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OPEN BOAT WHALING IN THE AZORES THE HISTORY AND PRESENT METHODS OF A RELIC INDUSTRY

by

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By Robert Clarke, M.A.

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(Plates XIII-XVIII, Text-figs. 1-7)

INTRODUCTION

THE Azores or Western Islands comprise a volcanic group of nine islands lying around latitude 38° N. some 900 miles from Portugal and towards the middle of the North Atlantic (Fig. 1). The islands lie in three groups whose outriders are distant from each other about 100 miles, and the distance from Corvo in the Western Group to Santa Maria in the Eastern Group is nearly 400 miles (Fig. 3, p. 297). The archipelago is administered not as a colony but as an integral part of Portugal. For this reason, when reference is made in the present account to the mainland or its inhabitants, these are usually distinguished as 'continental Portugal' and the 'continental Portuguese'.

At present (1953) there are three Portuguese whaling centres in the North Atlantic (Fig. 1). Setubal on the mainland of Portugal conducted steam whaling for Fin and Sperm whales between 1925 and 1927, and in 1944 resumed operations from a fine new station. In the archipelago of the Azores and in Madeira the fishery is of a different kind and only Sperm whales are taken. Sperm whales are the largest of the Toothed whales: the male Sperm whale can grow to 60 ft. in length and the female to 39 ft.

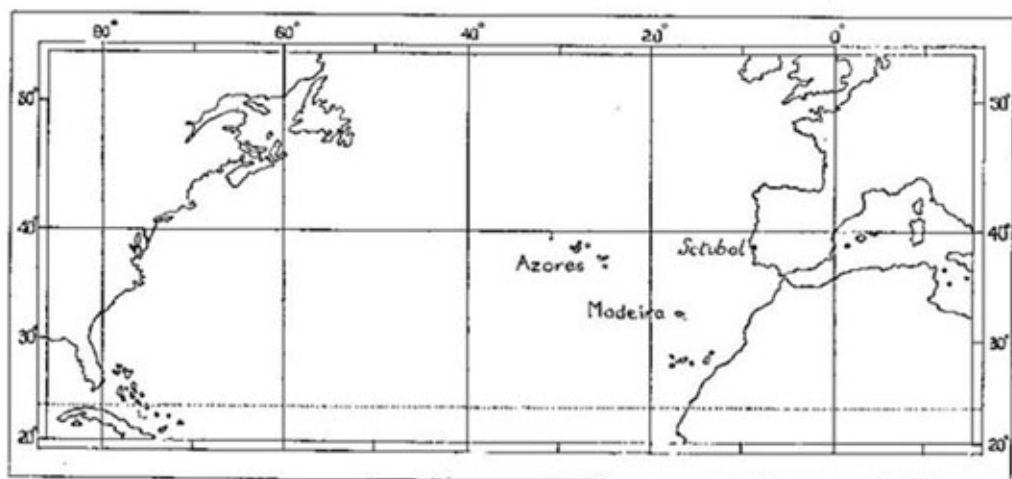


Fig. 1. Portuguese whaling centres in the North Atlantic in 1953. Open boat whaling is conducted from the Azores and from Madeira, and steam whaling from Setubal.

Sperm whaling in these islands is especially interesting because the methods employed are a survival of that old-time whaling generally believed to have quite vanished from the seas. Shore whaling off the coasts of the Azores, prosecuted with the hand harpoon and lance from open boats under oars or sails, is still a considerable industry. Moreover, these antiquated methods, learned from American whalers in the nineteenth century, are not confined to the chase, but extend at most places equally to the 'cutting in' of the whales and to the 'trying out' of their blubber in iron pots on the shore. An

'affair of oil' ashore at New Bedford in 1760, or even on a Spitzbergen beach in the early seventeenth century, must have been little different from a present-day scene in Pico or San Jorge or Terceira. It will indeed be seen that in four of the islands certain old 'try-works' stations have been replaced by

Table 1. *Sperm whales. Annual catches for the world and for the Azores from 1910 to 1949*

Year	Catch of whales		
	World	Azores	Azores (%)
1910	155	112	72.3
1911	302	120	39.7
1912	619	72	11.6
1913	465	68	14.6
1914	757	35	4.6
1915	861	33	3.8
1916	1083	71	6.5
1917	513	128	24.9
1918	1092	183	16.8
1919	1219	132	10.8
1920	873	124	14.2
1921	796	78	9.8
1922	912	121	13.3
1923	740	177	23.9
1924	950	71	7.5
1925	1475	151	10.2
1926	1775	199	11.2
1927	1441	166	11.5
1928	1989	185	9.3
1929	2074	212	10.2
1930	1311	99	7.6
1931	597	80	13.4
1932	811	179	22.1
1933	1423	266	18.6
1934	1999	234	11.7
1935	2481	379	15.3
1936	5068	387	7.6
1937	7392	417	5.6
1938	3725	417	11.2
1939	5049	400	7.9
1940	4466	552	12.4
1941	5303	(334)	—
1942	4383	525	12.0
1943	4538	663	14.6
1944	1466	591	40.3
1945	1382	443	32.1
1946	3418	592	17.3
1947	7395	565	7.6
1948	8766	698	8.0
1949	8728	484	5.5
1910-1949	99,792	10,743	10.8

This table has been prepared from the Azores catch figures in Table 10, and from world figures in the *Norsk Hvalfangsttid*. 1948, p. 312, and 1950, pp. 360, 560. The Antarctic catch figures are included in the year completing a southern summer season, for example, the world catch for 1949 includes the Antarctic catch for 1948-9. In the *Norsk Hvalfangsttid*. 1948, p. 312, figures were not available from 'Coast of Spain, Portugal and the Azores' for the earlier years 1910-19 and 1928-32; accordingly the Azores totals are added to the world catch in these years. Where the catch from 'Coast of Spain, Portugal and the Azores' has been shown as less than the actual Azores catch, there the world figures have been increased by the difference. For 1925-7 the Sperm whale catch from Setubal is added. These adjustments have made substantial changes in the published world catches of the earlier years, particularly 1910-23 when the changes would have been greater still had there been included the catches of the twenty or thirty Sperm whaleships still sailing in that period (see Table 3 and Plate XIII).

steam-powered factories, that since the turn of the century motor-boats have been generally used for towing purposes, and that in recent years radio-telephone has been introduced for communication between shore and motor-boat. Yet these are adjuncts rather than modifications, for the old Sperm whaling gear and the technique of hunting remain unchanged.

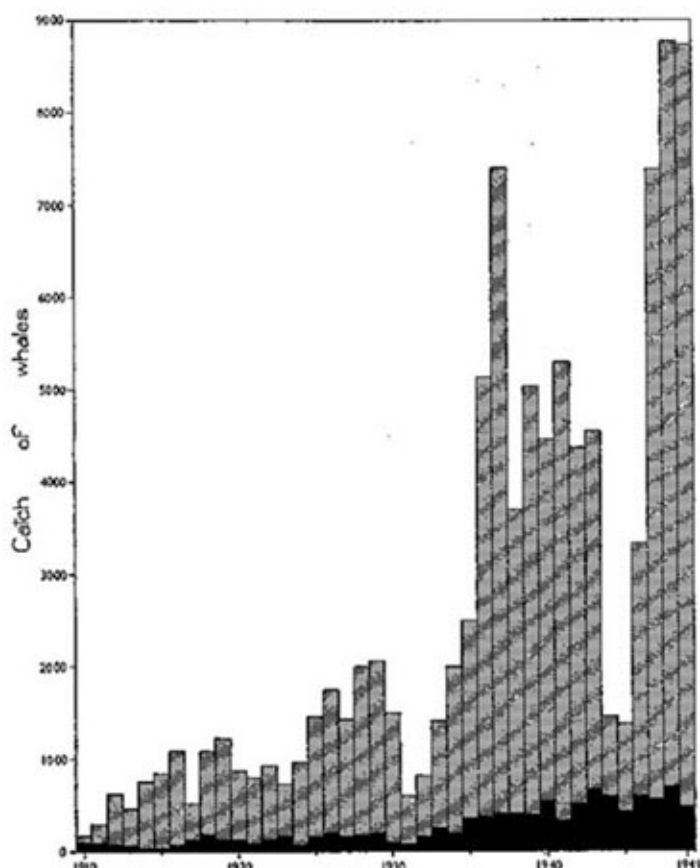


Fig. 2. Sperm whales. Annual catches for the world and for the Azores from 1910 to 1949.*

It is the more noteworthy therefore that the Azores open boat industry has never been so flourishing nor so widespread through the archipelago as it is today. Moreover, Table 1 and Fig. 2 show that, during 40 years of mechanized steam whaling elsewhere, the Azores contribution to the world catch of Sperm whales has never been negligible and was at one time substantial. Even in recent years, from 1946 to 1949, when post-war demands for sperm oil have been responsible for heavy catches by factory ships in the Antarctic and off Peru, the Azores have still managed to contribute between 6 and 17 per cent of the world catch.

The present report is an account of the origins, history and existing practice of open boat whaling in the Azores. It results from a mission undertaken in the summer of 1949 when I was sent to the Azores by the National Institute of Oceanography to investigate whales and whaling there. My stay lasted ten weeks, from 22 June to 5 September. During this period I visited all the nine islands and examined sixteen of the twenty-one whaling stations scattered through the archipelago (Fig. 3, p. 297; Table 4, p. 306). Although much of my time was spent in biological work on the island of Fayal, examining whale carcasses on the flensing platform at Porto Pim, Horta, I was privileged in August to sail after whales in the Fayal boats and make a 16-mm. cine-film which is believed to be a unique record of this survival.

* Azores figures for 1941 are incomplete.

The report has a historical and a technical section. To these are appended a few notes on Madeiran whaling which are necessarily sketchy and inadequate since I did not visit Madeira. The historical section falls naturally into two parts: the first describes the role of the Azores and their inhabitants in the pelagic Sperm whaling industry which the New Englanders inspired and monopolized during the eighteenth and nineteenth centuries; the second part traces from these whaleship days the emergence and subsequent fortunes of the shore whale fishery up to present times in the Azores. The technical section records the gear, methods and installations of the existing fishery and employs throughout comparisons with old-time American whaling. It says nothing of the effect of whaling on the stock of whales, because this is more appropriately included in a separate Discovery Report on Sperm whales which is nearing completion and which will examine the results of the biological work undertaken in 1949. This report will suggest that, although there is as yet no evidence of overfishing, it is unlikely that the stock would long withstand exploitation by steam whalecatchers, unless these were rigorously controlled.

Even though steam whaling may never be introduced into the Azores, I have been careful to make the technical record as detailed as my notes allow because it is too much to expect that an anachronism like this survival can continue indefinitely in an age whose mechanizing trend is everywhere withdrawing and protecting men from direct and manual conflict with the natural hazards of their environment. It is encouraging to know that in the North Atlantic men can still be found who have the courage and resolution, physical strength and endurance which open boat whaling demands.

ACKNOWLEDGMENTS

I am indebted to the Portuguese Government through its Ambassador in London, who approved my mission in 1949.

In recalling the goodwill and co-operation I met with everywhere, travelling in the Azores and in continental Portugal, I would especially like to thank the following persons for their great kindness with assistance or hospitality: Lieutenant-Colonel José Agostinho, Chief Meteorologist of the Azores; Senhor Joaquim Martins do Amaral, whaling owner of Fayal, at whose Porto Pim station I worked for two months; Senhor Tomas Alberto de Azevedo, manager of the Fayal whaleboats in which I sailed; Dr Tiberio avila Brazil, whaling owner in Pico; Capitão-Tenente Manuel Melo de Carvalho, Captain of the Port of Horta in 1949; Senhor Pedro Cimbron, whaling owner of San Miguel; Lieutenant-Commander Franklin Davies, R.N., the former British Vice-Consul in Porta Delgada; Dr J. Mousinho Figueiredo of the Ministry of Economics, Lisbon, an authority on Azores whaling; Senhor J. V. Leal of Pan American Airways System, Santa Maria; Commander J. W. McClelland, R.N., the British Naval Attaché at Lisbon in 1949; Senhor Jacinto Silviera de Medeiros, part-owner of the old try-house at Porto Pim, who has contributed much to the historical section of this account by patiently ransacking on my behalf the archives and newspaper files at Horta, by interviewing old whalers in Fayal and Pico, and by providing photographs of the last years of the whaleships in the Azores; Senhor Manuel Neves who shares ownership of the Porto Pim try-house with Senhor Medeiros; Mr H. R. Pearce, the only British resident in Terceira; Dr Alfredo Magalhães Ramalho, the Director of the Marine Biological Institute in Lisbon, who has since helped with some Portuguese literature; Senhor Francisco Marcelino dos Reis, owner of the Setubal whaling station; Senhor José Tavares dos Reis, manager of the whaling factory at Porto Pim, whose special help in the biological work will be acknowledged in a separate report; Senhor Antonio Linnares dos Santos, whaling owner of Terceira; and Senhor José Cristiano de Souza, whaling owner in Pico. In this list of helpers overseas, I have purposely left till last my best thanks to Mr B. L. Collins, of Horta, until recently British

Consular Agent, a friend who has been untiring with ways to meet my many requests no less since I left the islands than when he warmly supported my mission in 1949.

At home I thank Dr F. C. Fraser, of the Natural History Museum, who has kindly read this account in manuscript and who first told me, after his return from the voyage of the *Atlantide* (p. 305), that open boat whaling still survives in the Azores. Finally I am especially grateful to Dr N. A. Mackintosh, C.B.E., for sending me on this mission, for his advice and encouragement during the preparation of this report, and for seeing it through the press during my absence overseas.

THE HISTORY OF WHALING IN THE AZORES

The historical material does not pretend to be exhaustive. Early records are fragmentary or deficient, although I have been most fortunate in the special local assistance given by Senhor Jacinto Silveira de Medeiros. The whaling statistics in the Appendix (Table 10) are from the *Estatística das Pescas Marítimas no continente e ilhas adjacentes*, an official compilation of all Portuguese fisheries statistics, which is published annually. Its whaling records go back to 1896, and no earlier statistics are available to me, except for some isolated figures for the Western Group 1886-90, given by Faria e Silva (1890). The *Estatística das Pescas* contains certain other notes on whaling material which I have found useful. Otherwise my sources are scattered references in the narratives of Sperm whaling voyages and in the Portuguese literature: a more ambitious account would have required perusal of the State Papers of Portugal and a visit to the unique whaling libraries of New England.

The whaleships. 1765-1921

The hunting of Sperm whales on any commercial scale around the Azores was not at first undertaken from the shore, but from the lowered boats of whaleships. Such cruising in the Azorean seas, called by whalers the 'Western Islands ground', continued to the very last days of the deep-sea industry; and shore whaling—established no earlier than the 1830's—did not become a serious competitor for the local stock of whales until the end of the century. It seems that an occasional whale was captured before the coming of the New England whaleships (p. 296), but the history of the shore fishery properly begins with those Azores islanders who got their skill in these vessels and afterwards took the American methods ashore, where, staying at home, they could still hunt from their steep volcanic coasts the whale whose deep-water habit had previously led them to join protracted voyages into every ocean of the world.

The commencement of Sperm whaling from the ports of New England has been well chronicled by Macy (1835), Scammon (1874) and Starbuck (1878). By 1738 there had become established the practice of fitting out vessels 'to whale out in the deep for Sperm whales', and the whalers pushed farther and farther into the Atlantic Ocean, successively discovering new and lucrative cruising grounds. Sperm whales were hunted off the Carolina coast, then off the Bahamas and West Indies and in the Gulf of Mexico and the Caribbean Sea. Venturing eastward the whalers opened up the coast of Guinea in 1763, the Azores ground in 1765, and afterwards and more southerly, the coast of Brazil in 1774 (Macy, 1835).

Soon after it was first exploited in 1765, the Western Islands ground became a profitable fishery. Starbuck records that Nantucket whaleships in 1768 made a voyage to the Azores and by the middle of September had obtained an average of 150 barrels for each ship. This season, impressive by the standards of those days, is reported by D. Antão de Almada, Governor and Captain-General of the Azores, in a letter dated 19 October 1768 to the minister Francisco Furtado. Chaves (1924*a*) quotes from Almada's letter that in this year there had been 200 English (*sic*) ships fishing in the latitude of the islands, and they had each taken an average of 250 barrels of sperm oil and 100 barrels of spermaceti.

Other historians mention this letter. Serpa (1886, p. 24) and Lima (1940, p. 391) give much the same rendering although Lima mentions a previous season, 1767. But their excerpts maintain a confusion between whaleships and whaleboats, for Faria e Silva (1890, p. 541) gives the fishing strength not as 200 ships but as 70 ships working 200 whaleboats, and altogether producing 20,000 barrels of sperm oil and a great quantity of spermaceti. Actually the Nantucket fleet numbered 125 vessels, averaging 75 tons burden, in 1768 (Starbuck, 1878, p. 174); some of these went north, so that 70 is a reasonable estimate for those cruising off the Azores, but the total production for all Nantucket vessels in that year was only 15,439 barrels, which makes Almada's production figures too high.

English whalers at this time were occupied solely in the Greenland whale fishery, and by 'English ships' Almada meant the New England whalers, for North America was still a British possession at that date. It is undisputed that the American colonists had the initiative as well as the monopoly in the great Sperm whaling enterprise. Although later Britain was to be first after Sperm whales in the Pacific, she did not enter the fishery for this whale until 1775 (Beale, 1839, p. 143).

The catches to be made at the Western Islands were so good that whalers continued to frequent them in spite of the depredations of French and Spanish privateers and pirates which infested the whaling ground about the year 1770 (Starbuck, 1878, p. 53). By the end of the eighteenth century visits to the Azores and cruises in the adjacent seas had become a customary part of Atlantic whaling voyages. This practice persisted when the whaleships began to go farther afield, voyaging into the Indian Ocean (first opened for Sperm whaling on the Madagascar grounds in 1789) and into the Pacific which was rapidly exploited after the return of the British whaleship *Amelia** in 1790. As the nineteenth century progressed the Sperm whalers were increasingly attracted towards these oceans, and the duration of their voyages was prolonged into years. But most of these southseamen included some weeks or months in the North Atlantic cruising on the Western Islands or the Cape Verde grounds, either at the beginning of a voyage, or on the way home to New England in the hope of topping up a ship not quite full. Drouët, writing in 1861, states simply that all whaleships on their way to more southerly grounds fished between America, Bermuda and the Azores, but specially round the Azores, which were noted for large whales.

Calls at these islands, and the cruising off them, are features of the published narratives of most whaling voyages. Olmsted (1841) writes that the bark *North America* called at Fayal in 1839 at the beginning of a South Sea voyage. J. R. Browne (1846) describes how the bark *Styx*† took in the Azores on the way to Zanzibar. Bullen (1901) cruised off the Cape Verdes before going on to Mozambique, and Haley (1950, posthumous) visited both the Azores and the Cape Verdes in 1849 when bound for Australian grounds. Ferguson (1936, posthumous) mentions that the bark *Kathleen* called at the Azores in 1880, and having spent some time cruising there, sailed for the Gibraltar and Cape Verde grounds, afterwards returning to the Azores to tranship what oil she had taken before starting for Madagascar. The *Kathleen* was at the Azores again in 1900 (Table 2), but within two years was to be rammed and sunk by a Sperm whale on the Twelve Forty ground in the tropical Atlantic. Almost a century earlier, in 1807, the ship *Union* of Nantucket had met a similar end, and it was for Flores in the Western Azores that the survivors from that whale-struck ship had set their course (Starbuck, 1878, p. 115). In the nineties Chippendale (1953) was several times in the Azores or cruising off them, notably in the barks *Canton* and *Sunbeam*. Ashley (1926), who sailed in the *Sunbeam* in 1904, cruised the Western Islands and Canaries grounds at the start of a voyage to the West Coast of Africa and the South Indian Ocean. Finally may be mentioned the *Ocean Rover* which took in the Azores to fill her

* *Amelia* is the usual spelling in the nineteenth-century literature, but according to Dakin (1934) the correct spelling is *Emelia*.

† *Styx* seems to be a fictitious name for the vessel in which Browne sailed as a foremast hand.

empty casks on the way home after a long voyage and thereby gave rise to a famous incident of the American Civil War. When three years and four months out from New Bedford she was captured and burned off Flores by the Confederate cruiser *Alabama*. According to Starbuck (1878, p. 101) the blazing vessel attracted other whaleships to her assistance, and in this way the *Alabama* destroyed eight more Yankee whaling vessels: but Semmes, commanding the *Alabama*, said he had no choice but to burn the ships and did not in fact use them as lures for others (Semmes, 1869, pp. 423 ff.).

Beside these subsidiary cruises near home by the southseamen, there were vessels called 'plumpuddingers', mostly schooners and small brigs, which commonly frequented the Azores. The 'tween seasons' or plumpudding voyages were short, usually of not more than six months duration, and confined to cruising grounds in the North Atlantic at a time when Sperm whaling voyages, mainly in other seas, commonly lasted for three or four years (Melville, 1851, p. 95; Scammon, 1874, p. 241; Ashley, 1926, p. 103; Hohman, 1928, p. 9). The port which specialized in plumpudding voyages was Provincetown, Mass., and Captain N. E. Atwood (in Clark, 1887, p. 144) records that from 1820 onwards the Azores were a favourite ground for Provincetown vessels. By the middle of the century there were about 100 vessels, plumpuddingers and southseamen varying from 100 to 400 tons burden, cruising annually on the Western Islands ground (Drouët, 1861; Faria e Silva, 1890). According to Wilkes (1845, v, p. 520) the ground did not extend more than 200 miles from the islands and lay principally to the south of them. Apart from a little winter whaling the season lasted from April to November and Drouët states that the annual catch was about 150 whales, although this is a small figure for such a fleet and does not compare with the catches of the present shore fishery carried on by similar methods (Table 10).

When the Azores and the Cape Verdes were established as cruising grounds, it became the practice to call at the islands and embark the Portuguese inhabitants as recruits for the fishery. The whaleships also took fresh provisions from the Azores and salt from the Cape Verde Islands (Webster, 1834, p. 18).

Of the Cape Verdes it may be said that comparatively few islanders were recruited in the early decades: but in the last days of deep-sea whaling, between 1900 and 1920, when scarcely any nationals were to be found in the forecastles of American whaleships, these 'bravas' formed the major proportion of crews made up for the remainder of West Indians with some Azoreans. Murphy (1947), who made a whaling and sealing voyage in the brig *Daisy* in 1912-13, describes such a crew. The brigantine *Viola* called at the Cape Verde Islands for all her foremast hands in 1910 (Cook, 1926, p. 338). But I can find no reference to any shore whaling from the Cape Verdes although Sperm whales certainly frequent the islands, at least in winter. It appears that the bravas as whalers passed with the whaleships.

The islands commonly visited in the Azores were Fayal, Flores, San Miguel and Terceira. Fayal was the most important because, according to Drouët, it originally provided better victuals than were obtainable elsewhere. Its connexion with the whaling trade quickly prospered: Lima (1940) records that 104 out of 327 vessels calling at Fayal in 1866 were whaleships. A remark by Olmsted (1841) shows that by 1839 there was a United States consul appointed at Horta to look after American whaling interests. It was this consul or his son who had a hand in developing the shore whale fishery (p. 296). The whalers called at Fayal not only for recruits and provisions but also to discharge and tranship sperm oil (Clark, 1887, p. 25; Chippendale, 1953, p. 62). Drouët notes that every year four or five thousand barrels of oil were transhipped at the port of Horta. In those days the harbour had no breakwater and was dangerously exposed to storms and swell. Some of the transhipment trade was shifted to San Miguel when a new port was constructed at Ponta Delgada. Swindells, quoting in 1877 from a pamphlet by the harbour engineer of Ponta Delgada, wrote: 'lately St Michaels tends to become the entrepot where American whalers tranship or discharge their oil'. But the importance of San

Table 2. Register of Sperm whaling vessels calling at Horta, Fayal, between 1900 and 1921. Compiled by Senhor Jacinto Silveira de Medeiros

Date	Name	Rig	Port of Registry	Remarks
1900	26 Aug. <i>Pedro Varela</i>	Schooner	New Bedford	Captain Joao Pereira de Freitas
	27 <i>Greyhound</i>	Bark	New Bedford	Captain M. E. Costa, native of Fayal. See also Chippendale, 1953
	28 <i>A. R. Tucker</i>	Bark	—	138 tons burden
	<i>Pearl Nelson</i>	Schooner	—	—
	3 Sept. <i>Swallow</i>	Bark	—	Provision and oil transport
	8 <i>Platina</i>	Bark	—	—
	12 <i>Kathleen</i>	Bark	New Bedford	See p. 288
	22 <i>President</i>	Bark	—	—
	14 Oct. <i>Morning Star</i>	Bark	New Bedford	—
1901	8 May <i>Joseph Manta</i>	Schooner	—	Captain Antonio José de Freitas, native of Flores
	24 Aug. <i>Joseph Manta</i>	—	—	—
	25 <i>Pedro Varela</i>	Schooner	New Bedford	—
	31 <i>Harry Smith</i>	Brigantine	—	Provision and oil transport
	<i>Mary E. Simmons</i>	Schooner	—	—
	1 Sept. <i>Sunbeam</i>	Bark	New Bedford	Wrecked off Sapelo Island, Georgia, 1911 (see Ashley, 1926; Chippendale, 1953)
	9 <i>Platina</i>	Bark	—	—
	12 <i>Greyhound</i>	Bark	New Bedford	—
	18 <i>President</i>	Bark	—	—
	<i>Canton</i>	Bark	New Bedford	Later sold as a Brava packet and lost in the Cape Verde Islands (see Chippendale, 1953)
	20 <i>Pearl Nelson</i>	Schooner	—	—
	25 <i>Ellen A. Swift</i>	Schooner	—	—
1902	25 Aug. <i>Harry Smith</i>	Brigantine	—	—
	31 <i>Eleanor B. Conwell</i>	Schooner	New Bedford	—
	2 Sept. <i>Platina</i>	Bark	—	—
	3 <i>President</i>	Bark	—	—
	<i>Sunbeam</i>	Bark	New Bedford	—
	5 <i>Bertha</i>	Bark	New Bedford	Sold to Portugal as a packet in 1917 and lost at sea 1918 (see Robotti, 1950, p. 136)
	9 <i>A. R. Tucker</i>	Bark	—	—
	<i>Golden City</i>	Schooner	—	—
	15 <i>Morning Star</i>	Bark	New Bedford	—
1903	22 Aug. <i>Joseph Manta</i>	Schooner	—	Lost with all hands in a hurricane off Fayal, 9 October 1903
	25 <i>Harry Smith</i>	Brigantine	—	—
	27 <i>Adelia Chase</i>	Schooner	—	—
	1 Sept. <i>Pedro Varela</i>	Schooner	New Bedford	—
	<i>Bertha</i>	Bark	New Bedford	—
	2 <i>Greyhound</i>	Bark	New Bedford	—
	8 <i>Eleanor B. Conwell</i>	Schooner	New Bedford	—
	11 <i>Mary E. Simmons</i>	Schooner	—	—
	<i>Canton</i>	Bark	—	—
	14 <i>Sunbeam</i>	Bark	New Bedford	—
	15 <i>Ellen B. Swift</i>	Schooner	—	—
	<i>Morning Star</i>	Bark	New Bedford	—
	2 Nov. <i>President</i>	Bark	—	—
1904	14 Aug. <i>Harry Smith</i>	Brigantine	—	—
	28 <i>Greyhound</i>	Bark	New Bedford	—
	2 Sept. <i>Pedro Varela</i>	Schooner	New Bedford	—
	7 <i>John R. Manta</i>	Schooner	Provincetown, Mass.	See p. 305. Registered in New Bedford sometime after 1904
	10 <i>Leonora</i>	Brigantine	—	—
	16 <i>Platina</i>	Bark	—	—
	19 <i>A. R. Tucker</i>	Bark	—	—
	<i>Morning Star</i>	Bark	New Bedford	—
1905	18 Aug. <i>Pedro Varela</i>	Schooner	New Bedford	—
	20 <i>Harry Smith</i>	Brigantine	—	—
	21 <i>A. R. Tucker</i>	Bark	—	—
	29 <i>Bertha</i>	Bark	New Bedford	—

Table 2 (continued)

Date	Name	Rig	Port of Registry	Remarks
1905 6 Sept.	<i>Greyhound</i>	Bark	New Bedford	—
	<i>Wanderer</i>	Bark	New Bedford	See p. 292
8	<i>Canton</i>	Bark	—	—
9	<i>Sunbeam</i>	Bark	New Bedford	—
10	<i>Platina</i>	Bark	—	—
20	<i>Leonora</i>	Brigantine	—	—
21	<i>Sullivan</i>	Brigantine	Somerset, Mass.	Lost in Horta Bay, 14 October 1913
1906 31 Aug.	<i>Eleanor B. Conwell</i>	Schooner	New Bedford	—
	<i>Greyhound</i>	Bark	New Bedford	—
1 Sept.	<i>Bertha D. Nickerson</i>	Schooner	—	—
2	<i>Bertha</i>	Bark	New Bedford	—
	<i>Frederick Roessner</i>	3-mast schooner	—	Provision and oil transport
3	<i>Morning Star</i>	Bark	New Bedford	—
1907 19 Sept.	<i>Greyhound</i>	Bark	New Bedford	—
1908 7 July	<i>Planet</i>	Steamship	<i>British</i>	Captain Thomas Gibson
21 Sept.	<i>T. Towner</i>	Schooner	New Bedford	—
1910 31 July	<i>Pedro Varela</i>	Schooner	New Bedford	Put in for repairs after a mutiny
30 Aug.	<i>Bertha D. Nickerson</i> ³	Schooner	—	—
3 Sept.	<i>Viola</i> ²	Brigantine	Portland, Maine	Captain and owner John A. Cook (see Cook, 1926, p. 338). Reported missing 1918 under Captain José Luiz, native of Fayal
	<i>Cameo</i> ⁴	Schooner	New Bedford	—
5	<i>Pedro Varela</i> ⁵	Schooner	New Bedford	—
	<i>Richard W. Clark</i> ¹	3-mast schooner	New Bedford	Provision and oil transport
10	<i>Carleton Bell</i> ⁶	Schooner	New Bedford	—
	<i>T. Towner</i> ⁷	Schooner	New Bedford	—
	<i>Bertha</i> ⁸	Bark	New Bedford	—
	<i>Morning Star</i> ⁹	Bark	New Bedford	—
	<i>Wanderer</i> ¹⁰	Bark	New Bedford	—
11	<i>John R. Manta</i> ¹¹	Schooner	Provincetown, Mass.	—
14	<i>Wanderer</i>	Bark	New Bedford	—
1911 28 Aug.	<i>Margarett</i>	Schooner	New Bedford	See p. 305
30	<i>Richard W. Clark</i>	3-mast schooner	New Bedford	—
1 Sept.	<i>Viola</i>	Brigantine	Portland, Maine	Second year of maiden voyage under Captain John A. Cook
7	<i>Pedro Varela</i>	Schooner	New Bedford	—
8	<i>Greyhound</i>	Bark	New Bedford	—
10	<i>Alice Knowles</i>	Bark	New Bedford	302-78 tons. Lost off Bermuda 1917 (see Chippendale, 1953)
	<i>Andrew Hicks</i>	Bark	New Bedford	—
14	<i>A. E. Whyland</i>	Schooner	New Bedford	—
15	<i>Charles W. Morgan</i>	Bark	New Bedford	Last surviving whaler, preserved (ship-rigged) as a memorial at Round Hills, New Bedford, 1925, and moved to Mystic, Connecticut, 1941
	<i>Valkyria</i>	Schooner	New Bedford	—
	<i>Mystic</i>	3-mast schooner	New Bedford	—
	<i>Morning Star</i>	Bark	New Bedford	—
1912 28 Aug.	<i>T. Towner</i>	Schooner	New Bedford	—
5 Sept.	<i>Richard W. Clark</i>	3-mast schooner	New Bedford	—
	<i>Carelton Bell</i>	Schooner	New Bedford	—
	<i>John R. Manta</i>	Schooner	Provincetown, Mass.	—
6	<i>Alice Knowles</i>	Bark	New Bedford	—
9	<i>Mystic</i>	3-mast schooner	New Bedford	—
9	<i>Bertha</i>	Bark	New Bedford	—
19	<i>Wanderer</i>	Bark	New Bedford	—
22	<i>Cameo</i>	Schooner	New Bedford	—
28	<i>A. E. Whyland</i>	Schooner	New Bedford	—
1913 27 Aug.	<i>Carelton Bell</i>	Schooner	New Bedford	—
31	<i>Greyhound</i>	Bark	New Bedford	—
9 Sept.	<i>Mystic</i>	3-mast schooner	New Bedford	—
11	<i>Edward R. Smith</i>	3-mast schooner	Boston, Mass.	Provision and oil transport
12	<i>Cameo</i>	Schooner	New Bedford	—
16	<i>Andrew Hicks</i>	Bark	New Bedford	—
17	<i>Morning Star</i>	Bark	New Bedford	—
20	<i>Sullivan</i>	Brigantine	Somerset, Mass.	—
1921 11 Dec.	<i>Athlete</i>	Schooner	—	Captain Lester Mosher

1-11 These index figures identify the vessels shown in Plate XIII in September 1910.

