	Girth at pectoral fins	Girth at genital opening	Girth at small
M	50′	26′	15′	8′6″
-	58′	24′	10′8″	9′4″
M	61′	26′	18′	10′4″
-	63′	32′	14′11″	10′10″
M	66′	31′4″	20′4″	10′10″
M	67′	30′6″	18′2″	11′
M	67′	30′	20′8″	10′
M	69′	32′	21′4″	10′2″
F	70′	32′	21′	10′
-	70′	30′8″	20′	7′8″
-	71′	29′	15′	10′10″
M	71′	36′	18′	12′
M	71′	32′	26′6″	11′4″
-	72′	36′	28′	14′
M	72′	32′	18′6″	10′10″
F	74′	33′	22′	12′
F	78′	38′	21′	11′6″
Average	68′	31′	20′	11′2″

The girth at the pectoral region was obtained by measuring from the pectoral fin to the medial line of the dorsal region and multiplying the result by four; the girth at the lower opening was obtained by measuring one side of the body from the middle line of the ventral region to the middle of the dorsal region and multiplying the result by two;

this measurement was taken at the genital opening, not the anus; the girth at the caudal peduncle was obtained by measuring from the inferior edge of the peduncle to the top at a point approximately one foot forward of the caudal fin; the result was doubled. No blasted whales, or those filled with air, were measured. The figures indicate that the body is approximately proportioned in the girth ratio of one, two, three, from the tail forward, and its largest girth at the pectoral fins, is about fifty percent of the body length.

The pectoral fin is lanceolate, pointed, and appears small for the size of the body; this fin is between ten and twelve percent of the body length; all edges are smooth.

The whalebone is gray with yellow bristle. Extending anteriorly from the middle section of the mouth, the sheaves may be longitudinally striped with white or yellow in varying proportions. The baleen situated anteriorly on the right side of the mouth is yellow; this section extends posteriorly from the nib end and represents one-third of all the baleen situated on the right side, it is a characteristic of all fin whales. The baleen at the snout is represented by coarse strands, four to six inches in length, those on the right side are yellow; those on the left, yellow gray. The baleen of a mature fin whale is generally between two and three feet in length. There are no anterior-posterior lines of different hues on the bristles of the whalebone. As in most baleen whales, the baleen of this species is represented by coarse strands at the snout, these enlarge gradually to form small sheaves which increase in length and width, being larger and wider at the middle of the mouth; they gradually taper down in size again as they extend posteriorly. The whalebone in the back of the mouth is about one-third of the longest length attained. The baleen bristles of this whale are much more numerous and longer than those of the humpback; they reach a length of six to eight inches and form an impenetrable mat on the inner surface of the baleen. There are approximately two hundred eighty sheaves of baleen to one side of the mouth.

Hairs are found on the rostrum of this animal; they are few and scattered. They may extend back to the region of the nostrils, but the majority is found in the region of the snout. Occasional hairs are found on the sides of the lower jaws. Two parallel rows of hairs are found on the chin at the symphysis section; they are of uniform arrangement, about two inches apart and are found at this point on all fin whales; there are generally sixteen to twenty-four hairs at this point. These hairs may reach the length of one inch; they are generally a whitish gray in color and are not situated on protuberances as is the case with the humpback and right whales, but grow directly from the epidermis.

The palate of the fin is pink. The tongue is gray mottled with pink; it is extremely large and weighs over a ton. It is composed of a thin epidermis supported by a layer of fat which is in turn supported by a tier of meat; the interior of the tongue is hollow. This organ is heavily endowed with oil of the finest quality.

The dorsal fin of this species is very prominent, and falcate in shape. It is situated behind the line of the anus on the last quarter of the body; in height it corresponds to approximately two-tenths of one percent of the body length. It has the same color as the dorsal region of the body; the prominence of this appendage is an aid in distinguishing this species from the blue whale when the animal is sighted at a moderate distance and scrutinized with binoculars.

Many persons believe there is a separate species of this whale because the dorsal region is almost black in color and because its yield of oil is relatively small, but it is believed this is merely a young fin whale that has just left the mother and may be approximately two years old; none of these so called "black fins" were observed above sixty-five feet in length; their blubber was extremely thin with no fat on the back; the meat was light-red in color indicating lack of oil; the outline of the ribs and body frame could be noted as the animal lay on deck; the genital organ of these males always remained sheathed. However, the yellow baleen on the right side of the mouth, the asymmetrical coloration of the head, the white ventral region, and all other distinctive characteristics for fin whales were found on this type. This kind of fin whale was hardly worth processing; the blubber between the shoulders was about one and one-half inches thick; that of the dorsal region on the caudal peduncle was about four inches thick; the meat was devoid of oil. It is believed the maximum yield of oil from this type was twenty to twenty-five barrels.

Many fin whales are observed with a yellow tint showing over the regular dorsal and ventral colorations. Some persons think this is an additional color scheme, or that it indicates extremely fat fin whales because the blubber surface is yellowish in color. But this is entirely erroneous. This yellow hue is due to the water in which the animal has been swimming, it is apparently filled with a form of plankton life that is yellow in color. The plankton forms a yellow scum on the blubber of the whale and can be easily wiped off when the blubber is wet. After the blubber dries, the yellow material looks like a dry yellow dust that can be removed by rubbing the blubber; the yellow color then disappears and leaves the normal color of the blubber intact on the ventral or dorsal region. It is quite true, but it is not a positive condition, that most fins observed with this yellow scum are extremely fat whales; this condition may exist because the yellow plankton plant frequents water filled with krill. Scrawny whales have been noted with the yellow cast on their blubber also. The yellow scum on the dorsal region quite frequently gives that section a brownish gray appearance.

In general, the color of the body may be stated as being bluish gray, or black gray above, and white below.

The bluish gray or dark gray is the predominating color of the dorsal region; after the animal has been dead several hours this color becomes almost black. The gray color is found on the rostrum, along the back, on the dorsal surface of the flukes and pectoral fins. The entire ventral region of the animal is white, from the chin to the posterior edges of the flukes; the pectoral fins are white on the under surface also. The gray of the dorsal region commences to extend down on the white of the ventral area more liberally from the region back of the pectoral fins and gradually increases in an oblique direction until the flanks are completely darkened; the inferior edge of the peduncle remains white. Numerous fins have stripes of gray running obliquely from the pectoral region down the white of the ventral surface, but this characteristic cannot be termed a permanent mark for the species.

The head is not bilaterally symmetrical in its coloration. The exterior surface on the right side of the lower jaw is a pale white; this extends across and slightly to the left side of the chin. The interior surface of the right lower jaw is dark gray. The inferior edge of the rostrum on the right side is also a pale white; this condition commences at the snout and extends posteriorly for about one-third of the rostrum edge; the yellow baleen is located below this region. The exterior surface on the left side of the lower jaw is the same color as the dorsal region, being dark in color, the same condition applies to the left side of the rostrum; the dark-gray of the left jaw gradually fades out to white in the vicinity where the grooves of the ventral region commence. The inner surface of the lower left jaw is pale white, being the same as the exterior surface of the lower right jaw. This peculiar asymmetrical condition of coloring is characteristic of all fin whales and is the proper way to positively identify the species.

For all practical purposes the head may be figured as twenty percent of the body length. The rostrum of the skull is narrow and pointed; it lacks the U-shaped appearance of the blue whale. The chin of this species juts out to form an oblong protuberance; it resembles a strobic formation with a blunt, round apex. This formation represents the symphysis vicinity of the chin and is fissile in structure. The nostrils are located slightly forward of the summit of the head on the medial line of the rostrum; they are sheltered in a cavity of approximately six inches in depth. This cavity is formed at the posterior end of the coronoid process, which commences almost on top of the head and extends anteriorly for about one-third of the rostrum where it gradually diminishes. A deep fold of flesh extends into this cavity. Then nostrils are represented by two narrow apertures within the cavity that converge anteriorly to the medial line of the skull; they are on opposite sides of the heavy fold of flesh in the center of the cavity. The spiracles of a mature fin are approximately eight inches in length.

Definite information concerning the flukes could not be ascertained because modern whaling practice demands that most of this fin be cut away prior to being taken in tow by the killer boat to prevent the appendage from damaging the vessel by smashing against it in the seaway. The posterior edge, however, is thin and not crenated; a notch is present, but the inferior edges of this formation overlap. It is estimated that the flukes are approximately fifteen percent of the body length in width and six percent in length. The caudal and pectoral fins of this animal frequently bear the marks of the killer whale's molestations; these scars are in the form of crescent-shaped lacerations; which may vary from a mere nibble to a large bite. Occasionally, these appendages possess holes through them; these may originate from old wounds, or the body material may fuse while growing in such a manner as to form the apertures.

The caudal peduncle of the fin is very thin and narrow when compared to the same region of the blue whale. This characteristic often leads to the breaking of this particular region of the body when the carcass is secured at the stern of the factory ship. If the factory attempts to make way through the water, or a rough sea is running, the danger is enhanced. When this section of the body breaks the carcass is generally lost, or if retrieved, it causes a very unsatisfactory condition; because a strap has to be placed around the pectoral region in order to get the carcass up the ramp; this is a long, laborious, vexing task.

The inferior margin of the posterior edge is gray on the flukes. The inferior margin on the posterior edge of the pectoral limbs is also gray.

The plaits on the ventral region are numerous on this species; eighty is a practical estimate for these contained in the region between the pectoral fins. This excludes those that extend anteriorly a short distance on the posterior sections of the mandibles and those that are arranged above the pectoral appendages. These folds commence in the blubber at the inferior edges of the mandibles and extend posteriorly along the bottom of the mouth, the chest and the stomach. Those of the longest dimensions terminated in the region of the navel. When the plaits extend past the pectoral fin region, they gradually diminish in length on the flanks so that folds on the medial line of the ventral surface are the longest, these are the ones that reach the umbilical region. These formations appear much more numerous than they actually are on this whale because the blubber between the folds is narrow, being about one inch in width; the depth of the grooves is also about one inch. The bottom of the folds that extend from the chin to forward section of the belly are pink in color; those that extend down and back from the mandibles are black; the bottom of those on the posterior section of the abdomen are black also. The coloration gives the ventral surface a dark hue in these sections and a pink shade where it does not extend. When the carcass lies in the water filled with air, ventral surface up, it has a black and white color scheme. When the air is released from the body on the flensing deck, the grooves close and the ventral region appears all white. The ventral folds of this animal may be in the process of disappearing. Some traces exist back of the umbilical region but they are few and cannot be noticed except by careful examination; these traces can be seen on the medial line of the ventral surface back of the navel where they taper off to the normal surface of the blubber.

The blubber of the fin whale is thinner between the shoulders and on the ventral surface; it is moderately thick on the sides of the body. It is thickest on the dorsal region, commencing forward of the dorsal fin and extending along the caudal peduncle to the flukes; the peduncle contains a very thick covering of blubber on all its surfaces.

A moderate covering of blubber is also situated on the sides of the rostrum. On a seventy foot fin whale in good condition the blubber can be expected to run approximately three inches thick between the shoulders; from this point along the dorsal region it increases, attaining its greatest thickness at and back of the dorsal fin. In this region it may reach eight or ten inches. The blubber on the sides of the body attains four to six inches in thickness. The covering of the caudal peduncle is from six to ten inches in thickness; when this blubber is removed a mass of corpulent material generally adheres to the body and exudes oil freely. The blubber on the ventral region is quite thin being two to three inches in thickness; the unsatisfactory condition of this blubber lies in the fact that a thin veneer of meat must be taken with it unless special precautions are taken to cut it free; the blubber is also much coarser and, when boiled with the meat, takes longer and gives inferior oil. The best blubber comes from the dorsal region and the sides of the carcass; all the blubber on the caudal peduncle is excellent. If a whale is fat and in good condition, the blubber is generally slightly yellowish; after the external covering is removed, the carcass remains concealed in a covering of fibrous fat that may be two to four inches in thickness; this covering is heavily endowed with oil. When a whale is in poor condition, the blubber is extremely thin; sometimes the ribs and body frame can be seen distinctly outlined under the external covering. On such whales, the blubber may be one to two inches thick between the shoulders, two or three inches thick on the sides and four to five inches thick in the region of the dorsal fin and caudal peduncle. The blubber of the ventral region may attain a thickness of an inch and one-half. The blubber of such whale is coarse, hard, dry, devoid of oil, and makes a heavy rasping sound as it leaves the carcass. On such specimens the fibrous fat covering is lacking and meat shows over most of the carcass when the external covering is removed.

Practically all fins below sixty-five feet in length possess very poor dry blubber; those from sixty-five feet to sixty-eight feet are occasionally in good condition. Fins of and above seventy feet are good oil producers after January first in the Antarctic; before this time practically all fins are in poor condition and very scrawny. This species does not arrive in the far south as early as the blue whale, therefore, it takes them longer to get fat and in good condition. Fin whales should not be taken until January first at the earliest date in the Antarctic; this is speaking from a conservation point of view, not commercially.

Those fins that have a black-gray color on the dorsal surface are generally in poor condition; if this species possess a grayish-brown or yellowish-brown coloration, they can be estimated to be in good condition. The average number of barrels derived from each whale in a large catch of fins is approximately fifty barrels; specimens may be obtained that are in excellent condition; these may yield from sixty to seventy barrels but this is the maximum. Fins below sixty-five feet in length do not yield more than thirty to forty barrels at the most. A fin whale of sixty-five to fifty-five feet and shorter is not worth processing when whales are abundant. When fins are caught in equatorial waters they are thin and emaciated from lack of food; the blubber is thin, dry, and hard; the meat is light-red in color and devoid of oil; such whales, caught in those warms regions under such poor physical conditions yield twenty-five to thirty barrels of oil, but generally less, for an average, if the catch is large.

Fin whales blast rapidly within twenty-four to thirty-six hours after being killed. This species should be worked within twenty-four hours after death if the maximum amount of oil is to be obtained. Blasting is merely the putrefaction of the body due to the chemical reactions taking place within the carcass. This condition may be attributed to a high body temperature more than anything else; the blubber preserves the high body temperature within and prevents the external cooler conditions from exerting any influence; as a result the carcass decays internally. The cold waters of the Antarctic have no influence in preserving the carcass. When the carcass becomes blasted, the abdominal region is quite bloated, the organs of the stomach and the blubber become green in color, later turning to blue; such carcasses frequently "blow up" on the flensing deck when the blubber is removed. Fin carcasses have been observed more than forty hours after the particular specimens had been killed and the meat and bones were still warm; the meat was blubbering oil and appeared to be very watery; both water and oil appeared to be dripping from all sections of the body.

When fin whales commence to blast, it is practical to figure approximately twenty-five percent less oil than if the carcass had been worked within eight to sixteen hours after death. After thirty-six hours, the putrefaction progresses rapidly and the carcass can hardly be worked; it is very discomforting to the personnel, and the hawsers have trouble in holding the limbs and other sections in the process of dissecting the carcass. The amount of oil obtained diminishes and that which is processed is of a grade that contaminates the other oil;

The oil derived from a fin whale depends on:

1. Size.
2. Sex.
3. Time of the year.
4. Location of the catch.
5. Processing at the factory.
6. Length of time between the killing of the whale and the processing of it.
7. Condition of the sea.
8. Amount of air injected into the body.
9. The presence of krill in the stomach.

Size

Naturally, the size of the specimen is an important factor in determining the amount of oil to be obtained. If conservation is paramount, the killing of this species should not be allowed below sixty-five feet in length. The fin does not seem to be heavily endowed with oil until the length of sixty-five feet is attained. A specimen of sixty-five feet is commercially unprofitable to process when large numbers may be obtained that reach seventy feet and above. Specimens below sixty feet do not possess a large amount of oil when compared to the output that might be realized when the animal reaches seventy feet.

Sex

A female and a male of the same size apparently produce the same amount of oil. However, if a cow is with calf the condition of the body is more corpulent which necessarily indicates the presence of more oil.

Time of the year

This is an important factor when considering oil to be derived from this species. The fin apparently arrives in the Antarctic waters about the end of December and probably frequents those areas until well into the month of April, when it commences the migration to the equatorial regions. When they first arrive in the higher latitudes, their bodies are thin and emaciate from lack of food. All fin whales, regardless of their size, are thin and devoid of oil to any great extent, even for average conditions, when they first arrive in the Antarctic. In considering the average amount derived from each specimen, it is practicable to estimate between thirty-five and fifty barrels about the middle of January. The animal continues to feed and becomes more corpulent, allowing an average estimate of sixty to seventy barrels about the middle of February. The condition continues to improve as the season progresses, but it is believed about seventy barrels is the maximum attainment for all average conditions, or it may be reasonable to estimate one barrel per foot late in the season. It is believed the meat of the fin whale is not worth processing until at least the end of January; this is discussing the issue from the consideration of deriving profitable results after water, steam, time, and factory space have been utilized. The head, tongue, blubber, bone, and caudal section of the body up to the lower opening may be processed to advantage during December and January, but not the meat. The meat commences to possess oil about the middle of February and should be cooked out, especially that of the dorsal region. This species returns to the equatorial region about June and frequents those waters until about November. While in the lower latitudes this whale apparently loses its corpulence rapidly because it is practicable to estimate approximately twenty-five barrels per specimen for all average conditions when a large catch is obtained.

Location of the catch

The location of the catch must be considered. When the animal is in the warm waters of the low latitudes it is thin and gaunt; this naturally reduces the amount of oil derived from all sections of the carcass. After the animal has sojourned in the cool waters of the high latitudes, it becomes corpulent from feeding on the plankton life; it is the unctuous condition of the body that is responsible for the presence of oil in the blubber, flesh, and bone. In order to become fat, the animal must possess food in large quantities; the presence of this food is located in certain regions of the globe and has a relative effect on the condition of the whale and the amount of oil to be processed.

Processing at the factory

Oil production at the factory depends on several variable factors, they are:

(a) Size of the factory ship.

(b) Personnel of the ship.

(c) The efficiency of the factory in handling the whales.

Size of the factory ship: The size of the factory ship must be considered because the bigger the ship the larger is the amount of carcass that might be processed. For instance, the *Ulysses* can handle more of this species than the *Frango*, while the *Kosmos II* can use more fins, both in the number taken and the amount of carcass cooked out, than the *Ulysses*. The larger the quantity of carcass utilized, the larger is the amount of oil derived per fin whale; the factories, of course, must possess adequate space on their flensing and cutting decks, and also a large amount of cooking out apparatus that is supplied with the proper amount of water and steam. When these facilities are adequate and efficiently operated more of the whale can be used, and less thrown overboard; the result is more oil.

Personnel of the ship: The personnel that have the most experience can produce more oil than those that are just learning the processing; this applies particularly to the manipulation of the factory apparatus. An experienced man will blow down his equipment at the moment the maximum amount of oil can be obtained with the minimum amount of refuse and loss of fresh water. If the factory apparatus is blown down too early, some whale oil is sent overboard; if the tank is blown down too late, refuse and water are mixed with the whale oil, and more fresh water has been used than is actually necessary.

The efficiency of the factory in handling the whales: A careful check must be made to prevent more whales from being flensed and cut up than can actually be handled in the boiling down system. This condition applies to the Antarctic as well as to the equatorial regions, but it is not a detrimental in the higher latitudes as it is in the lower ones, although oil will seep from the meat and blubber if it is allowed to stand any great length of time after the body is dissected. All the waste on deck amounts to a large quantity when the number of whales to be considered is large.

Length of time between killing of the whale and the processing of it

The interval that elapses between the actual killing of the fin whale and the time it is processed at the factory is a very important factor in discussing this species. This animal commences to blast rapidly and is blasted within thirty-six hours of death.

Condition of the sea

The condition of the sea has a bearing on the amount of oil to be derived; a rough sea causes the whale to blast much faster than a calm sea. When fins are secured to the stern of the factory in rough water the carcasses are in continual motion; this working of the carcass in a seaway has much effect in decomposing the body.

Amount of air injected into the body

The amount of air injected into the carcass of the fin reduces the quantity of oil to be obtained, because the air aids in and hastens the decomposition.

The presence of krill in the stomach

The presence of krill in the stomach apparently hastens the blasting, because practically every fin taken in the Antarctic had food in its stomach; and it was the abdominal region which indicated putrefaction first in practically every instance. The amount of food present in each specimen was extremely large, each one possessing barrels of the material. This food, which closely resembles a shrimp in appearance, decays of its own accord within twenty-four hours when exposed to a cold atmosphere, such as being piled on the cutting deck of a factory. The result can be imagined when a large amount of this plankton is enclosed in the stomach of a dead whale which maintains it high body temperature for a long period even though the animal has long been dead.

Observations also indicate that a fin in a corpulent condition commences to blast much sooner than a specimen that is emaciated and thin.

In the fin whale, the best oil is obtained from the tongue and the blubber of the dorsal region. The oil from the blubber of the ventral region is next in quality. The oil from the bone is considered inferior to that from the blubber in amount and quality, but superior to that from the meat. It is possible to determine the meat that possesses oil; it is dark-red or purplish in color and comes in those specimens that have a layer of fat when the blubber has been removed; meat devoid of oil is light-red in color.

The amount of oil to be derived from a specimen differs with each and depends on several factors, but for all practical purposes estimate about one barrel to the foot. It is also practical, for all general considerations, to estimate that the fin whale weighs about one ton to the foot.

When a fin whale is in a corpulent condition it may be estimated, for general conditions, that fifty percent of the oil is coming from the blubber and fifty percent from the meat and bones. If the species is in poor condition estimate that most of the oil is from the blubber and the remainder from the bone; very little, if any, is processed from the meat. If conservative estimates are required it is practical to allow the same oil percentage characteristics as for the humpback species.

It is believed that the oil obtained by the *Ulysses* in the ice was grade one, but grade two for the Australian season merely because the ship used the entire carcass in Shark Bay. At the present time, shore stations generally get grade two oil at least, because of the long time that elapses between the killing of the whale and the working of it; most of this delay can be attributed to the long tow that is generally necessary from the location of the kill to the station. Grade one oil is generally used for the manufacture of margarine while any grade can generally be used in the making of soap; there is a slight difference in price between the different grades, grade one oil being considered the most valuable.

The fin whale specimens obtained in the Antarctic were devoid of external parasites. However, the caudal sections of the body, especially the flanks of the peduncle, possessed oblong white spots which were unquestionably the result of a sycophantic growth. These markings increased in number and prominence as the season progressed. They were hardly noticeable during the month of December, but were numerous and very conspicuous at the end of February and during the month of March. Each oblong white spot possessed a long axis at its center; this line became more prominent as the season advanced, and the wavy lines, radiating from the axis to the boundaries of the scar, became more elevated. The situation seems to be that whatever causes these white oblong spots becomes more frequent the longer the whale stays in the cold water. Whether these white lacerations later produce *Penella Antarctica* when the animal returns to the equatorial waters, or, whether they are the healing wounds that remain after *Penella Antarctica* has died and fell off, is not known. The fin whale killed in Shark Bay was covered with *Penella Antarctica*, but did not possess the oblong white spots in the blubber. The personal opinion is submitted that the parasite enters the body while the animal is in the cool waters of the high latitudes; it commences to grow immediately and eventually develops its external appendages, which can be seen by the time the animal returns to the lower latitudes, and then it dies. The same condition exists for the blue whales as stated for the fin species.

Fin whale fetuses and breeding

It is with regret that more accurate information cannot be submitted concerning this phase of the report. The following remarks are submitted because they were observed and recorded the whaling grounds.

Any discussion concerning the breeding and fetal development of this species must be presented with caution; the fin whale apparently mates and reproduces under one of two conditions. Two theories are introduced for consideration, they are:

1. The fin whale may mate at random and reproduce in a definite period in the course of a year, or
2. The fin whale mates at a definite time and possesses a period of gestation which exceeds twelve months

The theories are based on observations that allowed the examination of fetal specimens of all sizes and stages of development at almost every day and month of the expedition's operations; fetuses would be found on the same date that varied as much as fifteen feet in their length measurements; their other external characteristics differed to the same extent in development. Such results can only be accepted by allowing the two suggested theories to be examined. If the fin whale mates at random, but possesses a definite period of gestation, the fetal results can be accepted as natural, but if the whale does not mate at random, but possesses a definite mating period, the time of gestation must extend more than approximately ten or twelve months, which is plausibly acceptable for the humpback species. One of the two views is acceptable. The personal opinion is submitted that this species mates at random, but possesses a definite period of gestation.

It is believed that the female fin does not reproduce (until it has reached) below a length of seventy-two feet. This was the shortest specimen personally observed that contained a fetus; no females with milk were found during the Antarctic season.

Sufficient fetal data was not obtained to even contemplate a conjecture on their development, but it is believed, from data obtained, that the fin whale is approximately twenty to twenty-two feet long when born and weighs between one and one-half and two tons. These conclusions are based on the following measurements:

Length	Weight in pounds	Girth at pectoral fins	Girth at genital opening	Girth at small
4′2″	37	2′2″	6.5″	4″
6′1″	125	3′4″	2′4″	1′1.5″
6′9″	160	-	-	-
8′2″	338	4′10″	3′	1′9″
8′7″	305	-	-	-
9′4″	464	5′	2′8″	1′7″
9′11″	455	-	-	-
10′	499	5′4″	3′6″	1′9″
11′2″	671	7′4″	3′2″	-
11′4″	670	-	-	-
13′6.5″	1048	7′	4′6″	2′2″
14′4″	1168	6′8″	4′2″	2′1″
15′9″	1545	7′4″	4′8″	2′4″
16′5″	1944	10′8″	4′8″	-
17′	2464	10′2″	5′8″	2′10″

The fin fetus possesses all the characteristics of a mature specimen when it attains the length of three feet. Twins are quite frequent in this species; they differ by only a few inches in their length measurements. On one occasion, twins were found of approximately ten feet in length and a third fetus was also present; this specimen was apparently a runt. It was about three feet long but its appearance indicated that its development was not normal; its color was of a purple hue and it apparently did not possess a firm bone structure because the specimen did not have a rigid skeletal structure which is normal at three feet and noted in other fetuses of the same length. Some persons maintain that female fins have been observed with more than twin fetuses but these observations cannot be verified.

The fin whale is the same as the humpback and all other whales in the relative location of its external physical characteristics; such as fins, teats, sex opening, etc.

Section 14: The right whales

The right whale is a Mystacoceti or whalebone whale, it has no teeth. The term "right whale" is believed to have descended to the present time from ancient whaling when this animal was deemed the "right" type or best kind of whale to be obtained. Its products were considered superior and its characteristics offered more inducements for the old whalers to attack than the other baleen species. Antiquated whaling was as much interested in the amount of whalebone derive as it was in the quantity of oil obtained. Because of the simple equipment used and the primitive methods employed in hunting, the whale attacked could not be too large and had to float when dead. The right whale possessed these characteristics. The whalebone is finer and longer than in other species; is a good oil producer for its size; attains a length of forty to fifty feet at maturity, and most important, from the viewpoint of old time whalers, it floated when dead

It is believed the name right whale was first coined by the Basques when they hunted the animal in the Bay of Biscay, more than a thousand years ago. The term has remained affiliated with the species ever since.

All whales are separated into two divisions, the Mystacoceti or whalebone whales and the Odontoceti or toothed whales. The Mystacoceti are split into two families; the Balaenidae and the Balaenopteridae. The right whale belongs to the

Balaenidae. This family is characterized by possessing a skull that is very much arched and narrow anteriorly. The baleen is long; the pectoral limbs are small; there are no grooves in the blubber of the ventral region of the throat and belly. The dorsal fin is absent.

It is a matter of conjecture as to how many genera are in this family. Opinion at the present time indicates, and it is logical to accept, that there are only two genera of whales in this group, and that they include between them only two species, they are the Greenland whale and the right whale, both referable to Balaena. The Greenland whale or Bowhead is technically known as *Balaena Mysticetus*. The Right whale appears under a diversified and long list of synonyms.

It is interesting to note that the Greenland whale, which is restricted in its habitat and seldom found outside the Arctic Ocean, is the only species universally acclaimed under one name, that being *Balaena Mysticetus*. Practically all the other whales are given various names by different scientists. This has led to misunderstandings and confusion because the various genera and species that have resulted from the same whale being examined, segregated, and scientifically designated, after it has already been identified and classified by some naturalist. As a basis of this contention, it should be observed that the right whale, which has been associated with whaling longer, perhaps, than any other species, appears under more scientific designations than any other whale. This situation unquestionably arises from the fact that this animal is cosmopolitan in its habitat. The result is that the whale appears under various names because it is killed in different parts of the world, when apparently it is the same whale, but believed to be different because of some slight external or internal characteristic.

To be thoroughly acquainted with any names that might be mentioned concerning the species, the manifold designations affixed to it at various times are enumerated here.

Abbe Bonnatere gave his whale the scientific name of *Eubalana Glacialis* in 1789. Since that time, the following designations have been added or repeated:

Balaena Australes (Desmoulins); *B. Biscayensis* (Gray); *B. Sieboldi* (Gray); *B. Japonica* (Gray); *Hunterius Tomminckii* (Gray); *B. Antipodarum* (Gray); *B. Antarctica* (Schlegel); *B. Mediterranea* (Gray); *B. Angulata* (Gray); *B. Nordcaper* (Gray); *B. Capensis* (Gray); *B. Cisarctica* (Cope); *B. Eubalaena* (Flower); *Hunterius Swedenborgi* (Liljeborg); *Macleayius Australiensis* (Gray); *M. Britannicus* (Gray); *B. Tarentina* (Capellini); *B. Alutiensis* (van Beneden); *B. Kuliomoch* (Chamisso); *B. Cullamacha* (Chamisso). Scammon uses the same name as Gray for this species, *Balaena Sieboldii*; but also introduces *Balaena Gibbosa*, merely because a right whale of the North Pacific, which he termed a “scrag,” yielded a petty amount of oil. Townsend refers to this whale as *Balaena Australis*, *Balaena Sieboldi* and *Eubalaena Glacialis*.

The common names given to this species are:

Right whale, Atlantic right whale, North Atlantic right whale, Pacific right whale, North Cape whale, Nord Caper, Biscayan, right whale, southern right whale, northern right whale, black whale, and northwest whale. Without doubt these synonyms and common names are given to divergent groups of the same species. To countenance the existence of a large number of right whale classifications merely because the animal frequents different parts of the ocean, should not be accepted, especially when the species have been formulated on data based on localized observations and examinations, indicating some slight divergence in external coloration; or other trivial characteristic. In other words, because a right whale has been examined and found to possess a slight variation in the structure of its cervical vertebrae, has failed to give the expected amount of oil, or has been observed persistently frequenting the same section of the globe, is not adequate proof that numerous and various species exist. It may be that certain right whales exist in southern latitudes, while others frequent the northern latitudes, but this is no basis for contending that these whales are separate and distinct species. There is nothing to prove these whales do not cross the equator and intermingle or replace each other; accurate observations on the subject are too sparse and unreliable to divide the right whale into a southern and northern species. It is my opinion that those right whales of the southern waters remain in those regions practically all the time; and the same applies to the species north of the equator, but these whales can and do infrequently cross the equator and, regardless of enumerated synonyms and confused species, there is only one (true variety of) right whale in existence. The casual external observations made on the right whale killed by the *Ulysses* expedition coincided in every respect with the characteristics known to be in existence for the same type of whale that is found in northern waters.

The right whale is easily recognized at a distance. Its spout is split and commences in two distinct, diverging columns, each inclined at a slight angle to the side of the head. It has no dorsal fin and throws its flukes out of the water when diving. The whale resembles the humpback in its breathing habits, seldom remaining below more than a few minutes and never more than fifteen or twenty minutes at the longest. Consensus of opinion seems to be that the species is not gregarious but, when found in large numbers; it is merely a coincidence from feeding in the same vicinity. However, this whale is frequently observed traveling in pairs. Some authorities believe that when this species is found in large numbers it is an indication that the animal is about to commence a migration from the locality in which observed. They are slow swimmers, their maximum speed being about nine knots. They are not timid and show not the slightest concern on the approach of a killer boat. They closely resemble the humpback when observed beneath the surface, the general shape of their body closely corresponding with the squatty massiveness of that species; their dive is the same as the humpback, except that they have no dorsal fin to show before throwing the flukes in the air. Their blubber is very thick and tough, especially on the dorsal region; it offers formidable resistance even to the modern harpoon, a case being known where it required four well placed projectiles to kill the animal, merely because of the tenacity of the external covering.

The shape of the body is massive. It does not possess the tapering outline characteristic of the fin and blue whales. The dimensions are practically the same in girth from the end of the cervical region to the beginning of the caudal section; it then tapers down gradually to the caudal peduncle which is more round in shape than vertically compressed as in the blue and fin. The flukes are deeply notched and possess very thick anterior and posterior edges; the latter is not crenated.

The head is approximately twenty-five percent of the body length. The rostrum is much arched and quite narrow anteriorly where it possesses a protuberance just posterior to the snout. This bonnet, as it is familiarly known, is formed from blubber rising approximately one and one-half inches above the normal surface; it extends posteriorly back along the rostrum, rising gradually on the sides and summit where its prominence is enhanced by a gray hard parasitic growth that in turn shelters a large number of lice. The protuberance is about eighteen inches wide on the forward edge. Because of the parasitic growths, the formation loses all shape and dimensions as it extends back along the rostrum; the summit develops into a calcareous, irregular mass which gradually loses its prominence and levels off to the normal surface of the rostrum blubber.

It is believed that this bonnet is formed by the blubber that formerly rested on the dorsal region of the rostrum moving anteriorly until it assumed a position just back of the snout. The parasitic growths and lice eventually infested it so that it now resembles a growth bordering on a pathological condition. Many authorities intimate that the bonnet is the result of the parasitic infestation of the blubber, but it is believed of the protuberance was formerly a thick cap of blubber that became encrusted with the sycophantic growth and under normal conditions would appear as a thick cap near the snout; unquestionably the growth would be on the rostrum, whether the parasites were present or not and is not the result of their activity.

The extremely arched characteristic of the skull not only led to the dorsal blubber of the rostrum moving forward to form the bonnet but it moved posteriorly also. The covering that moved to the hinder portion now forms a slight protuberance that supports the spiracles. Unlike the nostrils of the blue, fin, and hump, which are located in a slight cavity, the nasal orifices of this whale are located on a slight prominence, which is also infested with parasitic growths. The nostrils are represented by two slits that are well separated and located on opposite sides of the medial lines, but converge anteriorly at a forty-five degree angle with the middle line of the rostrum. It is this structural feature that allows the spout of this species to originate in two distinct columns, eventually forming a vaporous mass at their summits.

The section of the rostrum between the bonnet and nostrils is not smooth but presents a horny, uneven surface caused by the calcareous parasitic growths and scattered hair tubercles which are similar to those found on the humpback whale.

The eye of this whale is small, round, and more protruding than the sight organs of the other Mystacoceti; the latter's eyes are more oblong and deep when observed externally and still intact in the head. Parasitic growths similar to those found on the rostrum and sides of the mouth, are located above the eyes.

The lower jaw bones of this whale are heavily encased in blubber which projects forward of the symphysis section of the chin to form a scoop-shaped, projecting lip. There is no well defined chin. Short scattered hairs are located on the slightly upturned blubber which forms a ridge on the anterior edge of the scoop-shaped projection. The blubber rises to a height of several feet above the mandibles to give the sides of the mouth a high and curved appearance; these sinuous free margins appear to be necessary, because of the extremely long baleen, which fits between the tongue and projecting blubber when the mouth is closed. A calcareous parasitic growth is found on the sides of the mouth along the upper edge of the sinuous formations. Farther down, there were circular parasitic growths uniformly arranged on both sides that projected to a height of several inches; there were five of these formations that increased in prominence and size, finally terminating in prominent growths on the sides of the chin.

The tongue was a solid mass of meat, lacking the soft epidermal covering and mobility so characteristic of other baleen whales. The anterior portion was pink; the posterior section was mottled with a gray-black coloration. The interior of the mouth was light-brown.

The lice found on this whale were similar to those found on the humpback species. They were noted on the rostrum, lower jaws, and sections of the head, also at the lower opening. The calcareous parasite was not the same growth as observed on the humpback; it possessed no shell-like formation, but appeared as a gray un-malleable mass with flaky projections. The calcareous growth was found on the bonnet, along the rostrum, above the eyes and on the side of the lower jaw. As on the humpback, it is believed the association of the lice with the calcareous parasite is a condition of commensalism or hyperparasitium.

The blubber of this animal was extremely thick on all portions of the body. The blubber of all whales is thinnest between the shoulders on the ventral surface. The blubber of the right examined was five inches thick between the shoulders, nine inches thick on the ventral region, and fourteen inches thick along the dorsal region commencing back of the shoulders and extending to the caudal peduncle; the peduncle presented one mass of glistening fat. The covering commenced to be extremely thick in the region that normally possesses a dorsal fin on other whales and this condition extended to the flukes. The epidermis of this blubber was very thick when compared to that of other whales, being one inch in depth. The rostrum of the skull and the lower jaws were encased in a fairly heavy covering of the blubber. The plaits were absent from the ventral region of the body which appeared smooth. There was no dorsal protuberance and not the slightest trace of a fin structure; this region was smooth and appeared more arched as it gradually descended to the caudal peduncle than in the blue, fin, and hump species.

The pectoral fins were short and very broad; being more quadrangular in shape than any other design. On the specimen examined, the fore limb had the following dimensions; anterior edge, seven feet two inches; posterior edge, four feet; outer edge, four feet two inches; inner edge, at shoulder, two feet eleven inches. The fin was six feet long on the medial line and four feet wide at the mid-transverse portion. From the structure of the appendage, it is believed to be used more as a balancing than as a swimming organ. The underlying metacarpals and phalanges could be seen spreading in divergent fashion under the thin outer covering of blubber. The attachment of the fin to the side of the body was much wider and thicker than in other species observed; the limb normally rested perpendicular to the body. Fins of other whales generally extend in a posterior direction from the shoulder. There were no parasitic growths on the limb, both surfaces were black in color, and all edges were smooth.

Hairs were found on various regions of the head. There were numerous but scattered hairs protruding on the anterior tip of the rostrum between the snout and bonnet; these hairs projected directly from the blubber. Back of the bonnet, but forward of the nostrils, there were numerous strands growing from the center of protuberances, similar to, but smaller than those found on the humpback. These hairy bulbs aided in causing the congested condition found just forward of and around the protuberance that supported the spiracles. The longest hairs did not protrude more than an inch above the epidermis; they were a pale gray in color. The protuberance that sheltered the hairs grew above the surface of the blubber to a height of an inch, maximum, and were generally less; they were black in color. Hairs were also found on the sinuous projection that formed the lower lip, anterior to the junction of the lower jaw bones; these were few, scattered, and shorter than those on the rostrum.

The baleen was coarse, long and black; its length caused it to spread at its lower extremities allowing small spaces between the sheaves. The bristles were black and frayed out from the plates at the inside of the lower tips; they did not extend the full length of the inside edge as in other baleen species, where it frays out from the tip of the sheave to the palate of the mouth; the heavy mat-like structure formed by the entwining bristles in blue, fin, and humps is entirely lacking in the right whale. The baleen did not extend to the extreme tip of the palate to form coarse shredded strands as in other Mystococeti; this area was devoid of any growth and presented a line of hard flesh. The sheaves commenced on the side of the palate about six inches from the nib-end of the snout; they gradually increase their length in the form of well-defined whalebone sheaves, attaining their greatest extent at the middle of the rostrum. On the specimen examined, the longest baleen was four feet nine inches; there were approximately two hundred fifty plates to the side. The whalebone of this species is longer, compared to its [overall] length, that that found in the blue, fin, and hump, but it is not as triangular in shape, possessing a very narrow base for attachment at the roof of the mouth.

The body color of the specimen examined was entirely black, no traces of white were found on any part of the carcass or appendages. In conjunction with the statements made by some authorities, it can be stated, therefore, that this whale is generally black, being perhaps occasionally blotched with white on the ventral region.

This animal, like the hump, is an excellent oil producer for its size. Although there are no exact figures from which to draw conclusions, casual observations made of the blubber and meat indicates that for all practical purposes it is reasonable to figure about one and one-quarter barrels to the foot.