Miguel did not last, for Horta also got its breakwater and (except for some competition from Dominica and Las Palmas in the final decade 1910-20) retained its standing as a premier port for transshipment and provisioning right to the lingering end of the old-time whaling. This is strikingly shown in Table 2, a register of whaleships and their associated provision and oil transports which called at Horta between 1900 and 1921. This table, except for a few added remarks, has been compiled by Senhor Jacinto Silviera de Medeiros. All the vessels wore the American flag except the British *Planet*. They include most of the whalers still sailing in those last years, and several of them (some already mentioned in this account) were famous in whaling history. September was the season when the whaleships assembled at Horta, and the remarkable photograph reproduced in Plate XIII shows that even as late as 1910 the harbour could present a lively prospect of sails, crossed spars and hoisted boats. Ships in the register for 1910 can be identified in Plate XIII, for Senhor Medeiros, who provided this photograph,* has also been able to name the vessels. The bark *Wanderer* and the schooner *John R. Manta* were later to be the last vessels to clear for Sperm whaling. The *Wanderer* was wrecked with the voyage scarcely begun outside New Bedford harbour at Cuttyhunk on 26 August 1924. In the following year the *John R. Manta* made a voyage from New Bedford to the Hatteras ground. With her return, and the return of the schooner *Margarett* also in 1925 from a longer cruise, the old-time whaling voyages were ended (Ashley, 1926, p. 117; Tripp, 1938). The brigantine *Viola*, on her maiden voyage when the photograph in Plate XIII was taken, was the last vessel designed and built specially as a Sperm whaler. Famous for her graceful lines, the *Viola* made four Atlantic voyages, each time taking in the Azores ground, until in September 1918 she sailed for a fifth but was never seen again. On this tragic voyage her captain was an Azores islander, Joseph Lewis (José Luiz) of Horta (Cook, 1926, pp. 338 ff.; Medeiros, unpublished).

The islanders from the first showed themselves able recruits to the industry, and quickly learned the special skills and methods of Sperm whaling. All those authors whose narratives I have mentioned commend the readiness and proficiency of the Azoreans, not so much as seamen, but as look-outs, boatmen and harponeers—properly, that is, as whalers. Ashley (1926, p. 5) has explained this success of the islander in whaling: 'Being nearly all islanders, brought up from childhood with oars in their hands, they were eminently suited to the purpose; for boatmen, not seamen, are required in the whale fishery.'

By the 1840's, when the American fishery was at its peak, the writings of Olmsted (1841), J. R. Browne (1846), Cheever (1851) and Melville (1851) show that the Azores whalers were established as part of the Sperm whaling scene. Even in 1839 the *North America* had six 'Portuguese' in her total ship's complement of thirty-one (Olmsted, 1841) and in 1846 Browne records that when the *Styx* cleared from the Azores she had twice as many Azores sailors as Americans in her fore-castle. A passage written about 1855 summarizes the islanders' position in American whaling in the mid-century (Nordhoff, 1941, p. 209, posthumous):

A great many Western Island Portuguese find employment in American whalers (*sic*), almost every vessel sailing from New Bedford carrying more or less of them. They are a quiet, peaceful, inoffensive people, sober and industrious, penurious, almost to a fault, and I believe invariably excellent whalers.

Writing in 1861, Drouët said that most of the young men in the Azores chose to ship as whalers if they could. A decade or so later, when the fishery had declined, the Azoreans bulked larger even than before, and some sailed as officers in the whaleships.

I am not here concerned with the causes of the decline of Sperm whaling; these have been variously analysed by Starbuck (1878, p. 113), Hohman (1928, chs. XIII and XIV), Harmer (1928, pp. 63-4) and Brandt (1940, ch. XIV). What is important to the present study is that the Portuguese, either Azoreans

* Taken by Senhor Goulart of Horta.

or the colonial Cape Verders, were prepared to put up with the hard conditions then prevailing in the whaleships: with indifferent food and low pay and inadequate sailing agreements, and with voyages that grew longer and longer during the several decades of the decline. Between voyages many settled in New England, for here the Azores expatriates, remarkable for their thrift and their warm regard for their native islands, could still manage to send money to dependents at home. Domiciled abroad, or at sea in the whaleships, they could also avoid the military conscription to which all Portuguese, unless they paid in lieu a good sum of money, were liable until their 36th year (Walker, 1886, p. 112). By 1880 a third of the 3896 whalers in the New Bedford fleet were Portuguese, and the Azores islanders amongst them had so far established themselves in New Bedford that the section of the city where they lived was called Fayal (Brown, 1887, p. 218). New Bedford was the last port to fit out the old whaleships, and in 1949 I met two veteran whalers, one in Santa Maria and one in Fayal, who had lived in New Bedford in their youth and had sailed after Sperm whales from that port. Both were still active as motor-launch enginemen in their shore fishery.

In the last phase of deep-sea whaling, between 1900 and 1920, the Azores islanders enjoyed their greatest influence in New Bedford ships, not so much in the forecastles (where berths were predominantly occupied by Cape Verders and West Indians), but on the quarter-deck where natives of Fayal and Flores and Pico commonly made voyages as mates, and sometimes as masters. Four ships recorded in Table 2 were commanded by Azoreans. The whaling voyage had by then reverted to the short Atlantic cruise favoured by the plumpuddingers and the earlier whalers of the late eighteenth century. On these short cruises and with slender and thrifty outfits, the Azores captains and part-owners could still make a whaleship pay even in the years between 1900 and the First World War, when the market for sperm oil had become quite limited. After 1921, however, it appears from Table 2 that no whaling vessel called at Fayal, and so far as the Western Islands ground was concerned this year saw the end of the whaleship era.

The technical section of this account will attempt to show how the Azores whalers have retained the American tradition in the use of whaleboats, boat gear, and whaling implements. But in the ordinary conversation of the whalers themselves lies a no less striking reminder of the origins of their fishery. These men speak only Portuguese, but they have preserved from their forebears some English words learned during the deep-sea voyages and representing the special vocabulary of their trade. Ancient terms which elsewhere live only in the pages of old narratives can be heard in the Azores today, sprinkling the Portuguese conversation of the whaleboat and the flensing platform. Chaves (1924*b*) and Figueiredo (1946) give some of these survivals of language, and I have overheard several others from the whalers. They are collected in Table 3.

This glossary includes some of the more technical whaling terms, which will be explained in their appropriate places. The Portuguese spellings of these Azores identities are virtually phonetic renderings of the English words. Where equivalents in continental Portuguese exist they have been inserted, but some of these are not precise, and such approximations have been queried. Several of the terms, like 'blackskin', 'junk', 'case', 'short-warp' and 'loggerhead', have no corresponding expression in Portuguese; and there are others where the Portuguese equivalents exist, yet are not used by the whalers or may not be known to them. 'Stern-oar' is such a word: its correct Portuguese rendering, *esparella* or *remo de esparella*, is not in their vocabulary. There are three words, common in the fishery, which have not been inserted in the table since they are currently in use on the continent, as in the Azores. They are 'harpoon' (*harpão, arpão*), 'lance' (*lança*) and 'motor-launch' (*gasolin-lancha*). 'Harpoon' of course owes nothing to America, and indeed antedates the discovery of the New World; this word, appropriately enough for the symbol of all whaling, is derived from the 'arpoi' of the early Basques (Markham, 1881, p. 974). A curious feature of the glossary in Table 3 is that, although it

includes English names for several species of whales, none the less the English generic word of their fishery is unknown to the islanders: a 'whale' to them is *baleia*, and by this term they mean, not any whale, but the Sperm whale, the only species they systematically hunt; they only say *Cachalote* when distinguishing the Sperm whale from other species.

The knowledge and experience gained by the Azores islanders in American ships was first put to use in the service of independent national enterprise, not in shore whaling from their own coasts, but in Portuguese whaling ventures on the seas adjacent to the colonial possessions of Portugal. The ships of the American whale fishery did not touch at the coast of Portugal, and no skilled whaling tradition

Table 3. *Glossary of whaling terms in English, currently used by Azores whalemen, and derived from the Americans*

English	Portuguese	
	Azores	Continental
<i>Of the species of whales:</i>		
Finback (<i>Balaenoptera physalus</i>)	Finebeque	Rorqual Comum
Humpback (<i>Megaptera novaeangliae</i>)	Ampebeque	Baleia de Bossa?
Bottlenose (<i>Hyperoodon ampullatus</i>)	Bôto	Bico de Garrafa
Killer } (<i>Orcinus orca</i>)	Quilha }	Roaz de bandeira
Grampus }	Grampas }	
Blackfish (<i>Globicephala melaena</i>)	Blequefish	?
<i>Of the whale:</i>		
bull	bulo	macho?
calf	cafe	baleia que ainda mama
blackskin	blequesquine	pelle
hump	ampo	bossa?
case	queize, caise, coice	—
junk	janco	—
spout	espato, esparto	coluna expiratoria, bufo, espirro
(there she) blows!	bloz!	—
<i>Of the whaleboat:</i>		
loggerhead	logaête, logaiête	—
cleat	clit	gancho da enxarcia
boom (of mainsail)	bûme	botaló
oar	ôa, ór	remo
stern-oar	stanó, estanól	esparella, remo de esparella
short-warp	chote-ope	—
bomb-lance	bomblanço	—
<i>Of cutting in and trying out:</i>		
spade	espeide	—
(horse-)pieces	piças	troços, pedaços de toucinho?
try-works	traiol	—
cooler	cula	vaso para esfriar?

was ever properly established among the continental Portuguese. It is true that shore whaling in Portugal was a recognized fishery by the reign of D. Pedro I (1357-67), but Lopes (1938) points out that this whaling was prosecuted entirely by the Basques, who during the fourteenth and fifteenth centuries obtained leave to extend their hunt for Right whales from the Bay of Biscay southward to the coasts of Spain and Portugal. The continental Portuguese themselves had no appetite for whaling, and there was little or no response to the various protective concessions by which the sovereigns of Portugal hoped to encourage their nationals. By the end of the eighteenth century, however, the Azores islanders had become proficient in Sperm whaling, and the prospects of their employment in Portuguese ships gave renewed encouragement to those who wished to see a national enterprise competing with America and Britain in the sperm oil industry.

Starbuck, in a footnote (1878, p. 85), reports that the English statesman Pitt in 1785 said, 'the Portuguese had now . . . a very pretty spermaceti-whale fishery, which they had learned from the New Englanders, and carried on upon the coast of Brazil'. The Brazil ground had been established for Sperm whaling in 1774, the business being prosecuted from whaleships well off the coast. Continental Portugal furnished the ships and finance for its venture on this whaling ground but the whalers concerned were undoubtedly islanders from the Azores, possibly with some Cape Verders. The attraction of the Azores whaleman to the Brazil enterprise may be partially considered as an aspect of the long (and still surviving) tradition of emigration from the Azores to Brazil. This new Portuguese whaling seemed to prosper at first, and efforts were made to exploit other grounds. Lopes records that in 1798 D. Maria I, Queen of Portugal, raised a fleet to hunt whales and try out oil at sea along the coasts of Portugal, Brazil, Mozambique and the Cape Verdes. In later decades there were bounties, like those offered at that time by the English government, for whaling ventures to the South Seas. Two of these subsidized Portuguese voyages were those of the *Speculação* and the *Adventeur* to New Zealand in 1840 (McNab, 1913, p. 288). But the deep-sea industry never became established, and it seems that by the 1860's the Portuguese whaleships were reduced to a few which cruised the Azores ground in summer (Drouët).

Some of these few ships were not from the Portuguese mainland, for, according to Faria e Silva and Lima, the Azores islanders in 1875 themselves began to fit out vessels for the off-shore ventures. The first was a French brig abandoned by the assurance company because of her poor condition: a company was formed in Fayal to prepare her for whaling as the *Cidade da Horta*. Most likely she was the 'Portuguese whaling brig' which the cruiser *Alabama*, between the taking of the *Starlight* and the *Ocean Rover*, chased off Flores in 1862, mistaking her for a Federal whaler (Semmes, 1869, p. 431). Faria e Silva says there were never more than five local whaling vessels, but Macedo (1871, II, p. 281) claims that Horta could at one time boast ten whaleships of her own. However, there was little money available in the Azores, and the costs of maintaining whaleships, set against the successful and economical shore whaling then being developed, discouraged the small island companies from directing their own enterprise in the direction of deep-sea whaling. Perhaps as early as 1870 (according to Faria e Silva), and certainly by the end of the century, the local Azores whaleships were all gone.

The industry in continental Portugal continued to decline throughout the latter part of the nineteenth century. Shipowners could not be persuaded to accept whaling risks: the Azores whalers, few of whom were as yet preoccupied with the new shore industry, found ample and satisfactory employment in the long voyages of American vessels. In 1862 and 1877 the last attempts were made by the Portuguese government to persuade crews and shipowners, by special benefits, to enter the fishery. Regulations of 1886 designed to implement these laws met with little response; and deep-sea Sperm whaling everywhere was in any case a dying industry by this time. No whaleships from continental Portugal appear to have survived beyond 1900 at the latest, for they do not appear in the register of ships calling at Horta (Table 2).

The special interest of the Azores whaleman lies in the shore fishery, still surviving, established in his own islands. But in the last century there were other shore whaleries overseas where he was active, and mention of these may help to emphasize his widespread employment and substantial contribution amidst the labours and hazards of nineteenth-century whaling. There was an early colonial venture in East Africa in 1805, when Starbuck records that the Portuguese attempted to whale out of Mozambique and employed New Englanders to take charge of the business. Presumably this was a seasonal shore fishery for Humpback whales, like the steam whaling ventures which operated from Mozambique more than a century later between 1910 and 1915 (Mackintosh, 1942, p. 231). California was another country where Azoreans were active in whaling. The lagoon fishery for the Californian Grey whale

flourished for several decades and was partially conducted from shore stations. The first of these was opened at Monterey in 1851. Most of the whalers here and elsewhere along the coast were Azores islanders who settled in California with their families (Scammon, 1874, p. 250; Clark, 1884; 1887, p. 55). There were besides Monterey at least twelve other stations, one of them called Portuguese Bend: and on all that coast the most experienced of the whaling captains was a native of the Azores. Scammon has described and figured the whaling settlement at Carmel Bay, and it must have been very similar to one of the small try-works stations like Ribeiras or Calheta do Nesquim at the present time in the Azores. Scammon says (1874, p. 250):

Scattered around the foothills, which come to the water's edge, are the neatly whitewashed cabins of the whalers, nearly all of whom are Portuguese from the Azores or Western Islands of the Atlantic. They have their families with them, and keep a pig, sheep, goat or cow prowling around the premises. . . . It is a pleasant retreat from the rough voyages experienced on board the whaleships. The surrounding natural scenery is broken into majestic spurs and peaks, like their own native isles. . . .

Azores whalers also settled in Tasmania, and served in vessels sailing from Hobart Town (Philp, 1936, p. 75). They were undoubtedly among the crews of whaleries established for Right whaling in the bays of Cook Strait, New Zealand, after 1830 (p. 338).

It seems true to say that wherever whaling was prosecuted in the last century, from ship or from shore, men from the Azores might be found among the company.

Shore whaling from 1832

Although whaling proper in the Azores started as a pelagic industry operated by the New Englanders, it appears, from Lima's account (1940, p. 391) of D. Antão de Almada's letter of 1768, that the islanders occasionally caught whales in earlier times. This primitive shore whaling may have been learned originally from the Basques who are likely to have called at the Azores when they pioneered the whaling voyage with early visits to Newfoundland. Gallup (1930, p. 271) mentions a tradition 'that Columbus, while lying at the Azores, was told of lands which lay beyond the setting sun by the captain of a whaler from "Ande Luz"'; and it may be significant that the word *vigias*, used for the old watch-towers built by the Basque whalers many centuries ago, is used also for the present Azores look-outs, and that the word *Cachalote*, used by the Azoreans as a specific, discriminative term for the Sperm whale, is of Basque origin according to Jenkins (1948, p. 72).

The present shore fishery came long after the arrival of the New England whaleships. It seems to have started in Fayal. This is to be expected since Horta was always the premier port of call for whaleships on the Western Islands ground. But the date of commencement is uncertain. No early records survive, but Senhor Medeiros, who gave a deal of time to enquiries on my behalf, tells me that in whaling families 1832 is a date often mentioned for the first launching from a Fayal beach. The oral tradition continues that the venture of 1832 was abandoned after a time and was not resumed again until 1851, when the old try-works at Porto Pim, Horta, was improved and extended as a Sperm whale factory. This try-works, which still survives although disused, was first built in 1836. The temporary abandonment before 1851 would explain why Bullar & Bullar, in their delightful account written in 1841 of a year spent in the Azores, do not mention whaling except to say that American whalers called at Fayal for provisions. The start in 1832 may have been made by islanders, but more probably by enterprising Americans who had settled in Fayal and who, with their own tradition of New England shore whaling, would quickly have seen the advantages of the high cliffs in exploiting, direct from the shore, the fishery which for decades had attracted each year the whaleships of their countrymen. There were undoubtedly such settlers, including the wealthy and influential family of Dabney which provided United States consuls to Fayal at least from 1839 to the end of the century (Olmsted, 1841;

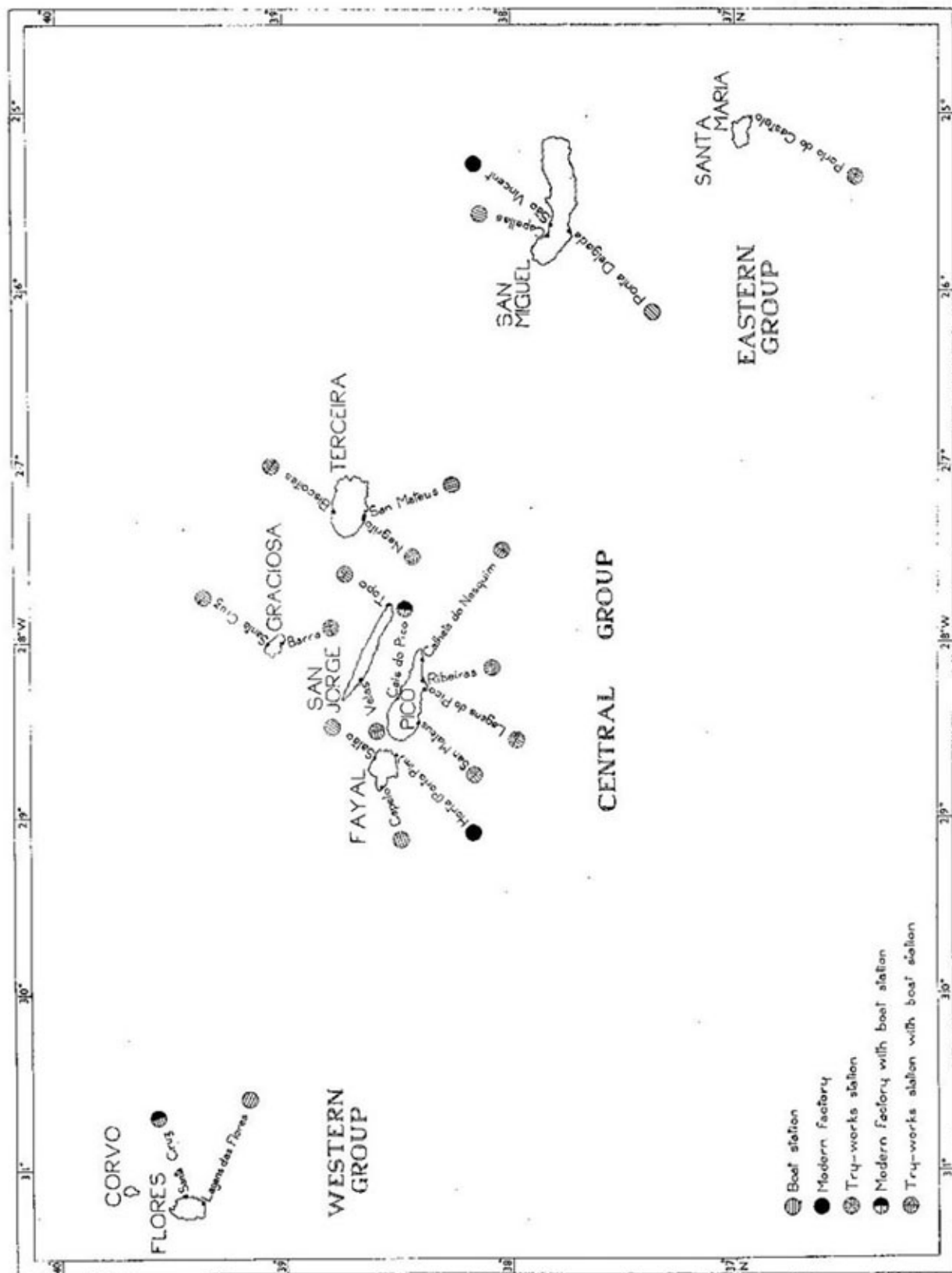


Fig. 3. Open boat whaling for Sperm whales in the Azores or Western Islands. Distribution of stations in 1949.

Monaco, 1888; Pouchet & Beauregard, 1889, p. 6). According to Lima (1940) the shore whaling business did not begin until the 1850's when Dabney and a Portuguese, Bensaude, acquired whaleboats, and Dabney set up the try-works at Porto Pim. This must refer to the date 1851 mentioned in the oral tradition. Other historians beside Lima place the start of shore whaling some twenty years later than 1832. According to Faria e Silva (1890) it began in 1856, and Chaves (1924*a*) notes that there were shore stations in Fayal and Pico a few years earlier than 1861. But where the earliest records are lost we should not dismiss hearsay evidence, and I conclude that shore whaling was started in Fayal, possibly by Dabney, about 1832, but it did not prosper and was relinquished until its revival and firm establishment by Bensaude and Dabney during the 1850's. How long it remained partially in American hands is not clear. In 1920 the Foreign Office Handbook (p. 30) declared that, 'Whaleries are conducted by the Americans: the chief are in Fayal and at Capellas in San Miguel'. However, when I visited the islands in 1949 the controlling interests everywhere were held by Portuguese, either locally or from the mainland of Portugal, and there were no Americans engaged in the industry. I believe that Portuguese have owned it entirely for a very long time.

Little evidence survives to indicate the spread of shore whaling to other islands of the archipelago, and the incidental references of travellers came mostly towards the close of the nineteenth century. From inquiries in Pico, Senhor Medeiros has learned that the business was certainly carried on there in 1880, when Anselmo da Silveira began whaling out of Calheta do Nesquim with two whaleboats brought from New England. One of those engaged in Calheta at that time, a harponer called Raimundo, was famous for his skill, being known in New Bedford as the 'Whale-Killer'. Chaves (1924*a*) put the date in Pico earlier than 1861, and we may assume that the successful venture in Fayal in the 1850's was not long in crossing the narrow strait to Pico. Pouchet, visiting the Azores in the Prince of Monaco's yacht *Hirondelle* in 1887, made anatomical observations on a Sperm whale at Lagens do Pico (Pouchet & Beauregard, 1889). Judging from Pouchet's description and photographs, I found this centre of the old try-works companies scarcely changed when I visited the settlement sixty years later. It is an interesting fact that the old whaleships (although they recruited Pico men) seldom called at Pico, which lacked not only harbours but also provision of fresh victuals, for little grows there, except *faya** (which is used for firewood) and the vine. Yet from Fig. 4 (p. 302), showing the annual catches of the several islands between 1896 and 1949, it is clear that by the end of the century Pico had secured the lead in shore whaling. From the size of the catch and from the number of stations operating (Table 4, p. 306) there is no doubt that Pico has ever since consistently maintained this position, although the figures for the catch of whales per whaleboat at the foot of Table 10 indicate that more whales are to be found to the south-eastward, around San Miguel and Santa Maria.

The special attention that Pico has paid to whaling may well be associated with the failure of the vineyards, which were devastated by phylloxera in 1853 and have only in recent years begun to recover. Before 1853 Pico had exported wine, principally to Russia and the West Indies, where 'Pico Madeira' had acquired some fame. When this business collapsed the Pico inhabitants must have turned to the new alongshore venture as an alternative livelihood. They had such success or were so well suited to the employment that, extending ambition beyond their own coastline, they persuaded other islands to make concessions so that Pico boats and crews might whale from these also. By 1908 Pico had two whaleboats in Terceira and four in Graciosa (*Estatística das Pescas*): when I visited the whaleboat stations of Capelo and Salão in Fayal during 1949 there were altogether nineteen whaleboats and ten motor-launches operating, but of these Pico maintained seven whaleboats and four motor-launches and the complete crews to work them (Table 8, p. 326). The island has long been known for the number of its whaling companies, all separate and competing with each other, and sometimes in

* See p. 348.

bitter and dangerous rivalry (p. 334). Recently there has been a trend towards amalgamation, as when three companies merged as Cais do Pico in 1946 to build a modern station, but even in 1949 Pico stood out from other islands in having an average of three times as many companies as there were settlements or stations (Table 4). Whaling, and the associated crafts of the boat-builder, blacksmith and cooper, are among the major occupations of the Pico islanders today. Confined by their sheer mountain to struggle for their livelihood upon its lower slopes and upon the coastal strip, the strong Pico men have long been used to simplicity and hardihood, qualities which have helped them to their special reputation among the Azoreans for unflinching effort and resolute daring in the whaleboats. With them above all the whaling tradition of the Azores is secure.

Flores, Terceira and San Miguel (Fig. 3), the islands other than Fayal frequented in the nineteenth century by whaleships, probably followed after no great lapse of time the shore whaling venture of Fayal in the 1850's. But I cannot find any details. A likely time for the start of shore whaling from San Miguel was the period during the 1870's when Ponta Delgada temporarily competed with Horta as the entrepot for the American whale oil and provision trade. The whalery was set up at Capellas on the north coast, and it is still the principal whaleboat station although the try-works are now disused. The station was evidently in existence some years before 1890 when Pouchet and Chaves examined a Sperm whale taken from San Miguel. Whaling flourished in the island, for a comparatively larger number of whales frequents this locality than the seas of the Central and Western groups. Like Fayal, although not to the same extent as Pico, the island has maintained whaling on some sort of scale no matter how small, even during the several periods of acute depression which have made whaling everywhere in the world since the 1870's and 1880's an industry of extraordinarily fluctuating fortunes. Whaling in Terceira, with a whaleboat station at San Mateus and try-works at Negrito hard by, started earlier than 1895, when the Prince of Monaco's yacht *Princess Alice* witnessed the killing of a Sperm whale by Terceiran boats (Buchanan, 1896; Monaco, 1896; Richard, 1907). There was another station on the north coast at Biscoites, but the whale fishery in Terceira does not seem to have prospered in this century, and was for a long time defunct until revived when the last war began (Fig. 4). To the westward, Flores, supplying recruits as well as fresh provisions to the deep-sea whaling, has had an association with the whaleships as old as that of Fayal, although not so important. In 1862 many boatloads of whalers landed in Flores: they were survivors of the tragedy of civil war and the wholesale burning of Yankee whaleships by the Confederate cruiser *Alabama* (Semmes, 1869, p. 445). These men were shipped back to the Federal States and it is very probable that they sold their whaleboats locally before departure. I wonder if these boats were used to start the whaleries at Santa Cruz and Lagens das Flores. We know from the statistics given by Faria e Silva (1890) that there was certainly whaling from Flores by 1886, but it seems to have fared little better in Terceira for the first three decades of this century.

In the remaining four islands of the archipelago there have been whaleries at least since the late nineteenth century, but they have been conducted (until the beginning of the last war) more or less intermittently and on quite a small scale. This is apparent from the island catch graphs in Fig. 4. Corvo was whaling at least as early as 1886. Smallest and most remote of the Azores and lying 12 miles north of Flores, this island maintained between six and eleven whaleboats in the decade following 1895, yet only one whale was caught during that time (Table 10), and subsequently whaling from the single landing place at Rosario has been abandoned. The small and poor community could not afford to maintain such an unproductive fishery. No doubt the Corvo whalers were defeated, not by a shortage of whales, but by the surf, which, beating everywhere about this unsheltered island, must have made their peremptory embarkations often perilous and sometimes impossible, and have equally endangered the subsequent beaching of the whaleboats and the proper stranding and cutting in of the

captures. Nevertheless, Corvo still plays its part in whaling, for I have been told by Colonel Agostinho that towards the end of July a look-out is manned on the Corvo cliffs and some whaleboats belonging to Flores are brought across the strait to fish from Rosario, although the dead whales are towed back to Flores for working up. In this way the look-outs command the northern ocean prospect otherwise obscured from Flores by the loom of Corvo. Turning to Graciosa and San Jorge in the Central Group, we know from the official statistics (Table 10) that whaleries had been established in these islands by 1896. Probably they started a good deal earlier. Graciosa has made little headway, but San Jorge, although whaling with occasional intermissions, appears since the turn of the century to have been as active as Fayal except that it has not shared so obviously in the period of expansion after 1940. To the south-eastward Santa Maria, the remaining island to be considered, was whaling in 1896, although within ten years the industry had lapsed despite the comparative abundance of whales round the Santa Maria coasts (p. 298). Possibly the island experienced difficulties akin to those of Corvo. No island in the archipelago is more steeply cliffed or more beset with dangerous reefs than Santa Maria. But in 1937 the whalery was revived. I do not know whether the single station at Porto do Castelo (p. 341) is the original one constructed some time in the nineteenth century, but it has secured, during the twelve years to 1949, a higher average catch per whaleboat than that of any other island (Table 10).

Since 1900 the Azores whaling industry has undergone developments or has acquired certain modern adjuncts which, although they have left intact the essential traditions and methods of open boat whaling, have greatly improved the efficiency possible 100 years ago. Surveying these, and the recent history of the fishery, it is useful to refer, not only to Table 1 and Fig. 2, comparing the Azores and the world catches, but also to the catch of whales per whaleboat for the archipelago, shown in the extreme right-hand column of Table 10.

A preliminary step taken by the island whalers was to make themselves independent of New England for the boats and special equipment of the whaling business. During the nineteenth century all the whaleboats were imported from New Bedford. But in 1894 a whaler and shipwright of Lagens do Pico, called Francisco José Machado (as I am informed by Senhor Medeiros) built the first local boat: the other islands, following the Pico lead, drew upon their indigenous tradition of small boat construction, and by 1900 all the necessary whaleboats were built locally. At the present time the whaleries are largely self-sufficient, and save for the special cooking equipment of modern factories, they import only ropes, try-pots and motor-boat engines. All the other gear, the harpoons, lances and cutting spades, the coopered barrels and tubs, the boat furnishings and the motor-boat hulls, are made in the islands.

The most important step forward has no doubt been the introduction of motor tow-boats. Even these had an American precedent in nineteenth-century whaling, for a 28-ft. steam launch was successfully operated from the bark *Rainbow* as a tow-boat for whaleboats and captured whales in the North Pacific Bowhead season of 1882 (Brown, 1887, p. 246). Senhor Medeiros has established that a motor-boat for towing purposes was first used by the Fayal whalers in 1909. The effect of this development was not immediately apparent, for the industry suffered a period of depression during the four years between 1911 and the beginning of the First World War. Sperm oil during the 1900's was exported to London and to the United States (*Estatística das Pescas*), but it had at this time few uses except as a lubricant and as a fuel sufficiently superior to kerosene to be required for railway signal lamps and for lighthouses: spermaceti, which had formerly provided the finest wax candles, found only limited employment in making cosmetics and medicinal salves, and in reinforcing the cheap paraffin candles which had ousted it. Up to 1910 the modest demand arising from these uses could be met without superfluity by the production from the Azores, and in a lesser degree from other

land stations and from the few surviving whaleships. The first decade of this century was in fact a reasonably profitable time for the shore whaleries, and the capital outlay on motor-boats must have reflected this comfortable phase. But for a few years after 1910 the small market became glutted with oil derived from the occasional attention paid to Sperm whales by the steam whaling industry, still active in the north and already established and expanding in the new southern whaling centres of the Sub-Antarctic and Antarctic. In consequence the Azores companies were faced with difficulties in selling their oil and the catches declined. Table 1 shows that the archipelago accounted for 72.3 per cent of the world catch of Sperm whales in 1910 but only 3.8 per cent by 1915. But the reduction of Allied whaling in the midst of the 1914-18 war (Fig. 2), combined with the increased war-time demand for sperm oil, brought renewed prosperity to the Azores. Motor tow-boats, of which Fayal had eight by 1918, were generally employed among the islands, and these must have combined with the increased catching effort to produce the noticeable war-time increase in the Azores catch of whales per whaleboat.