Girth dimensions were not obtained but a conservative estimate would be that the animal weighs approximately three-quarters of a ton per foot, until it exceeds forty-five feet in length, and then allow a ton per foot. The whale apparently eats the same food as the other Mystococeti, because its stomach contained the same specimen of krill found in the abdomens of all the other whales.

Section 15: Flensing and cutting blue and fin whales

The same type of gear is used for pulling up the blue and fin whales that issued on the humpback, except that it is heavier. For fin whales, a seven and one-half inch hawser is used with a single forty-ton winch; this is used in conjunction with the fifteen-ton winch and four-inch hawser. For blue whales, two seven and one-half inch hawsers are used with two forty ton winches; the fifteen ton winch and four-inch hawser are also used. This smaller winch is also known as the fishing winch. It is used to pull the whale one-third out of the water, thus bringing the caudal region within the ramp and enabling the one and three-quarter ton hook to be lowered and clamped on the small of the body and flukes. A single hook is used at all items. When two hawsers are necessary, as for handling blue whales, they are attached to the single shackle of the hook.

The ramp of the *Ulysses* was a convenient factor here. It was steep at its outer extremity and turned sharply to form a rising grade to the flensing deck. This is important, because the greatest strain is taken by the winches after the carcass is free of the water; a gradually graded ramp at the inboard end offers less resistance to the winches than if it is sharply graded throughout its extent. Steep-graded ramps also cause the hook and hawsers to break frequently. This did not happen on the *Ulysses*, but some factories use as many as three hooks in the course of a season merely because the ramp is built too steep.

The fifteen-ton winch aids in pulling the whale by having its hawser attached to the strap on the peduncle of the body, originally placed there by the killer boat. When the carcass is free of the water and the steep section of the ramp, the hawser leading to the fifteen-ton winch is cast free. The carcass ramp is pulled up the remainder of the ramp and to the flensing deck by the forty-ton winch, located on the amidships superstructure.

When pulled to the flensing deck, the carcass assumes a position approximately on one shoulder, about one-quarter of the forward body section being in contact with the deck. A cut is made in the blubber on the ventral region just forward of the flukes. This cut is carried anteriorly along the lower section of the body, just above the deck, and terminates in the blubber just under the point of the chin. A cut is made simultaneously along the upper side, extending along the body to the pectoral fin. This cut encircles the pectoral fin at the shoulder and then continues down to the point of the chin, where it joins the incision that extends along the body near the deck. A cut is now made posteriorly from the chin, along the center of the body, gradually drawing to the side where it terminates just forward of the lower abdomen. The cuts in the blubber are illustrated in the flensing diagrams (App. 3.9 and 3.10)The first strip of blubber is now ready for removal. A square hole is cut in the blubber in the vicinity of the chin and a toggle is inserted. The strap of the toggle is attached to the steel hawser of a deck winch. The flenser commences cutting the forward section of the blubber, a strain being taken by the winch at the same time, and as the flenser frees it from the carcass, the winch pulls it up and maintains a strain. The flenser merely follows along, cutting the blubber free and allowing the winch to drag it off, much as a peeling would be removed from an orange. On whales over sixty-five feet in length, the strip is generally cut just forward of the lower opening, a new insertion is made for the toggle, and then the remainder of the strip is removed from that point to the section just forward of the flukes. This procedure is followed to allow easier handling of the blubber and eliminates the danger of having the blubber strip break. Figure “B_v” indicates the carcass after the first strip of blubber is taken from the ventral region. Another toggle is inserted in the remaining blubber of the mouth and the same procedure followed as before. This removes the last vestige of blubber from the bottom of the mouth, the chest, and belly region. It also takes most of the tongue. On big fin and blue whales, an extra step is necessary to remove the tongue because of its large size and the difficulty encountered in handling it. When this extra step is introduced, a chain is spread on deck; the tongue is cut free from the mouth; pulled free of the carcass by hand hooks and spread over the chain. The chain is then made into a noose around the tongue. One end of the chain is taken to a winch hawser, the strain of the winch causes the chain to close tightly around the tongue and in this way it is removed to the cooking system.

A chain is necessary here because the soft, flabby flesh prevents a steel hawser or rope from gripping it; it is estimated that the tongue of a large fin or blue whale weighs at least a ton.

While the incisions are being made on the ventral area, the necessary steps are being taken to remove the blubber from the dorsal region. A cut is made just off the center of the peduncle ridge on the side of the caudal region forward of the flukes. This incision is made to prevent the blubber strip from breaking as it is removed later. A gash is then made down the center of the back, commencing forward of the dorsal fin and continued anteriorly to the region between the shoulders where a loop is made. This loop is formed for the purpose of holding a toggle that prevents the carcass from sliding across the deck during the act of turning it over. From the loop the cut is carried upward where it joins the incision coming down from the pectoral fin that has been brought over from the ventral region and then continued forward along the side of the rostrum where the blubber is thick enough to allowing cutting. Another incision is brought down and forward from the loop to the opposite side of the rostrum near the deck. A square hole is cut in the blubber on the rostrum, a toggle is inserted, the strap of the toggle is made fast to the hawser of a winch and the blubber is pulled from the body as the flenser loosens it. This strip of blubber removes the covering from the upper edge of the rostrum, and one-half of the dorsal area, to a point forward of the flukes. On large whales the strip is cut in the vicinity of the caudal section and the toggle is reinserted. This is a precaution to eliminate the danger of the blubber breaking and to make it easier to handle.

With the removal of the blubber from the ventral region and one-half of the dorsal area, it is necessary to turn the carcass over in order to remove the blubber from the side of the body that has been resting on deck. A toggle is inserted in the loop of blubber between the shoulders. A chain is attached to the strap of the toggle, led to the hawser of a winch, and a strain is taken, pulling the chain under the body and taut. A strap is passed around the upper pectoral fin, the hawser of a deck winch is made fast to the strap and a strain is taken; a pull is also exerted by another winch on the toggle between the shoulder. This procedure prevents the carcass from sliding sideways, the toggle between the shoulders and chain under the body holds it, while the pull on the upper fin turns the carcass over. Due to its bulk, a carcass never takes up a position flat on the dorsal region; it always rests on one side. This characteristic exposes the blubber that was formerly in contact with the deck. See figure “C_d.” This strip is taken off in one maneuver. With the last strip of blubber gone, the only sections of the body that possess the outer covering are the ventral and dorsal surfaces of the flukes, and the rostrum of the skull from the vicinity of the nostrils to the snout. With the removal of the blubber, the carcass presents a glistening mass of fibrous fat if the whale is in good condition; when whales are thin and emaciated from lack of food, there is no fat beneath the thin blubber, just a light-red meat.

Sometimes the blubber is removed from the belly and chest regions of the ventral side with a minimum amount of meat. This occasionally happens when the whales are thin; the object is to get the blubber off without taking the meat because it takes longer to boil out this blubber and there isn't any oil in the meat. When such procedure is followed, the flenser goes through the same routine as before, but has to cut every foot of blubber away from the underlying meat by short rapid strokes of his knife as the winch pulls the blubber free. The meat is then cut from the carcass, encircle with a chain, on one end of which is a pelican hook, dragged astern to the ramp and dumped overboard by tripping the hook. Factory-system space, steam, and water are saved by this procedure, but it takes approximately three times as long to flense the whale as under ordinary conditions.

The lower jaw is removed on the flensing deck. This step is accomplished by passing a strap around the chin, making fast the hawser of a boom winch and then pulling the lower jaw upward; this allows the severing of the soft jaw muscles on the side of the head and separation from the skull. The mandible is then dragged forward to the cutting deck where the superfluous blubber and flesh are cut off; the two bones are separated at the symphysis section of the chin, dragged singly to a bone saw and cut into portions small enough to enter the bone pressers of the Kværner system.

The baleen or whalebone is also removed on the flensing deck. This is accomplished by cutting under the baleen where it is fastened to the bone of the rostrum, beneath the snout; a strap is passed around the loose tip, made fast to a hawser from a boom winch, and a strain is taken. This pulls the baleen up, the flenser cuts posteriorly underneath the pulpy material by which the whalebone is attached to the bone, and separates the baleen in one strip from the head. The same procedure must be followed in removing the baleen form the opposite side of the mouth. When the baleen is cut free from the head, it is swung over the side of the ship, cut loose, and dropped into the sea. Whalebone was formerly used in the manufacture of various commodities, but is worthless today except in Japan and France. These countries use it for making brushes, etc. Whaling factories abhor the material because it plugs up their factory systems. It might be commercially profitable to save this material but modern factories have no storage space. The length of a strip of baleen depends on the species of whale from which it is procured; the baleen section generally being a few feet shorter than the head. On a large blue whale, for instance, a strip of whalebone would be about fifteen feet long and weigh at least five hundred pounds.

It takes approximately thirty minutes to flense an average size blue whale, and remove the lower jaw and baleen. For a blue whale over ninety feet long it may take between thirty and fifty minutes for the same routine; it being necessary to spend more time removing the blubber and running extra hawsers in turning the carcass over. Under ordinary conditions it takes about twenty minutes to prepare a fin whale for the cutting deck.

After the blubber is removed from the carcass it is dragged to the sides of the flensing deck. If sent to the Kværner system, it is introduced in large chunks or strips; if sent to the Hartman it must be cut into pieces approximately two feet square. The Hartman takes one hour to extract the oil at a filling, one filling containing three tons on the *Ulysses*. The Kværner takes four hours but holds twenty-five tons of blubber at a filling.

It takes approximately forty-five minutes to prepare an average size blue whale for the cutting deck from the time it leaves the water. On the *Ulysses* it was impossible to bring the next whale on the flensing deck until the preceding one had been moved to the cutting platform, unless the specimen was less than seventy-five feet.

A fin can be prepared for the cutting deck in approximately thirty minutes from the time it is taken from the water. When working small fin whales (less than sixty-five feet) it is possible to flense the next whale while the preceding one is on the same deck, because their size allows enough space; the *Ulysses* was handicapped in the Antarctic by her narrow beam. This characteristic was not noticeable during the Australian season because the humpbacks are relatively small when compared to the blue and fin whales.

Cutting up blue and fin whales

Four men constitute the crew for cutting up a blue whale. Three men are equipped with flensing knives, while the fourth handles the straps and gives the necessary hand signals to the winch drivers. It takes approximately one hour to cut up an average size blue whale and just about one hour and thirty minutes elapses from the time a blue whale is taken on the cutting deck until the cutting crew is ready for the next one. However, it would take the *Ulysses* over two hours to clear the cutting deck, when the specimens reached eighty-five feet or above.

The head is taken from the body first; one man performs this operation. A hook, attached to a wire hawser leading to a deck winch, is inserted on the anterior section of the rostrum, a strain is taken from the side and the head is pulled diagonally to the body; the cutter merely cuts through the soft muscles of the neck and separates the skull at the cervical region from the carcass; as the cutter goes through the flesh and bone, the head is pulled more laterally to the body by the steady strain of the winch. Finally, the head is free, it is then pulled to one side, all the superfluous meat is cut free from the skull by two other men and then it goes to one of the bone saws where it is cut into sections small enough to enter the bone pressers. It is necessary to remove the meat form the skulls of the blue and fin whales in order to allow the saw blade to make contact with the bone structure, if this procedure is not followed the saw blade is unable to make a firm contact and is in danger of breaking from bending and excessive vibration.

The caudal section of the body is now removed by cutting through the carcass at the junction of the lumbar-caudal region of just forward of the sex opening. This operation is accomplished by cutting through the meat and backbone of the body while a heavy strain is being exerted on the caudal section by a deck winch taking a pull on a strap which is made fast around the flukes. As the meat cutter goes through the meat, tendons, and backbone, the strain exerted by the winch widens the incision until finally the caudal section is entirely free. This part of the body is stripped of its meat by two men until only the two lobes of the flukes and the caudal region of the backbone remains; the meat is sent to the Kværner system. The lobes of the flukes are cut off and dumped in with the meat, and the remaining section of bone is pulled to a bone saw where it is cut into sections small enough to enter the bone pressers.

With the removal of the head and caudal regions, operations commence on the remainder of the carcass. Due to the massive bulk of the body, it rests on its side, one pectoral fin and one-quarter of the carcass being in contact with the deck, the other pectoral fin is uppermost. An incision is made down the middle of the back from the cervical region to the point where the caudal section of the body was removed; this cut is made right through to the backbone and lays that structure bare, the heavy meat on the lower side falling away as the incision progresses deeper into the dorsal region. Another cut is made on the ventral region of the carcass that extends from the point where the caudal section was removed up along the belly, along the chest, and to the throat. Because of the huge size of the blue whale a toggle is generally inserted in the posterior end of the abdominal region and a large strip of meat is removed that extends from just forward of the navel region to the incision already made at the lumber-caudal area; the removal of this meat tears out that section of the ventral region from the lower opening to the middle of the belly. A strap is now passed around the pectoral fin and a strain is taken by a deck winch hawser; this tension opens the incision in the back and exerts a strain on the connection of the ribs to the dorsal vertebrae, the cutter merely follows this connection with his knife and the steady strain of the winch improves his incision until finally the ribs are torn free from the backbone. The flimsy connection between the sternum and the one pair of ribs that articulates with it is now cut and one-half of the carcass is pulled free by the winch. This half of the carcass consists of one side of the body which is made up of the ribs, pectoral fin, and shoulder girdle. The removal of this section generally drags the contents of the thoracic and abdominal cavities with it so that the backbone and the other half are all that remain. The other half of the ribs is now cut free from the backbone in the same manner as before; this leaves only the dorsal-lumbar region of the backbone and the meat of that region. The meat is separated from the bone by rolling the vertebral column over by means of deck winches and hooks, the meat being cut free as the bone revolves. The bone is finally free, it is pulled off to one side by winches, leaving nothing but a huge mat of meat about forty feet long, fifteen feet wide, and two feet thick. A cubic foot of blue whale meat weighs seventy pounds.

Due to the extreme size of the neural spine on the dorsal and lumbar regions of the blue whale backbone, a special procedure must be carried out before this bone can be handled by the bone saw. This procedure consists of arranging the backbone out in a straight line and stapling the posterior end of the lumbar region to a stanchion, thus preventing the bone from moving. A specially designed hook with a cutting edge constructed on the inner curved section is then inserted in the neural canal above the centrum. The hook is pulled by a winch in such a manner that it moves parallel to the centrum and cuts the neural spine free from the transverse process and centrum at the point of juncture with the neural canal. The hook is pulled down one side and then shifted over to the opposite side, and the same procedure followed. This causes the neural projections to be cut down. The remains are later pulled to the bone saws and cut into sections small enough to enter the bone pressers.

The same procedure is used in cutting up a fin whale that is followed in cutting up the blue whale except that the cutting hook does not have to be run along the dorsal-lumbar region of the backbone, and the extra strip of meat cut out of the ventral region between the navel and lower opening. The head of the fin whale is also smaller than that of the blue and can be disposed of more easily. It takes between thirty-five and forty-five minutes to cut up a fin whale and about one hour elapses between the moment a fin whale comes on the cutting deck until the dissecting crew is ready for the next one.

The sides of the body consisting of the ribs, shoulder girdle, and pectoral fins are pulled off to one side and hoisted into the air by a boom winch. The meat is cut free. The ribs are separated by cutting through the flesh between them, and finally nothing remains but the shoulder girdle and pectoral fin to which the wire strap is still attached. The shoulder girdle is cut free from the fin, which is thrown overboard. The meat, ribs, and other remains are dumped into the Kværner system.

On the cutting deck there are various groups performing routine details under the direction of a foreman. Two men are engaged at all times in cutting up the sides of the carcass after they have been dissected into sections by the main group of cutters which consisted of four men. Three more men are engaged in pulling the meat, bones, and entrails to the Kværner system.

Six men move about the cutting deck and pull the pieces of bones from the bone saw to the bone pressers. One man works a bone saw, with the aid of an assistant. One man has charge of securing the Kværner system from deck when it has been filled, and to open it again when the cooking out process is completed. One man has charge of securing the bone pressers when filled and of opening them when empty. Three winch drivers handle the five winches on the forward platform. Five men handle the eight winches on the amidships structure.

Appendix 1: *Ulysses* Expedition chronology, April 1937 to April 1938

Distance: 29,000 Mile Voyage
Result: 3,665 Whales Killed
Observer: Lieutenant (junior grade) Quentin Walsh, on special assignment from Coast Guard Headquarters to enforce whaling treaty.

May 1, 1937	---	Departed N.Y. on Swedish Liner, *Gripsholm*
May 11, 1937	--	Arrived Göteborg, Sweden
May 26, 1937	--	Boarded Ulysses in shipyard dry dock
June 11, 1937	-	Departed Göteborg
June 12, 1937	-	Arrived Sandefjord, Norway
June 13, 1937	-	Departed Sandefjord
June 15, 1937	-	Arrived Southampton, England
June 16, 1937	-	Departed Southampton
June 17, 1937	-	Big fire in ship's fireroom
June 20, 1937	-	Passed Gibraltar
June 26, 1937	-	Arrived Port Said, Egypt
June 26, 1937	-	Transited Suez Canal
June 30, 1937	-	In Red Sea; sand storm; 98° F., midnight
July 2, 1937	--	Off Yemen; taking fuel oil from taker
July 4, 1937	--	Gulf of Aden, buried crewman at sea
July 6, 1937	--	Rounded Socotra; entered Indian Ocean
July 8, 1937	--	Another fire; cut plate out of starboard side due to heat below decks
July 10, 1937	-	Crossed Equator – 66° 11′ East
July 12, 1937	-	Arrived – departed Diego Garcia; Chagos Archipelago
July 22, 1937	-	Killed ten of thirty pigs aboard
July 24, 1937	-	Arrived West Coast of Australia
Oct. 5, 1937	--	Catastrophic Fire aboard *Ulysses* – Powder magazine blew-up
Oct. 9, 1937	--	Departed Australia
Oct. 31, 1937	-	Arrived Simons Town, South Africa
Nov. 2, 1937	-	Visited Cape Town, South Africa
Nov. 10, 1937	-	Departed Simons Town, South Africa
Nov. 13, 1937	-	Arrived Walvis Bay, Southwest Africa
Nov. 27, 1937	–	Departed Walvis Bay
Nov. 30, 1937	-	Arrived Cape Town, South Africa – fuel
Dec. 1, 1937	--	Departed Cape Town for Antarctica

Dec. 5, 1937	--	In the "Roaring Forties" – rough
Dec. 8, 1937	--	Pack Ice and Icebergs (huge)
Dec. 9, 1937	--	Commenced killing whales, Weddell Sea, Antarctica
March 16, 1938	-	Terminated whale operations
March 18, 1938	-	Departed Weddell Sea for New York
April 11, 1938	-	Arrived New York

Appendix 2: Daily records of the Antarctic season

In order to abridge the Antarctic section of the expedition's cruise, some material from the inspector's daily log is included. Various and sundry remarks, entered daily and pertaining to legal and scientific discussions, are omitted to abbreviate the record.

The primary reasons for submitting the whale catch data in detail are to allow certain conclusions to be drawn, if graphs are constructed depicting the outline of daily operations, and because some of the material may be of interest to different governmental departments, or to scientific groups.

The ship's position, meteorological data, and ice information represent the conditions that existed at noon. The date indicates the day on which the entries were made; to obtain the actual working day "one" should be subtracted from each date figure as entered.

The *Ulysses* commenced the Antarctic operations on December 8, 1937, in a position approximately fourteen hundred miles south of the Cape of Good Hope, and sailed various courses and speeds while traversing various areas in a general direction of south and west, concluding operations on March 15, 1938, in approximately 65° S, 30° W. It is estimated the factory ship covered about five thousand miles during the Antarctic operations.

The Antarctic whaling operations commenced under the requirements of the Whaling Treaty Act; but, in accordance with the Western Operating Corporation's own volition the expedition assumed the obligations of the International Agreement for the Regulation of Whaling on December 13, 1937. However, the factory did not adhere to the requirements which had been voluntarily accepted, and which the United States could not enforce because a sufficient number of nations had failed to ratify it. The result was that the *Ulysses* used only the portions of the carcass required by the Whaling Treaty Act when the whales were abundant. The *Ulysses* also adhered to the length requirements set forth in the International Agreement for the Regulation of Whaling because these limits were demanded in the contracts between the gunners and the owners.

The climactic conditions existing in the various areas worked by the *Ulysses* were not extremely cold, but they were very disagreeable. It was foggy, cloudy, or stormy weather approximately eighty-five per cent of the time. The sun was not visible from February 16 until March 22, except for occasional breaks in the clouds; the longest period of sunshine enjoyed at any time was about six hours, and that occurred on

Christmas Day. There was plenty of snow, but no rain; and fog was abundant, especially during the month of March.

During this season the whales were hunted while day light prevailed, which was practically twenty-four hours a day; the factory ship worked in two shifts for twenty-four hours. Severe storms, fog, or snow occasionally prevented the killer boats from hunting, but nothing allowed any rest or relaxation for the personnel of the factory ship. When whales were not being worked, the crew was engaged in overhauling rigging, splicing wire, washing down, etc.; nothing broke the monotony or offered diversion. Christmas Eve was observed by stopping work for six hours, and this was the only time the crew of the *Ulysses* paused for rest and amusement during the entire Antarctic season. The rest of the time found each day repeating the one before it by the same schedule of work and endless monotony.

The inspector was generally on or about deck from about eight-thirty in the morning until five or six in the evening, and frequently took a walk on the decks at night. On several occasions, when certain information was desired it was necessary to remain on deck between eighteen and twenty hours. This was done merely to check conclusions derived from certain figures and to allow positive and exact statements to be made concerning the operations of the *Ulysses*.

Needless to state, it is impossible for one inspector to completely check the operations of a modern factory ship. Two inspectors should be present, or the expedition's personnel should be imbued with the requirements, observance, and acceptance of the law. The attitude existing at the present time creates the opinion that anything is legal if the inspector is not actually present to observe and verify it.

The information indicates the daily operations' results and the position and meteorological conditions of each day that existed at noon. The meteorological information and filling records are omitted for the month of March because they are practically the same as the previous months.

DAILY RECORD OF ANTARCTIC SEASON
ULYSSES EXPEDITION 1937-1938
MONTH OF DECEMBER, 1937

	Whales Killed Daily			Whales Flensed Daily			Whales in Water /0600	Barrels of Oil Daily	Daily Footage		
Date	Blue	Fin	Hump	Blue	Fin	Hump			Blue	Fin	Hump
8	14	3	0	9	3	0	5	560	727	204	0
9	13	0	0	14	0	0	4	1600	1133	0	0
10	21	0	1	17	0	1	8	1920	1376	0	50
11	16	5	0	17	4	0	8	1760	1377	284	0
12	19	10	0	19	5	0	13	2000	1492	332	0
13	8	1	0	13	6	0	3	1600	1036	427	0
14	8	7	0	10	6	0	2	1360	781	408	0
15	16	0	0	13	2	0	3	1200	1039	123	0
16	22	1	0	17	1	0	8	1600	1338	72	0
17	23	4	0	17	3	0	15	1840	1373	206	0
18	11	2	0	18	3	0	7	1680	1427	203	0
19	20	0	0	18	0	0	9	1760	1422	0	0
20	14	0	0	17	0	0	6	1600	1368	0	0
21	14	1	0	17	0	0	4	1680	1377	0	0
22	24	0	0	17	1	0	10	1840	1405	56	0
23	24	0	0	19	0	0	15	1840	1541	0	0
24	7	0	0	10	0	0	12	1520	855	0	0
25	6	5	0	15	1	0	7	1680	1239	67	0
26	20	3	0	14	4	0	12	1280	1112	292	0
27	15	7	0	11	4	0	19	1840	876	288	0
28	7	6	0	14	6	0	12	1680	1125	425	0
29	5	3	1	9	5	1	4*	1280	725	351	43
30	15	0	0	12	3	0	4	1520	1041	292	0
31	13	0	0	10	0	0	7	800	774	0	0
Total	355	58	2	347	57	2		37,440	27,959	4030	93

*Two whales lost this date in gale.

DAILY RECORD OF ANTARCTIC SEASON
ULYSSES EXPEDITION 1937-1938
MONTH OF JANUARY, 1938

	Whales Killed Daily			Whales Flensed Daily			Whales in Water /0600	Barrels of Oil Daily	Daily Footage		
Date	Blue	Fin	Hump	Blue	Fin	Hump			Blue	Fin	Hump
1	7	0	0	14	0	0	0	1520	1133	0	0
2	11	2	1	10	2	1	1	1200	827	145	46
3	4	20	1	3	17	1	5	1600	238	1203	43
4	4	14	3	7	13	3	3	1360	546	922	118
5	2	18	0	2	21	0	0	1360	138	1478	0
6	9	0	0	9	0	0	0	960	724	0	0
7	12	9	0	9	6	0	6	1200	762	410	0
8	4	10	0	7	11	0	2	1520	542	773	0
9	4	17	1	3	16	1	4	1200	229	1079	40
10	4	29	0	4	20	0	13	1440	323	1369	0
11	1	6	0	2	18	0	0	1360	157	1241	0
12	13	6	0	10	3	0	6	1120	804	206	0
13	10	10	2	9	7	2	10	1520	707	493	72
14	5	18	0	7	12	0	14	1440	528	838	0
15	2	26	0	4	22	0	16	1360	310	1481	0
16	4	5	0	2	18	0	5	1280	159	1230	0
17	6	8	1	6	9	1	4	800	493	624	50
18	0	0	0	0	0	0			0	0	0
							4Fenders	560*			
19	0	2	0	0	0	0			0	0	0
							2Fenders	0			
20	1	3	0	0	2	0			0	135	0
							3Fenders	0			
21	6	5	0	3	4	0	6	160	248	292	0
22	2	2	0	4	4	0	2	1120	323	295	0
23	5	9	0	4	3	0	7	320	319	212	0
24	2	22	0	3	20	0	8	1600	251	1428	0
25	0	13	0	0	21	0	0	1280	0	1438	0
26	3	18	0	3	18	0	0	1360	240	1244	0
27	1	7	0	1	7	0	0	480	76	492	0

28	2	22	0	2	22	0	0	1200	153	1469	0
29	1	20	0	1	18	0	2	800	84	1233	0
30	0	1	0	0	3	0	0	560	0	215	0
31	0	4	3	0	3	3	0	0	0	183	133
Total	124	326	12	129	320	12		31,680	10,314	22,128	502

*Oil in factory system.
(Whales lost or used as fenders not shown. Noted in log report)

DAILY RECORD OF ANTARCTIC SEASON
ULYSSES EXPEDITION 1937-1938
MONTH OF FEBRUARY, 1938

	Whale Killed Daily			Whales Flensed Daily			Whales in Water /0600	Barrels of Oil Daily	Daily Footage		
Date	Blue	Fin	Hump	Blue	Fin	Hump			Blue	Fin	Hump
1	0	11	6	0	10	3	3	720	0	684	120
2	0	3	0	0	3	3	0	560	0	212	133
3	2	13	0	2	13	0	0	480	158	838	0
4	1	14	3	1	12	2	3	880	80	804	83
5	3	20	4	1	12	5	12	800	72	856	197
6	2	18	0	4	16	0	12	1680	306	1141	0
7	5	26	0	3	20	0	20	1520	230	1405	0
8	0	4	2	2	22	2	0	1440	166	1461	78
9	0	22	1	0	13	1	9	640	0	888	0
10	0	17	0	0	26	0	0	1360	0	1723	0
11	0	8	0	0	8	0	0	480	0	560	0
12	1	15	0	1	14	0	1	880	80	950	0
13	8	4	0	5	6	0	3	560	402	320	0
14	12	3	0	15	0	0	3	1840	1203	0	0
15	2	11	0	2	13	0	1	1440	161	896	0
16	5	6	0	5	4	0	3	800	411	265	0
17	4	12	1	3	14	1	2	1200	236	968	38
18	6	9	0	7	4	0	6	1120	542	282	0
19	3	22	3	2	8	2	18	720	149	549	75
20	0	33	0	1	25	1	24	1600	70	1671	40

21	0	17	3	0	25	1	22	1600	0	1594	30
22	2	20	1	1	22	3	18	1440	86	1425	112
23	0	9	1	1	23	0	4	1440	80	1562	0
24	1	23	0	1	18	1	9	1040	70	1227	45
25	0	19	3	0	24	3	0	1600	0	1599	106
26	2	8	1	2	8	1	0	800	160	562	38
27	0	25	1	0	23	1	2	1120	0	1523	44
28	2	40	0	2	25	0	17	1760	168	1691	0
Total	61	432	30	61	410	30		31,520	4,830	27,656	1,180

3 sperms were killed during February, not flensed, used as fenders.
1 Right whale killed during February, flensed.

DAILY RECORD OF ANTARCTIC SEASON
ULYSSES EXPEDITION 1937-1938
MONTH OF MARCH, 1938

	Whale Killed Daily			Whales Flensed Daily			Whales in Water /0600	Barrels of Oil Daily	Daily Footage		
Date	Blue	Fin	Hump	Blue	Fin	Hump			Blue	Fin	Hump
1	1	19	0	1	24	0	12	1760	90	1637	0
2	5	23	0	5	22	0	13	1600	382	1474	0
3	1	8	0	1	20	0	1	1280	82	1340	0
4	2	12	0	2	12	0	1	1120	154	849	0
5	0	7	0	0	8	0	0	960	0	552	0
6	1	1	0	1	1	0	0	0*	76	75	0
7	0	13	0	0	13	0	0	640	0	890	0
8	0	11	3	0	11	3	0	640	0	601	102
9	0	15	0	0	15	0	0	1360	0	1146	0
10	2	12	0	2	12	0	0	1040	165	855	0
11	1	3	0	1	2	0	1	320	84	122	0
12	0	2	0	0	3	0	0	240	0	193	0
13	0	5	0	0	5	0	0	80	0	349	0
14	0	0	0	0	0	0	0	400**	0	0	0
15	1	8	0	1	3	0	0	0**	75	196	0
Total	14	139	3	14	151	3		11,440	1,108	10,279	102

* Oil remained in system.
** Oil derived from system.
*** 200 barrels taken from factory system after season ended.

CAPITULATION OF ALL WHALES – ANTARCTIC SEASON

ULYSSESS EXPEDITION, 1937-1938

WHALES	KILLED	FLENSED	LOST, FENDERS, BLASTED, ETC.	TOTAL (ACCOUNTED)
Blue	554	551	3	554
Fin	955	941	14	955
Hump	47	47	0	47
Sperm	3	0	3	3
Right	1	1	0	1
Total	1560	1540	20	1560

12,280 barrels of oil obtained for the Antarctic Season.

December 9, 1937

NOON POSITION:		56°07S;	12°53E;	BAROMETER:	29:20;	TEMPERATURE:	32°F
SEA:	Smooth:	SKY:	Overcast, bc.;	WIND: NW-2;		Bergs, pack ice.	

FILLINGS

Kværner	8	Forward	Kværner	5	Mid
Press	14	- - - - - - -	Hartman	41	Blubber
Kværner	4	Blubber			

December 10, 1937

NOON POSITION:		56°14S;	12°18E;	BAROMETER:	29:40;	TEMPERATURE:	34°F
SEA:	Smooth:	WIND:	W-4;	Bergs and pack ice.			

FILLINGS

Kværner	14	Forward	Kværner	12	Mid
Press	24	- - - - - - -	Hartman	48	Blubber
Kværner	4	Blubber			

December 11, 1937

NOON POSITION:		65°06S;	11°30E;	BAROMETER:	29:50;	TEMPERATURE:	30°F
SEA:	Smooth:	SKY:	Overcast;	WIND: W;		Pack ice, bergs.	

FILLINGS

Kværner	18	Forward	Kværner	15	Mid
Press	23	- - - - - - -	Hartman	52	Blubber
Kværner	4	Blubber			

December 12, 1937

NOON POSITION: 55°57S; 11°11E; BAROMETER: 29:07; TEMPERATURE: 30°F
SEA: Smooth: SKY: Overcast; WIND: NW, light; Pack ice and bergs.

FILLINGS

17	Kværner, forward	17	Kværner, mid
25	Press - - - - - - -	52	Hartman blubber

Kværner 4 Blubber

December 13, 1937

NOON POSITION: 56°01S; 10°39E; BAROMETER: 29:20; TEMPERATURE: 31°F
SEA: Smooth: SKY: Overcast; cloudy, foggy, snow WIND: NW, light; Pack ice and bergs

FILLINGS

17	Kværner, forward	16	Kværner, mid, meat, bone
25	Press, bones	60	Hartman, blubber

Kværner 4 Blubber

December 14, 1937

NOON POSITION: 55°49S; 10°34E; BAROMETER: 29:25; TEMPERATURE: 30°F
SEA: Smooth: SKY: Overcast; fog; WIND: WNW or NW, light; Pack ice, bergs.

FILLINGS

16	Kværner, forward, meat bones	15	Kværner, mid, meat, bone
24	Press, bones	58	Hartman, blubber

Kværner 4 Blubber

Note: New law became effective afternoon of this date (December 13, 1937).

December 15, 1937

NOON POSITION: 55°58S; 10°34E; BAROMETER: 28:50; TEMPERATURE: 31°F
SEA: Smooth, but swell coming up from NW. SKY: Overcast, foggy; WIND: NW-4.
Pack ice and bergs.

FILLINGS

15	Kværner, forward, meat, bone	11	Kværner, mid, meat, bones
28	Press, bones	54	Hartman, blubber
Kværner	4	Blubber	

December 16, 1937

NOON POSITION: 56°18S; 9°30E; BAROMETER: 28:65; TEMPERATURE: 31°F
SEA: NW swell: SKY: Overcast; fog, snow; WIND: W-5; Pack ice, bergs;

FILLINGS

14	Kværner, forward	11	Kværner, mid, meat, bone
26	Press, bones	46	Hartman, blubber (aft)
Kværner	4	blubber (aft)	

REMARKS: *Kos 9* commenced working with this factory late today.

December 17, 1937

NOON POSITION: 55°57S; 11°2E; BAROMETER: 29:40; TEMPERATURE: 30°F
SEA: Smooth: SKY: Overcast; WIND: W-3; Pack ice, bergs.

FILLINGS

16	Kværner, forward, meat	16	Kværner, mid, meat
28	Press, bones	52	Hartman, blubber

Kværner 3 blubber (aft)

REMARKS: Violation; killed a 65′ bull blue whale this date (killed 16th).
Three fetuses found this date; not recorded.
Kos 1 and *2* commenced working this date.

December 18, 1937

NOON POSITION: 55°50S; 10°32E; BAROMETER: 29:15; TEMPERATURE: 31°F
SEA: Smooth, SKY: Overcast, snow; WIND: NW-2. Pack ice and bergs.

FILLINGS

18 Kværner, forward, meat, bone
14 Kværner, mid, meat, bones
27 Press, bone
54 Hartman, blubber
Kværner 4 blubber

REMARKS: Took up 8 whales from 0600 to 1800; 12 from 1800 to 0600.

December 19, 1937

NOON POSITION: 55°50S; 10°14E; BAROMETER: 28:42; TEMPERATURE: 31°F
SEA: Swell from WNW; SKY: Overcast; WIND: SW-2; Pack ice and bergs;

FILLINGS

18 Kværner, forward, meat, bone
16 Kværner, mid, meat, bone
28 Press, bone
54 Hartman, blubber
Kværner 4 blubber

REMARKS: On Sunday, December 19, 1937, the *Ulysses* threw the dorsal lumbar region of several carcasses over the side; this region contained back bone and meat, complete.

I went out on *Kos 6* today to observe operating; conditions of killing blue, fin, etc; system of navigation used.

December 20, 1937

NOON POSITION: 55°43S; 9°21E; BAROMETER: 29:70; TEMPERATURE: 30°F
SEA: Smooth, SKY: Overcast; fog, snow; WIND: N-3; Pack ice and bergs.

FILLINGS

20	Kværner, forward, meat	25	Kværner, mid, meat
26	Press bone	53	Hartman, blubber
	Kværner	4	blubber

REMARKS: Worked 8 whales from 0600 to 1800, 10 from 1800 to 0600. *Kos 9* killed a 60 foot blue whale today, but the ship's records do not indicate it. Spoke to manager about these two short whales. Mast of *Ulysses* received radio from Norway to make gunner abide by the foot limits.

December 21, 1937

NOON POSITION: 55°46S; 9°23E; BAROMETER: 29:60; TEMPERATURE: 32°F
SEA: Smooth; SKY: Overcast, fog; Pack ice and bergs;

FILLINGS

17	Kværner, forward, meat	15	Kværner, mid, meat
30	Press, bone	51	Hartman, blubber
	Kværner	3	blubber

REMARKS: Violation: killed a bull 60' blue whale. Failed to record a male fetus. Seven whales worked from 0600 to 1800; 10 from 1800 to 0600.

<u>December 22, 1937</u>

NOON POSITION: 56°13S; 9°42E; BAROMETER: 29:20; TEMPERATURE: 31°F
SEA: Smooth, SKY: Overcast, rain; WIND: N-4; Pack ice, bergs.

<u>FILLINGS</u>

19 Kværner, forward, meat 13 Kværner, mid, meat
28 Press, bones 53 Hartman, blubber
Kværner 4 blubber

REMARKS: Violation: Failed to record a female fetus. Threw meat of the lumbar dorsal region over the side, unaccounted for.

<u>December 23, 1937</u>

NOON POSITION: 56°26S; 10°9E; BAROMETER: 29:14; TEMPERATURE: 32°F
SEA: Smooth; SKY: Overcast; WIND: N-5; Pack ice, bergs;

<u>FILLINGS</u>

20 Kværner, forward, meat 16 Kværner, mid, meat
26 Press, bone 52 Hartman, blubber
Kværner 4 blubber

REMARKS: Threw 2/3 of dorsal lumbar region over the side. Worked 8 whales from 0600 to 1800; 10 from 1800 to 0600.

<u>December 24, 1937</u>

NOON POSITION: 56°28S; 10°10E; BAROMETER: 29:30; TEMPERATURE: 30°F
SEA: Smooth; SKY: Broken, mostly overcast; WIND: SW-3; Pack ice, bergs

<u>FILLINGS</u>

19 Kværner, forward, meat 16 Kværner, mid, meat
26 Press, bone 54 Hartman, blubber

Kværner 3 blubber

REMARKS: Worked 8 whales worked from 0600 to 1800; 11 from 1800 to 0600.

December 25, 1937

NOON POSITION: 56°40S; 10°50E; BAROMETER: 29:35; TEMPERATURE: 36°F
SEA: Smooth, SKY: Snow, overcast; WIND: WNW-4; Pack ice, bergs.

FILLINGS

14	Kværner, forward, meat	12	Kværner, meat
22	Press bone	40	Hartman, blubber

Kværner 4 blubber

REMARKS: Failed to record a male fetus this date. Threw meat of back over side. Stopped work at 1750 this date for six hours for Christmas Eve. Nothing accomplished when turned to again.

December 26, 1937

NOON POSITION: 56°47S; 11°11E; BAROMETER: 29:11; TEMPERATURE: 30°F
SEA: Smooth; SKY: Warm, clear WIND: S-1; Pack ice, bergs;

FILLINGS

16	Kværner, forward, meat	15	Kværner, mid, meat
27	Press, bone	42	Hartman, blubber

Kværner 3 blubber

REMARKS: Threw all sections of these whales over side except the blubber, head, and caudal region. Whales were rotten from standing so long. Men failed to work as planned by manager. Failed to record fetus of whale used.

December 27, 1937

NOON POSITION: 56°45S; 11°23E; BAROMETER: 28:70; TEMPERATURE: 32°F
SEA: Smooth, WIND: S-2; SKY: Clear; Pack ice, bergs.

FILLINGS

16	Kværner, forward, meat	13	Kværner, mid, meat
27	Press, bone	46	Hartman, blubber
	Kværner 3 blubber		

REMARKS: Spoke to captain, manager on December 26, 1937, concerning use of large number of whales. Manager stated ship could not use over 16 whales per day. Also stated bone pressers held 10 tons. Hansen stated they held 9 tons. Alopen stated Hartman holds 3 tons, Hansen figured they killed 6 tons. Worked 10 blue whales from 1800 to 0600.