The motor-boats have obvious advantages. When a blow has been raised from the cliffs a motor tow-boat can rapidly take two or three whaleboats to the neighbourhood of the whale, whereas formerly a stiff on-shore breeze might mean precious time occupied in miles of tacking, which could lose them the whale before they were close enough for a dart. In this sense the effective range of the whaleboats has become substantially extended. The close approach necessary for hand harpooning means that the noise of an engine would frighten the quarry, so that motor tow-boats are never used for the actual securing of whales, but during the hunt they are invaluable for giving short tows to the questing whaleboats, for bringing up spare whaleline in emergency, for assisting damaged boats, and for prolonging the hours of chase available to whaleboats which would otherwise be benighted. Finally the motor-boats tow the dead whales back to the whaling station, a distance perhaps of twenty or more miles: this was formerly a weary back-breaking task for whaleboats under oars, pulling with the likelihood of being benighted off a hard coast, and with the possibility of worsening weather and subsequent loss of a hard-won prize.

It is an arresting contrast of the period 1920-30 that in these years, when the general employment of motor tow-boats gave the old-fashioned whaleries their first aspect of modernity, the Azores whalers finally abandoned the occasional employment of firearms in fastening and killing whales and used exclusively the trusted and primitive weapons of the whaling trade, the hand harpoon and lance. As early as 1731 Britain was the first nation to introduce harpoon-guns into whaling; these were unsuccessful, but there were swivel-guns employed satisfactorily in British whaleboats at the Northern Right whale fishery after 1772 (Scoresby, 1820, II, p. 70), although they never became popular until the 1850's. Such pieces of ordnance were practicable in this fishery, whaling in ice bays of the summer Greenland Sea, but when the New England whalers in 1846 first turned their attention to firearms, they developed not swivel-guns but small-arms, which were handier and more accurate in the open weather of ocean Sperm whaling. By the 1870's each American boat usually carried a shoulder-gun, a supply of bomb-lances, and a darting-gun in addition to the hand weapons. The shoulder-gun fired a small lance fitted with a bomb, and was used to kill a whale which had previously been fastened with the hand harpoon. The darting-gun was a hand harpoon ingeniously combined with a stockless gun-barrel which automatically discharged a bomb-lance as soon as the harpoon iron fastened. Bomb-lances were so useful in securing a quick kill and in mitigating the perils of whaling that by 1874 the hand harpoon was rapidly going out of practice in American whaleboats and in 1887 was kept only for emergencies (Scammon, 1874, p. 228; Brown, 1887, p. 252). The Azores shore whaling business took over firearms with the rest of American gear and methods. In the *Estatística das Pescas* there are lists of catching equipment where *carabinas* and *espingardas* are

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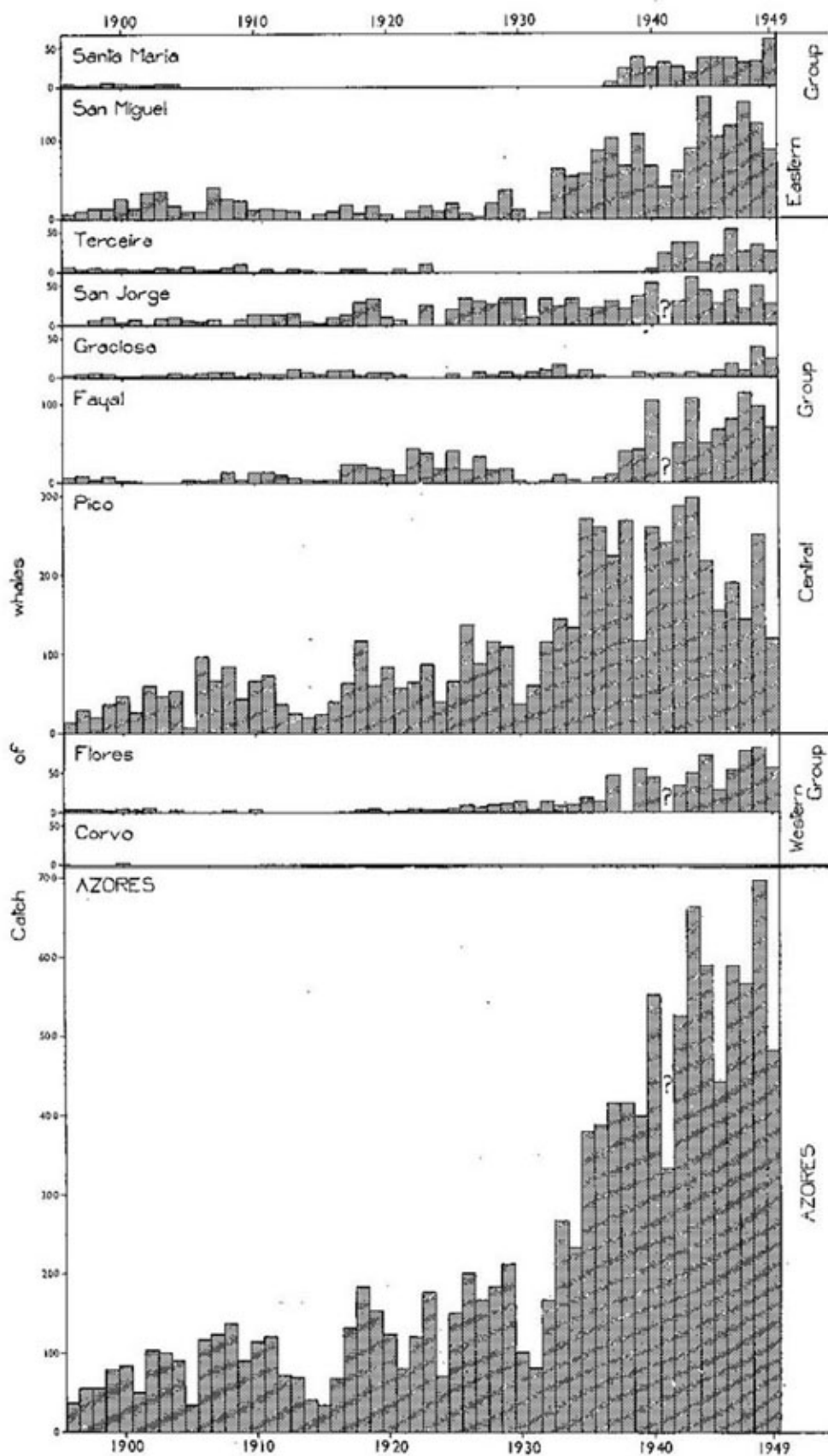


Fig. 4. Sperm whales. Annual catches in the Azores from 1896 to 1949.

mentioned, although intermittently and in decreasing numbers, for several whaling stations between 1905 and 1926. *Bomblanços* are listed for 1929, and I believe that *carabinas* ('carbines') were shoulder-guns and *espingardas* ('muskets') were darting-guns, but I cannot prove this because the American terms have no Portuguese equivalents. Compared with the listed numbers of hand weapons, few of these guns were in use at any time, and it is unlikely that they were ever popular with the islanders, if only because of the relative expense involved. In San Miguel there were still two *espingardas* available in 1934, but these seem to have been the last. Firearms are never used at the present time anywhere in the Azores. An experimental hand lance with an explosive head, electrically detonated, has been tried in Fayal, but not adopted (Figueiredo, 1946, p. 104). The weapons of Azores whalers today are patterns of hand harpoons and lances which existed a century ago. Why small-arms have been completely relinquished is not very clear. A similar shift to the old hand weapons took place in the last years of the whaleships when these also were manned largely by Portuguese. Ashley attempted to explain this by the need for economy, or by the possibility that Portuguese whalers had less assurance with explosives than the Americans (1926, p. 88). Firearms certainly had one disadvantage in Sperm whaling: they were best reserved for lone bulls because schools were frightened and dispersed by the detonations; and it is a fact that most whales round the Azores are in schools.

In the 1920's an important event for Azores whaling was the formation of the *Grémio dos Armadores da Pesca da Baleia*, an official organization with offices in Lisbon. This Association of Whaling Owners has something of the attributes of a medieval guild. All whaling owners or companies are members of the *Grémio* and it includes representatives from the Ministries of Marine and of Economics. Its functions are to safeguard the welfare of the whaling industry, promote its development and increase its efficiency; to arrange the most advantageous terms for the sale of sperm oil and whale products in foreign markets; to make rules for the conduct of the fishery and for the rightful ownership of disputed whales; to regulate the equipment and manning of the whaleboats and motor tow-boats and regulate the conditions of recruitment, organization and pay of the whalers; to collect statistics and records, and make regulations for conserving the whale stocks; and for all these rulings to establish against their non-observance penalties of money fines or the withdrawal of whaling licences. The rules and regulations of the *Grémio* were published in 1925 and a revision of the constitution and administration was issued in 1945 (*Grémio dos Armadores da Pesca da Baleia*, 1925, 1945).

The Azores catches fluctuated considerably in the 1920's although the general trend was a rising one. London and Lisbon received most of the oil, and little was exported direct to the U.S.A. The general slump of 1930-31 is clearly seen both in the world and in the Azores catches (Figs. 2 and 4). But by 1930 new uses were beginning to be found for sperm oil and spermaceti in the chemical and textile industries. Research and development in this field were particularly active in Germany, and it is significant that between 1930 and the outbreak of the Second World War the oil produced by the Azores found a market in Hamburg as well as in London and Lisbon. The catch figures for the world (representing largely Antarctic catches) and for the Azores, and the increased effort shown by the Azores catch of whales per whaleboat (Table 10) together boldly reflect this renewed interest of industrial markets in sperm oil during the 1930's. Today new uses continue to be found for the oil. Its chemical composition is very different from that of oil from Whalebone whales, which consists of true fats capable of being hardened into edible oils. Sperm oil is largely a mixture of waxes. It does not provide edible oils, but its present applications cover a wide field including cosmetics, soap, liniments and medicines, machine oils, plasticizers and fillers, paints and varnishes, roofing board, and the hardening of metals. A good deal goes to make sulphonates for the textile industry (*Norsk Hvalfangsttid*, 1948, p. 456), and for the new sulphonated detergents.

In the Azores the increasing prosperity after 1931 was accompanied by the introduction into one

island of modern methods of treating the carcass. Even today most of the whaleries of the archipelago cut in their captures either stranded on the beach or laid alongside a jetty. The ancient usages of the cutting-spade, assisted by rope-tackles and a hand capstan, are employed to remove the spermaceti organ and the blubber which are afterwards melted in iron try-pots (pp. 334 ff.). The stripped carcass with its valuable meat and bone is not used, being simply towed out to sea and dumped. During the depressed period of 1924 (Fig. 4) Chaves had called for modern processing which would save wastage and would produce a superior oil and make by-products in addition (1924*a*). But the necessary capital outlay had to wait for better times and it was ten years later in 1934 that the Azores acquired their first modern factory employing steam power for heaving-up the whale, for flensing winches and for pressure-cookers. The station is on San Miguel at São Vincent, a mile or so east from the try-works at Capellas which it replaced.

No further stations were built until the Second World War. Whaling in the Azores at this time, for reasons similar to those operating in the First World War, entered its period of greatest prosperity. Towards the end of the war, in 1944, when allied steam whaling was practically at a standstill although the market for sperm oil was unlimited, the archipelago contributed 40.3 per cent of the world catch of Sperm whales. Stimulus and capital were alike present for ventures with further modern stations. The factory at Porto Pim, Horta, was built in 1943 and two others followed, one at Cais do Pico in 1946 and one at Santa Cruz das Flores about the same time. The latest new station, at Lagens do Pico, which was built as far as its foundations in 1949 and was then temporarily abandoned because of a poor oil market, is now nearly completed and should start operations this year or in 1954. All the four modern stations now operating extract the blubber, spermaceti, and bone, and three of these stations also process the meat for meat-meal. At least one station installed a liver-oil plant in 1951. Methods of working up whales at these modern stations have been developed independently from those at whaling factories overseas (pp. 342 ff.).

Mention of one other technical adjunct brings the Azores whaling scene into its present state of development. Radio-telephone communication between look-outs and motor tow-boats was introduced during the war. The advantages are obvious enough, especially in giving revised bearings of sighted whales to the launches at sea, and also in permitting centralized control and organization of whaling sallies round all the coasts of an island. I believe San Miguel was the first island to take up radio-telephony for whaling, and it is there that the innovation has been most developed. In 1949 all the modern factories employed radio-telephones in their motor-boats and look-outs but certain of the islands which only possessed try-works had not then installed the equipment. The look-out at Santa Maria had a radio-telephone but nobody to operate it. This is symptomatic of the entry of a new technician class into the ancient practice of open boat whaling, for the industry which at the try-works whaleries still employs (saving a motor-man for the launches) simply boatmen and boat-builders, blacksmiths and coopers, requires at the modern stations engineers, mechanics and wireless operators.

Since the war ended the fortunes of Sperm whaling in the Azores have continued to fluctuate. The islands were much affected by the great post-war catches of Sperm whales in the Antarctic and off Peru (Fig. 2), and in 1949 much difficulty was experienced in selling the Azores production. Recovery in 1950 and 1951 was associated with the outbreak of war in Korea: times of war and rearmament seem to be boom periods for sperm oil. In the present year (1953) the Azores share the world recession in whaling due to a temporary glut of whale and sperm oil. This need not be expected to last.

The future may expect to see the numerous try-works stations eventually superseded everywhere by modern methods of oil production, for since Chaves's time the need for these technical developments, including the manufacture of by-products, has been stressed by other Portuguese authors (Figueiredo, 1946, 1951; Carvalho & Carvalho, 1951).

Table 4 summarizes the condition, in stations and material, of Azores Sperm whaling at the time of my survey in 1949. The eight islands with whaleries maintain in all twenty-one stations and, discounting the new installation at Lagens do Pico which is not yet operating, only four of them include modern factories. The others number eleven try-works stations (all but one with whaleboats operating directly from them), and six stations for whaleboats only. It is the object of the next section to describe in detail the equipment and the methods of hunting and of processing whales in this open boat fishery as it survives today.

THE PRESENT SURVIVAL OF OPEN BOAT WHALING

The open boat whaling of the Azores is a relic industry which, surprisingly enough, has spread rather than dwindled in the North Atlantic in recent years. That it should have spread from the Azores to Madeira in 1941 (p. 350), and that on the coast of Brazil open boats should have begun to take whales in 1950 (*Norsk Hvalfangsttid.* 1952, p. 499), are healthy signs in the survival of the ancient trade. There are no details available of the tiny revival in Brazil, but the whalers concerned are almost certainly immigrants from the Azores (p. 295).

Elsewhere in the world the practice of open boat whaling is outmoded and obsolete. The last deep-sea voyages in the old style were completed when the schooners *Margarett* and *John R. Manta* returned to New Bedford in 1925. The shore fishery on the eastern seaboard of North America, where as early as 1645 the settlers of Southampton, Long Island, had regulations for whaling, came to an appropriate end in 1918 when a Right whale was harpooned at Amagansett, Long Island (Starbuck, 1878; Edwards & Rattray, 1932). At Twofold Bay, West Australia, once a famous centre for bay whaling, there lingered a seasonal open boat Humpback fishery until 1932 when, according to Dakin (1934), the two remaining whaleboats ceased to operate. Old-style bay whaling in New Zealand had vanished years earlier, when in 1910 at Whangamumu, Bay of Islands, the open boat and hand harpoon were replaced by steam catchers which took over the Humpback whaling there (Ommaney, 1933). The Yankee whaleboats which once hunted on the Peru coast have since been copied by Peruvian fishermen, but it is not clear that these *boniteras* are used for whaling (*Norsk Hvalfangsttid.* 1952, p. 73). In high northern latitudes the natives still hunt Right whales from open boats when opportunity affords. But recent accounts show that hand weapons for Right whaling are obsolete, at least among the Alaskan and Canadian Esquimaux, who now use swivel-guns, shoulder-guns with bomb-lances, and darting-guns (Valin, 1945; Anderson, 1947; Brower, 1948, p. 103). In this there is no comparison with the Azores where the abandoning of explosives binds them much closer to tradition. In the northern fisheries for the White whale or Beluga, small types of hand harpoon and lance are still used for despatching the captures (Vladykov, 1944, p. 32); but this species, despite its name, is a dolphin of no great size, and the actual capturing is done with stake-nets. In certain parts of the South Seas, such as the Tonga Islands, the hand harpoon still survives, but here also the present native fishery is, I believe, only for dolphins and porpoises.

It is surprising that the survival of shore whaling in the Azores, as singular as it is outmoded, should for so long have attracted scant attention from travellers and students of whaling. Except for one reference by Jenkins (1921, p. 249) there was virtually nothing written outside Portugal about the Azores fishery until Knudsen's short note (1946) when, as a member of the *Atlantide* Expedition, he had visited the whaling station at Horta, Fayal, though not at a time when whales were being hunted or worked up. Recently, a brief, popular account by R. J. Houk appeared in the *Norsk Hvalfangsttid.* (1952, p. 667). I have contributed an article to the same journal (Clarke, 1953). Shortly before my departure for the Azores in 1949 I was able to see Figueiredo's valuable monograph, mainly describing the present condition of the industry, published in Portuguese in 1946.

Table 4. *Open boat whaling in the Azores. Condition of the industry in 1949*

Island	No. of look-outs	Station	No. of companies	Description of station	Method of working up whales	No. of motor tow-boats	No. of whale-boats	
Santa Maria	1	Porto do Castelo	1	Try-works station with boat station	Stranded on beach	2	4	
San Miguel	8	Capellas	—	Boat station	—	3	8	
		Ponta Delgada	—	Boat station	—	2	5	
Terceira	6	São Vincent	1 ²	Modern factory	Heaved upon flensing platform	—	—	
		San Mateus	—	Boat station	—	1	3	
		Negrilo	1 ²	Try-works station	Stranded on slipway	—	—	—
		Biscoites ¹	—	Try-works station with boat station	Stranded on beach	—	—	—
San Jorge	5	Velas	1	Try-works station with boat station	Laid alongside jetty	2	6	
		Topo ¹	1	Try-works station with boat station	? Stranded on beach or slipway, or laid alongside jetty	2	6	
Graciosa	4	Barra ¹	1	Try-works station with boat station	? Stranded on beach or slipway, or laid alongside jetty	2	4	
		Santa Cruz ¹	1	Try-works station with boat station	? Stranded on beach or slipway, or laid alongside jetty	2	4	
Fayal	7	Capelo	—	Boat station	—	8	13	
		Salão	—	Boat station	—	2	6	
Pico	9	Horta (Porto Pim)	1 ²	Modern factory	Heaved upon flensing platform	—	—	
		Cais do Pico	1	Modern factory with boat station	Heaved upon flensing platform	5	9	
		Lagens do Pico	7	Try-works station with boat station	Stranded on slipway or laid alongside jetty	5	14	
Flores	7	Ribeiras	3	Try-works station with boat station	Stranded on beach or laid alongside jetty	3	9	
		Calheta do Nesquim	2	Try-works station with boat station	Stranded on beach or laid alongside jetty	3	8	
Corvo	—	San Mateus	1	Try-works station with boat station	Stranded on slipway or laid alongside jetty	2	4	
		Santa Cruz	1	Modern factory with boat station	Heaved upon flensing platform	4	8	
AZORES	47	Lagens das Flores ¹	? 2	Boat station	—	4	8	
		—	—	—	—	—	—	
AZORES	21	—	25	Boat stations	Stranded on beach or slipway	3	122 ³	
		—	—	Modern factories	Laid alongside jetty	1	—	
		—	—	Try-works stations	Stranded on beach or slipway, or laid alongside jetty	4+? 3	—	
		—	—	Modern factories with boat stations	—	—	—	
		—	—	Try-works stations with boat stations	Heaved upon flensing platform	4	—	

¹ Stations not visited during the survey.

² In islands where there is a single company operating more than one station, the entry is made opposite the principal station.

³ The census of whaleboats was from personal inquiry: the official figure for 1949 was 125 (Table 2).

The following account is not intended to duplicate Figueiredo's descriptions. It rather attempts a comparative approach which may examine and establish the degree to which the traditions of old-style American Sperm whaling have been retained in the existing gear and methods of the Azores industry.

For comparisons with the American gear and methods I have found two long papers by J. T. Brown, in 1884 and 1887, to give the best account of the construction and furnishing of nineteenth-century whaleboats and of all those products of blacksmith work, the harpoons, lances, spades, and trying out implements, which were collectively known as 'craft' or 'whalecraft'. Illustrations of whaleboats, boat-gear and craft are shown best in the Atlas of plates in Goode, G. B. & Associates (1887), and also in Starbuck (1878, pl. III-VI), and in Scammon (1874, ch. III) whose text is also comprehensive, but not so detailed as that of Brown. To compare the hunting of whales then and now, there is much precise information in Melville's book (1851). There are other good first-hand accounts of whale hunting in J. R. Browne (1846), Cheever (1851), Nordhoff (1941, posthumous), Haley (1950, posthumous), Davis (1874), Bullen (1901), although the latter has some inaccuracies of nomenclature, and Ashley (1926), Murphy (1947) and Chippendale (1953), the last three authors having sailed in the late nineties or early years of this century near the end of the whaleship era. All of these, but principally Melville, Browne and Davis, also give details of cutting in and trying out. The narratives cover some seventy years of Sperm whaling, but the advances over that period (in part reviewed by Ashley, 1926) only concerned details, like the advance from fixed-flue to toggle harpoon, the use of small-arms, and the introduction of centre-boards in whaleboats and a second tub of line. Otherwise these descriptions do not contradict each other, so I have mentioned the authors here in order to save overburdening with references the comparative passages in this description of the Azores open boat whaling as it was in 1949 and remains today.

The cliff look-outs

Except for Santa Maria each island has several look-outs or *vigias* placed at intervals on the cliff tops (Table 4). In Santa Maria there is only one look-out, located in the south-east corner of the island. There is a look-out above every station where whaleboats are kept, and the remaining look-outs in an island are spaced so that together all command as much as possible of the ocean prospect. The arc of search is methodically swept with binoculars, and each arc substantially overlaps that of the adjacent look-out on either hand: in this way a large area of sea from two or three miles off-shore outwards to the horizon is searched for the blow of Sperm whales by two or more look-outs simultaneously. This is illustrated in Fig. 5, giving the dispositions and arcs of search of the Fayal look-outs whose names and organization are set out in Table 5. For the details in this table I am indebted to Senhor Tomas Alberto de Azevedo who took a special interest in showing me the look-outs of Fayal.

All look-outs seem to be permanent structures. Those recently built or rebuilt are made of stone faced with concrete. Such a recent example which I visited is the look-out in the cliff some 700 ft. above the try-works station at Porto do Castelo, Santa Maria. It is about 14 ft. square, and the seaward wall extends upwards only half-way to the eaves so that the watchers have an unrestricted view. At the end of the day's search this window can be closed by a wooden shutter which in the hours of manning is propped up like a shop sun-blind (Plate XIV). Fayal has some similar light and airy structures, but there is an old *vigia* in use at Atafona above the whaleboat station of Salão on the north coast of Fayal. This look-out is a weathered barn, with freestone walls of larva rock, standing beside a field of maize sloping to the cliff edge. I found it a dark, rafted place inside, mostly filled with trusses of hay, except for one corner where a solitary watcher bestrode a rough stool in front of a small unglazed window. A singular look-out is to be found at Monte da Guia, a ruined volcano which

towers above the modern factory at Porto Pim. Near the summit of this bold eminence, commanding the southern prospect at a height of 400 ft., there is isolated the little church of the Senhora de Monte da Guia, patron saint of the whalers. The *vigia* is the vestry of this church.

Table 5. *Open boat whaling in Fayal. Look-outs and their organization in 1949*

Locality	Reference to Fig. 5	Look-out	Manning	Binoculars	Signals
Horta	1	Monte da Guia	1	16 × 40	Rocket and white flag
Castelo Branco	2	Mõrro	2	20 × 50, 2 pairs	Rocket and white flag
Capelinhas	3	Costado Danau	3	30 × 40 20 × 50, 2 pairs	Rocket and white flag and R/T
Cedros	4	Alto das Concheiras	1	24 × 60	Rocket and white flag
	5	Cabeço Vigia	2	20 × 50, 2 pairs	Rocket and white flag and R/T
Salão	6	Cabeço Capitão	1	18 × 50	Rocket and white flag
	7	Atafona	1	16 × 40	Rocket and white flag

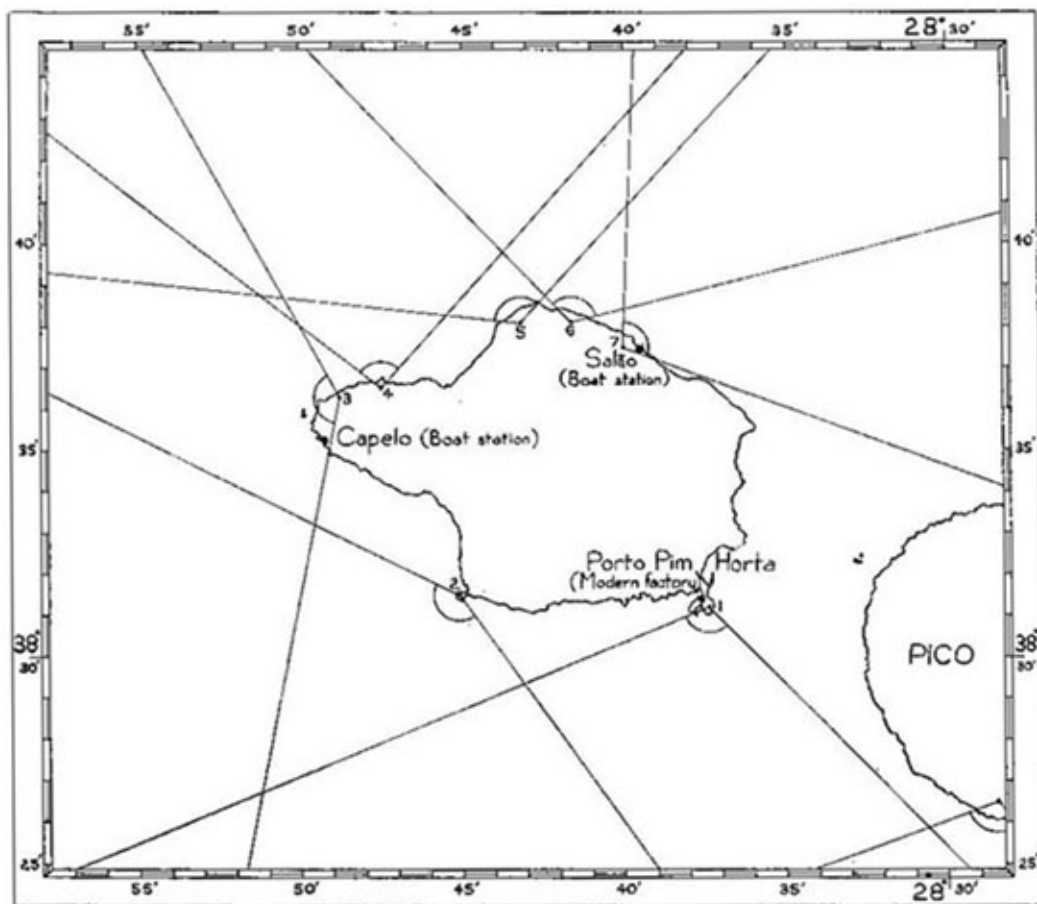


Fig. 5. Open boat whaling in Fayal. Look-outs and their arcs of search. The numbers refer to Table 5.

The manning of a look-out varies according to its importance: the watch may consist of one, two or three men, and the look-outs are manned all the year around from dawn to four or five o'clock in the afternoon. If a blow were raised at some later hour the whalers could not in general expect to kill before nightfall. With good visibility and little wind, the likeliest time for raising a whale is that period of low level light between dawn and sunrise: the whaling returns show that a good number of whales are sighted around six in the morning. Powerful binoculars are employed, some of them with magnifications up to thirty diameters. According to Senhor Tomas Alberto de Azevedo it is possible

in the best of weather conditions for an experienced watchman to glimpse from the high vantage of these cliffs a blow at 30 or 35 miles distance. The blow of a Sperm whale is low and bushy compared with that of a Blue or Fin whale, but it does not appear to disperse more quickly and it has the advantage to whalers of being many times repeated after a sounding. In the look-outs the binoculars are lashed to a square of wood which can be tilted on a thumb-screw pivot, and is rotated through the arc of search upon a vertical wooden pillar fixed between the watcher's knees (Plate XIV). A compass is fixed to this arrangement so that a bearing can be obtained.

When a blow is raised, or a number of blows from a school, the subsequent procedure varies according to the number of look-outs on the island, how far they are controlled by the same companies, and the extent to which radio-telephone communication is organized. All look-outs fire a rocket to warn the whalers to launch their boats forthwith and take tows from the motor-boats in readiness. All look-outs run up a white flag on the flagstaff invariably associated with a look-out. In this they preserve the former practice of their compatriots in Californian shore whaling when a flag was likewise hoisted as a signal. In the Azores the flag is not intended for signalling to the whaleboats. Where there are several look-outs on a coastline and none or only one or two have radio-telephones, the flag is used for informing adjacent positions: this warning is essential where whales have been sighted from a look-out which has no nearby whaleboat station. It is also a signal to the whalers's families which may dwell inland from the coast. When a kill is made the white flag is half-masted, so that a try-works can be prepared and food for the returning whalers got ready. For signalling the bearing of sighted whales from cliff to motor tow-boats without radio-telephone, two white sheets are spread upon the cliff and the boats keep these sheets in line as they make out from the coast. As soon as the watchers feel that the motor-boats have approached as near as they dare without frightening the whales, that is, when about a mile from their quarry, the sheets on the cliff are removed and at this signal the motor-boats cast off their tows, and the chase proper begins from whaleboats under oars or sails according to the ancient method. Signalling with sheets is of course superseded in look-outs employing radio-telephone communication. These can transmit revised bearings to the motor tow-boats as often as may be necessary. Other look-outs are warned by radio-telephone, and reports are also relayed to the headquarters of the whalery, or some other convenient place, for the information of whaling owners and factory personnel. The apparatus receiving messages from the Fayal look-outs is installed in a room above a shop near the old Spanish water-gate at Porto Pim, Horta: it is called the *casa dos baleiros*, the whalers' shop, where the whalers have credit and get most of their domestic supplies. In San Miguel the headquarters station is located on the top floor of Senhor Pedro Cimbron's offices in Ponta Delgada, and is organized as a planning, operational and strategic centre in regular and frequent communication with look-outs and motor tow-boats; here the supervision exercised can be compared with that of the expedition manager aboard a modern floating factory in southern whaling.

The whaleboat: its gear and employment

The only outstanding difference between the present Azores whaleboat and the boat lowered from nineteenth-century American whalerships is that the Azores craft is a seven-man boat and consequently longer than the six-man boat universally employed in the American whale fishery. Otherwise it will be seen that there are some details which actually preserve the typical mid-century boat of the heyday of Sperm whaling rather than the boat at its ultimate development in the stagnant period between the 1880's and the end of whalership days. Increasing the length has not diminished the extraordinarily graceful lines and the superb sailing qualities of the whaleboat. Comparing the plans and photographs of earlier authors, it seems indeed that the lines of the surviving Azores boat are perhaps finer and the appearance even more beautiful. Few can now compare the old boat and the

present one as sea boats and sailers, but from what I have seen in the boats, pulling or sailing on tireless rapid manœuvres in windless heavy swells or moderate wind and sea, they can today certainly equal and perhaps challenge Ashley's justified boast that the Yankee whaleboat, as finally evolved, was 'the most perfect water craft that has ever floated'.

To impress the completeness of the Azores survival of whaleboat, gear and 'craft', Table 6 (p. 314) shows in summary form the main construction features and complete equipment of a late nineteenth-century American boat fitted for Sperm whaling compared with those of a present Azores whale boat. As earlier mentioned (p. 293), the survival of old-time whaling extends to common speech, to several Yankee whaling terms used by the Azores whalers: therefore, elaborating on Table 3 and explaining terms and usages, I include in the following description the Azores phonetic spelling in brackets after a New England term, where a word in English of the old-style whaling remains unaltered and untranslated in the conversation of these Portuguese whalers. Besides the photographs and stills from the cine-film (Plates XIII and XV), illustrating the survival generally, this account of whaleboat and boat-gear is helped out by photographs of a model boat and its equipment, an exact replica built by a whaleboat builder of Pico (Plate XIV).