December 28, 1937

NOON POSITION: 56°32S; 11°01E; BAROMETER: 29:08; TEMPERATURE: 32°F
SEA: Smooth; SKY: Overcast; WIND: SSW-3; Pack ice, bergs;

FILLINGS

19	Kværner, forward, meat	16	Kværner, mid.
29	Press, bone	52	Hartman, blubber
	Kværner 4 blubber		

REMARKS: On this working date of December 27, 1937, they flensed 6 whales and had one in the ship; they cut up only five; this all in time from 0600 to 1800. Took up eight whales from 1800 to 0600 this date; some change from past. Even now they threw over all the meat of every whale of the dorsal lumbar region. Was on deck from 0830 December 27, 1937, to 0500 December 28, to check operations and no whale overboard this date except the dorsal lumbar region meat of back.

December 29, 1937

NOON POSITION: 56°33S; 11°36E; BAROMETER: 29:50; TEMPERATURE: 32°F
SEA: Smooth, WIND: SW-2; SKY: Overcast; Pack ice, bergs.

FILLINGS

16	Kværner, forward, meat	13	Kværner, mid, meat
28	Press, bone	50	Hartman, blubber

Kværner 3 blubber

REMARKS: Worked 10 blue whales from 0600 to 1800; and ten from 1800 to 0600. I was not on deck today as I was on deck all night. Spoke to Captain today and told him they are using too many whales and that they are throwing carcasses over at night and that they are not using the meat of the back; and that I have seen all those conditions. Failed to record a fetus, male, this date/ I saw it float past stern.

December 30, 1937

NOON POSITION: 56°39S; 12°13E; BAROMETER: 28:50; TEMPERATURE: 31°F
SEA: Rough; SKY: Overcast; Snow, gale; WIND: N-6; Pack ice, bergs;

FILLINGS

16	Kværner, forward, meat	10	Kværner, mid, meat
25	Press, bone	38	Hartman, blubber

Kværner 3 blubber

REMARKS: Lost 2 whales in gale this working day. These were fin whales. Two twin fetuses found in a fin whale this date. Heavy gale blew on morning of this working date. Trouble with hoisting winches; all factors tended to cut down number of whales used.

December 31, 1937

NOON POSITION:	57°06S;	12°06E;	BAROMETER:	29:00;	TEMPERATURE:	36°F
SEA: Smooth,	WIND: NNW-3;		SKY: Overcast;		Pack ice, bergs.	

FILLINGS

17	Kværner, forward, meat	13	Kværner, mid, meat
27	Press, bones	45	Hartman, blubber
	Kværner 4 blubber		

REMARKS: *Bull* killed a 66 foot male on 30 December, 1937. Fetus on deck; but not recorded; was a male fetus. In checking whales here you have to be at slip when taken up; the buoy boats generally carry them so you cannot ascertain length before being pulled aboard.

January 1, 1938

NOON POSITION:	57°34S;	12°14E;	BAROMETER:	28:80;	TEMPERATURE:	30°F
SEA: Smooth;	WIND: NW-4;		SKY: Overcast;		Numerous bergs;	

FILLINGS

9	Kværner, forward, meat	8	Kværner, mid, meat
15	Press	4	Hartman, blubber
	Kværner 3 blubber		

REMARKS: *Vikingen* alongside this date. Crew engaged overhauling rigging, handling lines, etc. It takes *Ulysses* about 2 hours to dispose of one blue whale from flensing deck to boilers. Takes about one hour to work a blue whale on the cutting deck, until ready for the next one. It takes thirty minutes to take off lower jaw bone, blubber, and the baleen.

January 2, 1938

NOON POSITION: 57°30S; 12°22E; BAROMETER: 28:37; TEMPERATURE: 30°F
SEA: Smooth, WIND: N-2; SKY: Overcast, snow; Ice packs, bergs.

FILLINGS

15	Kværner, forward, meat	13	Kværner, mid, meat
29	Press, bone	33	Hartman, blubber

Kværner 3 blubber

REMARKS: Threw the dorsal lumbar region of the three whales used as fenders over the side. Permission requested and granted because they were blasted. Therefore, the equivalent of about 12 whales went to system.

On the working date of January 1, 1938, gave permission to throw dorsal-lumbar region of back over of three whales. They had been used as fenders for *Vikingen* and were blasted. Caudal region, ribs, shoulder, head had been removed. This is first date I have seen *Ulysses* use some back meat except at date of new law.

January 3, 1938

NOON POSITION: 57°50S; 14°01E; BAROMETER: 28:80; TEMPERATURE: 33°F
SEA: Smooth; WIND: WNW-4; SKY: Overcast; Ice bergs, small ice, counted 51 bergs on starboard side this p.m.

FILLINGS

13	Kværner, forward, meat	10	Kværner, mid, meat
27	Press, bone	18	Hartman, blubber

Kværner 4 blubber

REMARKS: Worked three whales this working date from 0600 to 1800; 13 whales from 1800 to 0600; this included two fin and the hump.

January 4, 1938

NOON POSITION: 57°14S; 13°50E; BAROMETER: 29:10; TEMPERATURE: 32°F
SEA: Smooth, WIND: W-2; SKY: Cloudy; Ice bergs.

FILLINGS

17	Kværner, forward, meat	14	Kværner, mid, meat
28	Press bone	41	Hartman, blubber
	Kværner 3 blubber		

REMARKS: At 1500, January 3, 1938, 7 fins, 1 blue aft. 1 fin in ramp; one fin flensed, ready to cut. Took up five whales to 1500 from 0600. Large number of fin whales used but believe all right. Threw away meat of dorsal lumbar region of all whales during day. Takes about 20 to 25 minutes to flense a fin; takes 45 minutes to dispose of a fin whale on cutting deck.

January 5, 1938

NOON POSITION: 57°03S; 12°50E; BAROMETER: 29:55; TEMPERATURE: 32°F
SEA: Smooth; WIND: W-3; SKY: Cloudy;Ice bergs.
51 bergs on starboard side this p.m.

FILLINGS

16	Kværner, forward, meat	13	Kværner, mid, meat
27	Press, bone	42	Hartman, blubber
	Kværner 3 blubber		

REMARKS: Threw dorsal lumbar meat overboard as usual procedure. Whales track from east to west in Antarctic. Fin whales back from the ice; found in large numbers one day and entirely gone the next. Blue whales generally found in and about the ice.

<u>January 6, 1938</u>

NOON POSITION: 56°40S; 11°29E; BAROMETER: 29:26; TEMPERATURE: 31°F
SEA: Slight swell, WIND: N-4; SKY: Overcast; Ice bergs.

<u>FILLINGS</u>

17	Kværner, forward, meat	14	Kværner, mid, meat
28	Press, bone	30	Hartman, blubber

Kværner 3 blubber

REMARKS: *Kos 9* killed a 65 foot male this working date of January 5, 1938. *Ulysses* can handle twice as many fin whales because it takes less time to cut them up; their carcass is smaller and parts of body can be disposed of much faster; such as, head, back bone, tail, etc.; fin whales, being smaller, do not fill of clog up factory system like the blue whale. Threw over meat of back as usual and wouldn't be surprised if they dumped sections of carcass at night.

<u>January 7, 1938</u>

NOON POSITION: 57°03S; 10°55E; BAROMETER: 29:02; TEMPERATURE: 30°F
SEA: Swell; WIND: W-5; SKY: Overcast, snow hail; Ice cakes.

<u>FILLINGS</u>

11	Kværner, forward, meat	11	Kværner, mid, meat
22	Press, bone	3	Kværner, blubber

REMARKS: From this day's work it is practical to set forth the following weights for blue whales; as nine were worked and the system had only blue. Average length of whale: 80 feet.

Blubber weight	8.3 tons *
Bone	41.0
Meat	16.0 (that went in system)

Meat over 5.0 (at least)

115.3 tons, or 1.4 tons per foot.

Also note on this date that 47 tons more of whale was used than the theoretical figures indicate; they threw the meat over on this date also; the baleen and pectoral fin besides the scapulas went over the side, also.

January 8, 1938

NOON POSITION: 57°26S; 08E; BAROMETER: 29:04; TEMPERATURE: 30°F
SEA: Smooth, WIND: W-2; SKY: Overcast; Ice, cake and bergs.

FILLINGS

12	Kværner, forward, meat	10	Kværner, mid, meat
23	Press, bone	36	Hartman, blubber

Kværner 3 blubber

January 9, 1938

NOON POSITION: 57°25S; 9°42E; BAROMETER: 29:16; TEMPERATURE: 31°F
SEA: Smooth; WIND: W-5; SKY: Overcast; Scattered bergs, small cakes ice;

FILLINGS

17	Kværner, forward, meat	19	Kværner, meat
29	Press, bone	49	Hartman, blubber

Kværner 3 blubber

January 10, 1938

NOON POSITION: 57°14S; 8°98E; BAROMETER: 28:60; TEMPERATURE: 31°F
SEA: Smooth, later swells from NW; WIND: N-3; SKY: Overcast; Snow, bergs

FILLINGS

13	Kværner, forward, meat	14	Kværner, mid, meat
26	Press, bone	5	Hartman, blubber

Kværner 3 blubber

January 11, 1938

NOON POSITION: 57°19S; 8°31E; BAROMETER: 29:15; TEMPERATURE: 32°F
SEA: Smooth, WIND: W-2; SKY: Overcast; Scattered bergs;

FILLINGS

15	Kværner, forward, meat	16	Kværner, mid, meat (blubber)*
26	Press, bone	5	Kværner, blubber

*This is not listed, but I saw it going in.

January 12, 1938

NOON POSITION: 57°18S; 8°15E; BAROMETER: 29:17; TEMPERATURE: 31°F
SEA: Smooth; WIND: NNW-1; SKY: Overcast; Scattered bergs.

FILLINGS

16	Kværner, forward, meat	15	Kværner, mid, meat
26	Press, bone	4	Kværner, mid, blubber

January 13, 1938

NOON POSITION: 57°50S; 8°07E; BAROMETER: 29:14; TEMPERATURE: 32°F
SEA: Smooth; WIND: W-1; SKY: Overcast; Scattered bergs.

FILLINGS

12	Kværner, forward, meat	10	Kværner, mid, meat (blubber)*
24	Press, bone	16	Hartman, blubber

Kværner 4 blubber (aft)

*Using amidships for blubber too.

January 14, 1938

NOON POSITION: 57°54S; 8°09E; BAROMETER: 29:11; TEMPERATURE: 35°F
SEA: Smooth, No Wind; SKY: Overcast; Ice, scattered bergs;

FILLINGS

15	Kværner, forward, meat	10	Kværner, mid, meat (blubber)
27	Press, bone	32	Hartman, blubber

Kværner 4 blubber (aft)

January 15, 1938

NOON POSITION: 57°44S; 7°44E; BAROMETER: 29:21; TEMPERATURE: 34°F
SEA: Smooth; WIND: W-1; SKY: Overcast; Snow; Scattered bergs.

FILLINGS

16	Kværner, forward, meat	14	Kværner, mid, meat
26	Press, bone	12	Hartman, blubber

Kværner 4 blubber (aft starboard)

January 16, 1938

NOON POSITION: 57°28S; 7°38E; BAROMETER: 29:19; TEMPERATURE: 40°F
SEA: Smooth; WIND: W-1; SKY: Clear, bc; Scattered bergs.

FILLINGS

18	Kværner, forward, meat	16	Kværner, mid, meat (blubber)*
26	Press, bone	8	Hartman, blubber

Kværner 4 blubber (starboard, aft)

January 17, 1938

NOON POSITION: 57°37S; 7°25E; BAROMETER: 28:63; TEMPERATURE: 31°F
SEA: Smooth, SKY: Clear; Scattered but very few bergs;

FILLINGS

16	Kværner, forward, meat	14	Kværner, mid, meat (blubber)
21	Press, bone	4	Kværner, blubber

January 18, 1938

NOON POSITION: 58°04S; 7°30E; BAROMETER: 28:16; TEMPERATURE: 31°F
SEA: Swell, N; WIND: N-2; SKY: Overcast, Snow; Scattered bergs.

FILLINGS

15	Kværner, forward, meat	11	Kværner, amidships, meat (blubber)
22	Press, bone	18	Hartman, blubber

Kværner 4 blubber

January 19, 1938

NOON POSITION: 59°02S; 7°32E; BAROMETER: 28:80; TEMPERATURE: 32°F
SEA: Slight swell, SW-4; WIND: W-5; SKY: Overcast; snow; bergs.

FILLINGS

3	Kværner, forward, meat	1	Kværner, mid, meat
8	Press, bone	4	Hartman, blubber

Kværner 1 blubber

January 20, 1938

NOON POSITION: 61°19S; 7°50W; BAROMETER: 28:96; TEMPERATURE: 31°F
SEA: Smooth, SKY: Cloudy; Scattered bergs;

FILLINGS

No whales worked this date

January 21, 1938

NOON POSITION: 61°45S; 8°00E; BAROMETER: 29:21; TEMPERATURE: 31°F
SEA: Smooth; WIND: SW-1; SKY: Overcast; Scattered bergs.

FILLINGS

No record of fillings.

January 22, 1938

NOON POSITION: 61°46S; 8°00E; BAROMETER: 29:27; TEMPERATURE: 31°F
SEA: Smooth; WIND: SW-1; SKY: Overcast; Scattered bergs.

FILLINGS

No record of fillings.

January 23, 1938

NOON POSITION: 61°28S; 8°36E; BAROMETER: 28:87; TEMPERATURE: 31°F
SEA: Smooth; SKY: Overcast; Ice bergs, but very scattered.

FILLINGS

No record of fillings.

January 24, 1938

NOON POSITION: 61°26S; 8°38E; BAROMETER: 29:22; TEMPERATURE: 32°F
SEA: Smooth; WIND: SW-2; SKY: Overcast; Numerous bergs;

FILLINGS

6	Kværner, meat, forward	5	Kværner, mid, meat (blubber)
7	Press, bone	8	Hartman, blubber

Kværner 2 blubber (aft)

January 25, 1938

NOON POSITION: 60°21S; 4°13E; BAROMETER: 29:35; TEMPERATURE: 38°F
SEA: Smooth; WIND: SE-1; SKY: Clear; Numerous scattered bergs.

FILLINGS

19	Kværner, forward, meat	16	Kværner, mid, meat (blubber)
28	Press, bone	30	Hartman, blubber

Kværner 4 blubber (aft)

January 26, 1938

NOON POSITION: 60°07S; 3°07E; BAROMETER: 29:27; TEMPERATURE: 31°F
SEA: Smooth; WIND: ENE-2; SKY: Cloudy; Few scattered bergs.

FILLINGS

15	Kværner, forward, meat	11	Kværner, mid, blubber, meat
28	Press, bone	14	Hartman, blubber

Kværner 4 blubber (aft)

January 27, 1938

NOON POSITION: 60°10S; 1°17E; BAROMETER: 28:89; TEMPERATURE: 34°F
SEA: Smooth; WIND: NE-2; SKY: Overcast; No ice;

FILLINGS

17	Kværner, forward, meat	13	Kværner, mid, meat (blubber)
25	Press, bone	28	Hartman, blubber

Kværner 4 blubber (aft)

January 28, 1938

NOON POSITION: 60°43S; 1°34E; BAROMETER: 29:00; TEMPERATURE: 32°F
SEA: 3; WIND: SW-4; SKY: Overcast; Scattered but few bergs.

FILLINGS

11	Kværner, forward, meat	5	Kværner, mid, meat (blubber)
14	Press, bone	2	Kværner, blubber

January 29, 1938

NOON POSITION: 60°57S; 5°34W; BAROMETER: 29:52; TEMPERATURE: 32°F
SEA: 3; WIND: W-4; SKY: Overcast; No ice.

FILLINGS

21	Kværner, forward, meat	15	Kværner, mid, meat, blubber
28	Press, bone	42	Hartman, blubber

Kværner 5 blubber

January 30, 1938

NOON POSITION: 60°47S; 7°13W; BAROMETER: 29:65; TEMPERATURE: 33°F
SEA: 3; WIND: -4; SKY: Overcast; No ice;

FILLINGS

16	Kværner, forward, meat	12	Kværner, mid, meat, blubber
19	Press, bones	12	Hartman, blubber

Kværner 3 blubber (aft)

January 31, 1938

NOON POSITION: 60°54S; 8°42E; BAROMETER: 28:23; TEMPERATURE: 35°F
SEA: Smooth; WIND: NNE-5; SKY: Heavy fog; Scattered bergs.

FILLINGS

5	Kværner, forward, meat	6	Kværner, mid, blubber, meat
10	Press, bone	8	Hartman, blubber

Kværner 1 blubber

February 1, 1938

NOON POSITION: 60°35S; 11°38W; BAROMETER: 28:15; TEMPERATURE: 39°F
SEA: 5; WIND: 1-S; Thick fog; Scattered bergs.

FILLINGS

3	Kværner, forward, meat	2	Kværner, mid, meat
4	Press, bone	1	Kværner, blubber

February 2, 1938

NOON POSITION: 59°54S; 14°54E; BAROMETER: 28:96; TEMPERATURE: 34°F
SEA: 3; WIND: SSW-4; SKY: Overcast; Many scattered bergs; Thick fog.

FILLINGS

12 Kværner, forward, meat — 7 Kværner, meat, blubber
15 Press, bone — 18 Hartman, blubber
Kværner 2 blubber

February 3, 1938

NOON POSITION: 60°16; 15°53E; BAROMETER: 28:28; TEMPERATURE: 38°F
SEA: 4; WIND: N-4; Thick fog; Snow; Overcast; Many bergs.

FILLINGS

9 Kværner, forward, meat — 1 Kværner, mid, meat
10 Press, bone — 10 Hartman, blubber
Kværner 2 blubber

February 4, 1938

NOON POSITION: 61°26S; 19°12E; BAROMETER: 28:10; TEMPERATURE: 33°F
SEA: 6; WIND: W-6; SKY: Broken; Few scattered bergs.

FILLINGS

15 Kværner, forward, meat — 3 Kværner, mid, meat, blubber
19 Press, bone — 22 Hartman, blubber
Kværner 3 blubber

February 8, 1938

NOON POSITION: 61°53S; 22°07W; BAROMETER: 29:18; TEMPERATURE: 30°F
SEA: Smooth; SKY: Broken; WIND: SSW-3; Very many icebergs; 43 on port side.

FILLINGS

17	Kværner, forward, meat	12	Kværner, mid, meat, blubber
28	Press bones	52	Hartman, blubber

Kværner 3 blubber

February 9, 1938

NOON POSITION: 61°54S; 22°00W; BAROMETER: 28:80; TEMPERATURE: 32°F
SEA: Smooth; WIND: W-3; SKY: Cloudy;Very few icebergs.

FILLINGS

21	Kværner, forward, meat	12	Kværner, meat, blubber (mid)
27	Press, bone	56	Hartman, blubber

Kværner 3 blubber

February 10, 1938

NOON POSITION: 61°58S; 23°10W; BAROMETER: 28:28; TEMPERATURE: 31°F
SEA: 1; WIND: W-1; SKY: Overcast; Pack ice, bergs.

FILLINGS

11	Kværner, forward, meat	5	Kværner, meat blubber, bones
18	Press bone	24	Hartman, blubber

Kværner 2 blubber

February 11, 1938

NOON POSITION: 62°02S; 23°45W; BAROMETER: 28:16; TEMPERATURE: 30°F
SEA: Smooth; WIND: 3-W; SKY: Overcast; cloudy; Field ice and pack ice.

FILLINGS

19	Kværner, forward, meat	14	Kværner, mid, blubber, meat
27	Press, bone	3	Kværner, blubber

Hartman 46 blubber

REMARKS: If the *Ulysses* had killed less whale and used more of the carcass of those killed, she would have obtained more oil, killed less whale, and complied with the legal requirements. She dumped large quantities of blue whales when they were abundant and continually dumped the meat of the fin whales. The reason for this is that the ship had to conserve her water supply and not waste it by boiling out meat. Also, the gunners would have been unable to obtain free catches all the time. This would have griped all of them, Martinsen in particular. Therefore, *Ulysses* disregarded the law almost completely. It was not a case of preserving the whales by adhering to the law, it was a case of obtaining as many whales as possible and dumping the carcasses when occasion demanded so that the factory would not become jammed, entailing a restricted catch.

A law cannot be enforced by compulsion when one inspector is present. Voluntary efforts must be made by the persons in charge of the operations to adhere to the law; otherwise it is merely a case of 'catch as catch can' on the part of the inspector, and 'get away with as much as possible' from the ship's view point.

The Japanese question is annoying to these people, but they must realize that Norway was most instrumental in making the laws; that Norwegians are hunting for the Japanese this year, when Norwegian law prevents such a thing.

February 12, 1938

NOON POSITION: 61°52S; 23°26W; BAROMETER: 28:24; TEMPERATURE: 27°F
SEA: Smooth; WIND: WSW-5; SKY: Overcast; Field ice, pack ice, few bergs.

FILLINGS

10	Kværner, forward, meat	5	Kværner, meat, blubber
14	Press, bone	3	Hartman, (aft) blubber

February 13, 1938

NOON POSITION: 61°02S; 24°00W; BAROMETER: 28:64; TEMPERATURE: 30°F
SEA: Smooth; WIND: W-4; SKY: Broken, bc; Field ice, pack ice, few bergs.

FILLINGS

17	Kværner (forward) meat	4	Kværner, mid, meat, blubber
18	Press	2	Kværner, aft, blubber

February 14, 1938

NOON POSITION: 61°22S; 23°02W; BAROMETER: 28:35; TEMPERATURE: 29°F
SEA: Smooth; SKY: Overcast; Snowing, heavy field ice, scattered bergs.

FILLINGS

11	Kværner, forward, meat	9	Kværner, meat, blubber
13	Press, bones	14	Hartman, blubber

Kværner 1 blubber

REMARKS: Had altercation with Captain Mikkelsen and manager on this date concerning the weighing of fetuses. It was caused by:

A blue whale fetus was found in a whale at 8:50. I waited around until 10:45 to see if it was to be weighed. Four men from the bone gang and two other men were sitting there, doing nothing. I went to bridge at 10:45 and told Captain Mikkelsen in the presence of the manager, Mr. Svensen, and the quartermaster that I wanted him to order the boatswain to get the scale and weigh the fetus. I pointed out the group of men doing nothing on the deck as they had been standing for over an hour. The fetus was finally weighed at 11:10. At noon Captain Mikkelsen asked to see me. The manager was present. He seemed quite angry about asking to have the fetus weighed and the way I addressed him on the bridge. They seem to have the impression that they weigh these fetuses and carry out the law merely to satisfy me personally. Mikkelsen also stated I've issued orders. I told him I had issued no orders, here or in Australia, except for doing my duty in enforcing the law. Halforsen stated I should see him, then see the mates, then see the boatswain about carrying out enforcement details and weighing fetus. I told him I wouldn't do it for him or anyone else. My policy has been to see the captain or the manager. Let him issue the orders as I am merely present to see the results. The manager thinks I am merely a glorified messenger boy. I also told the manager and the captain their records are wrong, that fetuses are not being measured, and that I am here to see if the law is carried out and that it is my instruction to carry it out to the letter. Also, that I was instructed to get the fetus data from Washington, and that if the ship didn't want to do it, or care to do it, then it was up to them and I would notify Washington accordingly.

The question is: Does the fetus data come under the 'any' biological requirements of "Section Eight, Part (c); Law of 1936," and what is the status of the inspector here. Can they issue orders for law enforcement, or not? I haven't issued any orders to anyone on deck directly since this outfit commenced work; I have always seen the captain or the manager about requests to enforce the law. I challenged Mikkelsen to bring any man to his cabin this morning and state that I issued him an order of any kind. The captain wouldn't do it. According to Captain Mikkelsen and Mr. Halforsen, the manager, I have no authority on this vessel to enforce Section 10, Act of 1936. They also believe that Section 5, concerning biological data, is not enforceable unless the Western Operating Company gives the direct orders.

February 15, 1938

NOON POSITION: 62°14S; 23°30W; BAROMETER: 28:37; TEMPERATURE: 31°F
SEA: Smooth; WIND: W-2; SKY: Overcast; Snow; Heavy pack and field ice.

FILLINGS

19	Kværner, forward, meat	15	Kværner, mid, meat, blubber
27	Press, bone	4	Kværner, aft, blubber

Hartman 58 blubber

February 16, 1938

NOON POSITION: 62°14S; 23°03W; BAROMETER: 28:90; TEMPERATURE: 29°F
SEA: Smooth; WIND: W-2; SKY: Overcast; Heavy field ice and pack ice.

FILLINGS

17	Kværner (forward), meat	12	Kværner, mid, meat, blubber
27	press, bone	50	Hartman, blubber

Kværner 3 blubber

February 17, 1938

NOON POSITION: 62°05S; 22°50W; BAROMETER: 29:19; TEMPERATURE: 38°F
SEA: Smooth; WIND: NNE-2; SKY: Overcast; Heavy field ice and pack ice.

FILLINGS

12	Kværner, forward, meat	9	Kværner, mid, meat, blubber
16	Press, bone	28	Hartman, blubber
	Kværner	2	blubber

REMARKS: I informed Captain Mikkelsen this date, February 17, 1938, that he is responsible for getting and weighing fetal data, no matter what detrimental factors are in issue. *Kos23*, Gunner Jespessen, commenced hunting for *Ulysses* this date, February 16, 1938, and brought in first whale this evening.

February 18, 1938

NOON POSITION: 62°23S; 22°18W; BAROMETER: 29:20; TEMPERATURE: 32°F
SEA: Smooth; WIND: W-3; SKY: Overcast; Snow; Field ice and pack ice.

FILLINGS

18	Kværner, forward, meat	15	Kværner, mid, meat, blubber
25	Press, bone	44	Hartman, blubber
	Kværner	4	blubber

February 19, 1938

NOON POSITION: 62°20S; 22°00W; BAROMETER: 28:81; TEMPERATURE: 32°F
SEA: Swell from N; WIND: W-2; SKY: Overcast; Snow; Heavy field ice, pack ice.

FILLINGS

14	Kværner (forward), meat	11	Kværner, mid, meat, blubber
21	Press, bone	36	Hartman, blubber
	Kværner	3	blubber

February 20, 1938

NOON POSITION: 62°35S; 20°44W; BAROMETER: 28:85; TEMPERATURE: 36°F
SEA: Smooth; WIND: NE-1; SKY: Overcast; Heavy field ice.

FILLINGS

10	Kværner, forward, meat	9	Kværner, mid, meat, blubber
18	Press, bone	26	Hartman, blubber

Kværner 3 blubber (aft)

REMARKS: There are about four factories within a radius of 300 miles of us at this time. They are: *Walter Rau, Kosmos II, Svend Foyn, Teriveken.* These ships average 8 little boats apiece. This means there are 32 killer boats in a circle of 300 miles with the *Ulysses* as center. This is one of the reasons the whales cannot survive. More factories are tracking from east to west, at this time.

From the appearance of the blue whales at this time it can be estimated that an 80 foot blue gives approximately 125 barrels and 90 foot or above females give 225, at least, due to corpulent condition. It can be figured a 70 foot fin gives about 60 to 70 barrels. Their blubber is not as thick, nor are they as fat as the blue whales; in other words, figure about 1.5 barrels per foot of blue whale at 80 feet, and 1 barrel per foot of fin whale at 70.

It is not a case of too much work on part of ship to keep WI-1 correct, but it seems that no one cares about its correctness. They keep a list of whale killed in radio shack, but do not bother with it to make up form but merely take the flensed whales. The same goes for recording fetuses and collection of stomach contents. There is no semblance of keeping the records accurate, as required by WI-1, or to collect stomach contents required by Department of Fisheries.

February 21, 1938

NOON POSITION: 62°41S; 20°36W; BAROMETER: 28:76; TEMPERATURE: 32°F
SEA: Smooth; WIND: E-1; SKY: bc; Heavy pack ice.

FILLINGS

20	Kværner, forward, meat	14	Kværner, meat, blubber
28	Press, bone	60	Hartman, blubber

Kværner 3 blubber

February 22, 1938

NOON POSITION: 62°42S; 20°32W; BAROMETER: 28:991 TEMPERATURE: 37°F
SEA: Smooth; WIND: 1-W; SKY: Clear; Heavy pack ice.

FILLINGS

19	Kværner (forward), meat	12	Kværner, mid, meat, blubber
27	Press, bone	69	Hartman, blubber

Kværner 4 blubber

February 23, 1938

NOON POSITION: 62°36S; 20°27W; BAROMETER: 29:10; TEMPERATURE: 33°F
SEA: Smooth; WIND: E-1; SKY: bc; Heavy pack ice.

FILLINGS

21	Kværner, forward, meat	13	Kværner, mid, blubber, meat
29	Press, bone	59	Hartman, blubber

Kværner 3 blubber

February 24, 1938

NOON POSITION: 62°38S; 20°84W; BAROMETER: 28:78; TEMPERATURE: 31°F
SEA: Heavy swell; SKY: Overcast; Dense fog over most of sky; Scattered ice pack.

FILLINGS

17	Kværner, forward, meat	14	Kværner, meat, blubber
27	Press, bone	50	Hartman, blubber

Kværner 3 blubber

February 26, 1938

NOON POSITION: 61°54S; 21°08W; BAROMETER: 29:11; TEMPERATURE: 30°F
SEA: NE Swell; WIND: W-1; SKY: Overcast; Heavy pack ice, scattered bergs.

FILLINGS

20	Kværner, forward, meat	13	Kværner, mid, meat, bone
29	Press, bone	54	Hartman, blubber

Kværner 3 blubber

February 27, 1938

NOON POSITION: 61°42S; 22°06W; BAROMETER: 28:77; TEMPERATURE: 33°F
SEA: Smooth; WIND: W-2; SKY: Overcast; Fog; Field ice.

FILLINGS

13	Kværner, forward, meat	7	Kværner, mid, meat, blubber
18	Press, bone	26	Hartman, blubber

Kværner 3 blubber

<u>February 28, 1938</u>

NOON POSITION: 61°59S; 24°18W; BAROMETER: 29:05; TEMPERATURE: 31°F
SEA: Smooth; WIND: W-1; SKY: Overcast; Fogbanks; Scattered bergs.

<u>FILLINGS</u>

17 Kværner, forward, meat — 8 Kværner, mid, blubber, meat
21 Press, bone — 35 Hartman, blubber
Kværner 3 blubber

Appendix 3: Walsh's annotated sketches from the *Ulysses* cruise

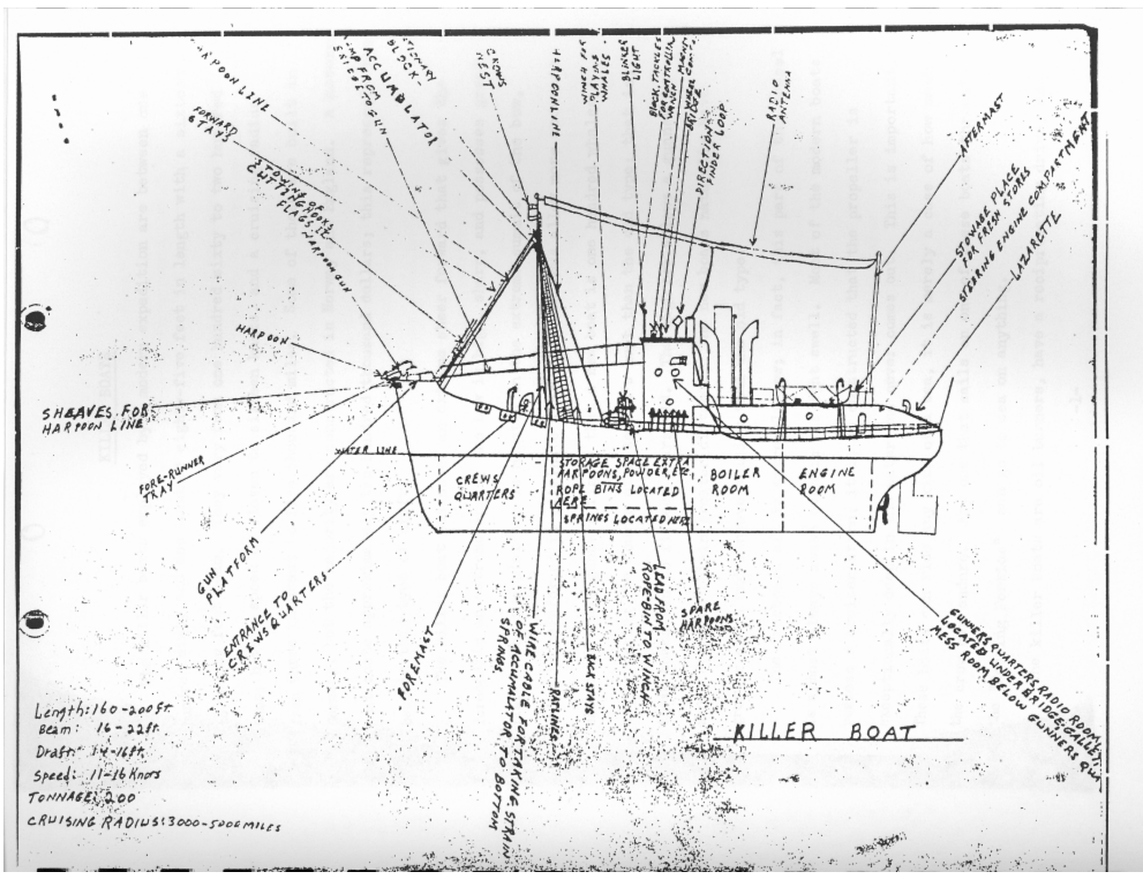


Fig. 3.1. The killer boat.

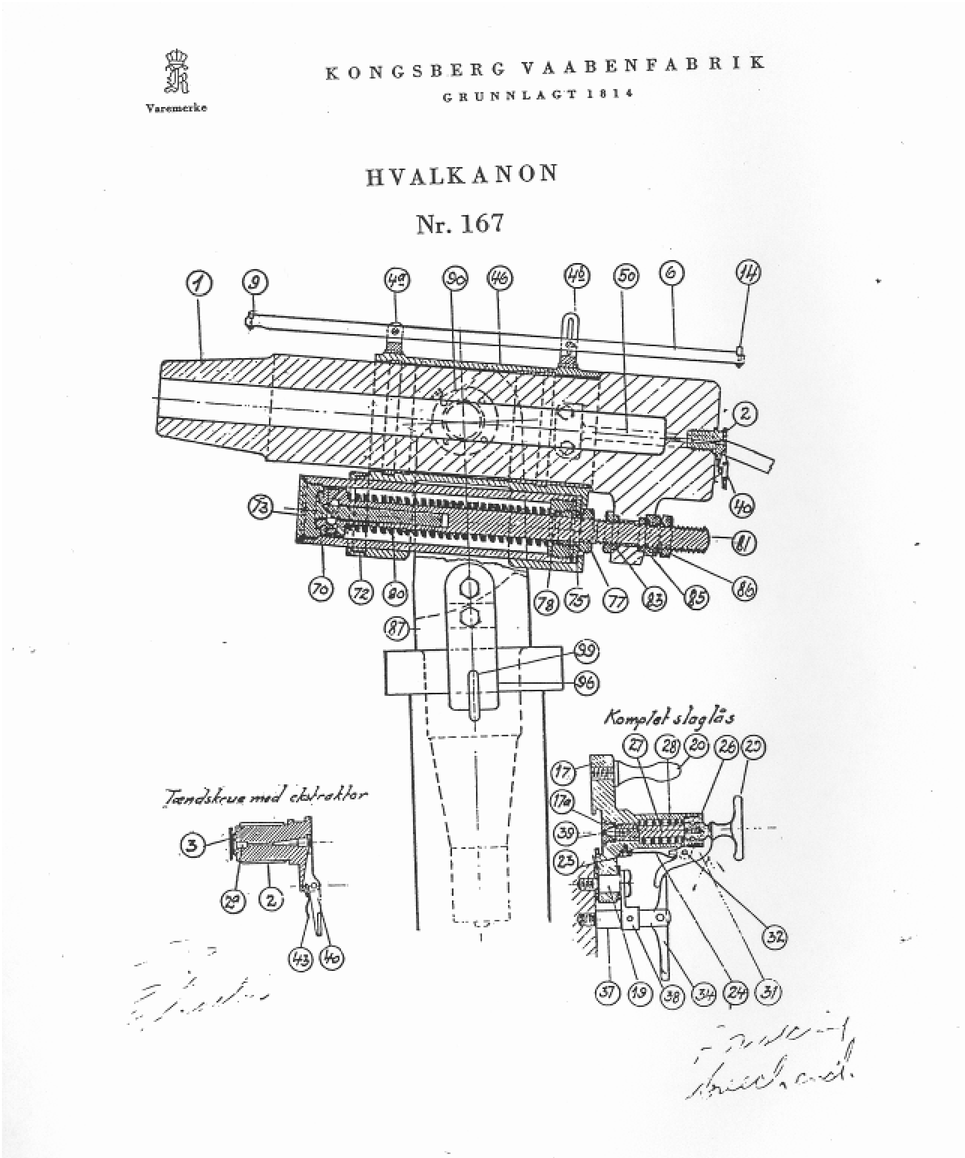


Fig. 3.2. The whale canon.

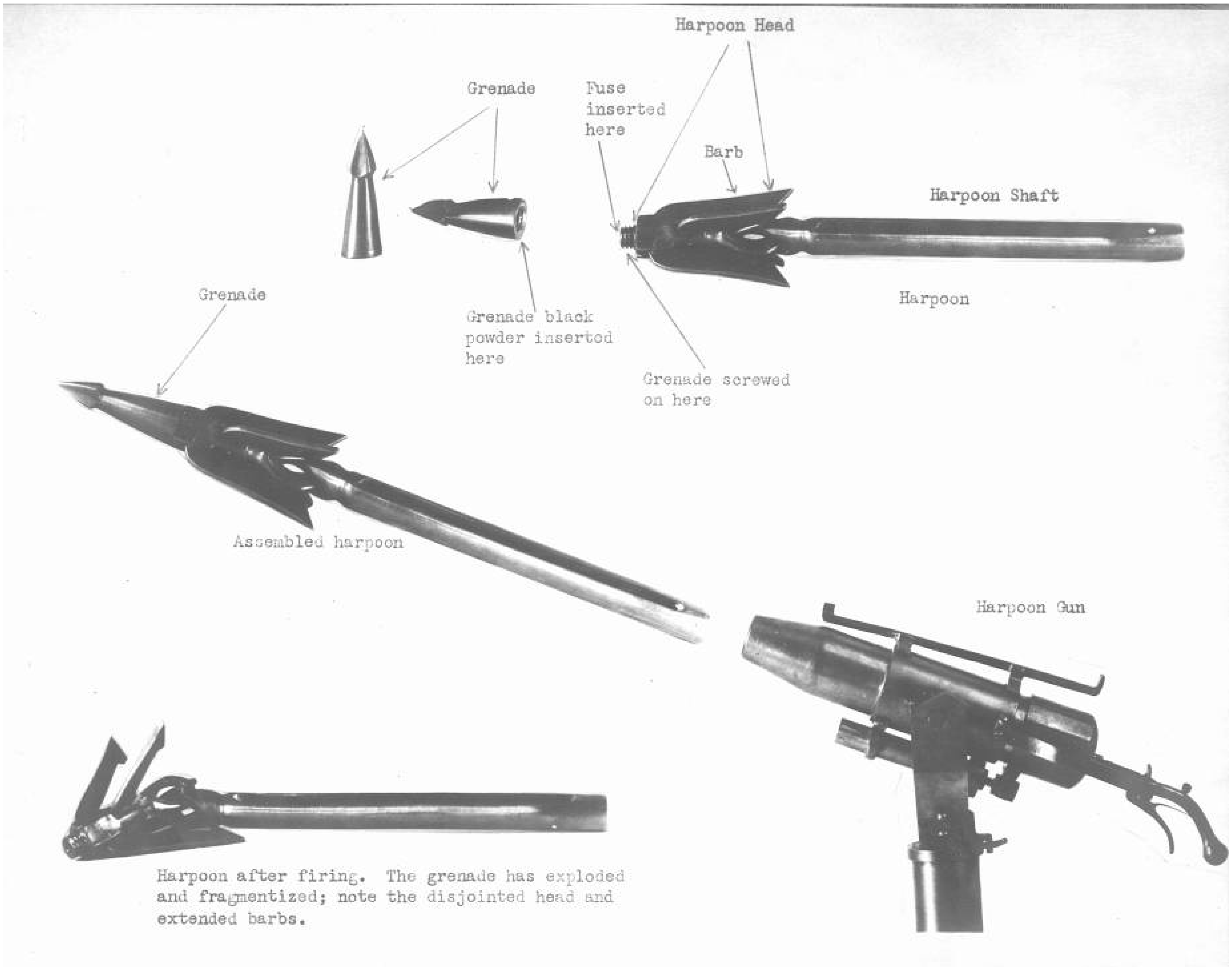


Fig. 3.3. The harpoon and head.