The whaleboat. The Azores whaleboats are always called *canoas dos baleiros* or, simply, *canoas*. This name reaches back beyond the Yankee tradition and is an everyday reminder of the origin of the New England whaleboats, and even of the source and inspiration of New England whaling, for the colonists of Massachusetts, although early influenced by English and Dutch models, got some of their whaling practice from the Nattick Indians who showed them the primitive employment of the Red Indian canoe in shore whaling, and later sailed for many decades as harpooners and boatmen in the deep-sea ventures. The canoe origin is still apparent in the general aspect of the whaleboat, and particularly in the gradual tapering from the midships beam towards both ends, as compared with the independently evolved English whaleboats, which were nearly uniform in width so far as bows and quarter where they were sharply rounded in.

All the Azores boats are built locally. Fitted complete with all equipment a whaleboat in 1950 cost about 4000 escudos or £500. Most boats are 37 or 38 ft. long, but there are some of 34 or 35 ft., and I have seen a 30-ft. boat at Porto do Castelo, Santa Maria. Probably the latter carries six men only, for as late as 1937 the figures in *Estatística das Pescas* show that the whaleboats of Santa Maria were six-man boats. But the overwhelming rule in the Azores is the long seven-man boat. There is a boat-header in charge at the tiller or steering-oar, and six men paddling or pulling. This appears to have been general practice since about the turn of the century. The first locally built boat, by Francisco José Machado in 1894, followed the standard pattern of American whaleboats of the time and was 28 ft. long with a crew of six. The present Azores boats are not without precedent, either for crew number or length, in open boat whaling since the boats of the English Greenland fishery, although only 26 or 28 ft. long, commonly employed seven men (Scoresby, 1820, II, p. 222), and on two occasions only the Americans built experimental boats, for towing and for Sulphur-bottom* whaling respectively, which were 36 and 38 ft. long with seven and nine pulling oars (Brown, 1887, p. 241). The standard American whaleboat never got beyond the length of 30 ft. adopted in the 1890's, and I assume this limit was imposed by the requirements of pelagic whaling. A larger, heavier boat would have occupied too much of the ship's length when hoisted on a three or four-boat ship, and would have been more difficult to hoist on the falls: moreover the whaleboat was (and remains today) of extraordinarily light construction, and when hoisted as a dead weight its keel had to be supported on 'cranes' to prevent sagging, so that a longer boat would probably have been liable to break its back even upon the cranes in the stress of weather and of the ship working. But no boats are hoisted in the shore whaling of the

* 'Sulphur-bottom' was the American term for the Blue whale.

Azores. Excellent surf boats, they are launched from the beach by plenty of willing hands, and when their business is finished they are heaved out again. So they have not the same risk of sagging, and therefore another 8 or 10 ft. added to their length means more room to work in a cluttered boat, and still room for an extra man to pull the extra weight and to tend the whaleline: the extra man of an Azores seven-man boat shares some of the duties of the seventh man of an English boat in Scoresby's time—those of 'linesman'.

The other dimensions of a 38-ft. Azores whaleboat are 6 ft. 8 in. in the beam and 2 ft. 6 in. in depth amidships. This may be compared with a 28-ft. Provincetown boat in 1887 which had a beam of 5 ft. 8 in. and a depth of 2 ft. 2 in.

The hull is smooth-sided, that is, carvel built. American boats were clinker built until the 1860's when the smooth-sided hull was generally adopted. All whalers everywhere are agreed that the Sperm whale is very sensitive to noise, and the carvel built boat is said to make less noise than a clinker-built one when going through the water: J. T. Brown in fact mentions that the name 'clinker' derives from the knock of water against lap-streaking. The hull is double-ended, for as soon as the harpoon is darted or after a thrust with the lance, the boat is cleared from the whale by backing water, and therefore must be able to go astern as easily as it goes ahead. There is no deadwood aft or forward: deadwood aft would impede quick turning on the steering-oar. The keel has no centre-board fitted, and this is a detail in marked contrast to late nineteenth-century American practice, for centre-boards became general in the 1870's. They allowed the sail area to be increased. My impression is that although the present Azores boats have reverted to the earlier method without centre-boards, they seem not to have diminished their sail area accordingly: the mainsail is peaked up until the overtopping gaff is within a small angle to the mast, and, sailing without centre-board, it is necessary for every man to sit right out to windward when close-hauled under this astonishing spread of canvas. Again the special conditions of shore whaling can no doubt explain why the use of a centre-board has been dropped. Since the whaleboats are all beached when not in use, there is always a likelihood, when launching or heaving-up on a shingle beach, of stones wedging in the slot in the keel so that the centre-board cannot be lowered when required. A characteristic of the hull itself is the rounded or canoe bottom, such that the boat rides high and buoyant in the water. The lines of the forward end or entrance are not as fine as those of the run, aft. The boat rises somewhat from amidships towards each end, with the bow a trifle higher than the stern.

As to the timber employed, most boat-builders now use local wood since the imported wood formerly used has become too expensive. The Pico builders appear still to import woods from Scandinavia and America, and presumably these are the traditional materials of whaleboat construction—white oak for the timbers, white cedar for the outer planking, and white pine for the platforms, thwarts, and ceiling or inside planking. The local Azores wood for planking is not cedar but a kind of 'false spruce' which I am unable to define further.

Like most of the American boats intended for Sperm whaling, the bottom and sides of the Azores boat are painted white. The top streak or gunwale streak plank is always a bold contrasting colour. In Pico boats it is blue, as it was in most of the Yankee whaleboats. Fayal boats have a red top streak, and for these two islands the distinction is essential, because it will be remembered that Pico has a concession to sail a limited number of her whaleboats from the coast of Fayal. In contrast to the former American custom there is not today much paint used inboard of the gunwale rubbing streak, but the timbers and ceiling, box and cuddy-board (*q.v.*) are varnished: the platforms for the harpioneer and the boatheader are neither painted nor varnished lest these men slip. The boats are immaculately kept, and a delightful feature is the use of polished strips and turned rods of Sperm jaw-bone for the gunwale rubbing streak and for the sail-cleats. Scrimshaw work employed in this

way, at once decorative and functional, sets off the handsome appearance of these boats. In the whaleship days sperm bone and ivory was sometimes used for a few of the blocks, belaying-pins and other small gear in working the ship, but I have nowhere found in the literature any mention of scrimshaw fittings for the whaleboats, perhaps because these boats of the pelagic fishery (apart from those smashed in the chase) got much knocked about during long voyages with limited shipwright attention, and so were not decorated, as they could not be expected to last as long as those of the present shore whaling venture.

Following the regulations for fishing vessels generally, the Azores whaleboats have painted on their bows identity letters and numerals, suffixed by 'P.B' for *Pesca da baleia*, or, simply, 'B' for *Baleia*. Each boat has a name on the quarter, sometimes done in a gilt scroll. Favourite names are those of saints or of relatives of the whaling owners. By this naming the boats acquire an individuality denied to the anonymous boats carried in the whaleships. As an example of a shore whaling fleet there are preserved in Table 8 (p. 326) the names of all the whaleboats and motor tow-boats sailing from Fayal in 1949, just as Table 2 preserves in another order of size the registry of whaleships from a vanished era.

In its furnishings the present-day whaleboat keeps all the distinctive features of the nineteenth-century model. The stem bears a conspicuous groove, the chocks, where the whaleline runs when fast to a whale. The chocks may have a bronze or brass roller, or be bushed with some metal like lead, but sometimes in Azores boats the chocks have a plain wood surface without liner. Aft the chocks a small triangular space, decked in and sunk below the gunwale, is called the box. When the boat is hunting and the gear is in readiness, the box has coiled upon it several fathoms of the forward end of the whaleline: this box-line, or box-warp, is the slack necessary when darting the harpoon, which is fastened to the end of the box-line. Limiting the after edge of the box is a sturdy cross-plank set at gunwale level. This is the clumsy cleat or thigh-board, its special feature being a semicircular notch off-centre, where the harpioneer braces his left thigh when he stands up to dart the iron. Occasionally in Azores boats the notch (which is sometimes padded) is not off-centre but placed in the fore-and-aft line, presumably for the convenience of a particular harpioneer who can manage a left-handed or right-handed dart with equal ease (Plate XIII). A little abaft the thigh-board on either side there are the bow-cleats, two substantial fairleads swept up from the wood of the gunwale and directed forwards. These bow-cleats are used in 'bowing-on a whale', that is in veering the boat to tow parallel to a fastened whale by bringing the taut whaleline from the chocks to the bow-cleat, so as to get in position to use the lance. Bowing-on is a job for the bow-oarsman. In a boat fast to a whale, the bow-cleats are also a safeguard, preventing a whaleline which may happen to jump the chocks from sweeping the boat. This is especially important in the Azores where, so far as my experience goes, the chock-pin and kicking-strap seem not to be employed, although they were universal in the old fishery. The chock-pin was a slender wooden pin which helped to keep the whaleline towing in the chocks. The kicking-strap was a short length of rope secured to each end of the clumsy cleat so that the whaleline, stretched along the mid-line of the boat, passed under it. A line which had jumped the chocks and had wrenched free of the kicking-strap would be arrested at the bow-cleats. A third use for the bow-cleat, port or starboard, is as a fairlead for the line when ranging alongside a dead whale in order to reeve the towing-strap (p. 323).

In an Azores whaleboat there are six thwarts placed and nailed upon the risings, that is, the top planks of the ceiling on each side. Proceeding aft, the thwarts may be named, harpioneer, bow-, midships-, line-, tub-, and after-thwart, according to the oarsmen who occupy them. The linesman actually shares the tending of the line with others (the tub-, and after-oarsman), but this is a convenient nomenclature. The American six-man boat had five thwarts, for there was no linesman. The seventh man of the Azores boats, the officer or boatheader, called *mestre* in the Azores, has only standing room

for he manages the great steering oar: when sailing and using the tiller, and at times apart from the more urgent moments of hunting, the boatheader often finds a seat on the cuddy-board. When going on a whale (p. 328), and at most times when handling the steering oar, the boatheader stands on two projections from the risings, called the standing-cleats, so as to get a 'longer view'. The bow-thwart is also the main-thwart and is specially strengthened, being dunnage all the way across, that is, the space on the thwart between the two sets of thwart-knees is planked-in flush from side to side, so that the thwart effectively comprises two thicknesses of plank: the other thwarts have one knee to each side and are dunnage only on the side where the oarsman sits, giving him a flat seat. The strengthening of the main-thwart is to support the mast-hinge. This consists of a hinged tabernacle for the mast, with step below, which was introduced in the late nineteenth century so that, when going on a whale under sail, the mast and sails can be struck with the utmost despatch as soon as the harpoon is darted. From the level of the main-thwart forward into the eyes of the boat, and covering the lower planks of the ceiling, there is a platform which may be called the harponeer platform, where the harponeer stands to dart his iron and afterwards to lance the whale. (It will be seen on p. 330 that in the Azores the boatheader does not come forward to lance the whale as he did in the American whale fishery.) Aft there is a short boatheader platform similar to the forward one. It is on the boatheader platform that slack line is coiled when hauling up to a fastened whale. The stern of the boat is decked across at gunwale level by the cuddy-board.

Projecting upwards from the cuddy-board, off-centre towards the starboard side, is the most striking feature of a whaleboat. Some 8 in. high and shaped like a silk hat, this bollard (so-called in the old English Greenland fishery) is the loggerhead (*Az. logaête, logaiête*) around which the whalcline from the after line-tub is taken, afterwards passing between the rowers down the fore-and-aft line of the boat and thence either to the box to be coiled there as the box-line or, in a boat fastened to a whale, through the chocks and so outboard. At the loggerhead the whalcline is controlled: when the sounding which follows the initial dart is exhausted then a turn or so round the loggerhead checks the slackening line: whilst the whale is towing the boat the line is snubbed here, or paid out as required: when the whale begins to tire and the boat hauls forward for the lancing, then slack line is taken in round the loggerhead. It is managed by the boatheader. After a little service the loggerhead acquires a considerable groove round the base, worn by the smoking friction of the line. Taking such strain, the loggerhead is very securely fastened: its foot extends down to a tapered insertion in the keel, and for additional strength there is provided on the cuddy-board a sort of king-plank with a curious flowing curve, the lion's tongue or loggerhead strip.

The Azores whaleboat is never hoisted, and therefore no lifting lugs are fitted fore and aft, such as were universal in American pelagic whaling.

Towing behind the motor-boat. For towing from the coast towards the sighted whales, or for short tows during the periods of hunting, each whaleboat has a long hemp towing-warp, fastened in the boat by a wooden towing-toggle jammed under the clumsy cleat. Whilst towing, the warp is tended by the harponeer, who uses a corner of the lowered jib for partial shelter from the drenching spray, for the motor-boats tow at speeds around 16 knots. The boats are either towed one, two, or three in line astern, or else in tandem, when they are veered by the boatheaders at their tillers.

In American whaleboats working from whaleships on the high seas there were, of course, no power boats generally employed, and the only line comparable to the Azores towing-warp was the boat-warp or painter.

Sailing. The present-day Azores whaleboats, at least all that I have seen, are rigged with gaff mainsail and jib, the latter either loose- or club-footed. Mention has already been made of the astonishing sail area carried by these boats without centre-boards. The gaffsail rig with jib, although the customary American

Table 6. *The whaleboat. Main construction features and complete equipment of a late nineteenth-century American whaleboat fitted for Sperm whaling compared with those of a present day Azores whaleboat*

Gear or employment	Late nineteenth-century American whaleboat	Present day Azores whaleboat
The whaleboat	Length <i>usually</i> 28 or 29 ft. Centreboard Bow chocks Bow box Thigh-board 5 Thwarts Mast-hinge on bow-thwart Cuddy-board, aft, <i>with</i> Loggerhead	Length 30-38 ft. — Bow chocks Bow box Thigh-board 6 Thwarts Mast-hinge on bow-thwart Cuddy-board, aft, <i>with</i> Loggerhead
Towing behind the motor-boat	(1 Boat-warp or painter)	1 Towing-warp 1 Towing toggle
Sailing	Mast Mainsail boom and gaff, <i>or</i> Yard and sprit-yard 1-3 Sails, <i>usually</i> , mainsail and jib 5 Paddles Rudder Tiller	Mast Mainsail boom and gaff 2 Sails, mainsail and jib 6 Paddles Rudder Tiller
Pulling	5 Pulling oars 4 Iron spur rowlocks 1 Tub-oarlock 1 Steering-oar	6 Pulling oars 6 Iron spur rowlocks — 1 Steering-oar
Hand harpoons and lances	6 Harpoons (mounted toggle-irons) 4-6 Sheaths for harpoon heads 1 Boat-crotch 3 Short-warps, each 4 fm. 3 Hand lances, mounted 2-3 Sheaths for lance heads 3 Lance-warps	4 Harpoons (mounted toggle-irons) 2-4 Sheaths for harpoon heads — 2 Short-warps, each 4 fm. 2-3 Hand lances, mounted 2-3 Sheaths for lance heads 3 Lance-warps, each 8 fm.
(Firearms)	<i>Usually</i> : 1 Shoulder-gun 1 Watertight lance-bag, <i>containing</i> 4 Bomb-lances 1 Darting-gun, rigged	— — — —
Tubs, whalclines, and accessories	2 Line-tubs, one large and one small, <i>containing</i> 2 Manilla whalclines, one 225 fm. and one 75 fm. 2 Tub covers 1 Drug 1 Blackfish poke	2 Line-tubs, of equal size, <i>containing</i> 2 Hemp whalclines, each 120 fm. 2 Tub covers — — —
Tending the whale line	½ doz. Chock pins 1 Kicking-strap 2 Nippers 1 Boat-bucket 1 Piggin 1 Boat-hatchet 2 Boat-knives	— — — — <i>Usually</i> 2 Nippers 1 Boat-bucket 1 Piggin 1 Boat-hatchet 2 Boat-knives
Reeving the towing-strap	1 Boat spade 1 Grapnel 1 Boat-hook	1 Boat spade 1 Grapnel <i>Sometimes</i> 1 Boat-hook
Waiving the whale and signalling	1-3 Boat-waifs	3 Boat-waifs
Equipment for survival at sea	1 Boat-keg 1 Lantern-keg, <i>containing</i> Lantern Matches <i>or</i> tinder-box Candles Hard bread Pipes and tobacco 1 Boat-compass 1 Small roll of canvas Paper of copper tacks <i>Sometimes</i> 1 Foghorn	1 Boat-keg 1 Lantern-box, <i>containing</i> Lantern Matches Candles Hard bread — 1 Boat-compass 1 Small roll of canvas Paper of copper tacks —

rig of the 1890's, was not universal in the Azores at the end of the last century, for Richard (1936) has a photograph taken off Fayal in 1888 which shows lug-sailed whaleboats. By that time the American whaleboats had acquired centre-boards, and the lugsail and spritsail (common in these boats in earlier decades) had become largely outmoded and replaced by the gaffsail and jib. Cleats (*Az. clitos*), inboard of the gunwale and on the cuddy-board, are provided for managing the main sheet, since a horse fixed across the cuddy-board would interfere with the free passage of the whaleline. The boatheader is in charge of the main sheet, but may delegate this to the after-oarsman at times. The bow-oarsman manages the jib sheet. When going on a whale under sail, the jib is always lowered before the harpioneer stands up to strike, so that he may have room for the dart.

Conforming with late nineteenth-century American practice, the Azores whalers employ sails whenever there is sufficient wind. These permit not only the greatest speed in the conditions prevailing, but also a quieter approach than is possible under oars. It is an everyday practice to go on a whale with mainsail set until the moment the harpoon is darted. As the iron fastens in the whale the stays and halliards are loosened, the mast is unstepped and lowered aft on its hinge, and the spread of the mainsail is bundled under control until gaff, sail, mast and boom (*Az. bême*) can be quickly lashed together with the main sheet, and all stowed so as to project from the boat over one quarter and leave a clear run for the line, which, from the moment of fastening the whale, has been leaping after the harpoon along the length of the cluttered boat. There is no need to emphasize the cool boatwork necessary to conduct this operation, since once to foul the running line whilst struggling with mast or sails can mean serious or even mortal injury.

Whenever a boat is sailing after a sighted whale, the crew employ paddles to lend more speed to the boat. The paddles, betraying their Red Indian origin by their shape and the way they are used, number six, one for each oarsman. Each man paddles sitting on the gunwale, facing towards the bow.

Steering when under sail is by rudder and tiller, but, as soon as the whale is fastened and the mainsail is down, it is necessary to unship the rudder and change to the steering oar. The boatheader, already occupied with the line at the loggerhead, must attend to the rudder quickly, so a lanyard is provided whereby the rudder pintels are unshipped from their gudgeons at a single pull, and the rudder then suspended outboard on the port quarter by belaying the lanyard to the cleat on the cuddy-board.

Sailing after a whale in one of these boats, with a fresh wind on the quarter and with paddles plying fast, I have estimated that the maximum speed attained has been about 8 or 9 knots. This is a necessarily approximate and subjective estimate, but I find it agrees with Brown's maximum figure for an American whaleboat under sail. I would agree also with his estimate of 4-6 knots as an average speed when beating up and down in the general sailing of a day's hunting. A Sperm whale is rather slower than the Blue and Fin whales, and my impressions are that when he is on a feeding ground like the Azores he may loiter at the surface, 'having his spoutings out' between soundings, at around 1-3 knots: when on passage he makes about 4 knots: and when alarmed and running (but still a 'loose-fish' not yet fastened) he seldom does more than 8 knots, although this speed can be much exceeded by a wounded whale (p. 331). It will be seen from these approximate figures that a whaleboat sailing and paddling in favourable conditions can hope to overtake even a running Sperm whale if it persists in the chase. In practice this can be achieved more quickly by a short tow from a motor-boat for part of the running chase.

Pulling. There are six pulling oars (*Az. bars, órs*) in an Azores whaleboat. It will be remembered that the American boats had only five. The boat is single-banked and the oarsmen are staggered, that is, there is only one man to a thwart and each man sits the whole width of the thwart from his rowlock so as to balance the great length of his oar. When rowing, the harpioneer always sits on the port side but pulls a starboard oar, the bow-oarsman sits to starboard and pulls a port oar, and so on. Over

a length of about 10 in., where it works in the rowlock, each oar is thrummed with a thole-mat: this provision, whereby the creak of the oars is muffled, has been traditional in the American fishery and it is noticeably effective in assisting a quiet approach under oars. The oars are exceptionally long and heavy. Because the boat has a canoc-like plan, the inboard part of each oar when pulling varies progressively in length from thwart to thwart, and therefore the oars have to be of different lengths so that they may strike equally. In a 38-ft. boat there are two oars each of three lengths, 16, 17 and 18 ft., one set (pulling alternate sides) increasing from forwards to midships, and the other set decreasing from midships towards the stern, thus,

Harponeer Oar	...	...	...	...	...	...	...	...	...	ft.
Bow	...	...	...	...	...	...	...	...	...	16
Midships	...	...	...	...	...	...	...	...	...	17
Line	...	...	...	...	...	...	...	...	...	18
Tub	...	...	...	...	...	...	...	...	...	17
After (stroke)	...	...	...	...	...	...	...	...	...	16

The American boats, pulling only five oars, had to work a less symmetrical arrangement of one long and two short oars on the starboard side against two medium lengths on the port side. The longest American oar did not exceed 18 ft., so it is worth mentioning that the 'longest oars used in any service' still survive today.

Iron spur rowlocks are used similar to those which in the late nineteenth century American boats replaced the double thole-pins of the first half of the century. I do not, however, recollect seeing a tub-oarlock in the present Azores boats. A feature universal in American whaleboats, the tub-oarlock was intended to lift the tub-oar clear of the line-tub in a rolling boat: it took two forms, a dual-purpose, double-decked iron rowlock, the double oar-lock, or a raised wooden oar-lock, the tub oar crotch, which was shipped through a cleat in the gunwale and used as necessary in addition to a conventional spur rowlock.

When a boat is hunting under oars, the whaleline, lying in readiness along the boat between logger-head and box, passes over the loom of each oar.

The steering-oar or stern-oar (*Az. stanó, estanól*) is longer and greater than any of the pulling oars. It measures 22 ft., or sometimes 23 ft., and retains the same length as the nineteenth-century stern-oar. When in use it is thrust out, supported on a sturdy iron steering-oar brace, to the port side of the stern post. Here the stern post and the outer member of the steering-oar brace together share the fulcrum for its sweeping motion. A rope grommet keeps it from jumping the steering-oar brace: this was also the standard American arrangement, although I believe that when Melville was writing, and certainly in the English Greenland fishery, the stern-oar worked simply in a grommet without steering-oar brace. At its inboard end the steering-oar, like the pulling oars, has a fashioned handle, but its loom is distinguished by a further peg handle projecting at right-angles about a foot below the first. This allows the boatheader, straddling his platform or the standing-cleats, to manage the oar with both hands more easily, and (by using the peg as a lever) to expend less effort in keeping the oar blade up-and-down in a sea-way. The steering-oar is always used when the boat is not sailing, that is, when pulling or paddling, and after the boat has got fast to a whale, although it is sometimes boated when the whale is towing steadily. A very ancient feature of English and American whaleboats alike, the great steering-oar survives as the most rapid and effective agent known for turning an open boat. Rapid and considerable turns are essential in coping with the sudden unexpected risings of the quarry, with the several techniques of going on a whale, and with the frequent emergencies at harpooning or lancing when tail-flukes or jaw must be avoided. The oar is also usefully employed for sculling the

boat, particularly in the confined water of landing places where sometimes there is scarcely room for oars in the transit between launching slip and motor tow-boat.

In the present whale fishery, as in the old days, it is customary, when going on a whale under oars, to boat the oars when within 100 yards or so of the dart, and to make the remaining distance with paddles, since these make even less noise than the muffled oars. The practice is not invariable, for when the chance of securing a dart depends absolutely on haste, as when a whale is thought nearly to have 'had his spoutings out' and therefore be ready to sound, then the quiet approach is sacrificed to speed and the boat completes the distance still under oars. In Plate XV, Fig. 5, where a boat under oars is in the moment of fastening, the whale is actually 'rounding out', that is, arching its back preparatory to peaking flukes and sounding: a moment later and the opportunity for the dart would have been lost. When getting fast under oars the rowers, as soon as the iron is darted, backwater one stroke to clear from the whale and then they peak their oars: this means that they shove the handles of their oars into peak-cleats, holes cut into battens fixed to the ceiling opposite each rowlock. Oars boated in the ordinary way might foul the running line, but with oars a-peak and neatly stowed and forming in fact a guiding trough for the line, the boat can tow after the whale and yet be at once ready, when the whale slackens, to haul slack line and then rapidly get out oars again for a pull alongside to make the lance-thrusts.

When a boat is pulling with utmost exertion to go on a whale, I have seen the boatheader keep one hand only for his steering-oar and, with the palm of the other upon the loom of the after-oar, lend his weight to every stroke taken by that oarsman, so that no source of effort might go unspared. This backing of the after-oarsman is mentioned by Melville (1851, p. 363), and by Ferguson in the 1880's (1936, p. 181, posthumous), and it seems to have been a singular way they had in New England because Cheever (1851, p. 132) makes the trick decisive in winning for the Americans a famous race after a whale, rowed between whaleboats from four whalers of France, England, Portugal and America, becalmed in the South Pacific.

Hand harpoons and lances. In the history of seafaring trades there can scarcely be a more remarkable survival than the present use in the Azores of hand weapons to take and kill great whales. Not only in the weapons themselves, but in the precise division of their employment (the harpoon only for fastening the whale by a rope to the boat, and then the lance for killing the fastened whale) the islanders preserve a rigid continuity of technique which has now persisted for a period at least approaching three and a half centuries. The Englishman Thomas Edge in 1611, at 'Greenland' (that is, Spitzbergen) made some of the earliest captures of the Northern whale fishery. Purchas published in 1625 an account of the methods employed by Edge's Basque whalers during these early voyages. His description (edition 1905-7, XIII, p. 27) remains a precise summary of Azores methods today.

... the Harponyre, who standeth up in the head of the Boat, darteth his Harping-iron at the Whale with both his hands, so soon as he commeth within his reach; wherewith the Whale being stricken, presently descendeth... and therefore doe they reare out a rope of two hundred fathome, which is fastned to the Harping-iron, and lieth coyled in the Boat... and when they perceive him rising they hale in the rope to get neare him, and when the Whale commeth up above water, then do the men lance him with their lances...

One may not trace this practice much farther back because the medieval Basque whalers and the American Indians encountered by the early colonists, employed mass methods involving numerous boats, and darts, tridents and arrows associated with ropes and 'drugs' (p. 322) for entangling and exhausting the whale: these methods are not comparable with the present survival. But the present-day lance, for length and pattern, remains virtually as it was in Edge's time; and the present toggle harpoon, although a great improvement on the old two-flued iron, can claim a primitive antecedent in the bone-and-sinew toggles of Eskimo whaling and sealing.

The American whalers seldom used the term 'harpoon' either as noun or verb. They called the harpoon an 'iron'. The kind used today in the Azores is the iron which became standard in the American whale fishery during the second half of the last century. It was invented in 1848 by James Temple, a negro of New Bedford, who made 'whalecraft', that is, was a blacksmith engaged in working from iron the special utensils or 'craft' of the whaling trade. Before this time the harpoon commonly employed was much the same as that known to Edge: it had a fixed saggitate head with two barbs or 'flues', although a one-flued iron became popular in the 1840's, only to be swept away by the superior 'Temple's Gig'. The simplest, besides most successful, of many toggle and other experimental irons invented in that period, the Temple iron has a sharpened pivoted head, which, after being darted in the whale, swings out, as soon as it takes the strain, from its former position along the shaft to one at right-angles to the shaft, and so toggles the harpoon within the whale's tissues. It enters the whale easily, and its special advantage is obvious: it is much less likely to 'draw' than the two-flued iron with fixed flues. The original Temple iron had the toggle pivoted in a channel at the end of the shank, but it soon gave place to the standard form as used in the late nineteenth century in American whaling and in the Azores today. In this the toggle and not the shank is channelled.

Because of the unique place the hand harpoon and lance have in whaling history, the following account describes in detail the craft, the method of mounting them, and their employment in the boat. (By 'mounting' is meant the rigging of the iron or lance to a wooden pole ready for the chase.) The remarks apply equally to the American design and employment, unless stated otherwise. The measurements in Table 7, from mounted craft kindly presented by Reis e Martins Lda., are recorded as typical, but there are of course some few inches or so variation in the sizes of poles and straps in use. Brown (1884) gives a few measurements for the American iron and lance and these agree closely with those in the table, except that the Azores lance-head is rather more than an inch longer than Brown's specification.

The single toggle flue or head of the harpoon is made from cast steel. There is one shallow barb on the back edge behind the keenly sharpened tip. The channelled throat of the flue is drilled to receive the steel pivot, or hinge-pin, borne on the flattened end of the shank. To keep the flue swivelled back parallel to the shank, a small wooden pin, about the thickness of a matchstick and cut off flush with the metal, is fitted tightly into a hole drilled through the flue and the embraced shank, a little below the pivot. As soon as there is strain on the fastened iron, the pin snaps and the flue swings out and toggles the instrument. All harpoons are 'marked craft', that is, the heads are stamped with the initials of the whaling company and usually with the year the harpoon is put into service. Marking craft with the ship's name and date was customary from the early days of English and American whaling, when it served to settle disputes of priority which sometimes arose when boats from rival ships fastened to the same whale. The practice survives in the Azores, where companies in rivalry (p. 334) can also appeal to marked craft. The shank of the harpoon is not made of steel but of tough wrought iron so that it will bend and not snap during the strains and turns of the captured whale. At the end of the shank the hollow wrought iron socket swells gradually to its base so that it looks like a tall cone. The total length of the Azores toggle iron is about 2 ft. 9 in., which is correct for an American Sperm whale iron. In the American Arctic fishery the Bowhead iron was about a foot longer, for the whalers recognized that Right whales in high latitudes have especially thick blubber so that a longer shank was necessary to ensure that the iron could penetrate the blubber and toggle in the meat.

The American method of mounting an iron, used in the Azores, is the same as that employed in the Greenland fishery in Scoresby's time (1820, II, p. 230), when it was called spanning-in. I watched an iron being mounted at Capelo, Fayal, in 1949, and the whole operation, including the shaping of the pole, took about half an hour. A harponeer usually mounts his own irons. With a small file the toggle

head is carefully cleaned of rust. The socket of the iron is then completely served with spunyarn or marlin. This helps to jam the iron-strap and prevent it chafing. The iron-strap is a length of hemp rope as used for the whaleline: it was manilla fibre in the late American fishery. The strap is fastened tightly to the shank of the iron by a round turn and eyesplice, so that, when the strap takes the strain of the towing whale, the fastening holds by jamming against the swelling of the socket. The fastening

Table 7. *The hand harpoon and lance. Measurements of mounted craft presented by Reis e Martins Lda. in 1949*

Component	Harpoon		Lance	
	ft.	in.	ft.	in.
Head:				
Cast Steel	—	—	—	—
Length	7	$\frac{5}{8}$	4	$\frac{1}{2}$
Point to barb (harpoon head only)	3	$\frac{3}{8}$	—	—
Greatest breadth (without barb in the case of harpoon head)	1	$\frac{1}{8}$	2	—
Shank:				
Wrought iron	—	—	—	—
Length	1	11	4	4
Diameter	—	$\frac{7}{16}$	—	$\frac{7}{16}$
Socket:				
Wrought iron	—	—	—	—
Length	—	6	—	6
Diameter at base	—	$1\frac{3}{4}$	—	$1\frac{3}{4}$
<i>Total length of iron or lance</i>	2	$8\frac{3}{4}$	5	$2\frac{1}{2}$
Pole:				
Local wood	—	—	—	—
Length	5	9	5	8
Breadth at butt	—	$2\frac{5}{8}$	—	$2\frac{3}{8}$
Width at butt	—	$2\frac{1}{8}$	—	$2\frac{3}{8}$
Butt ferrule:				
Copper	—	—	—	—
Width	—	—	—	$\frac{1}{2}$
Strap:				
Hemp	—	—	—	—
Circumference	—	$2\frac{1}{2}$	—	$1\frac{1}{2}$
Length including becket	6	2	6	6
Seizings:				
Marlin, usually three turns	—	—	—	—
Distance of first seizing from socket	1	3	1	10
Distance of second seizing from socket	4	8	—	—
Pole loop:				
Hemp	—	—	—	—
Circumference	—	1	—	—
Distance of insertion from butt	—	$3\frac{1}{2}$	—	—
<i>Total length of mounted craft</i>	8	$5\frac{3}{4}$	10	$10\frac{1}{2}$

is called 'the hitches' and the way of making it was traditional in the American fishery. Other fastenings than the round turn and eyesplice have sometimes been employed for the hitches in New England whaling in its earlier days (Ashley, 1948, p. 334), but they are not known in the Azores. The pole of the harpoon is a length of local wood about 6 ft. long and $2\frac{1}{2}$ –3 in. in section, well chamfered at the edges, and roughly tapered from a more or less square butt to an increasingly cylindrical form and a somewhat smaller section at the socket end. American poles were traditionally of hickory with the bark still on. The socket end is skilfully tapered with an adze and the iron fitted over it and jammed with

a few taps of the pole upon the ground: at no time is the keen-edged toggle allowed to touch any hard surface. At this stage the iron-strap is finished, about 6 or 12 in. from the butt of the pole, with a good-sized eyesplice called the becket. It is here that the box-line will be bent later. The actual mounting of the iron, the fastening of it tight and true to the pole, is accomplished by passing through the becket a stout billet of wood, and then toggling this between a door frame or iron bitts, or whatever improvised holdfast may be handy. The butt is now jammed against a door-step, or something similar, and an assistant bears down all his weight upon the pole until the strap is stretched taut along it, and there stopped down with two marlin seizings, each of three or four turns. The toggling arrangement is now withdrawn and each seizing finished with two copper tacks to jam it and prevent it riding up the pole. Finally a light line is rove through a hole in the butt end and then spliced to make an open loop. A last touch is given to the point and edges of the flue, all the metal parts are well greased, and the mounted iron, now a heavy weapon some 8½ ft. long, is ready for the boat (Fig. 6).