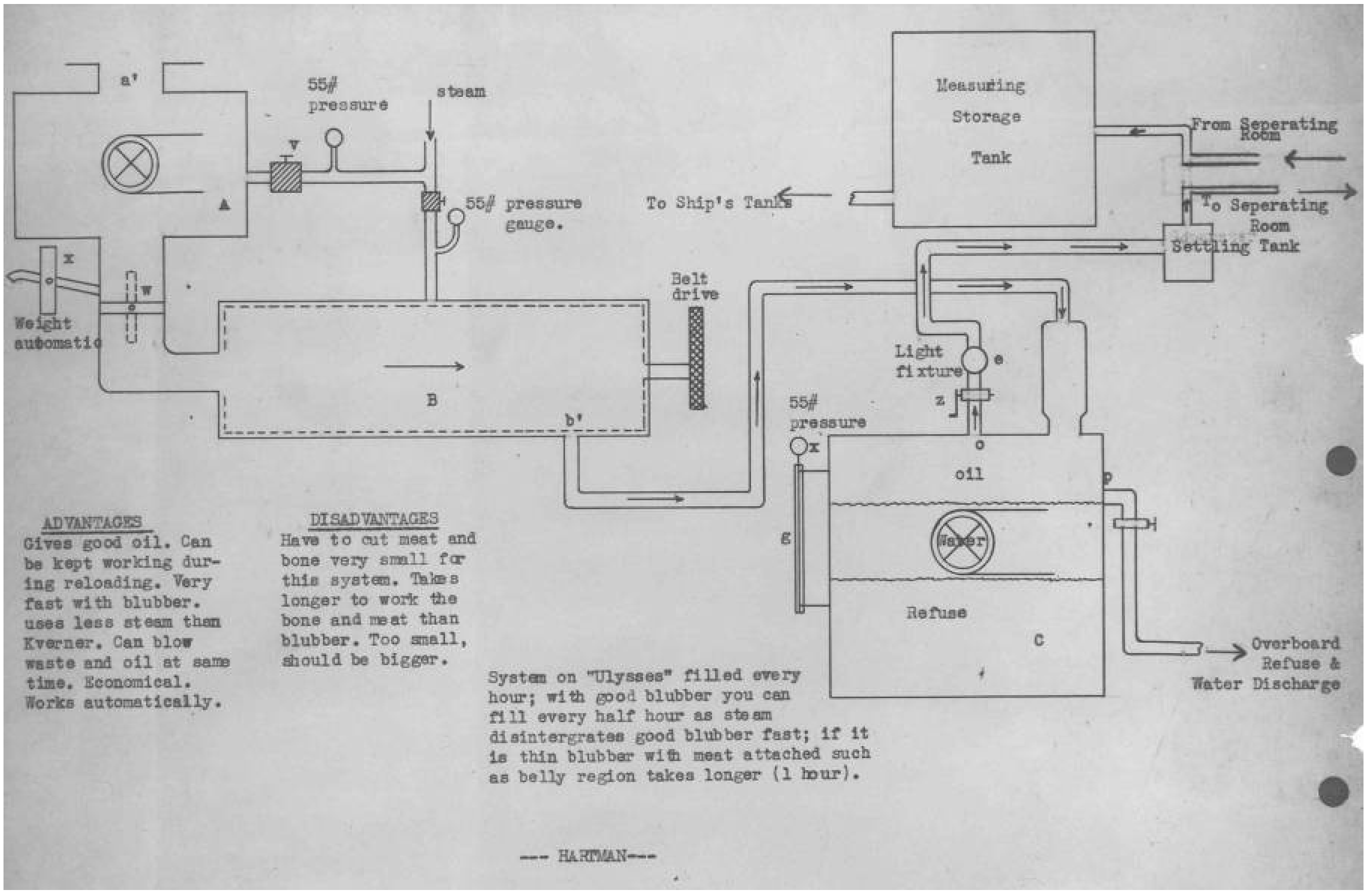


Fig. 3.4. The Hartman system.

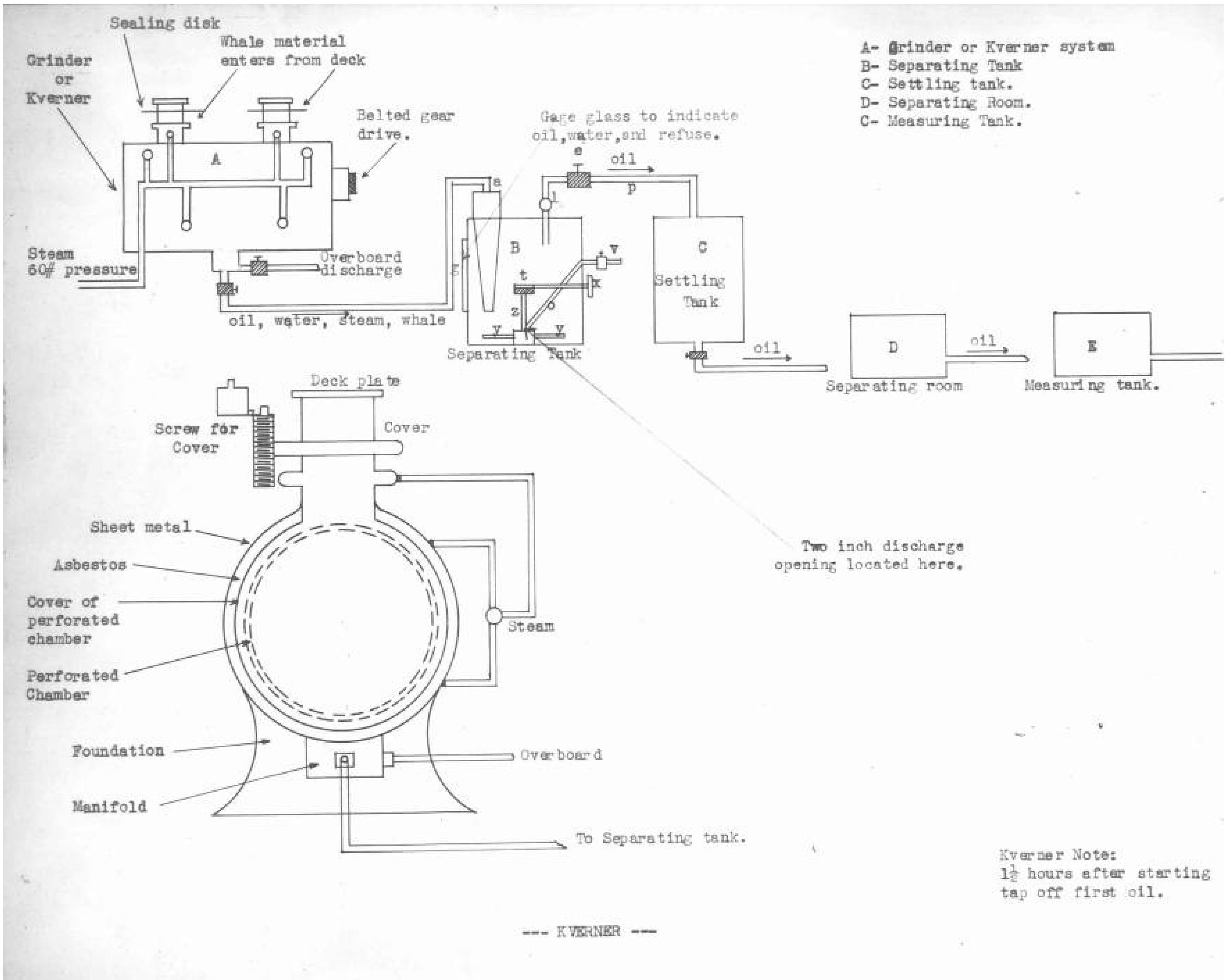


Fig. 3.5. The Kværner system

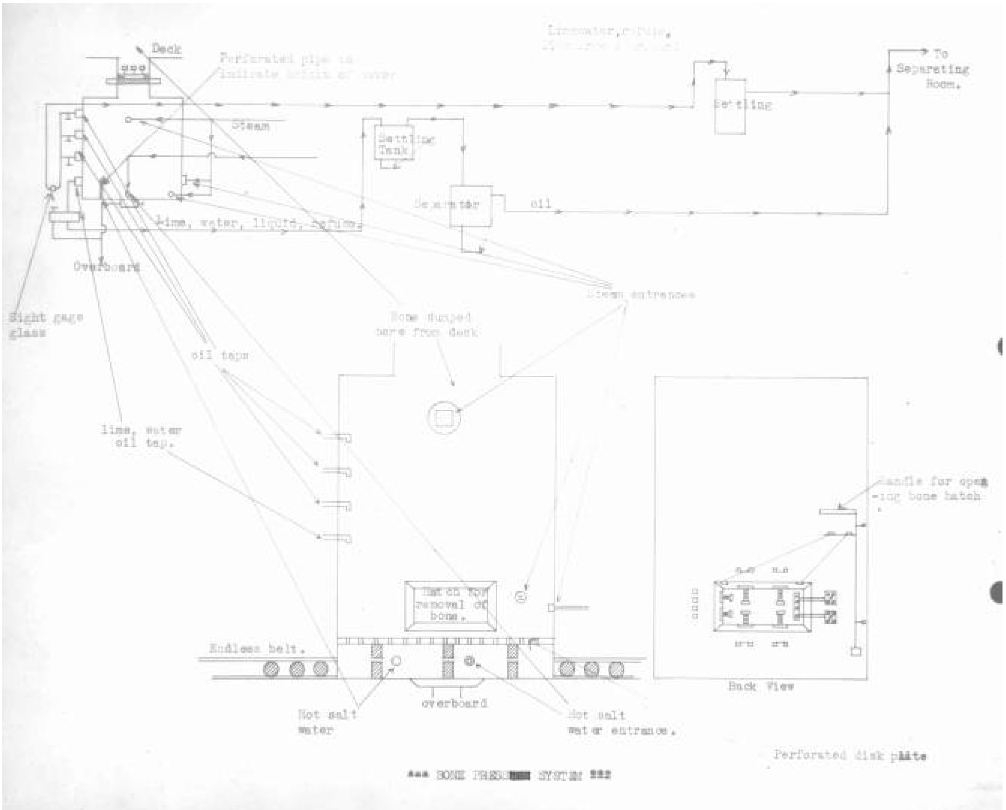


Fig. 3.6. The bone presser.

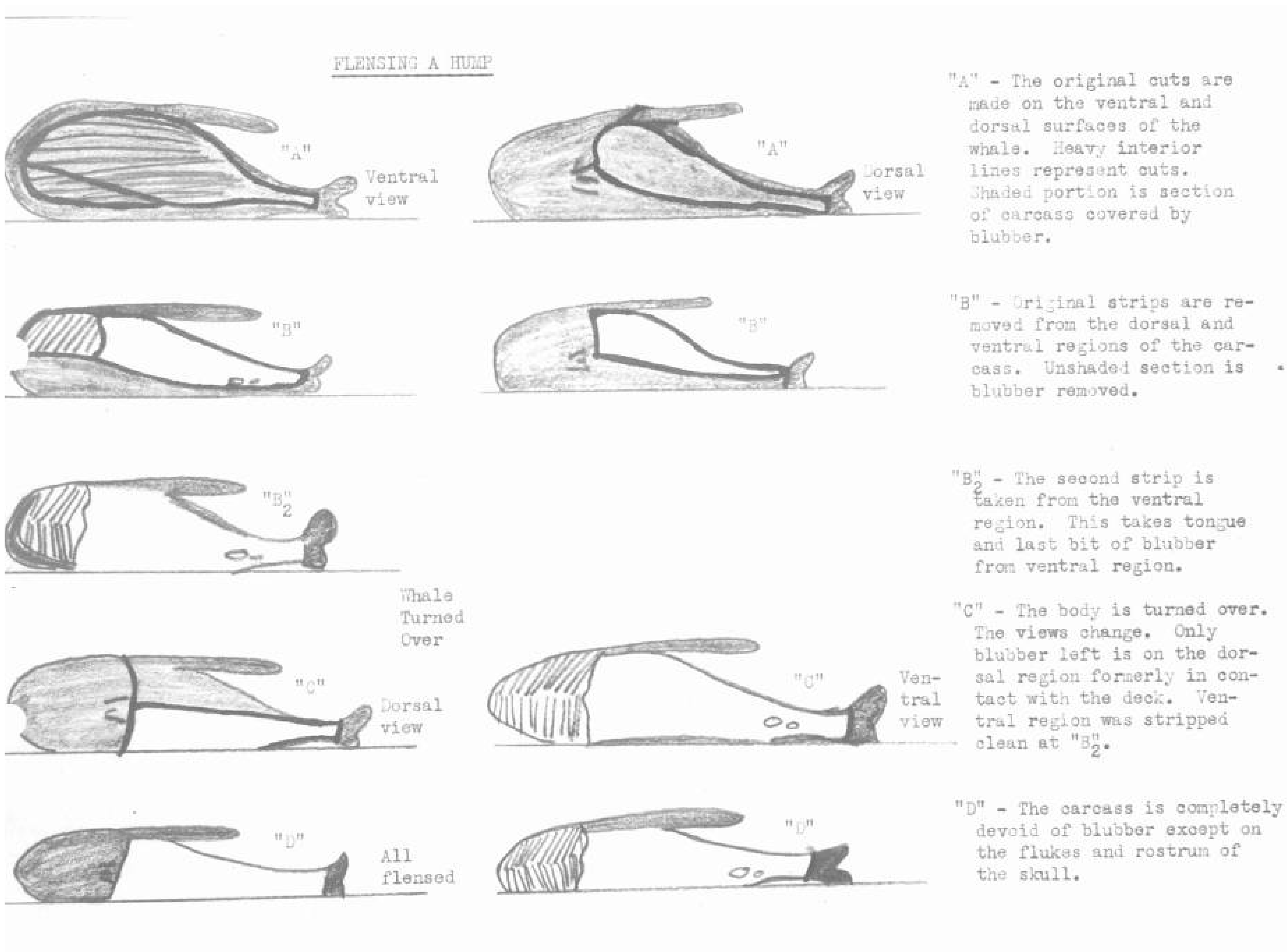


Fig. 3.7. Flensing a humpback

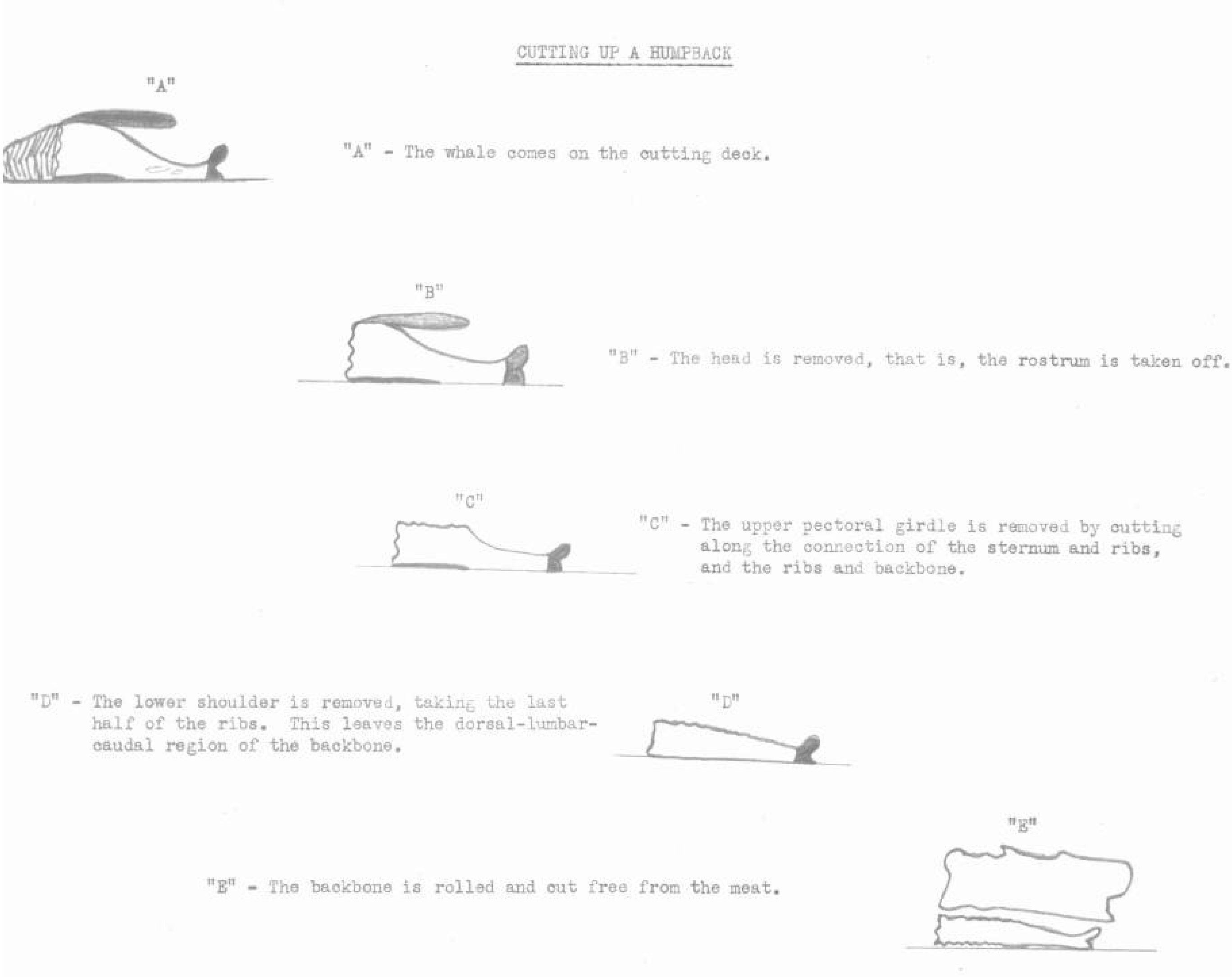


Fig. 3.8. Cutting up a humpback.