The Azores whaleboat carries four mounted irons, although most of the American boats had six. Two of these harpoons are the live irons, that is, they are attached to the whaleline and will be used in getting fast. They are called first and second irons. The end of that stray part of the whaleline called the box-line, after passing through the loop at the butt, is fastened to the strap of the first iron by a double becket hitch. The significance of the butt loop is to save the harpoon pole: when the whale is struck the iron takes the strain and the marlin seizings on the pole are quickly broken and it slips from the iron socket, but is still held on the whaleline by its loop where it rides loosely and can eventually be recovered. The second iron is bent to a short-warp (*Az. chote-ope*) which is a rope of some 4 fm. and is itself attached by a bowline to the whaleline, where it runs freely. As soon as the first iron is fast the harpioneer darts his second, trying to get that fast also. But frequently there may be no time for the second dart before the whale sounds. In this case, to avoid the danger in the boat from a live iron on a running line, the harpioneer at once tosses the second iron into the sea, whence it may later be recovered on the short-warp. When the American and English whaleboats lowered for whales, the live irons were placed ready to the harpioneer's hand in a special forked rest, called a boat-crotch or iron-crotch (or 'mik' in the English fishery), cleated to the starboard gunwale. I have never seen the boat-crotch fitted in Azores whaleboats, where the irons are simply leaned in a handy position against the thigh-board. The remaining irons, making the four carried, are the two spare irons which are stowed in their traditional place, in the waist of the boat against the port side, lying across the thwarts below the gunwale, and protected by a bit of canvas.

The whale lance is a long spear for killing. The cast steel head (called the mouth in the English fishery) is a petal-shaped blade about 4 in. long and 2 in. broad, with a razor-sharp edge all round. Brown (1884) mentions that sometimes the faces of the American blade bore longitudinal grooves, for easier entrance, but I have never seen these



Fig. 6. The hand harpoon and lance. Sketch of the mounted craft specified in Table 7.

in Azores lances. The shank and socket are of wrought iron, and the former is very long, some $4\frac{1}{2}$ or 5 ft. This lance is mounted on a 6-ft. lance-pole in the same way as a harpoon, except for some finishing details. The lance-strap is seized to the pole with only one seizing and not with two: it is of lighter line, usually $1\frac{1}{4}$ in. stuff. The pole is customarily of the same local wood as the harpoon pole, although in the old American fishery the lance-pole was traditionally made of pine. It is usual to finish the butt of the pole with a copper ferrule. In the lance presented, the pole has a chamfered octagonal section. A distinctive feature is that the lance-strap is not simply finished with an eyesplice behind the seizing, but is led through a 3-in. slot cut into the pole some 4 in. from the butt: the slot communicates with a centre hole drilled from the face of the butt, and through this hole the strap is rove and there given an eyesplice which thus starts neatly from the butt face. This mounting makes the pole clean and unencumbered down its length, and therefore easier to manage. The total length of the mounted lance is about 11 ft (Fig. 6).

In the boat the lance-warps or lance-line is bent to the eyesplice in the lance-strap. The lance-line is a light length of about 8 fm. whereby the lance is recovered after it has been struck or tossed into the whale. Inboard the lance-line is secured to the clumsy cleat. The two or three mounted lances which equip the boat are stowed in a similar way to the spare irons, but the lances are forward on the starboard side, handy to the harpooner.

The keen, bright heads of the spare irons and lances are protected by sheaths of traditional American form. They each consist of two flat pieces of hardwood which close against each other on a leather hinge. Their inside surfaces are excavated to accommodate the head of the iron or lance, and the ends opposite the hinge are tied together and round the instrument's shank with marlin fastenings.

Of lines for the harpoons and lances there are in each boat two short-warps and three lance-warps.

The precise techniques of harpooning and lancing are best postponed until discussion of whale hunting in general.

In late nineteenth-century American boats it was customary to carry certain fire-arms in addition to the hand weapons. It has already been stressed that fire-arms are not today employed in Azores whaleboats, although they found a limited employment in previous years (p. 301). The typical fire-arm equipment of an American whaleboat is listed in Table 6 and the items are briefly described on p. 301.

Tubs, whalelines and accessories. The whaleline in an Azores whaleboat is coiled in two line-tubs of equal size. These are cooper-made of local wood and are each about as big as a large old-fashioned wash-tub, but not so deep. They are stowed on the ceiling of the boat, the waist-tub between the line-thwart and tub-thwart, and the after-tub between the tub-thwart and after-thwart. I believe that two equal tubs like these were at one time used in American boats, around the 1860's and 1870's. Earlier we know from the writings of J. R. Brown, Cheever and Melville that one large tub only was employed. Later than the 1870's, when the centre-board became a standard fitting in American boats, the waist-tub had to be made much smaller, so as to stow to one side (the starboard side) of the centre-board.

The tubs of an Azores boat each contain 120 fm. of line, of $\frac{3}{4}$ in. diameter and of $2\frac{1}{2}$ in. circumference. This makes a whaleline of 240 fm. which is about as long as was used in American whaleboats when a single tub was stowed: American boats with two equal tubs usually coiled 150 fm. in each tub: when centre-boards were introduced it was customary to retain this length of 300 fm. by coiling 75 fm. in the small tub and 225 fm. in the large tub. It is interesting that the Azores whalers should retain the somewhat shorter line of the first half of the nineteenth century, because they could no doubt make the tubs a little larger and stow more line. But in the event of a fastened whale taking all a boat's line, the attendant motor-launches can bring up more line in a rapid and easy fashion unknown in the old days when only a whaleboat in company could help in this way. Moreover, it is worth remembering

that the Yankee Sperm whalers of the late nineteenth century might sometimes switch to Northern Right or Bowhead whaling in certain seasons: in the latter fishery a great length of line is desirable because the Sperm whale, despite its reputation as a deep diver, is said not usually to sound as deep as a Bowhead when it is struck and first feels the dart (Gray, 1939). One can make no general rule about the reaction of Sperm whales to the harpoon, but from what I have seen I would say that a typical response is to sound and take out between 150 and 200 fm. of line (or maybe no more than 100 fm.) and then surface and start to run: or occasionally a whale may start to run with scarcely any sounding.

The fibre used for whaleline in the Azores is nearly always hemp. This is a small but striking difference from the old days, because manilla fibre was already ousting hemp from American whaleboats in the 1840's, and was universally employed throughout the second half of the century. The return to hemp, or its retention in the Azores, is superior practice because the best Italian hemp is stronger than manilla and in the whaleboat makes a more pliable rope, coiling easily into the tubs and springing freely from them. Manilla is cheaper than the best hemp, so the strength and pliability of the latter must make it more economical in the long run, unless it is that hemp is more readily available to the Azores. On the other hand I now hear that the islanders sometimes use sisal, which is cheaper than either manilla or hemp but is an unreliable fibre under strain.

The lines are carefully maintained. When the boats return after a day at sea, the lines are laid out to dry upon the rocks. Coiling them afterwards into the tubs requires care and skill, for men's lives may be endangered and a whale lost if the line does not run freely and easily from the tub. The line is coiled down in Flemish flakes, and each flake is put down from the outside inwards, the line being led back along a radius to the periphery to start the next flake. One end, which is the initial end when coiling down, is brought up to project from the rim of the tub, and finished with an eyesplice. Canvas covers, painted to make them waterproof, are placed over the full tubs. When the tubs are back in position and the boat is at sea for whales, the covers are removed and the end from the waist-tub is bent to the eyesplice of the after-tub with a double becket hitch. (In the whaleship days the tubs were not placed in the boat until it was about to be lowered, and usually the covers were removed before the tubs were stowed aboard.) The after-tub, of course, is the first to empty when the line is running. It is convenient to mention here that the whaleline is at no time secured to any part of the boat. It is checked by round turns at the loggerhead only. If the line were made fast somewhere, then a whale suddenly taking all the line might capsize the boat and drag it under before there was time to cut.

The American whaleboats carried two accessories for the line which are not used today in the Azores. These were the drug and the blackfish poke. Both were devices to impede and exhaust the whale. They were survivals from primitive whaling, for the Red Indians employed the drug, and the Esquimaux employed inflated seal skins. The American drug or droguc was a heavy piece of board, sometimes two boards nailed together in a cross, but usually a square or octagon about 15 or 18 in. in breadth: occasionally a small wooden tub was used. The blackfish poke was the stomach of a Blackfish, or sometimes a seal skin, which could be inflated in the boat. When a drug or poke was to be used in a fast-boat (that is, a boat fastened to a whale), the appliance was secured by a rolling hitch to the whaleline outboard of the chocks, and afterwards the line was let go, clear of the boat. Later the wounded whale might be recovered, being encumbered to exhaustion by the drug or poke. In Melville's whaling experience the appliances were usually employed among schools when there was opportunity of taking more whales than a vessel's whaleboats could manage if dealing with them one at a time. J. T. Brown said the drug was also fastened to a calf, 'to attract the mother or other sympathising cows' (1887, p. 268). In the late years of the fishery the drug or poke came to be employed only as a last resort, to try and save a whale which was taking out all the line. Although the drug is now obsolete in the Azores,

it has not long been so: the last mention of *arrastos* among the inventories in the *Estatística das Pescas* was for San Miguel as recently as 1929. Today drugs are no longer necessary, because the motor-boat can arrive so quickly if a whaleboat signals for additional line.

Tending the whaleline. When the harpioneer has fastened to a whale, the box-line goes away, and the main-line begins to run out from the after-tub, round the loggerhead, down the boat and through the chocks. From the first the boatheader must manage the line, in the beginning to keep it from jumping the loggerhead, and later to start checking it. I have seen a line, after jumping the loggerhead, brought back to it again, leaping round the seared, clenched fists of the boatheader. For checking the line the boatheader may use nippers or hand-cloths, gloves made each of two squares of canvas sewn together, to prevent the skinning of his hands. Meanwhile the linesman sees that the line runs clear from the tub. In the American six-man boat the tub-oarsman attended to this. As the line in an Azores boat flies from tub to loggerhead, the two after-oarsmen dash water upon the uncoiling flakes. They use two cooper-made wooden vessels, the boat-bucket with a rope handle, and the smaller piggin, which has one stave projecting above its rim to serve as a handle. The piggin is properly a bailer for the boat, but it seems generally to be used also for wetting line, and was so used in American whaling. 'Wetting line' is an essential operation. Such is the friction at the loggerhead that an unwetted line may catch fire there, and even a wetted line can smoke. It is well to confirm earlier statements to this effect, since I have seen commentaries on whaling where they were pooh-poohed.

The operations in a fast-boat, like checking line, towing behind the whale, hauling line, and hauling up for lancing, can be reserved for the description of whale hunting. But the tools used in emergency may be mentioned here. It is necessary to 'cut line' for certain mishaps. These are when a man fouls the whaleline, or some part of the boat fouls the line so that the bows pull down and the boat is likely to swamp, or when a boat is stove by a whale and there are men in the water, or when a whale is still towing at nightfall, or simply when some line must be saved from a whale which is clearly taking out all from an isolated boat. For cutting line there are a boat-hatchet and two boat-knives. In the Azores as in the American boat, these are kept in definite ready-use positions. At the harpioneer end, the boat-hatchet is cleated below the port gunwale abaft the thigh-board, and the forward boat-knife is stuck in a leather sheath nailed to the thigh-board itself. The after boat-knife is in a similar sheath nailed to the cuddy-board and ready to the boatheader's hand. A blow with the hatchet is best for cutting rope, and this is specially true in a whaleboat when the line is running, because attempts to hack a running line with a knife will turn the blade. The whaling regulations of the Grémio dos Armadores da Pesca da Baleia require that each boat must carry a hatchet for cutting line in emergency (1925, p. 9).

Reeving the towing-strap. When a whale has been killed the boat is ranged alongside by the line at the bow-cleats, for it is necessary to cut a hole in the head or tail for reeving the towing-strap. A boat-spade is carried for this purpose. This is one variety of the cutting-spades still employed in the Azores for working-up whales (p. 334). The boat-spade is a stout cast steel chisel about 8 or 9 in. long and 3 or 3½ in. wide, usually with chamfered sides, and fixed by a short shank to a wrought iron socket on a pole about 9 ft. long. Chopping the hole is an awkward operation requiring strong arms and a steady balance. It is easier to mortise the hole into one side of the spread of the flukes than into the selected regions of the head, where the parts, though equally tough, are thicker and less accessible from the boat: the flukes offer a good hand-hold for keeping the boat ranged alongside. In the head the hole is chopped through the bulge of the lip of the single blowhole, or, more commonly, through the nib end, that is, through the 'cut-water' where the lower forward end of the junk (p. 336) comes smoothly downwards and inwards to join the margin of the front of the palate (Plate XVI, Fig. 5). Although more tediously accomplished, a hole in the head region is preferable because the whale,

naturally enough, tows better when travelling head first. If the whaleboats of one company are amidst a school and several whales are being taken, the holes are usually chopped both fore and aft, so that several whales can be taken in tow in line astern behind one powerful motor-boat. A grapnel and a boat-hook are usually included in the boat's equipment to assist in reeving the towing-strap through the hole mortised with the boat-spade. The towing-strap may be a short-warp doubled and knotted, or more commonly a wire-rope strop or short chain supplied from the attendant motor tow-boat.

In the American fishery up to the 1860's or 1870's the boat-spade was sometimes employed in a perilous operation called 'spading flukes'. This was a method of 'stopping a running whale' by a single hamstringing blow with the sharp spade, aimed at the tailstock where it receives the insertion of the flukes. Spading flukes was less often employed in Sperm whaling than in northern Bowhead whaling, when the prospect of a fastened Bowhead escaping by a run below the edge of the pack-ice sometimes called for this desperate use of the boat-spade. The introduction of bomb-lances made spading flukes unnecessary so that by the late nineteenth century the practice was obsolete. And I am told that in the Azores today, although the bomb-lance has itself been abandoned in favour of a return to hand-lancing, the use of the boat-spade as fluke-spade has not also been revived and the whalers no longer deliberately 'fight under the flukes of the whale'.

Waifing the whale and signalling. An Azores whaleboat carries three hand-signalling flags or waifs. It is common practice to use one of these flags for waifing, that is, marking a dead whale. A dead Sperm whale occasionally sinks, when it becomes a total loss, unless it can be held by lines from one or more whaleboats, or from a motor-boat. However, it usually floats, although low in the water and with its corrugated flank awash, and, at a distance, made only a little more conspicuous by the stiffly upthrust flipper. It is therefore marked with a flag, to be picked up when the whalers's day ends, for the whaleboats and tow-boats will carry on with their hunting after a kill has been made, unless the day is advanced and there are no prospects of further whales. The Azores waifs retain the traditional pattern of bygone whaling: the wooden staff of each, where it is inserted into a slit cut on top of the whale, is notched to make from one to three projections which hold in the fibrous blubber. The Americans sometimes employed a blackfish poke, painted white and on a stray-line, for marking dead whales, but a waif is invariably employed in the Azores.

The primary purpose of the waifs is actually for signalling, and the regulations of the Grémio dos Armadores da Pesca da Baleia (1925, p. 9) insist that all whaleboats must carry three flags, one red, one white, and one blue. Senhor Tomas Alberto de Azevedo has explained their significance to me. A red waif set in the boat summons assistance. For instance the boat may require more line, or may need a tow from the motor-boat: or there may be a forthright emergency, as a smashed boat, or a man injured by a foul line. The white flag is an invitation from the boat of one company to that of a rival company to 'mate', that is, to share the same whale. Companies may only do this in unusual circumstances, for they are vigorously competitive. However, it may happen, for example, that a Pico boat fastens to a whale but is swamped. It is still fast, and by all the rules of whaling owns this whale, although in no position to do much about it. A Fayal boat may fasten at this juncture, and then the showing of a white flag means that each company agrees to go half shares in the whale. A blue flag is a mutual sign of recognition between boats of the same company: it may also signal to a cliff look-out that two or more boats are in company. The American whaleboats carried between one and three waifs. Methods of signalling between the whaleship and her boats differed a good deal: some ships evolved arbitrary codes intended to baffle other vessels which might lower for the same school. But one system commonly used, and described by J. T. Brown in a footnote (1887, p. 257), required three or four coloured waifs and closely resembled the present Azores code. The boats carried flags which were duplicated in the ship, just as the red, white and blue Azores waifs are replicated in the motor-boats.

Equipment for survival at sea. Lest a boat be benighted, or carried far off the coast by a running whale, the Grémio dos Armadores da Pesca da Baleia requires that a lantern and a boat-compass, and water in a boat-keg, and hard bread (ship's biscuit), be carried in all whaleboats. This follows the old-time practice. The Azores boat-keg is wooden, cooper-made, and retains the traditional shape of a low, truncated cone. The lantern, candles, matches and hard bread are stowed in a waterproof wooden lantern-box kept in the cuddy (the space in the stern below the cuddy-board). The lantern-box corresponds to the frustum-like lantern-keg in which these supplies, often with some tobacco and a few pipes included, were stowed in the old days. The boat-compass is kept in one of two narrow wooden drawers sliding below the cuddy-board to port and starboard respectively, and handy to the boat-header. The other drawer contains some canvas and a paper of copper tacks, which can be used for making an emergency patch if the boat is stove by a whale. I do not recollect seeing a hammer in the equipment, and I assume that the boat-hatchet is used for driving the tacks, although Figueiredo (1946, p. 93) indicates that a mallet is carried.

A final item of equipment, sometimes carried in the old American boats, was a boat-horn or fog-horn. I have not seen a fog-horn in Azores whaleboats, and it is likely that the Americans more commonly included a fog-horn when they were Right whaling on coast banks or along the ice-edge where sudden fogs might be expected.

The gear enumerated comprises the complete equipment of an Azores whaleboat. Checked and overhauled daily it is kept in the boats as they lie in readiness in their sheds, or hauled in echelon on the boat-slip. It will be seen that in an open boat so cluttered, 38 ft. long and burdened further with a crew of seven, there is no room for the unskilled or awkward man, especially when the line is running. One may therefore imagine the tight fit in an American nineteenth-century whaleboat shorter by 10 ft., with only one man less, and with all the Azores equipment plus a centre-board and fire-arms.

Whaleboat stations. Generally the whaleboats and motor tow-boats sail from the station where the whales are processed, but the boats serving certain whaleries, namely three modern stations and one try-works station, sail from separate places. There are six of these 'whaleboat stations' in the Azores, and the two at Capelo and Salão on Fayal are described here as examples: the others receive passing mention when try-works stations and modern factories are discussed.

Both Capelo and Salão are remotely situated, being chosen because some small reef offers a little shelter for launching boats on the exposed coast. Capelo is the bigger station and lies below Capelinhas Lighthouse at the extreme west of Fayal. Here the reef turns at an angle to the shore and makes a tiny creek denied to Salão. There are thatched boat-houses along the beach, and a store for ropes and sails. During the summer months the boats are not taken to the houses, but are kept in readiness along the length of a stone slipway into the creek. The crews of the Pico boats which sail from Capelo (p. 298) are temporarily lodged at the station and have their own mess-room, where there are bunks and a table and a store of potatoes and dried fish. A woman comes daily to cook for them. The Fayal men have their cottages in the coast village nearby, but they spend all day at the station in readiness for launching.

The isolation of the little station at Salão in the north of the island is only equalled by that of the Porto do Castelo whalery in Santa Maria (p. 341). The slipway at Salão, built in the lee of a single out-crop of rocks, is reached by a scrambling path down the sheer cliff. There is no beach and no place for boat-houses. On the cliff top, nearly a mile from the coast road, there are two mess-rooms, the respective summer quarters of the Fayal and Pico whalemén.

The whaling strength of Capelo and Salão is shown in Table 8. The two stations are closed in the winter months, when bad weather makes launching impracticable and the motor-boat anchorages

untenable. In winter some of the boats are stored at Capelo, and some are taken to the harbour at Porto Pim, where they carry on whaling when opportunity affords.

The motor tow-boat

The uses of the motor tow-boat in Azores whaling have been summarized in a historical context on p. 301 and some are mentioned in more specific terms in the foregoing account of the whaleboats; they will be referred to again when whale hunting is discussed. At this point it is convenient to interpolate a short description of the motor-boats and their equipment.

Nowadays there are motor tow-boats at all whaleboat stations, in the proportion of one motor-boat to two, or sometimes three, whaleboats (Table 4, p. 306).

The motor-boats are all made locally in sheds or shelters at the principal whaling station of each company. A typical launch is 40 ft. long and 8 ft. in the beam. It is petrol-driven and is both fast and powerful. With no whaleboats in tow, but racing, say, to assist some boat in difficulties, it can attain a speed of 18 knots with ease. It can make satisfactory headway when towing several dead whales: the Fayal motor tow-boat *Cetaceo* (Table 8) can tow no less than eight whales the 15 miles between Capelo whaleboat station and the factory at Porto Pim at rather more than 2 knots.

Table 8. *Whaling fleet sailing from Fayal in 1949*

Boat Station	Boats owned in Fayal		Boats owned in Pico	
	Whaleboats	Motor tow-boats	Whaleboats	Motor tow-boats
Capelo	<i>Natercia</i> <i>Eliza</i> <i>Capelinhas</i> <i>Santo Espírito</i> <i>Rutt</i> <i>Maria da Conceição</i> <i>Senhora Santa-Ana</i> <i>Senhora das Augustias</i> <i>Maria Virginia</i>	<i>Walkiria</i> <i>Cetaceo</i> <i>Maria da Conceição</i> <i>Orion</i> <i>Isolda</i>	<i>Senhora do Linault</i> <i>Maria Vequene</i> <i>Maria Lucinda</i> <i>Mester Cardron</i>	<i>Horizonte</i> <i>Marota</i> <i>Cachalote</i>
Salão	<i>Senhora da Guia</i> <i>Senhora do Socorro</i> <i>Carlos Manuel</i>	<i>Maria Luiza</i>	<i>Pomiporo Recreio</i> <i>Fatinha</i> <i>Maria Adelaide</i>	<i>Picarota</i>

The crew usually comprises an engineman, who is in charge, and a boatman. Unlike the whaleboats, the motor-boats are not hauled ashore, and since several of the stations are on hard, exposed coasts, the motor-boats have to lie at open anchorages which sudden storms can make untenable. Consequently the engineman, who is often an aged and veteran whaleman, always sleeps aboard his craft, so that in emergency he can clear the anchorage and make for the nearest harbour. The engineman's quarters (comprising a bunk and little else) are right forward, and abaft these is the engine compartment which also accommodates the radio-telephone apparatus in those boats in which it is fitted. The cockpit aft has stowage for two drums of petrol, a boat-keg of water, and two spare tubs of whaleline for those whaleboats which may signal that they require more line. There are also wire strops and one or two light chains as towing-straps for the dead whales. On deck the mast is permanently stepped, and is rigged with suitable tackle for a boatswain's chair, so that from time to time, when approaching the reported position of a blow, or when in the midst of a hunt for a scattered and 'gallied' school (p. 328), the boatman may be hoisted to the masthead as a look-out. A sail is not bent, but is carried in case of engine breakdown. Certain items of whaleboat gear are lashed ready to hand upon the deck. These include a harpoon and lance, each mounted and fitted with a sheath. The harpoon provides for a sudden rising, or some unusual event, which might allow the motor-boat to

fasten a whale. But a motor-boat would normally never attempt the harpooning, and the event must be rare for I have not heard of an instance. On the other hand lancing is occasionally carried out from the motor-boat when the circumstances are suitable. Time to the kill can be saved thereby, for a fastened whale running at the surface can be overtaken by a motor-boat before it has tired sufficiently for the fast-boat to draw close enough to lance it. Also a whale which can scarcely be approached by the whaleboat because it has turned 'ugly' with flukes or jaw, may be attacked from a motor-boat using tosses of the lance combined with approaches and retreats at speed. Typically, however, the motor-boat, a towing and escort craft, does not take part in lancing: the lance may be looked upon as emergency equipment like the harpoon. The deck of the motor-boat also carries three waifs for signalling, corresponding to those carried in a whaleboat. Finally, there are a boat-spade and a boat-hook, for the reeving of the towing-strap is not uncommonly executed by the motor-boat, particularly when there are plenty of whales and the whaleboat can best be employed in resuming the chase.

Whale hunting

My experience of the Azores hunting methods is got from two days of twelve hours each spent whaling from the boat station at Capelo, Fayal, on 11 and 13 August 1949. The first day was spent in a motor tow-boat and the second in a whaleboat, and since these were profitable excursions for the whaling fleet, yielding one Sperm whale on the first day and thirteen on the second, the 16-mm. cine-film made at this time includes all aspects of whale hunting. I feel especially privileged to have sailed in a whaleboat since the presence of an eighth man increases the difficulties and dangers of the chase.

A personal account of the Azores whale hunt has been published elsewhere (Clarke, 1949). In the present report it has been necessary to describe some part of the technique of hunting in the previous pages, so as to explain the construction and employment of whaleboats, gear and motor tow-boats. These should be read in conjunction with the following remarks which attempt to record in their proper sequence the details of procedure and the events of the hunt.

Alarm and departure. As soon as the cliff look-outs raise a blow (*Az. blo*), usually in the clear light approaching sunrise, a rocket is fired and within a few minutes, amidst shouts of '*Baleia, baleia!*', the whalemén are running down to the boat-slip or manhandling the boats from their sheds. Since they can expect a whole day at sea they commonly bring personal provisions, bits of bread and cooked fish and bottles of water, and stow these with their jackets and jerseys in the boat ceiling or under the box or the cuddy. The boats are launched and sculled towards the motor tow-boats which sidle in to meet them. When the towing-warps are fast, the launches, each with two or three whaleboats astern, start at speed towards the reported blow, at any distance between 3 and 30 miles from the coast. The time between the warning rocket and departure is not usually more than ten minutes.

Whilst they are being towed, each boat's crew removes the covers from the tubs, arranges the line, and bends on the live irons, making everything ready for the chase. If it is sailing weather the mast is stepped and stayed.

At intervals of a quarter of an hour or so, a motor-boat equipped with radio-telephone will call up the watchers on the cliffs and ask for any revision of the bearing, and for any change in the number of blows sighted. Motor-boats not so equipped watch the cliffs to keep in line the sheets placed there as markers. As she approaches the reported position a motor-boat sends the look-out to her masthead, and as soon as he raises the low, rounded blow, the motor-boat makes towards it, but stops when about a mile away lest the sound of engines should alarm the whale. Immediately she casts off the towing-warps of her whaleboats.

Chasing. According to what wind there is, the boats hoist sail or man the oars, and the chase from the whaleboat begins (Plate XV). The interval between leaving the launch and fastening the whale with the

harpoon may be short or long, from ten minutes or so to several hours, but it is likely to be the longest part of the hunt, often wearisome, and requiring patience to resist the several disappointments which may punctuate it. The chase is likely to take longer if the whaleboats at sea have divided their attention amongst several whales of a pod which have 'gallied', that is, become frightened and perhaps scattered at a good speed in all directions. Of course, the motor-boats, which are seldom far away, assist here by giving short tows after running whales. The latter blow frequently, tend to travel 'head out', and are not easily lost from sight. Occasionally Sperm whales are not 'scary' but loiter at the surface and appear so indifferent that even an engined craft could approach without disturbing them. Such indifferent whales are soonest fastened. But a whaleboat, after a back-breaking pull or anxious work with the paddles, may be nearly on a whale, and the harpioneer up and ready, when the quarry rounds out, turns his flukes, and sounds (Plate XV, Fig. 3). A Sperm whale will not sound for less than five minutes, and if he is fresh he may be down for twenty minutes or half an hour, or for even longer periods: there is an extreme case from the Azores where a Sperm whale is said to have sounded for one hour and a quarter. The re-emergence or rising may be in any direction and as much as a mile or more from the position of the sounding. During the sounding interval the boat may drift, whilst the men smoke and talk quietly, or it may quarter the area, tacking and going about or under leisurely oars. (I have mentioned that the men talk quietly, for I have not heard any shouted orders or raised voices in a whaleboat at any moment of the hunt: even in their conversation the whalers appear at all times to feel the actual or possible proximity of the whale, and therefore the need for quiet.) A keen look-out in all directions is kept for the first rising. Unless at a distance and in a sea-way, this is not likely to be missed by the watchers, and on occasion it may also be heard, for on a still day the first explosive blast of the blow of a Sperm whale is audible up to 250 yards distance. After sounding, a Sperm whale blows many times in succession. Recent data collected on the respiratory rhythm are still incomplete and have not been analysed, but the actual number of blows seems to depend on the size of the whale and the duration of the sounding just completed. This period, whilst the whale is 'having his spoutings out' before sounding, is a good time to close with the harpoon. But the boat, after a burst of strenuous effort, may again be disappointed. According to the narratives of old-time pelagic whaling, the harpioneer may also be baulked if the whale 'settles'. By settling is meant an abrupt bodily sinking in the water 'with the apparent rapidity of a lump of lead', and is said to be a sudden expedient of an alarmed Sperm whale which has no time to sound. But I have not myself seen a Sperm whale settle either in the Azores or elsewhere.

There are times, especially in winter in bad weather, when all the whaleboats return after a fruitless day. Usually, however, one or several of the whales reported are eventually fastened or killed.

I have noticed that the whaleboats are careful to avoid the glassy-smooth circular patches, nowadays believed to consist of aerated water, which appear singly at the surface after a whale has sounded, or in succession if he is swimming a little below the surface. The American whalers also avoided this 'slik' or 'glip', lest by disturbing it they gallied the whale which in some mysterious way was believed to be in communication with its slik.

Fastening. The last hundred yards or so of the pursuit are made from a definite and not a haphazard direction relative to the quarry, and the approach is called 'going on the whale'. It is a time of great urgency and extreme effort in the boat. The men will normally be plying the paddles, having boated their less quiet oars, although if speed means everything they may go on under oars (p. 317); or they may be in any case under sail and paddling (Plate XV, Fig. 4). The boatheader, handling the steering-oar or the tiller, urges to faster time and greater effort by a whispered, '*Força, força!*'. He may decide to 'go on the flukes' or to 'go on head and head', but he is careful to avoid 'getting on to the eye of the whale', that is, approaching the whale on its beam.

These customary approaches, traditional from the American fishery, take advantage of the accepted oblique or sidelong vision of the Sperm whale. The position of the eye is such that the visual angle is certainly curtailed behind, where the blind arc contains about forty degrees on either side of the mid-line. The species is also said not to be able to see ahead, but actually it is still doubtful how good the angular vision is in front, because the head, in spite of its great length and bulk, has hollow-lines about the level of the eyes, and these increase in depth towards the bluff of the forehead. This can be seen in Plate XVI, Fig. 5, which shows the eye and the hollow-lines. Presumably these longitudinal depressions allow the animal a more extensive forward vision than is generally supposed, at least when travelling head-out. Colnett, in his legend to a drawing of a Sperm whale, made this point as early as 1798; it has again been observed in recent years by Ashley (1926, p. 78). In practice, however, since 'taking the whale head and head' (called *cabeça com cabeça* in the Azores) is a recognized method of approach, the vision immediately ahead must be assumed to be at least ineffectual: we do not in any case know how efficient are the underwater and aerial aspects of seeing in the Sperm whale.

When going on head and head the boat is set towards the forehead of the whale, at first by lining the emergence of the dorsal fin or hump (*Az. ampo*) a fraction to the left of the spout (*Az. espato*) and afterwards, when near enough, by direct glimpses of the bluff of the forehead. When very near, the harpioneer stands up, bracing his thigh in the clumsy cleat: the boatheader steers to one side of the animal and then, with a single sweep of his stern-oar, 'lays the boat on' so that the bow turns in towards the whale at a point, if all has gone well, a little behind the back of the head. 'Choosing his chance', but almost in the same moment, the harpioneer darts his iron: the men give a stroke or so astern to clear the boat, and the whale is fastened and taking out the line. Going on head and head has the advantage that the whale is more rapidly overtaken because pursuer and quarry are in fact travelling towards each other. The disadvantage does not lie in gallying the whale by rapidly crossing the eye, since this happens in an instant and is immediately followed by the dart: it lies in the likelihood of a too hasty dart striking too far forward on the very tough integument of the head, where the iron is most unlikely to enter deep enough to fasten properly. Presumably for this reason, and for the greater peril which, in my opinion, invests this approach, it is unusual to go on head and head in the Azores. The commonest practice, and one more likely to be favoured by the relative positions of boat and whale during the chase, is to 'go on the flukes', keeping the hump and the spout in line from astern, and making the last approach on the whale's quarter and towards the hump: the boat is laid on with the stern-oar, the iron darted, and the boat cleared as when going on head and head.

The whaleboat is not infrequently laid on so that the bow actually bumps against the whale's flank. I have myself been in such a boat going on 'wood to blackskin'. In such a case the harpoon, which has been poised above the head in both hands with the point directed downwards, is struck into the whale with a movement from the hips which so doubles the harpioneer as to threaten his balance. Darted in this way, the iron often buries all its shank to the socket, or 'to the hitches', in the phrase of American whaling. In any case the dart is not a good one unless the iron is 'fleshed', driven quite through the blubber thickness so that the head toggles in the muscle but is afterwards strained against the firm inner surface of the blubber where it is not likely to draw. Besides bumping the whale wood and blackskin (*Az. blequesquine*), it more often happens that the boat approaches so that the iron is darted from a distance of between 1 fm. and 3 fm. The dart caught in the cine-film still (Plate XV) was about 2½ fm. and was successful. Darting even at this distance requires skill and great reserve of strength in a man who is already strained by pulling and paddling. A dart of 4 fm. would be exceptional, were it not that there certainly appear to be 'long-dart men' in the present Azores whaling who can even

exceed 4 fm. (p. 334). The iron is not thrown as one might throw a spear, but rather pitched in a kind of forceful lob, downwardly directed, so as to get maximum effect from the weight of the harpoon as well as from the man behind it. The spot on the whale chosen for the dart may be anywhere on the back or upper flanks between the levels of the umbilicus and the flipper: a dart forward of the hump in the thoracic region is popular because the iron may toggle under a rib and so be lodged with especial firmness. The head presents a solid and hard surface to the iron and so is always avoided.

The second iron is darted immediately after the first, or tossed overboard if there is no chance of another dart.

The manoeuvre of backing water to clear from the whale was accompanied or instigated by the traditional cry 'Starn all' from the boatheader in the American fishery, but in the Azores there seems to be no order, the action taken being automatic.

When there are many whaleboats from the same company at sea, but only one or a few whales, it may happen that more than one boat will fasten to the same whale. Several 'fast-boats' will usually kill the whale more quickly and certainly, although there may be difficulties in boat management.

The fast-boat. In the American whaleboats, the striking of mast and sail (in a boat which had gone on under sail) was partly the job of the harponeer as he went aft to change ends with the boatheader. In the Azores the bow and midship oarsmen attend to the mast and sail, for the boatheader and harponeer never change ends in the present survival, and this is the one detail which distinguishes the existing technique of hunting from that of 100 years ago. To the last days of American whaling it was an invariable rule that the harponeer fastened the whale but did not lance it: he gave place to the boatheader for this operation, and himself went aft to take the steering-oar and tend the line at the loggerhead. He was in fact known as the 'boatsteerer', for the term 'harponeer' was rarely or never used by whalers. But in the Azores the harponeer keeps forward where he both fastens and lances the whale. For this reason I have purposely avoided using the word 'boatsteerer' which is not applicable to the Azores survival. The dangerous task of lancing calls for greater judgment and a firmer resolution than does harpooning, and the reason for the exchange procedure in American boats is usually given as the need to have the more experienced man, the boatheader (who was one of the whaleship mates), in the more responsible position. But one might argue that no job is more responsible than the line-managing and the steering in a fast-boat. Indeed, the American practice was long ago examined and logically criticized by Melville (1851, p. 299) who held that, instead of further jeopardizing the safety of the boat by running fore and aft in the crowded moment following the dart, the two officers should keep their places, and that the harponeer should mostly be relieved of rowing during the chase, so as to be fresh when called to dart his iron and, later, his lance. The Azores harponeer wields both these weapons, but he also continues to pull an oar. How or when the relinquishing of the American technique came about is not known to me, but there is the fact that the Azores shore whalers have not had to contend with the question of prestige inherent in the manning of a whaleship and her boats.

As soon as the whale feels the harpoon, he runs away with the line, usually sounding but occasionally in headlong flight at or near the surface. What happens afterwards until the whale is killed may occupy a short or long time, sometimes as little as half an hour or an hour, and sometimes several hours: similarly the behaviour of the fastened whale and the consequent management of boat and line varies a great deal and from whale to whale. Nor can these variations be associated with sex or size of the quarry. What follows is therefore an attempt to give a general idea of the range of procedures and events.

As the whale's pace begins to slacken, the first effort is made to snub the line at the loggerhead. This may rush the boat ahead, but typically it brings the bow down and some water may be shipped,

because the whale often reacts to the resistance by sounding further. So the line is freed and surges out again. With perhaps one tub empty and the other partially so, the whale starts to rise so that there is slack line to haul. The men face forward, straddling the thwarts, and labour to bring in the line which passes between their legs and is coiled down, not in the tubs, but on the boatheader platform. It has nevertheless to be coiled neatly, for in a short time the whale probably starts to run, and all this recovered line must fly out again: a foul turn in the coil at this juncture, or a foot carelessly placed at the boatheader's end, can be disastrous. As soon as the whale slackens, the boatheader snubs the line and the boat goes away at an astonishing speed behind the towing whale which now renews its effort. Captain G. A. Covill (in Davis, 1874, p. 398) claimed that a Sperm whale could tow a whaleboat at between 20 and 25 knots for a short time. This is little, if at all, overestimated, for my impressions, refreshed and confirmed by the evidence of the cine-film, suggest to me a speed approaching or attaining 20 knots, although only for short bursts, and these very soon or immediately after feeling the iron and the strain on it. Towing behind a running whale, called a 'Nantucket sleigh ride' in the old days, may continue for some time, but with intermissions and slackenings and renewals of pace, during which turns are repeatedly put on and taken off the loggerhead to snub or to free the line. At times there is a chance to haul slack line, but as like as not this will be taken out and the tow begin again. Whenever the line is running the boat-bucket and the piggin are employed to wet the flakes as they uncoil.

If the whale looks like taking all the line, then a motor-boat or a nearby 'loose-boat' is signalled to bring up more line. The motor-boat may run alongside and exchange the empty after-tub for a full one, but a neighbouring loose-boat (one not fast to a whale) passes the end of its whaleline to the harponeer of the fast-boat, who secures it outboard of the chocks by a rolling hitch to what remains of the original line: thereupon the boatheader lets go this line, and the former loose-boat becomes fast, whilst the fast-boat becomes loose. Sometimes in the Azores a whale will take the line of three boats, but not necessarily in a deep sounding, for repeated bursts of furious running can take out all this length of line.

Lancing. Eventually the whale slackens enough for the boat to approach for the lancing. Sometimes this happens no more than a few minutes after the boat fastens, but this does not necessarily mean a quick kill, for several lance-thrusts are commonly required, and a lanced whale may start again and tow for a long time and with renewed power before the harponcer can get in some thrusts more taxing to its strength, and in the end mortal.

As the whale slackens the men straddle their thwarts and haul towards him, hand over hand. This can be laborious work when they must fight every inch of the line they win. When fairly near, and if he is now going slowly enough or is by this time stopped, the whalemen can get out oars and pull up to him, often 'wood and blackskin'. But if he is still going pretty strong, the line is brought from the chocks to the bow-cleat, and the boat 'bowed on' to veer alongside the whale, near enough for a thrust or toss with the lance.

The chosen spot is a little behind and above the flipper with the lance directed obliquely forwards, and it is the whaleman's skill and experience to find the 'life' or vital spot in the thoracic viscera. For the whaleman this does not seem to be the heart, perhaps because its thick ventricular walls may tend to close against a cut, sealing for a time the slim wound of the lance-head. The lungs are generally considered as the life, although it is interesting to note that Davis (1874, p. 176) discriminates further, naming the blood reservoir formed by the complexus of blood-vessels lying under the spine and in the neighbourhood of the lungs: these are the thoracic rete mirabile.

The nearness of approach of the whaleboat determines the method of handling the lance. If the harponeer 'gets a set' wood and blackskin, then he may, standing braced at the thigh board and then

with a blow which doubles him like a jack-knife, drive the 4 or 5 ft. of shank 'socket up' into the whale's side. If the whale does not in that moment rear its flukes and sound, a bold harpioneer may retain hold of the lance-pole and thrust the weapon vigorously up and down in the wound. I have been present when a lance was 'churned' in this way. Churning can only last a moment, for almost at once as the boat is desperately backed clear, the flukes go up and the whale is sounding and the line running again. Then the whole operation of towing, hauling line, and lancing is repeated. If the boat is bowing-on (and in no enviable position, for it is travelling between the jaw and the thresh of the flukes, the Sperm whale being 'dangerous at both ends') or in an approach under oars that does not end wood to blackskin, the 11- or 12-ft. lance is tossed just as though it were a harpoon and up to about the same distance. Even with a dart like this it is customary to get a good 3 ft. of entrance into the whale. It will be remembered that the lance is fastened to the boat by the lance-warp, so that it can be recovered and tossed or thrust again and again. Frequently the wrought iron shank is much bent between thrusts, especially when the whale jerks away, towing or sounding. The harpioneer commonly straightens a bent shank against the gunwale or across his knee, and I have seen a harpioneer actually do this between thrusts whilst just laid off and practically still alongside a whale. In the late nineteenth-century American boats there was sometimes a 'lance straightener' provided, a slot cut in the gunwale just abaft the chocks, but I have not seen this provision in the present Azores whaleboats.

A couple of lucky or shrewd blows can end the struggle at the first lancing and within a few minutes, but commonly several approaches are required and several thrusts, interspersed with short tows occupying a period of, say, an hour from the first lancing and sometimes much longer, before the whale goes into his 'flurry'. The present Azores whalers use none of the bomb-lances which assisted to a quicker and safer kill both in the later American fishery and in the Azores decades ago, but the occasional or handy assistance of the motor-boat in lancing has reduced the time to the flurry in recent years in the Azores.

The flurry. The death struggle can occupy a single convulsion after a particularly successful thrust with the lance, but commonly it takes several minutes, when it is called the flurry. Comparing my own observations and first-hand accounts from the whaleship days, the flurry seems to take a similar course in many whales captured with the hand harpoon and lance, and therefore it is interesting as an aspect of behaviour.

The movements of the flurry may be large in dimension but they are carried out slowly, with the labouring exertion of an exhausted animal. The struggle is heralded by the spouting of blood from the blowhole due to the mounting haemorrhage of the lungs. At this stage, called by the old whalers 'red flag' or 'chimney afire', the respiratory beat is still sufficiently strong for the exhaled air to atomize the blood, so that the blow is a red mist. The whale struggles at the surface describing a somewhat circular path. The head rears more and more from the water, rising at an abrupt angle between 6 and 15 ft. into the air whilst the gape of the open mouth increases. The jaw now clashes shut as the head falls sideways back, making a splashing withdrawal to a few feet beneath the surface. Next the whale rounds out, as though in an effort to sound. First the snout emerges and then the hump, and then the flukes rear out, but when these are still far from the vertical they fall back and smite the water with a report which, on a calm day, can be heard for miles. The head again emerges and pushes upwards, the jaw clashes, and much the same labourings as those described may take place once or twice again. The circular path is maintained, but the exertions become less and less large in scope. The spout of blood is no longer a mist but a broad, low cascade welling at the blowhole. If it has recently been feeding, the whale vomits squid, sometimes very large, in whole or part. So much blood has been lost that the welling at the blowhole has ceased before the last convulsion takes place. The flukes may sweep a little in a slow arc flat on the surface, and the head start to rear once more. Now the

with the kind of incidence recorded in the old whaling voyages, does not suggest that open boat Sperm whaling is less perilous today, in spite of the ready assistance which the motor-boat can give. But one should remember that, because of the numerous independent companies which in some islands whale in close proximity, the Azores whalers are given to 'whaling for victory' more perhaps than any bold crew of whaleship days.

By whaling for victory is meant the furious competition, reckless of any danger or consequence, between whaleboats from rival companies attempting to harpoon the same whale. (For centuries whalers everywhere have recognized that the first boat to fasten owns the whale, no matter what may happen afterwards.) I have been in a Fayal boat racing a whaleboat from Pico, each boat going on the flukes from opposite quarters. As the harpooners stood up the boats approached so close that the mainsail boom of the Pico boat swept the after part of the Fayal boat and advanced almost to foul the mast, yet neither boat gave an inch of way and both would have collided over the whale, or both fastened together with almost certain fouling of lines and boats, had not the whale abruptly sounded as both harpooners were about to dart. I mention this example of 'victorious whaling' to explain my acceptance of incidents reported to me where a rival boat has intercepted a boat about to fasten, whereupon the harpooner of this boat has notwithstanding hurled his iron clean over the rival and successfully fastened the whale. In such cases the harpoon is possibly not darted overhead in the normal manner, but is 'pitchpoled', that is, tossed underhand in a manner recognized but rare in the whaleship days: it has been said that pitchpoling can strike a whale across 7 fm. Whatever the technique, the successful tossing of a harpoon across a rival boat has apparently happened several times, and predominantly in Pico where the companies are (or were until recently) in the sternest rivalry. As a measure of the stature of the Azores whaler in skilful strength and daring at the present day, it may be mentioned that a similar feat, culminating a race at Delagoa Bay, South Africa, when an American boat fastened a whale across a rival English boat, became a classic and supposedly unique episode in whaling adventure. Apparently first recorded by Cheever (1851, p. 133), it has been widely quoted since. Yet the Azores whalers have done this more than once, and do it now, only their whaling has been little known.

Saving the whale

In the present year (1953) there are in the Azores only four modern stations equipped with steam winches and pressure cookers. At the other eleven Sperm whale factories (called in this report 'try-works stations') the whales are processed or 'saved' according to the ancient practice. 'Saving a whale' comprises two stages: the whale is first 'cut in', that is, the blubber and spermaceti are removed, and then these materials are 'tried out' by melting in iron pots to yield sperm oil and 'head oil'. It is unfortunate that, although I have everywhere been shown the implements and fixtures used in cutting in and trying out, I have not happened to visit a try-works station when a whale was actually being saved. Under this heading I therefore describe the various stations and their equipment and give an outline of the methods employed. The outline is derived partly by inference from the equipment and partly by conversations with whaling owners and their station hands. I am not able, however, to examine all the details of technique which may exhibit variations from the old American practice. But the Azores whaleboats are not more astonishing survivals than these stations, some of which retain the methods and the very aspect of New England whaleries of the mid-eighteenth century.

Cutting in. The cutting of blubber and meat, and the disjointing of bones, is done with vertical jabs from a cutting spade (*Az. espeide*). The familiar Norwegian flensing knife, developed from the 'strand knives' of the old Dutch and English whalers, is unknown in the Azores. The cutting spade is, of

course, got from the Americans who, I believe, perfected this British instrument when they developed for their pelagic fishery the spiral method of cutting in shortly to be described, and required for this purpose a long-handled chisel which could be wielded from a cutting stage at deck level and applied to a whale ranged alongside in the water. As will be explained later, these are also the conditions of cutting in alongside a jetty in the Azores, but they are not the circumstances of cutting in a stranded whale on an Azores beach, or of 'working up' on the flensing platform of an Azores 'modern' station: here the whale can be directly approached, and, as Figueiredo (1946, p. 114) has pointed out, the more efficient flensing knife could be introduced as a time-saving replacement: none the less the long cutting spade is certainly used with great skill and effect no matter how the whale is cut in. One form of cutting spade, the boat spade, has already been described. The other forms differ only in detail. The scarfing-spade, used for cutting blubber, is a little wider than the boat-spade: the leaning spade is obviously wider, and is for detaching gobbets of meat from blubber: the bone spade has a long shank and heavy blade for decapitating the head. These varieties can be distinguished at the Azores whaleries (Pl. XVIII, Fig. 1), but they are used rather indiscriminately on the flensing platform at modern stations. Here the lengths of the handles vary from 6 to 12 ft., although longer spades may be used for cutting in at a jetty. A typical cutting spade measured at Porto Pim had the following dimensions:

							ft.	in.
Length of cast steel blade	...	...	...	...	...	...	0	7
Width of cast steel blade	...	...	...	...	...	...	0	4 $\frac{3}{8}$
Length of wrought iron shank	...	...	...	...	...	...	0	8
Length of wrought iron socket	...	...	...	...	...	...	0	6
Length of wooden pole	...	...	...	...	...	...	7	4
Total length of mounted craft	...	...	...	...	...	...	9	5 $\frac{3}{8}$

There may be mentioned another cutting instrument which is occasionally seen in Azores whaleries although not much used nowadays. Made by a whalecraft firm in Pico, it is like a giant butcher's knife, and an example measured in Fayal had a 27-in. blade riveted to a 19-in. handle. It is larger than the leaning knives used by the Yankee whalers for trimming blubber pieces, and seems to have had no counterpart in the American fishery, at least after 1800. The 'Pico knife' is something similar to a strand knife on a short handle and recalls knives depicted in a print (Jenkins, 1921, p. 129) of an early Dutch whaler of the seventeenth century when it was customary to tow the Northern Right whale to the ship in some Spitzbergen bay, and then hack off the blubber with axes and knives before transporting it ashore for trying out.

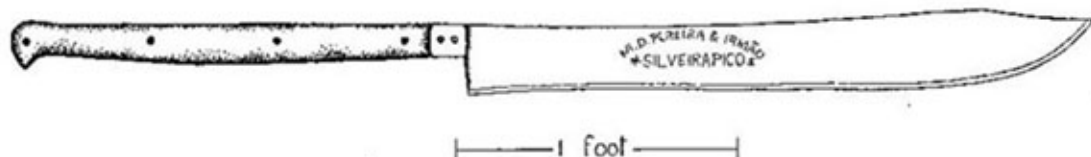


Fig. 7. Pico knife.

The Azores employ two methods of cutting in. The first and more primitive is simply to strand the whale on the beach, or a gently inclined stone slipway, and there remove the blubber. The second is the spiral technique of the whaleships brought ashore, that is, the whale is floated alongside a jetty or quay, and cutting in proceeds as though the jetty were the deck and sides of a whaleship. The four try-works stations at Pico use both methods, according to the number of whales to be saved, the state of the tide and the weather, and the facilities agreed between companies, where several may share the

beach and jetty of each station. At Lagens do Pico, the biggest try-works station, most of the whales are stranded on stone slipways. The two stations at Graciosa and the station at Topo, San Jorge, may use both methods but I have not visited these. All the stations in two islands (Porto do Castelo in Santa Maria, and Negrito and Biscoites in Terceira) merely strand their whales. At Velas, San Jorge, on the other hand, it seemed to me that cutting in is all done alongside the jetty (Table 4). Neither method makes any use of the meat, bones and viscera, and local sanitary regulations require that the stripped carcass be towed out to sea on a suitable ebb tide.

When a whale is cut in by stranding, it is heaved up the beach as far as it will go upon the flood tide. A thick rope warp is secured to the whale's snout, and the end is taken up the beach to a capstan which is securely bedded in rock and cement, and is walked round with capstan bars. The proper designation of this capstan is a 'crab', a whaling term dating from the late seventeenth century: it is the only engine or installation, apart from the try-works, necessary for saving a stranded whale. With the crab it is not possible to do more than strand the whale with its lower sides and tail awash, and the men at the seaward end may be working up to their thighs in water even at low tide when most work is done on the carcass. The whale is stranded with the head end leading, in order to get at the spermaceti organ with the least difficulty. The blubber of the trunk and head is removed piecemeal by two men with cutting spades who work mostly atop the whale. Each is assisted by a hook-man who takes tension with a 3-ft. iron blubber hook as the blubber, in pieces (*Az. piças*) each about 2 ft. square, is chopped out and cased from the underlying connective tissue. For transporting the blubber up the beach there are cooper-made blubber tubs, carried between two men using a stout pole thrust through rope handles. The blubber pieces are very heavy and a second method is to mortise a hole in the piece and so carry it skewered on the pole across the shoulders of two men.

Stripping the head blubber reveals the walls of the spermaceti organ which accounts for most of the enormous bulk of the head. Lying outside the skull and above its rostral part, the spermaceti organ is supported below by the maxillae and limited behind by the maxillary crests. There are two parts within its substantial fibrous walls. The upper part is a reservoir or cistern called the case (*Az. queize*), irregularly traversed by fine membranes and full of liquid spermaceti. A large case may yield ten or more barrels of spermaceti, and there are records of yields exceeding fifteen barrels. The floor of the case is traversed by the wide blowhole canal from the back of the mouth to a distal sac leading upwards to the blowhole on the top left-hand side of the front of the head. Below the case and separated from it by a thick layer of fibres ('whitehorse'), there lies the 'junk' (*Az. janco*) which is divided by transverse partitions into a regular series of compartments or cells: each cell is filled with an areolar tissue loaded with spermaceti so that the cut surface of the junk looks like an opaque jelly. The hollow lines (p. 329, Plate XVI) of a Sperm whale's head seem to correspond for some part of their length with the level of the whitehorse, so that they roughly distinguish the case above from the junk below in the external aspect of the head.

Without tackles the dissection of the spermaceti organ from the stranded whale is a considerable task. The stripped head is cut in and the case broached, when the spermaceti is bailed and scooped into a tub. On exposure to the air the spermaceti soon becomes a soft white waxy solid. When the case is emptied its walls are cleared away so that the junk can be chopped out in manageable sections to follow the spermaceti to the try-works.

Cutting in a stranded whale is illustrated in Pouchet & Chaves's paper (1890, pl. IX). It is a laborious and slow operation, and is accompanied by a certain amount of wastage of spilt spermaceti, although some of this is recovered from the water and beach by 'skimming slicks' with a scoop net, as is done when cutting in alongside. The primitive nature of the survival is obvious, and the following description from Macy (1835) shows how the existing Azores practice compares with New England opera-

tions in an early shore whalery for Right whales at Nantucket about the beginning of the eighteenth century:

The process called Saving the whale after they had been killed and towed ashore, was to use a crab, an instrument similar to a capstan, to heave and turn the blubber off, as fast as it was cut. The blubber was then put into their carts and carried to their try-houses, which in that early period, were placed near their dwelling-houses, where the oil was boiled out and fitted for market.

This even seems to have been an advance upon the Azores method, for the crab at Nantucket was clearly used to strip blubber much as a steam winch does in modern whaling. It would in fact be more appropriate to shift the comparison to the early Northern fishery when whales were not always taken to the vessel but were sometimes stranded on a Spitzbergen beach and the blubber hacked off there.

When cutting in alongside a jetty or quay, the whale, floating on its side, is secured fore and aft by head rope and fluke chain to ring-bolts in the stone facing of the jetty. Meanwhile a cutting stage has been rigged above the whale by bracing two stretcher planks outwards from the jetty, and joining them at their outer ends with a third plank, the outrigger, which supports the men using cutting spades. The stretchers are braced from stout wooden posts set in iron hoops fixed to the jetty. The outrigger is fitted with a handrail. For hoisting the blubber there must be a derrick or an elevated beam or gallows to stand duty for a whaleship's main-top and suspend the large and heavy cutting tackles. These are two outsize purchases worked alternately, each consisting of an upper and a lower block with heavy rope falls. If a derrick system is employed, then these purchases take a rather different form, but they are always noteworthy for their great size. I have seen cutting blocks in the Azores which were about 18 in. long and 12 in. wide and 6 in. deep. Cutting in is begun by mortising a hole in the blubber just above the flipper. This hole receives the great blubber hook attached to the lower block of one tackle. I have been shown a blubber hook weighing more than 100 lb.

The insertion of the hook in whaleship days on the high seas was a job for a man sent overboard on a monkey rope, but it can be done at an Azores shore station with less difficulty from a rowing-boat. When the hook is in position, the end of the falls is taken to the crab on the jetty, and the men walk round and heave. This turns the whale slightly in the water so that it lies with the jaw accessible. A strap is secured round the lower jaw and fastened to the second purchase. By hoisting on this, whilst men on the stage sever the throat blubber and mandibular muscles, the lower jaw is disarticulated and got upon the jetty. The jaw and teeth will later provide material for scrimshaw work (p. 347). When the jaw is removed the stripping of the blubber is begun. The falls of the first tackle are eased to allow the whale to resume its former position where it can be 'scarfed' with a cut round the flipper and extending towards the back as two parallel lines 5 or 6 ft. apart. The men heave again at the crab and the first 'blanket piece' is started by wrenching up the flipper and its surrounding blubber, which begins to peel off as a giant strip. The strip rises and the whale turns in the water as the spades extend the scarf and help to tear the blubber from its underlying attachments of loose connective tissue. When the tackle 'comes two blocks', with the lower block hard against the upper one, a man on the jetty takes a boarding-knife (a long-handled, double-edged sword) and cuts a hole at waist level in the strip of blubber now hoisted above him. Through this hole is toggled the strap of the lower block of the second tackle, or else two holes are made and the block is fastened with a chain strap instead of a toggle. When strain has been transferred to the second tackle, a few slashes above the toggle or strap with the boarding-knife cuts the first blanket piece clear, and it is 'boarded' onto the jetty. Then the newly-fastened tackle starts to hoist the second blanket piece. The scarfing, hoisting, and boarding of the blubber continues, and in this way successive blanket pieces are brought to the jetty, whilst the whale turns in the water and the blubber peels off in spiral fashion as a continuous strip down the body. When the tailstock is approached, the strip is severed, and the blubber

of the tailstock is usually secured by first docking the flukes and then unjointing the tailstock and hoisting it to the jetty. I believe that the head is cut off with spades at some early stage in boarding the blubber. It is usually dissected last, or separately. When cutting in the head, a chain strap, the head-strap, is rove through a hole in the nib end (p. 323), and by this attachment the cutting tackle hauls the forehead upwards so that the head lies up-and-down in the water. The spades now free the junk and case from the skull, and afterwards the junk and case are themselves separated. For these operations the spades follow scarfs earlier cut into the head at the time of removing the lower jaw. The junk is hoisted upon the jetty. If the head has been a small one, it is possible to haul up the case also, or even haul up case and junk together without separating them, but the spermaceti from a large case has to be bailed out whilst the case remains upended, hoisted half in and half out of the water. For bailing the case there is a long wooden bucket with a rounded bottom, the case-bucket, and this is rammed into the case with a pole, and then, brimming with spermaceti, hauled out on a whip. This is done repeatedly, until the case is emptied.

This method of cutting in, which corresponds in almost every detail with cutting in alongside a whaleship, may possibly not be employed with such elaboration at some stations like Ribeiras and Calheta do Nesquim in Pico where I recall seeing few special fixtures apart from the crab upon the quay: but my notes are deficient here and it may be that the beam and hoists are only rigged at these stations when a whale is captured. At San Mateus in Pico there are samson's-posts on the quay for tackles (Plate XVI, Fig. 3). The foregoing description refers to the former technique at the old try-works station at Porto Pim, which apparently was not discontinued until the existing modern station was built in 1943. The old try-works station is about 100 yards from the new station and further along the footpath which encircles the base of the steep hill called Monte da Guia. The quay, which was specially fashioned as a cutting platform and is now quite disused, is hewn from the rock and is approached by a flight of rough steps. Ring-bolts and hoops and the rusted bedding for the crab and the legs of the derrick are still to be seen. There is an adjacent stone platform where the head was cut in separately, and the junk and spermaceti carried by a separate flight of steps into the try-house by a separate door. The try-house stands on the cliff above the cutting platforms. The operations at Porto Pim are illustrated in a photograph reproduced by Richard (1936, pl. VII, fig. 2), showing a whale being cut in there in 1888.

Both these surviving methods of cutting in, either stranded or alongside, were used by those emigrant Azores islanders who conducted shore whaling in the bays of California in the second half of the last century (p. 295). The present account may be compared with Scammon's description and illustration (1874, p. 250 and pl. XXVI) of the station at Carmel Bay in, I believe, the late 1850's.

Under a precipitous bluff, close to the water's edge, is the station; where, upon a stone-built quay, is erected the whole establishment for cutting-in and trying-out the blubber of the whales. Instead of rolling them upon the beach, as is usually done, the cutting tackles are suspended from an elevated beam, whereby the carcass is rolled over in the water—when undergoing the process of flensing—in a manner similar to that alongside a ship. Near by are the try-works, sending forth volumes of thick, black smoke from the scrap-fire under the steaming cauldrons of boiling oil. A little to one side is the primitive store house, covered with cypress boughs. . . .

The Americans were probably first responsible for adapting the whaleship technique of cutting in to shore conditions by employing a derrick or gallows. Among the earliest of establishments so equipped were those dating from the 1830's and operating for Right whales in the bays of Cook Strait, New Zealand. Dieffenbach (1843, I, p. 51) mentions the scaffold or 'shears' used for cutting in alongside at Te-awa-iti, Tory Channel. These New Zealand whaleries were owned in those days by American and English adventurers, although there were undoubtedly some Azores islanders among the mixed nationals who worked the stations.

Trying out. A necessary preliminary to trying out the blubber is the reduction of the blanket pieces, or the smaller square pieces cut from a stranded whale, into strips of a suitable size for mincing before they go into the try-pots. These strips are the horse-pieces, and measure about 18 or 24 in. long and 6 or 8 in. wide. They are prepared with a cutting spade and 'leaned up' (from any adhering bits of meat) with blubber knives similar to butchers' knives. At certain stations, like Lagens do Pico and Negrito, Terceira, the horse-pieces are temporarily stored in large shallow stone tanks dug into the ground close to the try-works. These tanks are equivalent to the blubber room, a space in the upper hold of a whaleship where it was customary, except when caring for small whales, to send down the blanket-pieces and prepare and keep the horse-pieces before passing them up to the try-works. The horse-pieces, which are heavy enough in spite of their small size, are usually shifted about with a steel spike or prong mounted on a wooden handle, called a blubber pike. With this instrument they are pitched into blubber tubs and so carried to the mincing-horse. This is a stout wooden plank where the horse-pieces are laid and sliced with transverse cuts into 'books' or 'bibles'. The slicing or mincing (which facilitates the subsequent extraction of the oil) is done with a two-handled draw-knife called a mincing knife. The slices are about $\frac{1}{2}$ in. thick, and the 'book' earned its peculiar name because each cut stops short of completely severing the piece, which now resembles a book with forty or so pages. Towards the end of the last century a good many of the American whaleships adopted a simple hand-cranked machine for mincing the books. These mincers may exist in the Azores, but I have not seen any during my survey of the try-works stations. It is in fact unlikely that the mincing machine is used, since it may need a crew of three or four men to make the most of its obvious advantage of speed in mincing, whereas the mincing knife needs only one man; and time is not very important at a small try-works station which does not expect to be 'blubber-logged' by a large catch. The minced books fall straight into the mincing-tub, a large blubber tub across which the horse is laid. From the mincing-tub the books are forked into the try-pots with a two-pronged blubber fork about 7 or 8 ft. long. The try-pots, where the oil is boiled out, are huge cast-iron cauldrons whose size may be judged by the spare pot with implements shown in Plate XVIII, Fig. 1.

The pots are built into an oven of volcanic stone faced with cement, forming an extraction plant called the try-works (*Az. traiol*). Resembling a large domestic copper (as indeed it was called in the early Spitzbergen fishery) this traditional structure arrests the eye, even when no whales are being cared for, and distinguishes some small coastal settlement as a try-works station. The try-works vary a little from one whalery to another, and it is convenient to describe a Pico try-works (Plate XVIII, Fig. 2) in explaining the rest of the process of trying out.