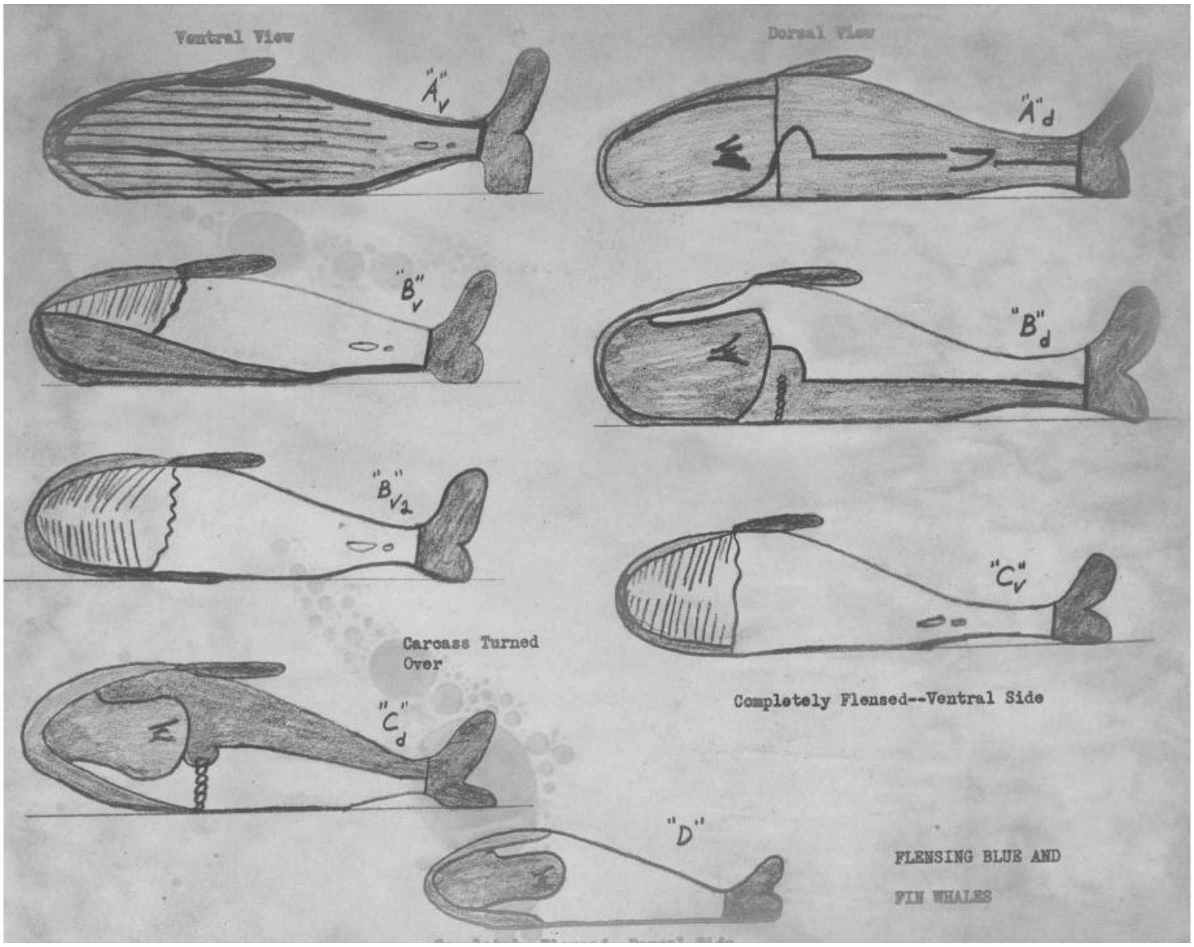


Fig. 3.9. Flensing blue and fin whales.

Key to accompany App. 3.9: Flensing Blue and Fin Whales

“v” indicates ventral views.

“d” indicated dorsal views.

“A” – The original cuts are made on the ventral and dorsal regions. The heavy lines on the surface of the diagrams represent the incisions in the blubber. The shaded portion of the carcass is that area covered by blubber in all views. The loop between the shoulders is inserted to aid in turning the carcass over as the operations proceed.

"B" – The first strips are taken from the ventral and dorsal regions. By taking the strip from the ventral region half the bottom of the mouth is removed, exposing the baleen. See "B_v."

"B_{v2}" - The second strip is taken from the ventral region; this removes the external covering from the remainder of the abdominal region and extracts the tongue. In blue whales, and large fins, a special bight, or third strip, is generally taken to remove the tongue.

"C" – The carcass is turned over. The views change. Only a section of blubber remains on the dorsal region that was formally resting on deck. The ventral surface has been completely stripped. See "C_d" and "C_v."

"D" – The dorsal region as it finally appears with the blubber retained by the rostrum of the skull and the flukes. The flensing operations are completed.

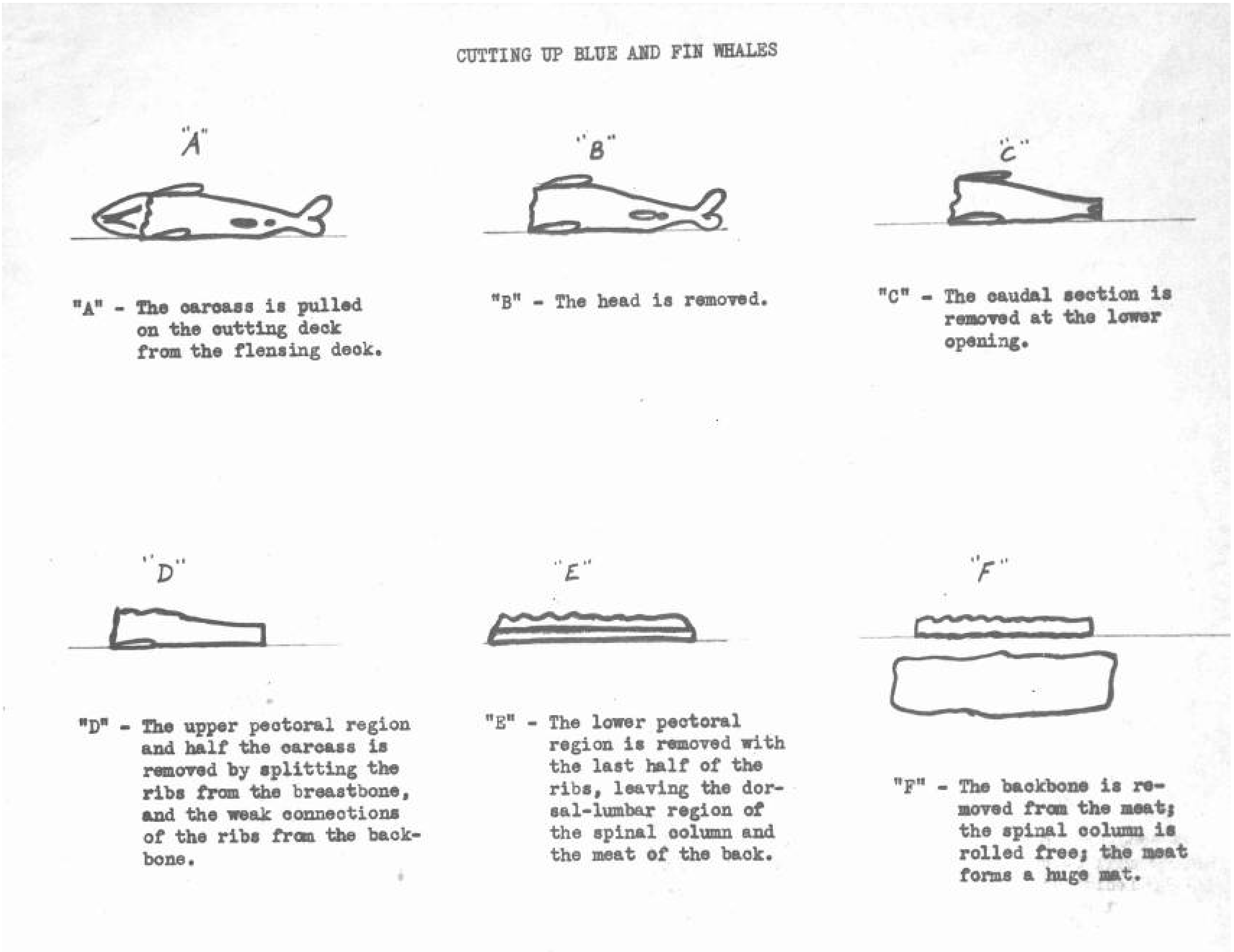


Fig. 3.10. Cutting up blue and fin whales.

HUMPBACK SPOUTING AND DIVING

"A" - Spout of a humpback; it is ten to fifteen feet high, drifts with the wind, and soon disperses. This is the first blast after a deep dive, two or three more may follow between surface dives, but they are relatively smaller.

"B" - Surface dive of the animal; this is the dive the animal takes between breaths, and indicates it is not going very deep. Unless molested the humpback may take three to seven breaths before sounding.

"C" - The humpback sounds. The flukes are thrown into the air and resemble a giant butterfly just before they disappear; this showing of the caudal fin indicates that the animal will remain below the surface for some time, generally twenty minutes at the longest.

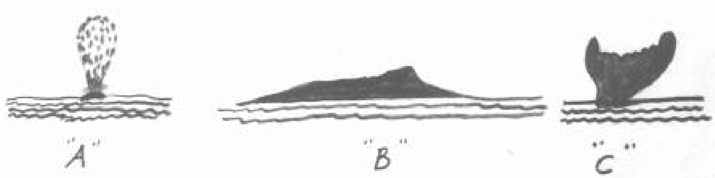


Fig. 3.11. Humpback spouting and diving behavior.

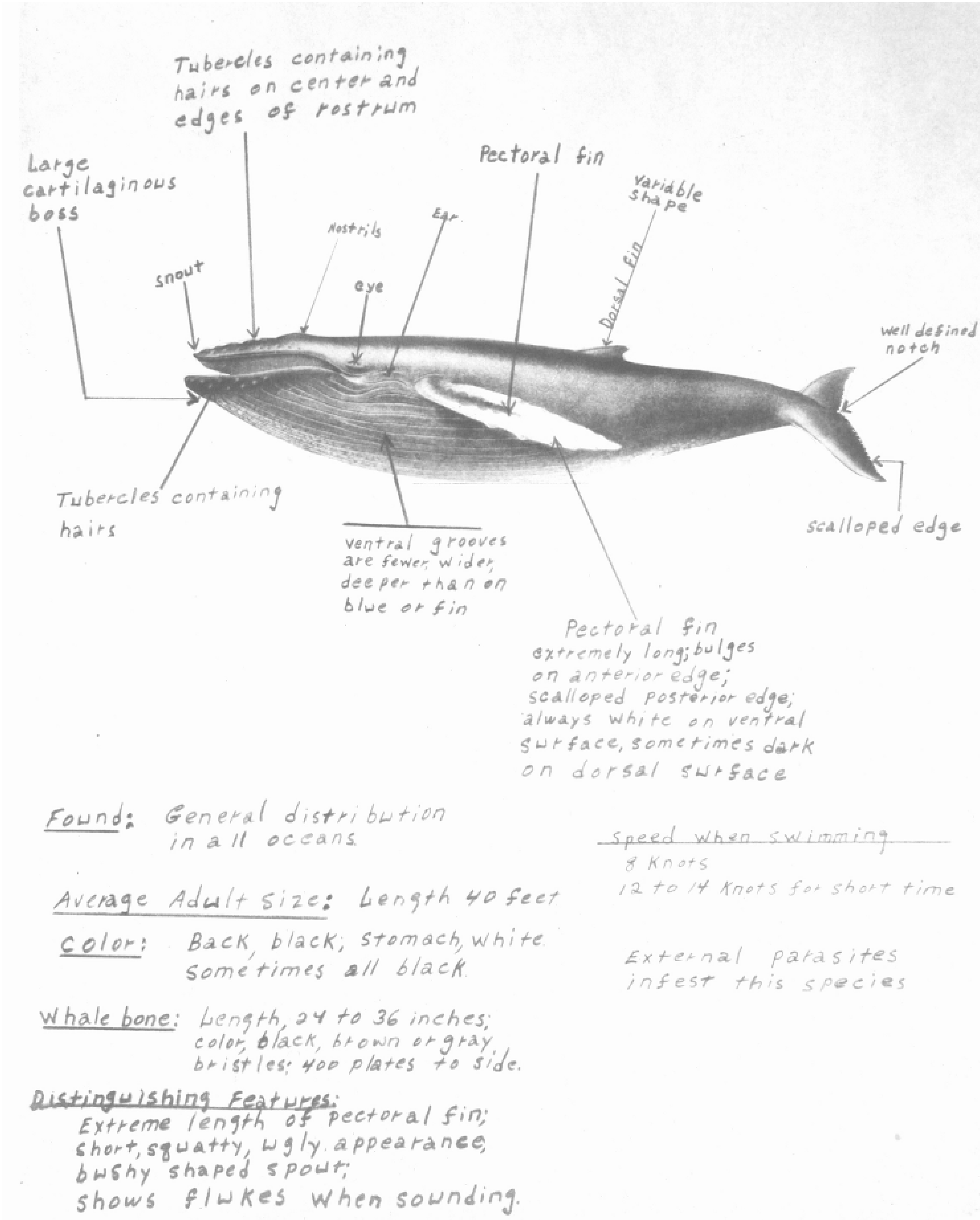


Fig. 3.12. Walsh's annotated sketch of a humpback whale.

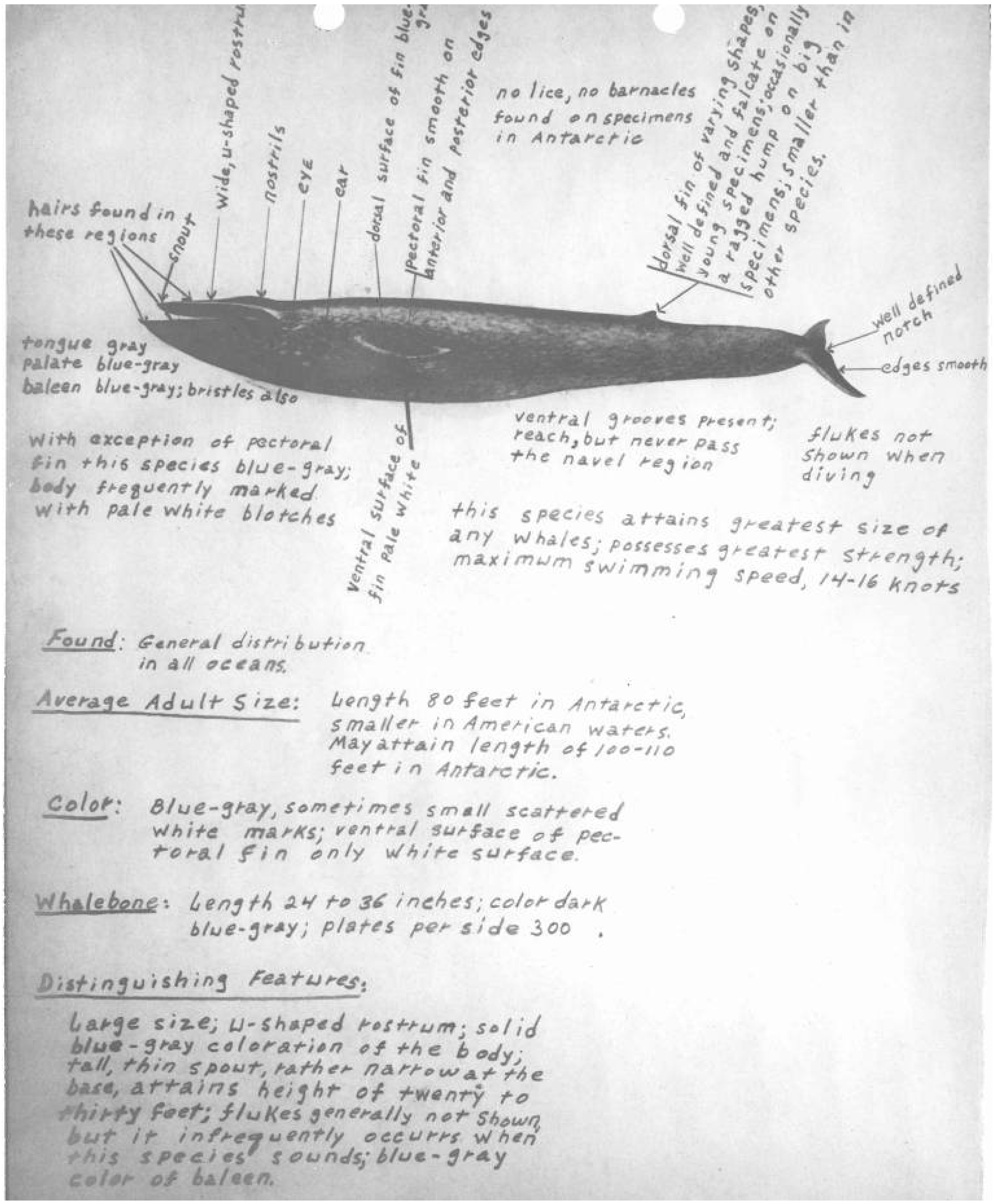
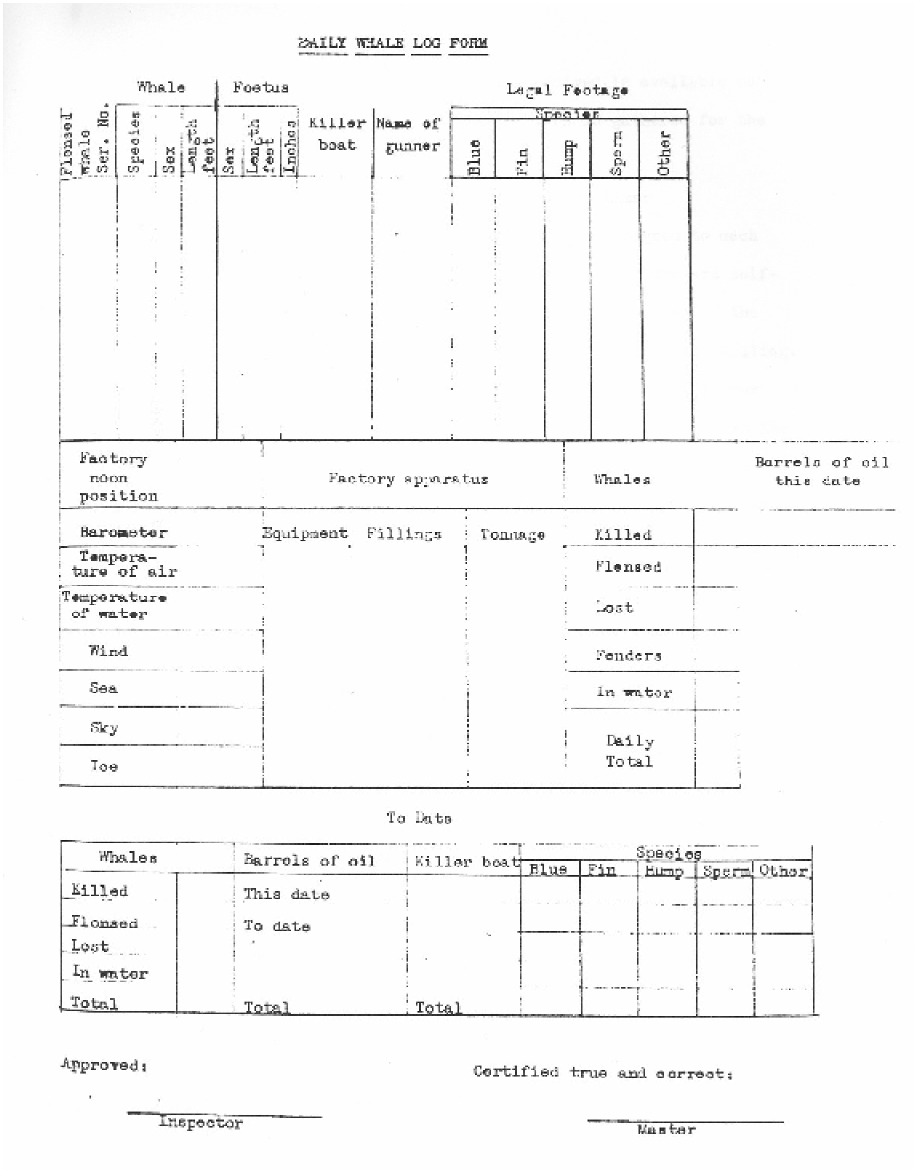


Fig. 3.13. Walsh's annotated sketch of a blue whale.



DAILY WHALE LOG FORM

Whale				Foetus			Killer boat	Name of gunner	Legal Footage				
									Species				
Flensed whale Ser. No.	Species	Sex	Length feet	Sex	Length feet	Inches			Blue	Fin	Hump	Sperm	Other

Factory noon position	Factory apparatus		Whales		Barrels of oil this date
Barometer	Equipment	Fillings	Tonnage	Killed	
Tempera-ture of air				Flensed	
Temperature of water				Lost	
Wind				Fenders	
Sea				In water	
Sky				Daily Total	
Ice					

To Date

Whales		Barrels of oil	Killer boat	Species				
				Blue	Fin	Hump	Sperm	Other
Killed		This date						
Flensed		To date						
Lost								
In water								
Total		Total	Total					

Approved: Certified true and correct:

Inspector Master

Fig. 3.14. Walsh's proposed whaling form.