Pico has the most primitive and also the most numerous of the existing try-works. Here they stand exposed without shelter of any kind. There are two pots in rectangular casings in each try-works, except for one single-pot installation among the several at Lagens do Pico. Each pot in the try-works has its own fire-place, usually with a step before the hearth. Iron plates sliding on a horizontal rod serve to close the fire-places, which in whaling language are properly termed 'the arches'. The flues behind each fire-place lead to a common chimney of characteristic shape, squat and conical with flattened sides. When trying out is in progress, the oil melting from the books is kept constantly stirred with a blubber fork or a pike or a spade. The boiling oil is judged to be done when the remains of the books have become crisped and browned 'scraps' or 'cracklings'. The pot-spade is handy for stirring because it can most efficiently scrape any scraps from the side of the pot where they would otherwise burn and darken the oil. Scraps are removed and the oil skimmed with a sieve-pan or scrap dipper, which is a colander made from a pierced circular plate of iron or copper, mounted on a long handle. The scraps, pitched into the arches with a pike or fork, are used as fuel to keep the try-works going, and this practice dates at least from the early Spitzbergen whale fishery when the scraps were

known as 'finks' or 'fritters'. When trying out is completed, a heap of scraps is saved to start the next boiling (Plate XVIII, Fig. 3). The heaps look like discoloured, yellowish-black stacks of old cork floats. A bailer, consisting of a large copper or tinplate can mounted by a wrought iron shank upon an 8- or 9-ft. pole, is used to ladle the boiling oil from the pots into a cooler (*Az. cula*) placed alongside the try-works. At Lagens do Pico the coolers (ancient adjuncts to all try-works since early Spitzbergen days) are simply great cylindrical or slightly conical vessels made of sheet iron plates riveted together. To hasten cooling at Lagens the oil may be ladled from the first cooler to a second or even a third: elsewhere in the Azores I have not seen more than one cooler alongside a try-works.

I have no information on the time taken to cut in and try out a whale in the Azores, but, judging from the whaleship records, a large Sperm whale would probably keep a station with a two-pot try-works busy for three or four days and perhaps longer. There is of course no comparison between these methods and modern whaling on the Norwegian model.

Try-works stations. All existing Azores try-works stations employ the implements and methods just described. The correspondence with trying out aboard an old whaleship is remarkably complete. In a whaleship the brick built try-works was placed just abaft the fore-hatch, and accommodated two pots, although some ships had three-pot works in the middle of the last century. The only different features of a whaleship try-works were a shallow water reservoir under the structure to protect the deck from burning, and the absence of any chimneys until sheet metal ones were introduced in some whalers during the second half of the century. But the Azores try-works stations can most strikingly be compared with the early shore whaleries, with the basically similar operations at Spitzbergen described by Gray, 1662-3 (in Jenkins, 1921, p. 152), and more closely with later New England scenes like that shown in a print reproduced by Scammon (1874, pl. XXIII) of a New Bedford station in 1763, with its try-houses and implements and blubber tubs. And such scenes as Carmel Bay in the 1850's (p. 338) are not even different in detail from some present stations in Pico. There is given below a survey of the aspect and equipment of the various Azores try-works stations as they exist today (see also Fig. 3, p. 297; Table 4, p. 306).

Lagens, on the southern coast of Pico, deserves further mention since it has always held a prominent position and is now the biggest centre for processing whales in the old-fashioned way. Here there are seven companies which own or share an installation of five open try-works. One of these has only a single pot. The open-air factory is built at the expanded end of the breakwater, shaped like a frying-pan, which runs out on a reef sheltering the lagoon of Lagens. Where the breakwater ends, the seaward side is clear to give space for a derrick and room to turn the carts which transport materials. On the lagoon or harbour side, the five try-works extend upon the level upper portion of a broad stranding slip. Low walls, helping to break the wind and sea, join the try-works which are so disposed as to make the nodes and terminals of branching arms formed by the walls. In this way three or four working spaces, each with a crab and flanked by try-works, can handle separate whales hauled to the common slip (Plate XVI, Fig. 2). Opposite the factory, across the harbour, there are six whitewashed boat-houses and two launching slips, each of the latter providing for the whaleboats of a group of three boat-houses. In the harbour the motor tow-boats lie at anchor. Elsewhere on Pico the installations are more modest. West of Lagens the little village of San Mateus has a single try-works with a large square tank as cooler, built on the rocky beach against the foot of the sea-wall. At San Mateus the coast road so hugs the shore that whaleboats have to be manhandled from a boat-house across the road: they are afterwards launched from a slipway which is a mere slit in the reef. Whales may be stranded at this slipway or cut in alongside a rough quay built against part of the reef (Plate XVI). To the eastward of Lagens there are two isolated villages, Ribeiras and Calheta do Nesquim, very similar to each other as whaling settlements, and clinging to the foot of tall cliffs which in this region

of Pico carry the coast road several hundred feet above the shore. At present there is a zigzag roadway winding precipitously to Ribeiras from the coast road, but I was told in 1949 that two years previously the settlement could only be approached on foot or by pack-mule. Both settlements are much exposed and were severely damaged by a hurricane in 1946. Each has a stone jetty or quay along a reef jutting into the cove and sheltering a small beach where whaleboats are launched and whales are stranded. Whales are also cut in alongside the quay. At Ribeiras this quay has a crab and a single try-works with two pots. The quay at Calheta do Nesquim has two crabs and once boasted three try-works, but two of these were destroyed by the hurricane.

The functioning try-works I have seen in other islands are roofed over or completely enclosed in a shed or try-house. In the old whaleships the try-works were sometimes roofed over, but never completely enclosed.

There is a try-works station at the town of Velas in San Jorge. Velas is the largest settlement in this island, and it may be for health reasons (since try-works belch thick and evil-smelling smoke from the burning scrap) that the try-house at Velas is situated at the end of a short road hugging the sea-wall beyond the main part of the town. Wattle-sided ox-carts carry the blubber here from the quay where the whales are cut in alongside. This wagon transport recalls Obed Macy's description of early shore whaling at Nantucket (p. 337). The two boat-houses at Velas, like that at San Mateus, Pico, are across the road from the narrow boat slip, and the whaleboats have to be hauled over. San Jorge has a second station at Topo, but I have not visited this and do not know whether the whales are cut in stranded or alongside.

The factory at Negrito, Terceira, is a little more elaborate than at Velas. Negrito is the only try-works station whose boats sail from a separate place: this is the boat station at San Mateus, a little farther along the coast. Negrito has two stranding slips with a raised stone platform between, where a single crab can work ropes through fairleads to either slip. The try-house stands nearby on somewhat higher ground, before a cemented space where two stone blubber tanks are excavated. Within the try-house there is a battery of four pots which are used for blubber only. The spermaceti from the case and junk is boiled out separately in an adjoining open-air try-works whose two pots are made not from cast iron but from riveted sheets of wrought iron. Spermaceti needs a lower temperature for trying out than blubber, and I have been told, rather obscurely, that this explains the use of sheet iron pots. At several Azores stations the case and junk are tried out indiscriminately with the blubber, so that the cooked spermaceti or 'head oil' is not kept separate. But where this separation is carried out, I understand that it is still customary, as in the whaleship days, to 'squeeze sperm' before putting the head matter into the pots. Squeezing sperm means plunging the hands into a tub of the semi-liquid spermaceti and there squeezing them together, so as to remove 'slobgollion', the fine strings and tatters of membrane which are suspended in the spermaceti and which would tend to char in the pots and somewhat affect the quality of the head oil. Turning again to factory details, it may be mentioned that proper storage tanks, excavated from the rock and lined with cement, have been built underground at Negrito: three are for body oil and one is for head oil. Most Azores try-works stations fill the cooled oil directly into the familiar steel drums for shipment. (The wooden oil casks of whaleship days are no longer used in the Azores, and nowadays the coopers who make the line tubs and blubber tubs for whaleboats and factory get the major part of their living from coopering wine casks.) The other try-works station in Terceira is at Biscoites on the north coast, but I have not seen it.

On the island of Graciosa there are two small try-works stations, at Barra and at Santa Cruz, neither of which I have visited.

Santa Maria has a single station in the more sheltered south-east corner of the island at Porto do Castelo, but its equipment for rendering oil is more elaborate than I have seen at any other try-works

station. At the same time (saving the launching slip at Salão, Fayal) it is the most isolated whalery in the Azores. Unlike all others it is not a settlement, having no dwelling-houses, and it is approached only by a zigzag footpath terraced from the red clay and limestone of the sheer cliff and winding down from the lighthouse high above (Plate XVI). The whalemens live at the small village of Maia, a mile to the north, and they have to reach their homes by a roundabout way over the top of the cliff. The try-house lies under the cliff at the head of a small beach where two reefs run seaward, affording shelter in suitable weather for launching boats and stranding whales. A small stone and concrete jetty has been built along one reef and equipped with a derrick, but this is used for loading oil transports and not for cutting in. The crab for stranding whales is installed on the beach below the try-house. This is open all along the front, disclosing a try-works with a row of five pots, each with its own arch. The pots do not need to be separately bailed into the cooler. Instead they are served by two run-offs, channelled into the flush stone surrounds of the pot brims. The oil is bailed directly into the run-offs which are both drained by an iron pipe into a square cooler built of stone. The cooler is, of course, open at the top, but it abuts upon a second stone tank which is covered except for a small square opening fitted with a wooden lid. This is a settling tank into which the oil from the cooler is bailed. From here it can flow by gravity into a large closed storage tank partially sunk into the ground. Finally, the stone top of the storage tank supports a small vertical donkey engine driving a steam pump, so that oil can be pumped as necessary into a large cylindrical metal storage tank installed on a stone platform. In 1949 a second try-works of two pots was being constructed for spermaceti only. Outside the four modern stations and apart from the motor tow-boats, the donkey engine at Porto do Castelo is the only machine I have encountered in the Azores whale fishery: and it is in other respects clear that Porto do Castelo, despite its isolation and difficulty of access, is the most advanced of the old-fashioned stations. The other stations and their try-works are functioning survivals from the last century, but this one has been built, or rebuilt, in recent years.

The only other try-works in the Azores are the four disused ones which have been superseded by steam-powered factories. They deserve brief mention here. In Flores there is one at Lagens which I have not seen. I was informed in Flores that Lagens das Flores is now a boat station and that the only factory is the modern installation at Santa Cruz. On the north coast of Pico, at Cais do Pico, the old try-house contains a battery of eight pots, and this try-works is still kept in good repair against an emergency developing in the steam cooking plant of the new station. The former try-works station at Capellas, a sheltered cove on the north coast of San Miguel, is today simply a boat station, and the slipway is used by whaleboats sailing for the modern factory at São Vincent two miles to the east. In Fayal the old station at Porto Pim, Horta, stands close to the new one. The old boat-houses, like long Nissen huts built in volcanic stone, are still used in winter for the boats brought down from the summer whaleboat stations of Capelo and Salão. The old stone cutting platforms at Porto Pim have already been described (p. 338). The deserted try-house is remarkable for its size and spaciousness. Two try-works each with two pots are ranged against the walls. Accessories I have not noticed elsewhere are conical sheet iron covers for the pots, intended to reduce the risk of fire should a pot boil over. Try-pots in the old whaleships sometimes had similar covers. The cooler here is an immense wooden cask. In one corner there is a wooden pen still heaped with dry and dusty scraps, as though awaiting the next 'affair of oil'.

Working up at modern stations

The islands of Fayal, Flores, Pico and San Miguel each have one steam-powered whaling factory where the whale is heaved upon a flensing platform and there reduced to its blubber, meat and bone for pressure cooking. Unlike most of the try-works stations these four modern stations are placed apart

from the town or village, just as all whaling stations elsewhere in the world, treating the whole carcass, are isolated for hygienic reasons. Working up (that is, saving the whale in the modern sense) is mostly done by a special factory staff, whereas the whaleboatmen at try-works stations do all the cutting in and trying out with no shore-side assistance. Although the cooking equipment is similar to that at any shore whaling station overseas, the Azores modern factories merit description because the platform whalers have adapted the traditional methods of the cutting spade to the employment of the steam winch, developing an independent technique of flensing and butchering which differs markedly from Norwegian practice.

I am best acquainted with the procedure at Reis e Martins Lda.'s station at Porto Pim outside Horta, Fayal, where most of my time in the Azores was spent. A low isthmus, with the bay called Porto Pim on its west side, runs south from Horta, and the whaling station is built (Fig. 5) where the isthmus abruptly terminates in the high steep sides of Monte da Guia. The flensing platform is partially cut from the hillside and is bounded here by a high unfenced wall at whose top grazing cattle look down upon the platform. A steep cobbled slipway runs down to the water where ringbolts are fixed for securing whales hove to the slip (see Plate XVI, Figs. 5 and 6). A stone bridge spans the slipway and carries the path which leads round the flanks of Monte da Guia to the old try-house farther along the bay. The slipway rises to the flensing platform, which is an enclosed square courtyard with a cemented floor sloping unevenly downwards. Blood is drained from the platform by a system of gutters leading to sumps which open upon the slipway. At the back of the platform in a housing built against the factory wall there are two whaling-winchs which can be coupled together: a smaller winch, for working up the head, is fixed in one corner.

The Sperm whales, brought by motor tow-boats from the boat stations at Capelo and Salão, are secured to a buoy lying just off the slipway. Two men in a small boat take a light 'fishing wire' from a whaling-winch to the whale, and in this way it is hauled into the slip (Plate XVI, Fig. 5). As soon as the whale strands at the slip, there are whalers and local fishermen standing thigh deep in the fouled water to begin stripping blackskin for use as fishing bait. Their scrapers are bits of old iron, or a cutting spade, or simply the clenched nails of bare hands. Meanwhile the platform men are sharpening their cutting spades on a hand-cranked grindstone in preparation for flensing (which cutting in is best called in this context). The multiple heaving-purchases, employing steel blocks and steel wire ropes, are rove; and the moving or lower blocks are laboriously dragged down the slipway and fastened to a large fluke chain around the tailstock. Double purchases may be used on a small whale, but quadruple purchases are required for a large one. Two complete purchases are used for each whale, the standing or upper blocks being stopped to robust concrete heaving-posts bedded in front of the winch housing: the fall of each purchase is taken to either whaling-winch and the two winches coupled for heaving up.

With this tackle the whale is slowly got upon the platform, and at once cutting begins by removing the head at the condyles with a heavy spade, assisted by a wire from the smaller winch. Already this differs from Norwegian practice, which is first to flense all the blubber from head and body before decapitating. The head is dragged to the far corner of the platform, where the whaleboatmen are waiting to flense it and remove the spermaceti organ.

If the whale is a large one, then work proceeds at once on the trunk of the animal. If there are several whales, and these of small or moderate size, then the trunk of the first is heaved to one side, and room made for heaving up the second which is decapitated and similarly dragged to one side. In this way three whales may be worked up together.

Flensing the blubber from the trunk starts with the removal of the post-anal ventral hump (which is all blubber) as a thick strip chopped out with spades from behind the anus to the tailstock. Meanwhile, with the whale lying on its side so that back and belly are respectively left and right, the main

ventral scarf is made as a series of horizontal and vertical cuts. The scarf begins at the anus and is taken horizontally forwards until a few feet in front of the genital slit, where the direction is changed to proceed vertically upwards for about 2 ft. then again horizontally about the same distance, and then downwards, and again horizontally forwards for some 3 ft., when the marking out of a three-sided square is repeated, bringing the scarf at or near the end of the trunk. The tracing of the cut is such that, when the blubber above the scarf is later removed, there remain two square flaps looking like two merlons with a crenelle between in a battlement of blubber. The dorsal or left-hand side receives similar treatment: the dorsal fin and posterior dorsal humps are removed, like the post-anal ventral hump, in a single thick strip; afterwards the blubber in front of the former position of the dorsal fin is scarfed so that it will leave two 'merlons' like those on the right-hand or ventral surface. At this stage the tail flukes receive attention: that fluke raised off the platform is cut off close to its insertion, but the other fluke is conveniently left as a prop to the tail until flensing is further advanced. The flenser now resumes work on the trunk, when all the blubber on the top surface, between the dorsal and ventral scarfs, is removed, most of it in 2-ft. squares with spade and blubber hook, as though a stranded whale were being cut in (p. 336 and Plate XVII). The steam winches are not much used in flensing, although a certain amount of the flank blubber is stripped with their assistance. The flipper is removed last: the senior flenser climbs atop the carcass and clears the insertion of the flipper from its remaining surround of blubber and then disarticulates with his spade the joint between humerus and scapula. Flensing at this stage exposes the white connective tissue covering the meat of one side, with the two blubber merlons standing up left and right (Plate XVII). A hole is mortised in the centre of each merlon, for these flaps will later be used to turn over the remains of the carcass. The first meat to be removed is the ventral body-wall, cut with spade and hook from the anus forwards in a series of transverse slabs or belly fillets. This exposes the intestines. Meanwhile the scapula has been severed from its muscular attachments and dragged off the top of the whale. The great fillets of dorsal muscle or back meat between the neural spines and the transverse processes, are stripped away with the winch as in steam whaling practice elsewhere. In the Azores the winches find more employment in stripping meat and disjoints the skeleton than in flensing the blubber. With the back meat removed, the thoracic cavity is exposed by removal of the ribs, after disarticulation at the thoracic vertebrae with thrusts of the spade. The ribs are dragged out in pairs on a strop from the winch. This completes the work on one side. The carcass is turned over with wires through fairleads left and right to large wooden toggles on the paired blubber merlons of either side, with one wire above the carcass and one below. Working up can now proceed more quickly, for the carcass is much reduced in height and splayed across the platform. The blubber of the former underside now lies on top and is cut out in the usual 2-ft. squares. The flipper goes with the blubber. The belly meat and back meat are stripped away, the scapula removed, and the second side of ribs cut out piecemeal like the first. All that remain are the intact vertebral column, stripped to the bone, and the mass of thoracic and abdominal viscera. With a wire round a fairlead the visceral mass is dragged and slithered down the slipway, whence a motor tow-boat will eventually remove it to the open sea. Neither the liver nor other parts of the viscera were processed at Porto Pim in 1949. The vertebral column is completely reduced by the freeing of each vertebra in turn with the spade.

Work on the head is the one part of the factory operations reserved for the whaleboatmen who come from their boat stations especially for this duty. The custom must derive from the whalship days when bailing the case and cutting junk were jobs for the boatsteerers. The mass of tissue in the head makes dissection an arduous task: a whale measuring 55 ft. (16.8 m.) has a head about 20 ft. long and nearly 9 ft. high. With the head lying on its side the blubber and tissues between the rami of the lower jaw are first removed: these tissues include the tongue and hyoid apparatus. Next the mandibular muscles

are severed, and the lower jaw is dragged to one side (Plate XVII). At this stage the head blubber is removed, either in square pieces if the whale is small, or in strips flensed with the head-winch. The spermaceti organ is dissected by first opening the case and scooping and draining the spermaceti into tubs. The case is then chopped out piecemeal, followed by the blocks of junk, very much as the head of a stranded whale is cut in. The skull only remains, and this is trimmed of any adhering tissue and dragged to the far corner of the platform to be sawn into pieces.

All sawing is done with two-man forester's saws, for there are no steam bone-saws at the Azores modern stations. The ribs as well as the skulls are sawn up, and there are heavy bone-axes to chop neural spines and transverse processes from the larger vertebrae to get them small enough for the cookers. A last job, which has to wait for some slack period after the platform has been mainly cleared, is to remove the teeth from the lower jaw. An accumulation of lower jaws may in fact be left for days or weeks so as to rot the integuments and tooth attachments and make stripping easier. 'Stripping ivory' is done in the traditional manner, well shown in a sketch made about 1850 and reproduced in Haley (1950, posthumous, p. 199). The tooth row on each side is dragged away complete, adhering to a strip of gum as the teeth are helped in turn from their sockets with a heavy spade. Modern Norwegian practice is similar. The teeth are preserved for scrimshaw (p. 347), together with some sections of the mandibular rami, called 'pan-bone'. The anterior symphyseal part of the lower jaw normally goes with the rest of the bone to the cookers.

Work on the platform and in the cooking factory may be continued if necessary by lamplight into the early hours, but the men get very tired, for there are no night shifts or reliefs.

The sequence of operations described is followed rigorously on the platform at Porto Pim. Indeed, the routine nature of the work is one of the few things this and the Norwegian practice have in common. In Norwegian whaling the animal, still with its head unsevered, is flensed by removal of the entire blubber blanket in three strips: the first two strips are simultaneously dragged off with flensing winches left and right, and the whale is then 'canted' by hauling on crossed wires, one secured to the lower jaw and one to the upper flipper, so as to get at the third strip which has been underneath the whale. Overturning the carcass in the Azores is done late in the work and upon what is only the median half of a truncated animal. The Norwegian practice of butchering or 'lemming' a flensed whale is first to remove the head, and then open the body cavity in a single operation by severing the attachments of the ribs and dragging away a whole side of breast by tension at the shoulder: this is in marked contrast to the Azores piecemeal method. In dissecting the head the Norwegian practice again avoids piecemeal methods by detaching the whole 'trusk' or spermaceti organ (case and junk together) as one mass of tissue. The Azores platform men are no less skilful than their counterparts overseas, but the methods employed, and the modest power and variety of the available machinery, make whaling operations at an Azores modern station slower than at a skilled station elsewhere. On a good day in the Azores I have known a platform occupy nine hours in dismembering three whales measuring 52, 42 and 41 ft., and still leave two heads half dissected. A good crew using Norwegian methods can clear a 50-ft. Sperm whale from a factory ship deck within three-quarters of an hour and from a shore station within one hour.

The factory at Porto Pim employs a battery of vertical pressure cookers much like those at any other steam whaling station. The steam is supplied from a boiler fired with brushwood. The wall of the cooking plant limits the rear of the flensing platform, and there is a door near the top of the wall, admitting to an elevated gallery where the cookers can be filled. The pieces of blubber and sawn blocks of bone, suspended on hooks or strops, are hoisted to the door with a steam-operated whip: there are no elaborate bucket-hoists or ramps for this purpose. Cookers for blubber and bone are similar to each other, except that a series of iron grids or spacers are fitted when charging with blubber, so as to

facilitate extraction. The cooked bone is dried and ground into bonemeal. Oil from the blubber and bone is settled and separated by gravity, and then stored in tanks and drums. There were no centrifugal machines for separating oil in the Azores in 1949, and I understand that a good deal of the gravity-separated oil from the modern stations, and of the poorer, darker oil from the try-works stations, is sent to Saccavan on the mainland for refining.

At Porto Pim the meat is not extracted, being dried and converted into meat meal without pre-cooking. No mechanical hoppers are used: the meat is cut for the driers by a small gang with butchers' knives, working at trestles just apart from the platform. After the great fillets have been divided into manageable hunks, these are brought to the trestles and cut into small strips and again into $2\frac{1}{2}$ -in. cubes ready for the meat meal plant.

Sperm whale meat is edible, and I have found it as tender and as well-flavoured as properly prepared meat from Whalebone whales, but when fresh it is very dark, the colour of burgundy in reflected light, and many people find this dark colour repugnant. Aboard the old whaleships it was frequently enjoyed pot-roasted or made into pies and meat-balls, but I learn from enquiry that nowadays people seldom eat it in the Azores. It is only in Japan that the meat of this whale is generally eaten.

The modern station in Flores is situated above a small cove rather less than a mile north of Santa Cruz. The station is built upon a cliff, and, although its flensing platform and cooking plant are similar to those at Porto Pim, there is a remarkable feature in the great length (in recollection at least 100 yards, and possibly much longer) of the stone slipway up whose steep incline the whales are drawn between walls of masonry to the level courtyard of the platform (Plate XVI, Fig. 4).

The factory at Cais do Pico is notable for its fine, wide concrete flensing platform sloping smoothly to a brief slipway running out from the shore between two stone piers. At this station there is a steam capstan besides the whaling-winch and head-winch. The cooking plant has four autoclaves for blubber flanked by two larger ones for bone. There are four storage tanks for oil. At Cais do Pico in 1949 the meat was not used, being dumped at sea with the viscera, but the company had plans for installing a meat meal plant. In 1951 the separation of spermaceti and the extraction of liver-oil was begun.

The station at São Vincent, San Miguel, is the oldest of the modern stations, for it has been operating since 1934. Like the last station, it is built close to the beach with only a short slipway. Instead of a blubber-hoist there rises from the platform a broad wooden staircase, with two flights of stairs, giving access to the tops of the autoclaves within the cooking plant. A procession of men and boys, two by two, clamber up the stairs shouldering poles which suspend the blubber pieces and tubs of bone. The plant has oil-fired boilers to supply its eight pressure cookers. The head oil is kept separate, and there is a manually-operated screw press to squeeze out sperm oil from the solidified spermaceti. Meat at this factory is usually extracted in the cookers before it is dried to make meat meal. The cooked meat is stuffed into jute bags and subjected to a simple screw press, and afterwards removed from the bags, minced, and conveyed to the drying plant. There is also apparatus at São Vincent for making blood meal. The blubber staircase and the two manual presses are shown in Plate XVII. The station is served by whaleboats sailing from Capellas nearby, and from Ponta Delgada on the south coast.

Ambergris, scrimshaw, sperm leather and tendons

Besides meat meal and bone meal produced only at modern stations, there are minor by-products which are interesting in themselves although they receive varying attention from the different Azores whaleries and are of scarcely any importance to the economic condition of the industry at the present time.

The search in the Azores for ambergris, a concretion arising in the hind gut of Sperm whales, is as ancient as the recorded history of whaling on the Western Islands ground, for Chaves (1924*a*) says that the State correspondence of 1768 (p. 287) mentioned ambergris. Today, as in past centuries, it is the custom when cutting in or working up a whale to make a routine search for the substance with a few thrusts of the spade into the mass of guts. Usually the search is confined to male whales since most Azores whalemén hold to the belief, for long a tradition in Sperm whaling, that ambergris does not occur in females. Ambergris retains today a market in perfumery, and, although the market fluctuates a good deal, it is still possible for specimens of the right smell, colour and consistency to fetch very high prices. The *Estatística das Pescas* publishes the value of pieces found in the Azores: the figures naturally vary a good deal, and the authorities would probably not claim that they are more than approximate, but during the 1940's the published value of a kilogram of ambergris was around 1,000 escudos, that is, about £10 at the rate of exchange then prevailing, and this is a possible figure for ambergris of good quality. It is a comparatively rare find, although Chaves (1924*a*) was sufficiently convinced of the possible importance of ambergris to the Azores whale fishery that he suggested that the normal faeces of Sperm whales should be analysed for the presence of ambreine, the characteristic constituent of ambergris.

According to the figures in the *Estatística das Pescas*, a total of 1208.58 kg. of ambergris have been found in the Azores between 1896 and 1949. When discovered the ambergris is in pieces ranging from small 'rognons' of two or three ounces to very rare instances of huge masses weighing several hundred pounds. A mass found at San Miguel in 1944 is among the largest on record anywhere in the world. According to Figueiredo (1946, p. 176) it weighed 322 kg.: the *Estatística das Pescas* gives 422 kg. but this is a total annual figure and could include 100 kg. from another whale or whales. In 1949 I was present at two finds of ambergris, one of 19 kg. at São Vincent, San Miguel, on 27 June, and a much smaller one at Porto Pim, Fayal, on 12 July when a 'parcel' of these rognons, weighing 2, 3 and 4 oz., were recovered from one whale. The quality of a find is just as variable as its weight, and these finds were soft, black specimens of poor quality, although they may improve by ageing after removal from the whale.

The art of working teeth and pan-bone into decorative and useful articles is preserved in the Azores, particularly in Pico where scrimshaw is something of a cottage industry in the whaling settlements. An art now perhaps 200 years old, scrimshaw arose from the circumstances of the American whaler's life, and the word means in its widest definition the handcraft employing Sperm teeth or 'ivory', pan-bone and Right whalebone, metal and South Sea warwood and coco-nut shells, beaten silver coins and turtleshell and mother-of-pearl, and in fact any material incidental to the whaling voyage which could be worked with jack-knife or file or turned on a simple lathe, to while away spells of tedium during the years of cruising. Mostly, however, the whaler worked with sperm ivory and bone and whalebone, finding these at once unusual and of satisfactory texture: scrimshaw indeed is limited to these materials in the earliest published mention of 'schrimshawing' by Olmsted in 1841 (p. 149), and in the slightly later references to 'mux and skimshander' by Cheever (1851,* p. 136) and to 'skrimshander' by Melville (1851, p. 282). In its proper sense as the spare-time occupation of a whaling voyage, scrimshaw survives and flourishes today in the carved and turned Sperm whale teeth made on Antarctic expeditions by modern whalemén, but the work of the shore whalemén of the Azores better deserves the name, for they got their art direct from the Americans who started it.

The teeth require no preparation beyond boiling to remove bits of adhering tissue, but the pan-bone is chained for at least a year in some shallow part of the sea-bed where the bottom fauna scours it, and

* The second edition (1851) of Cheever's book has been consulted in preparing this report. The first edition (1850) also mentioned 'skimshander'.

the water washes out the oil saturating the bone. The use of scrimshaw in Azores whaleboats has already been mentioned (p. 311). The decorative articles are rather more sophisticated and show more use of the lathe than those made in whaleships. The teeth provide cigarette-holders and pipes, perfume jars, egg-cups, and cups with stems like liqueur glasses, darning-mushrooms, paper-knives and chess sets, seals, signet rings and crucifixes. The chess sets are particularly fine. Articles made from pan-bone include rosary boxes and trinket boxes, walking-sticks, and decorative panels for mandolines. There is a photograph showing a selection of Pico scrimshaw in Figueiredo (1946, p. 188). The amount of finished scrimshaw work is very modest, and is sold across to Fayal where it is mostly bought by visitors on the fortnightly steamer.

The most characteristic scrimshaw articles of the old whaleship days were neither carved nor turned, but were simply engravings or graphics (the best being of high artistic accomplishment) done on polished sperm teeth and depicting a variety of scenes, usually violent moments in the whale hunt or sentimental subjects of home and affection. I have seen none of these graphics in the Azores, but I found recently in London a scrimshaw tooth, shown in Plate XVIII, which seems to be a direct link with the days when Portuguese islanders sailed in the American ships and learned their present trade of Sperm whaling. As scrimshaw the tooth is undistinguished, the subject being conventional and the execution crude. Above a whaling bark flying the American flag, there is a dove of peace (a common motif in scrimshaw) clutching in its beak a streamer bearing the name *Manuel Ballros*. *Manuel* may be Portuguese, but it is the surname which is arresting, because so unlikely. The suggestion is that this tooth was engraved at sea during the last century by an illiterate Portuguese whalerman, either Azorean or Cape Verde, who was assisted by his messmates to inscribe, with indifferent success, their phonetic rendering of his spoken *Manuel (dos) Baleiros*, 'Manuel of the Whalermen'.

Sometimes the unworked bones of Sperm whales are put to homely and everyday uses. Figueiredo (1946, p. 190) shows sections of jaw-bone used as gate-posts to a field of maize. I have seen door lintels of sperm bone, and also comfortable stools made from upturned vertebrae furnished with wooden legs and back-rest.

On the island of Pico, but not elsewhere, the skin of the Sperm whale is made into leather. In other parts of the world the tough skin of the penis of the great Whalebone whales is sometimes saved because it can be tanned to a handsome leather; and there is a regular industry for making leather from the skins of the Beluga or White whale (Vladykov, 1944, p. 149) since the skin of this dolphin is well supplied with longitudinal fibres and, in fact, makes the strongest shoe laces obtainable. But leather-making from the skin of the ordinary body surface of a great whale seems to be practised nowhere except in Pico and possibly in Japan, where they tan a certain amount of whale skin from some unspecified part of the body. In Pico the craft is apparently indigenous and not a relic of American whaling, for I have seen no mention of the tanning of whale's skin in the old narratives. Sperm whale blackskin when fresh is soft and friable, and to the ordinary eye appears quite unsuitable for leather-making, yet I find the finished material to be a brown, tough and durable leather, resembling unworked shoe-leather from cows' hide, although perhaps a little less pliant.

Senhor Joaquim José Machado of Lagens do Pico has kindly described how the sperm leather is made. The skin is mostly selected from the head because here it can be stripped with the least attachment of underlying blubber. The strips of blackskin are first steeped in a tub of lime which loosens the adhering blubber and makes removing it easy. Tanning is the next stage, the skin being placed in an infusion of bark from the *faya*, a beech-like shrub, *Myrica faya*, which gave Fayal its name and which is also common in Pico on the foothills and near the coast. After tanning, the skin is pressed through rollers to remove moisture, and then placed in the sun to dry. The leather so produced is about 6 mm. thick, which means that the skin does not diminish in thickness during the conversion into leather.

Pico seems never to have exported any of its sperm leather, and very little of it is made today, perhaps because the whalers are not so poor as they were. But sperm leather was formerly widely used for making the soles of shoes, and for the rough sandals worn by Pico men. (The surfaces of Pico are so severe that it is the custom to go shod, whilst peasants and whalers in other islands go barefooted.) Senhor Machado says that a sperm leather sole lasts for six months, which is very good wear on Pico lava and cinders. Complete shoes can be made by using uppers tanned from the skin of large foetal whales. In former years the skin of the adult penis made uppers for durable leather sea-boots.

The extraordinary strength and flexibility of tendons and connective tissue fibres from the Sperm whale make their use widespread in the Azores. At those modern stations which have a meat meal plant, the tendons have anyway to be pulled from the giant fillets of meat, otherwise they would clog the machinery. They are not discarded, but are saved and used for lashing the yokes of the ox-carts which are still the customary transport of the archipelago. The thick, round tendons from the tail are made into whips. Below the blubber there are layers of parallel connective tissue fibres which are best developed in the head, where they enclose the spermaceti organ as beautiful, glistening sheets, closely composed of flat ribbon-like fibres, each several yards long and less than $\frac{1}{2}$ in. wide. These fibres also are used for lashing yokes, but more especially for lacing and joining machine belting.

The whalers

The life of the Azores shore whalers has changed little since the days when their forbears shipped with Yankee masters for the deep-sea voyage. Their dress has not changed at all. This is J. Ross Browne's description of his Azores shipmates on a whaling voyage (1846, p. 33);

The Portuguese wore sennet hats with sugar-loaf crowns, striped bed-ticking pantaloons patched with duck, blue shirts, and knives and belt. They were all barefooted. . . .

Today most whaleboatmen still wear the wide-brimmed straw sombrero and the trousers of striped bed-ticking, the latter with neat and extensive patching which is itself a reminder of the old whaling life when old clothes had to be kept together during a prolonged voyage, and men became experts at 'a patch over a patch, and a patch over all'. In the boats and on the flensing platform the whalers still go barefoot.

At some at least of the whaling settlements, as at Californian settlements in the last century, the whaleboatmen receive no wages but are paid on the 'lay' system, which is a direct survival from the whalership days when each officer and man, according to his station, received an agreed share or lay of the net profits of the voyage. At an Azores whaler's the owners may take half the profits, and the other half be divided amongst the whaleboatmen at an annual pay-off, so that the boatheaders, harpooners and tow-boat enginemen get two shares each for every share of the ordinary boatman. The shore-side staff at modern stations, that is, the platform and factory workmen, seem to receive fixed salaries and a bonus on the oil: I believe there are some whaler's where the whaleboatmen also are paid like this, instead of receiving a lay. Even the 'slop-chest' system of issuing clothing and other goods, by debits to the pay-off, is preserved in the Azores, for at Porto Pim (and probably elsewhere) the whalers go to one shop, the *casa dos baleiros*, where they have a year's credit for food, clothing, wine and oil.

Most of the whalers and their families till a patch of land for maize or vines, keep a cow or goat and some chickens, and do a little fishing when they can, to help out their earnings from the whale fishery.

The whalers are devout Catholics, and every Azores whaleboat sails with one or two sacred pictures in frames secured under the cuddy-board or under the box. In Fayal, on the first Sunday in

August, there is held each year the whalers' own festival, the *Festa dos baleiros*, when the whaleboats are blessed (Plate XVIII). On this day the boats from Capelo and Salão come down in strength to Porto Pim, where they are beached in line upon the sandy shore to the isthmus which leads to Monte da Guia. The crews wear their best clothes of black serge, and each boat is dressed with flags; the linc-tubs are uncovered and the line taken to the loggerhead, and the first and second irons and a lance are set ready at the prow. The dedicatory service takes place on the high top of Monte da Guia, in the little church whose vestry is a whale look-out. For the rest of the year no other service is celebrated there. After the service, the image of the Virgin and Child is borne from the church down the long winding road to the isthmus. The whalers of the Porto Pim factory have earlier strewn flowers and set up arches of green boughs to make the road into a processional way, and there are a brass band and rockets and fire crackers. Arrived at the beach, the priest visits each boat in turn. The bearers rest the image athwartships, forward of the loggerhead, and looking out to sea. From the after-tub the harpooner takes a bight of line and doubles it, to make a length which he passes round the saint and loosely ties, whilst the line remains snubbed at the loggerhead. When the blessing is over, the image is carried to the next boat. In this symbolic way the Sperm whalers make once a year a holy capture and ask a blessing on themselves, that they may catch whales yet be protected from the hazards of the chase.

WHALING IN MADEIRA

Madeira lies some 500 miles south-east of the Eastern Azores and at about two-thirds of the distance between that group and the Canary Islands (Fig. 1). In the days of the whaleships a certain amount of Sperm whaling was carried on in summer around Madeira and was mostly to the north of the island, according to the charts of whaleship catches published by Townsend (1935). But I have heard of no shore whaling business there until 1941 when the increased demand for sperm oil and the restriction of southern whaling combined to bring the Azores industry a new prosperity and gave the incentive for extending the open boat venture to Madeira. One might suppose that any shore whaling anywhere starting anew in modern times would inevitably employ steam whaling methods. But Madeira could replicate the Azores in the coast-frequenting Sperm whales, in the high cliffs suitable for look-outs, and in her island stock of hardy fisherman and boatmen. Here was everything needful to an open boat industry, which, in time of warfare and scarcity, could dispense with the special personnel of modern whaling and could be started economically at a fraction of the capital outlay required for steam whale-catchers and factory plant.

In Madeira as in the Azores the whaleboats take only Sperm whales. Table 9 gives the statistics of the industry for 1941 to 1949. The catch of whales per whaleboat is substantially more than the catch per whaleboat calculated from Table 10 for the same period, around most islands in the Azores, but this may be because weather conditions are better at Madeira rather than because whales are more plentiful there.

Whaling in the island is virtually a replica of the parent methods employed in the Azores, and I imagine that in 1941 Azores whalers were sent to train the Madeirans in their adventurous trade. Prior to this time the Madcirans themselves had a meagre whaling tradition, for they seem not to be mentioned in the old voyages, and there is only a single record by Clark (1887, p. 56) noting that the Azorean whaling settlement of Cojo Viejo, California, included two or three Madeirans.

I have not myself visited Madeira and I am mostly indebted for the following brief notes to Figueiredo's monograph (1946, pp. 89 and 141 ff.) and to Senhor Tomas Alberto de Azevedo of Fayal who undertook a whaling mission to Madeira a few years ago. There may be recent changes of which I am not aware.

In 1946 there were three look-outs stationed on the cliffs, at Garajau and Ponta do Sol on the south coast, respectively east and west of Funchal, and at Ponta do Pargo at the western extremity. Radio telephone communication between look-outs and motor-launches was introduced in San Miguel and in Madeira at about the same time. There are three whaleboat stations, at Funchal and Câmara de Lobos in the south and at São Vicente in the north. They employed in all four motor-launches in 1948 and (according to the *Estatística das Pescas*) twelve whaleboats. Whales are cut in at Porto Moniz in the north-west and at Garajau in the south. At Porto Moniz a try-works is still used to extract the oil, but at Garajau (where there is a flensing platform) the method of extraction represents the stage

Table 9. *Statistics of open boat whaling for Sperm whales in Madeira from 1941 to 1949*

Year	Catch of Sperm whales	No. of whaleboats	Whales per whaleboat
1941	76	4	19.0
1942	23	7	3.3
1943	133	13	10.2
1944	75	13	5.8
1945	91	14	6.5
1946	166	14	11.9
1947	109	13	8.4
1948	162	12	13.5
1949	135	12	11.3
1941-49	970	102	9.5

reached by modern overseas whaling between 1904 and 1925. As much as possible of the animal is saved. There is a pressure-cooker which deals with entrails, meat, and bone: but the blubber and head matter are cooked in open vessels with boiling water. This method of 'open cooking' of blubber with water yields the finest sperm or whale oil obtainable, with the lowest fatty acid content. Such oil is superior in quality to that from tried out (melted) blubber or from 'apparatus cooked' blubber, although open cooking was superseded in the modern industry about 1925 when pelagic whaling from floating factories began and the various modifications of pressure-cooking, called apparatus cooking, were generally adopted. (Heyerdahl, 1938, p. 346.)

Twenty-six miles north-east of Madeira lies the island of Porto Santo where three whaleboats and a motor-launch have been maintained for several years. Porto Santo, however, has only once appeared in the figures of the *Estatística das Pescas*, in 1945, but no catch was recorded. Senhor Tomas Alberto de Azevedo told me in 1949 that not a single whale had ever been taken from that island.

SUMMARY

1. Open boat whaling for Sperm whales, conducted with nineteenth-century gear and methods, still survives in the Azores and Madeira. This report describes the history and existing practice of the industry in the Azores, and adds a note on Madeira. The writer visited the Azores in 1949, took part in the whale hunting, and examined sixteen of the twenty-one whaling stations.

2. The *historical section* describes first the course of pelagic whaling, mostly American, on the Azores or Western Islands ground between 1765 and 1921, and then the development of the island shore whaling industry which arose from the experience of the Azoreans in American whalships.

In the nineteenth century both southseamen and short-cruising plumpuddingers whaled round the Azores and called there (chiefly at Horta, Fayal) for recruits and provisions. The islanders, skilled from childhood in boatwork, made excellent whalers. For a long period after 1780 Portugal employed some of these skilled nationals in unsuccessful efforts to establish a pelagic whale fishery.

Azoreans were also employed in various shore stations overseas. Afloat and ashore the islanders were ubiquitous in the nineteenth-century whaling scene.

Organized shore whaling in the Azores probably began in Fayal in 1832, but it was not successfully established until the 1850's. Thereafter it spread to the other islands. By the 1920's motor tow-boats were in general use for towing whaleboats and captured whales. At this time a guild of whaling owners was formed, the Grémio dos Armadores da Pesca da Baleia. In 1934 the first steam-powered factory was opened in San Miguel for processing whales, and after the Second World War three further modern stations were built in Fayal, Pico and Flores. These utilize blubber, meat and bone, but at all the other Azores stations only the blubber is saved. It is still removed by 'cutting in', and the oil extracted by 'trying out', using implements and installations of the old New England design, and scarcely changed from seventeenth-century whaling. The latest technical adjunct in the Azores is radio-telephone communication between cliff look-outs and motor tow-boats.

3. The *technical section* notes the uniqueness of the present survival of open boat whaling in the Azores and Madeira; and then describes exhaustively the boats, gear and methods of the survival, compares them throughout with those of American nineteenth-century whaling, and attempts to explain the very few differences.

The present whaleboats are seven-man boats and are longer than the American boats which carried six men. Boat furnishings and gear have not changed; and nor has the technique of hunting except that in the Azores the harpioneer both fastens and lances the whale, and does not change places with the boatheader for lancing.

At try-works stations the whale is cut in either stranded on the beach or floating alongside a jetty. The method of cutting in alongside is the old whaleship practice brought ashore. Trying out, and the various try-works stations, are described.

The report describes working up at Azores modern stations because this has evolved independently of Norwegian practice and shows interesting differences.

Minor products of the Sperm whale are discussed. The intestines are always searched for ambergris which is occasionally found. Scrimshaw, learned from the whaleship days, is practised as a cottage industry. In Pico the blackskin of the whale is sometimes tanned into durable shoe-leather. Tendons and connective tissue fibres are widely used for whips or lashings.

The life of the Azores whalers has scarcely changed in 100 years. The whalers are devout Catholics and once a year there is a *festa dos baleiros* when the whaleboats are blessed.

4. In *Madeira* Sperm whaling did not start until 1941. It is the same whaling as in the Azores whence it presumably came. There were in 1946 three whaleboat stations and two factories, one a try-works station and one a steam-powered plant.

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APPENDIX

Table 10. *Statistics of open boat whaling for Sperm whales in the Azores from 1896 to 1949*

Year	Catch of Sperm whales									
	Santa Maria	San Miguel	Terceira	San Jorge	Graciosa	Fayal	Pico	Flores	Corvo	AZORES
1896	3	6	6	...	2	5	13	2	...	37
1897	1	8	2	...	4	9	28	2	...	54
1898	3	13	4	4	6	2	20	2	...	54
1899	5	13	2	9	5	8	36	1	...	79
1900	3	25	3	1	1	1	46	2	1	83
1901	3	9	2	5	1	1	27	1	...	49
1902	2	32	1	...	3	...	60	4	...	102
1903	3	34	4	8	4	...	46	...	...	99
1904	3	16	2	9	6	...	54	1	...	91
1905	...	9	6	5	4	2	7	...	...	33
1906	...	8	2	4	5	1	97	...	...	117
1907	...	40	2	7	6	3	66	...	...	124
1908	...	24	5	...	6	15	85	1	...	136
1909	...	23	9	6	2	4	44	...	...	88
1910	...	11	...	13	5	13	68	2	...	112
1911	...	12	2	12	5	15	74	...	...	120
1912	...	10	...	13	4	9	36	...	...	72
1913	...	10	3	14	11	5	25	...	...	68
1914	...	...	1	4	7	3	20	...	...	35
1915	...	7	...	1	2	1	22	...	...	33
1916	...	9	...	10	9	3	40	...	...	71
1917	...	19	1	12	9	25	62	...	...	128
1918	...	8	2	29	2	24	117	1	...	183
1919	...	16	...	33	5	18	58	2	...	132
1920	...	5	...	11	6	17	85	...	...	124
1921	...	...	3	7	1	9	57	1	...	78
1922	...	11	...	...	...	43	64	3	...	121
1923	...	17	8	25	...	36	89	2	...	177
1924	...	11	...	...	...	18	41	1	...	71
1925	...	20	...	20	4	39	64	4	...	151
1926	...	7	...	32	...	15	137	8	...	199
1927	...	3	...	29	7	32	88	7	...	166
1928	...	19	...	26	2	15	115	8	...	185
1929	...	37	...	33	5	17	111	9	...	212
1930	...	12	...	34	2	1	36	14	...	99
1931	...	...	...	10	6	...	60	4	...	80
1932	...	8	...	32	8	2	115	14	...	179
1933	...	64	...	24	15	10	145	8	...	266
1934	...	54	...	33	2	4	132	9	...	234
1935	...	58	...	21	10	...	272	18	...	379
1936	...	85	...	22	1	6	260	13	...	387
1937	5	102	...	29	...	10	224	47	...	417
1938	22	66	...	20	...	39	270	...	...	417
1939	37	107	...	35	7	41	118	55	...	400
1940	22	65	3	52	3	102	260	45	...	552
1941	29	39	23	?	4	?	239	?	...	(334)
1942	23	61	38	31	3	50	287	32	...	525
1943	18	89	36	60	6	107	297	50	...	663
1944	36	152	12	45	5	50	217	74	...	591
1945	35	102	20	26	9	68	155	28	...	443
1946	35	117	54	43	17	79	193	54	...	592
1947	29	146	25	19	9	115	144	78	...	565
1948	30	121	32	48	37	97	251	82	...	698
1949	57	87	26	26	25	86	120	57	...	484
1896-1949	404	2027	339	992	308	1275	5797	746	1	11,889

In the calculation of the average value, for each year and for each island, of the ratio 'whales per whaleboat' I have disregarded instances where numbers of whaleboats are recorded but nil catch of whales, or vice-versa (as whaleboats for Corvo 1896 to 1904, or whales in 1938).

APPENDIX

Table 10. *Statistics of open boat whaling for Sperm whales in the Azores from 1896 to 1949*

Year	No. of whaleboats									
	Santa Maria	San Miguel	Terceira	San Jorge	Graciosa	Fayal	Pico	Flores	Corvo	AZORES
1896	2	4	6	4	4	16	5	13	9	63
1897	2	2	4	4	4	13	34	13	9	85
1898	2	4	4	3	4	6	34	13	9	79
1899	2	4	4	11	5	14	44	3	...	87
1900	2	8	4	2	4	2	47	16	8	93
1901	2	8	4	3	3	3	50	3	9	85
1902	2	8	2	4	4	16	46	17	11	110
1903	2	9	4	4	4	3	46	17	8	97
1904	2	4	5	8	6	...	34	12	6	77
1905	...	4	3	10	6	14	14	...	...	51
1906	...	4	5	8	6	2	26	...	...	51
1907	...	4	4	8	6	5	45	...	...	72
1908	...	4	4	...	8	7	40	6	...	69
1909	...	4	4	4	3	10	40	...	...	65
1910	...	2	...	6	4	8	45	6	...	71
1911	...	2	4	6	3	12	52	...	...	79
1912	...	3	...	8	3	14	53	...	...	81
1913	...	4	4	7	4	5	32	...	...	56
1914	...	...	2	4	4	11	21	...	...	42
1915	...	3	...	4	3	4	43	...	...	57
1916	...	3	...	4	3	4	42	...	...	56
1917	...	3	2	8	3	5	45	...	...	66
1918	...	3	2	6	3	8	50	3	...	75
1919	...	6	...	8	3	7	44	3	...	71
1920	...	4	...	7	3	11	47	...	...	72
1921	...	...	3	7	3	6	43	3	...	65
1922	...	4	...	...	...	9	43	3	...	59
1923	...	3	3	7	...	15	43	4	...	75
1924	...	3	...	...	...	14	42	3	...	62
1925	...	3	...	8	3	16	38	6	...	74
1926	...	3	...	6	...	10	33	6	...	58
1927	...	3	...	6	3	9	35	3	...	59
1928	...	3	...	6	3	4	32	3	...	51
1929	...	6	...	6	3	3	35	3	...	56
1930	...	4	...	6	3	2	38	6	...	59
1931	...	...	...	6	3	...	21	3	...	33
1932	...	4	...	5	3	2	28	6	...	48
1933	...	6	...	5	3	3	35	6	...	58
1934	...	6	...	4	3	3	34	7	...	57
1935	...	12	...	6	3	...	31	7	...	59
1936	...	12	...	7	3	2	31	7	...	62
1937	2	9	...	8	3	3	36	7	...	68
1938	?	?	?	?	?	?	?	?	?	?
1939	3	5	...	7	3	7	30	8	...	63
1940	3	8	2	7	3	9	35	10	...	77
1941	2	8	4	?	3	?	41	?	...	(58)
1942	2	10	6	10	3	11	41	9	...	92
1943	2	11	6	10	3	11	46	10	...	99
1944	3	12	6	10	3	10	44	9	...	97
1945	3	12	5	7	3	13	43	10	...	96
1946	3	13	5	7	6	10	42	17	...	103
1947	4	15	5	7	4	12	43	18	...	108
1948	4	17	5	7	11	12	51	18	...	125
1949	4	15	5	5	10	12	56	18	...	125
1896-1949	53	311	126	311	194	408	2049	335	69	3856

In the calculation of the average value, for each year and for each island, of the ratio 'whales per whaleboat' I have disregarded instances where numbers of whaleboats are recorded but nil catch of whales, or vice-versa (as whaleboats for Corvo 1896 to 1904, or whales in 1938).

APPENDIX

Table 10. *Statistics of open boat whaling for Sperm whales in the Azores from 1896 to 1949*

Year	Whales per whaleboat									
	Santa Maria	San Miguel	Terceira	San Jorge	Graciosa	Fayal	Pico	Flores	Corvo	AZORES
1896	1.5	1.5	1.0	...	0.5	0.3	2.6	0.2	—	0.7
1897	0.5	4.0	0.5	...	1.0	0.7	0.9	0.2	—	0.8
1898	1.5	3.3	1.0	1.3	1.5	0.3	0.6	0.2	—	0.8
1899	2.5	3.3	0.5	0.8	1.0	0.6	0.8	0.3	—	0.9
1900	1.5	3.1	0.7	0.5	0.3	0.5	1.0	0.1	0.1	0.9
1901	1.5	1.1	0.5	1.7	0.3	0.3	0.5	0.3	—	0.6
1902	1.0	4.0	0.5	...	0.8	...	1.3	0.2	—	1.3
1903	1.5	3.8	1.0	2.0	1.0	...	1.0	...	—	1.4
1904	1.5	4.0	0.4	1.1	1.0	...	1.6	0.1	—	1.4
1905	...	2.3	2.0	0.5	0.7	0.1	0.5	...	...	0.6
1906	...	2.0	0.4	0.5	0.8	0.5	3.2	...	...	2.3
1907	...	10.0	0.5	0.9	1.0	0.6	1.5	...	...	1.7
1908	...	6.0	1.3	...	0.8	2.1	2.1	0.2	...	2.0
1909	...	5.8	2.3	1.5	0.7	0.4	1.1	...	...	1.4
1910	...	5.5	...	2.2	1.3	1.6	1.5	0.3	...	1.6
1911	...	6.0	0.5	2.0	1.7	1.3	1.4	...	...	1.5
1912	...	3.3	...	1.6	1.3	0.6	0.7	...	...	0.9
1913	...	2.5	0.8	2.0	2.8	1.0	0.8	...	...	1.2
1914	...	...	0.5	1.0	1.8	0.3	1.0	...	...	0.8
1915	...	2.3	...	0.3	0.7	0.3	0.5	...	...	0.6
1916	...	3.0	...	2.3	3.0	0.8	1.0	...	...	1.3
1917	...	6.3	0.5	1.5	3.0	5.0	1.4	...	...	1.9
1918	...	2.7	1.0	4.8	0.7	3.0	2.3	0.3	...	2.4
1919	...	2.7	...	4.3	1.7	2.6	1.3	0.7	...	1.9
1920	...	1.3	...	1.6	2.0	1.6	1.8	...	...	1.7
1921	...	...	1.0	1.0	0.3	1.5	1.3	0.3	...	1.2
1922	...	2.8	...	...	...	4.8	1.5	1.0	...	2.1
1923	...	5.7	2.7	3.6	...	2.4	2.1	0.5	...	2.4
1924	...	3.7	...	...	...	1.3	1.0	0.3	...	1.1
1925	...	6.7	...	2.5	1.3	2.4	1.7	0.7	...	2.0
1926	...	2.3	...	5.3	...	1.5	4.1	1.3	...	3.4
1927	...	1.0	...	4.8	2.3	3.6	2.5	2.3	...	2.8
1928	...	6.3	...	4.3	0.7	3.8	3.6	2.7	...	3.6
1929	...	6.3	...	5.5	2.7	5.7	3.1	3.0	...	3.8
1930	...	3.0	...	5.7	0.7	0.5	0.9	2.3	...	1.7
1931	...	...	...	1.7	2.0	...	2.9	1.3	...	2.4
1932	...	2.0	...	6.4	2.7	1.0	4.1	2.3	...	3.7
1933	...	10.7	...	4.8	5.0	3.3	4.1	1.3	...	4.6
1934	...	9.0	...	8.3	0.7	1.3	3.8	1.3	...	4.1
1935	...	4.8	...	3.5	3.3	...	8.8	2.6	...	6.4
1936	...	7.1	...	3.1	0.3	3.0	8.4	1.9	...	6.2
1937	0.4	11.3	...	3.6	...	3.3	6.2	6.7	...	6.1
1938	...	...	...	...	...	...	...	...	...	...
1939	12.3	21.4	...	5.0	2.3	1.0	3.9	6.9	...	6.1
1940	7.3	8.1	1.3	7.3	1.0	11.3	7.4	4.5	...	7.2
1941	14.5	4.9	5.8	?	1.3	?	5.8	?	...	5.8
1942	11.5	6.1	6.3	3.1	1.0	4.5	7.0	3.5	...	5.7
1943	9.0	8.1	6.0	6.0	2.0	9.7	6.5	5.0	...	6.7
1944	12.0	12.7	2.0	4.5	1.7	5.0	4.9	8.2	...	6.1
1945	11.7	8.5	4.0	3.7	3.0	5.2	3.6	2.8	...	4.6
1946	11.7	9.0	10.8	6.1	2.8	7.9	4.6	3.2	...	5.7
1947	7.3	9.7	5.0	2.7	2.3	9.6	3.3	4.3	...	5.2
1948	7.5	7.1	6.4	6.9	3.4	8.1	4.9	4.6	...	5.6
1949	14.2	5.8	5.2	5.2	5.0	7.2	2.1	3.2	...	3.9
1896-1949	7.2	6.3	2.7	3.3	1.6	3.2	2.7	2.2	0.1	3.1

In the calculation of the average value, for each year and for each island, of the ratio 'whales per whaleboat' I have disregarded instances where numbers of whaleboats are recorded but nil catch of whales, or vice-versa (as whaleboats for Corvo 1896 to 1904, or whales in 1938).

PLATE XIII

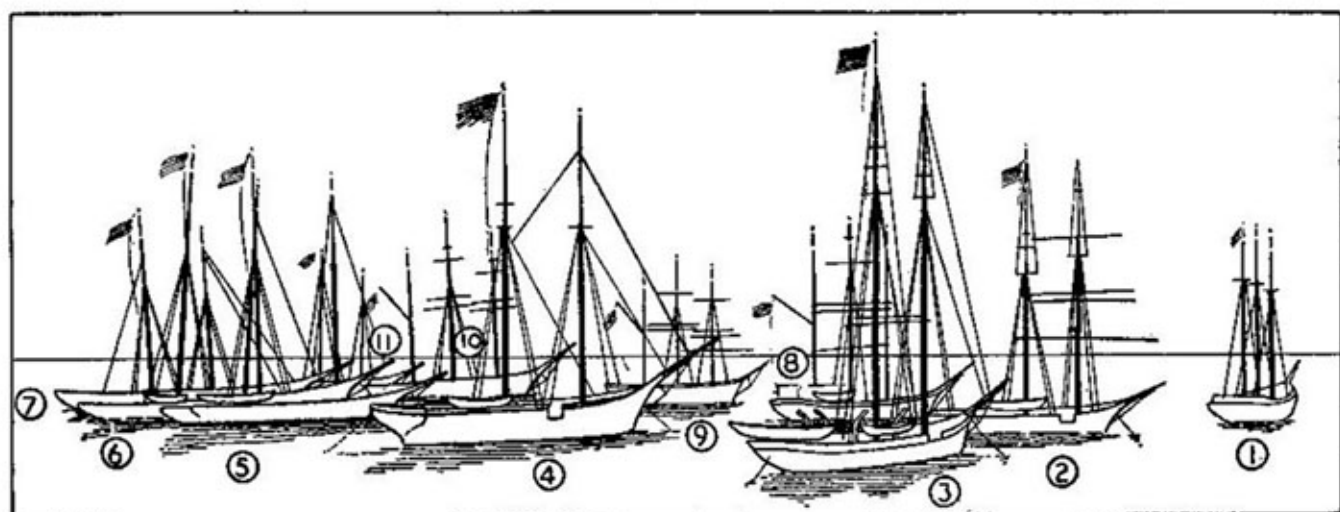


Fig. 1. Whaleships at Horta, Fayal, in September 1910. (Photo: Senhor Goulart, Horta.)

KEY TO OUTLINE SKETCH ABOVE

- | | | |
|-------------------------------|-------------------------|--------------------------|
| 1. <i>Richard W. Clark</i> | 5. <i>Pedro Varela</i> | 9. <i>Morning Star</i> |
| 2. <i>Viola</i> | 6. <i>Carleton Bell</i> | 10. <i>Wanderer</i> |
| 3. <i>Bertha D. Nickerson</i> | 7. <i>T. Towner</i> | 11. <i>John R. Manta</i> |
| 4. <i>Cameo</i> | 8. <i>Bertha</i> | |

These vessels appear in Table 2, pp. 290-1.

Fig. 2. Whaleboats on the launching slip at Salão, Fayal. 12 August 1949.



1



2

PLATE XIV

Fig. 1. Model of an Azores whaleboat made by a whaleboat builder of Pico in 1949.

Fig. 2. Plan view of the model whaleboat and its gear.

Above the boat

steering oar	lances with sheaths
pulling oars	harpoons with sheaths.

The boat

(some furnishings from stern to stern; see also Pl. XIII, fig. 2)

steering-oar brace			boat hatchet
after boat-knife	standing-cleats	mast-hinge	thigh-board <i>with</i>
loggerhead <i>and</i>			forward boat-knife
lion's tongue			chocks.

Below the boat

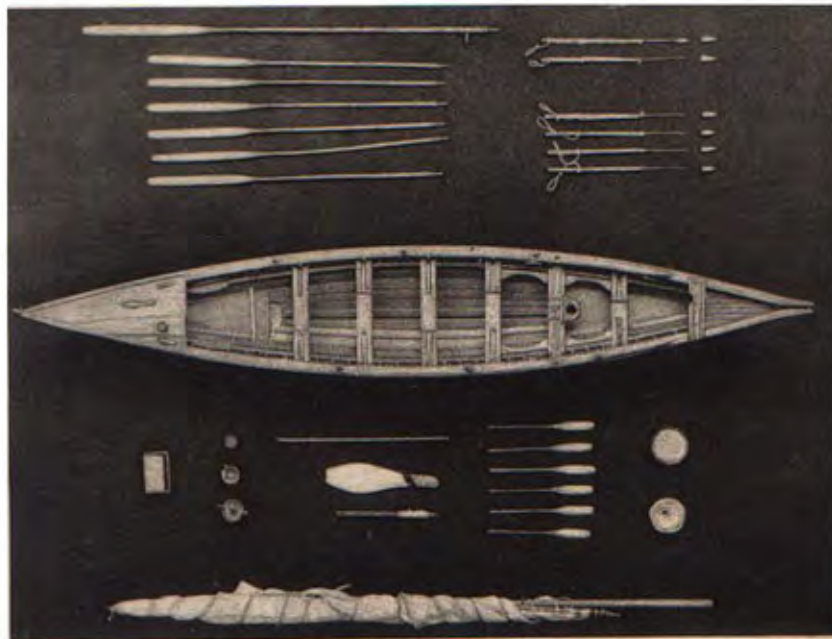
	piggin	tiller		
lantern box	boat-bucket	rudder	paddles	line-tubs
	boat-keg	waifs (3)		
	mast, mainsail boom, and sails.			

Fig. 3. Cliff look-out above Porto do Castelo, Santa Maria. 23 June 1949.

Fig. 4. Interior of the Porto do Castelo look-out.



1



2



3



4

PLATE XV

*Stills from the cine-film made off Capelo, Fayal, on
11 and 13 August 1949*

- Fig. 1. Whaleboat under oars preparing to chase.
- Fig. 2. Whaleboat under sail, chasing.
- Fig. 3. Chasing. A whale peaks his flukes and sounds.
- Fig. 4. Going on a whale. Photographed a moment before the harp-
pioneer put aside his paddle and stood up for the dart.
- Fig. 5. The dart. Fastening a 53-foot bull.
- Fig. 6. The flurry.



1



2



3



4



5



6

PLATE XVI

- Fig. 1. Try-works station of Porto do Castelo, Santa Maria, 23 June 1949. Whales are cut in on the beach at the head of the inlet between the reefs. The try-house can be seen built against the foot of the cliff.
- Fig. 2. Stranding slip with try-works at Lagens do Pico, 24 August 1949. Note the crab on the right with a stone blubber tank to the left of it.
- Fig. 3. Quay for cutting in alongside at San Mateus, Pico, 24 August 1949. Note the samson's-posts for cutting tackles.
- Fig. 4. The modern station on the cliff at Santa Cruz das Flores, 1 July 1949. Note the slipway between stone walls, and the level flensing platform above it.
- Fig. 5. Heaving up a 53-foot (16 m.) whale at the modern station at Porto Pim, Fayal, 12 July 1949. The head has hollow-lines in front of the eye (p. 329). Note also the cut-water or nib end in front of the anterior margin of the palate (p. 323).
- Fig. 6. The flensing platform at Porto Pim, 16 August 1949.



1



2



3



4



5



6

PLATE XVII

- Fig. 1. Working up at Porto Pim. Flensing the blubber piecemeal with cutting spade and hook. 14 August 1949.
- Fig. 2. Working up at Porto Pim. The two 'merlons' of blubber left for canting the whale (p. 344). Holes have not yet been mortised into the merlons. 16 August 1949.
- Fig. 3. Working up at Porto Pim. Disarticulating the lower jaw from the head. 16 August 1949.
- Fig. 4. The blubber staircase on the platform of the modern factory at São Vincent, San Miguel. 27 June 1949.
- Fig. 5. Manual press for removing sperm oil from spermaceti in the factory at São Vincent. The four blubber tubs contain spermaceti. 25 June 1949.
- Fig. 6. Manual press used in the manufacture of meat meal at São Vincent. 25 June 1949.



1



2



3



4



5



6

PLATE XVIII

- Fig. 1. Spare try-pot with whalecraft in the try-house at Porto do Castelo, Santa Maria. 23 June 1949. The whalecraft from left to right are: blubber fork; two scarfing spades; leaning spade; bone spade; leaning spade; boat spade and blubber pike. A boiler lies across the pot; an (unmounted) scrap dipper lies at the foot of the pot on the left.
- Fig. 2. Try-works at Lagens do Pico. 24 August 1949. Open try-works with two pots. Note the main cooler with second and third coolers behind it.
- Fig. 3. Corner of the try-house at Porto do Castelo, Santa Maria. 23 June 1949. Blubber tubs and mincing tubs beside a heap of scraps.
- Fig. 4. Scrimshaw tooth of the nineteenth century believed to have been engraved by a Portuguese whaleman (p. 348).
- Fig. 5. *Festa dos baleiros* at Porto Pim, Horta, Fayal, on Sunday, 7 August 1949. Blessing a whaleboat: the whaleline is knotted round the Saint.
- Fig. 6. *Festa dos baleiros*. Beflagged whaleboats each dressed with harpoons and lance.



1



2



3



4



5



6

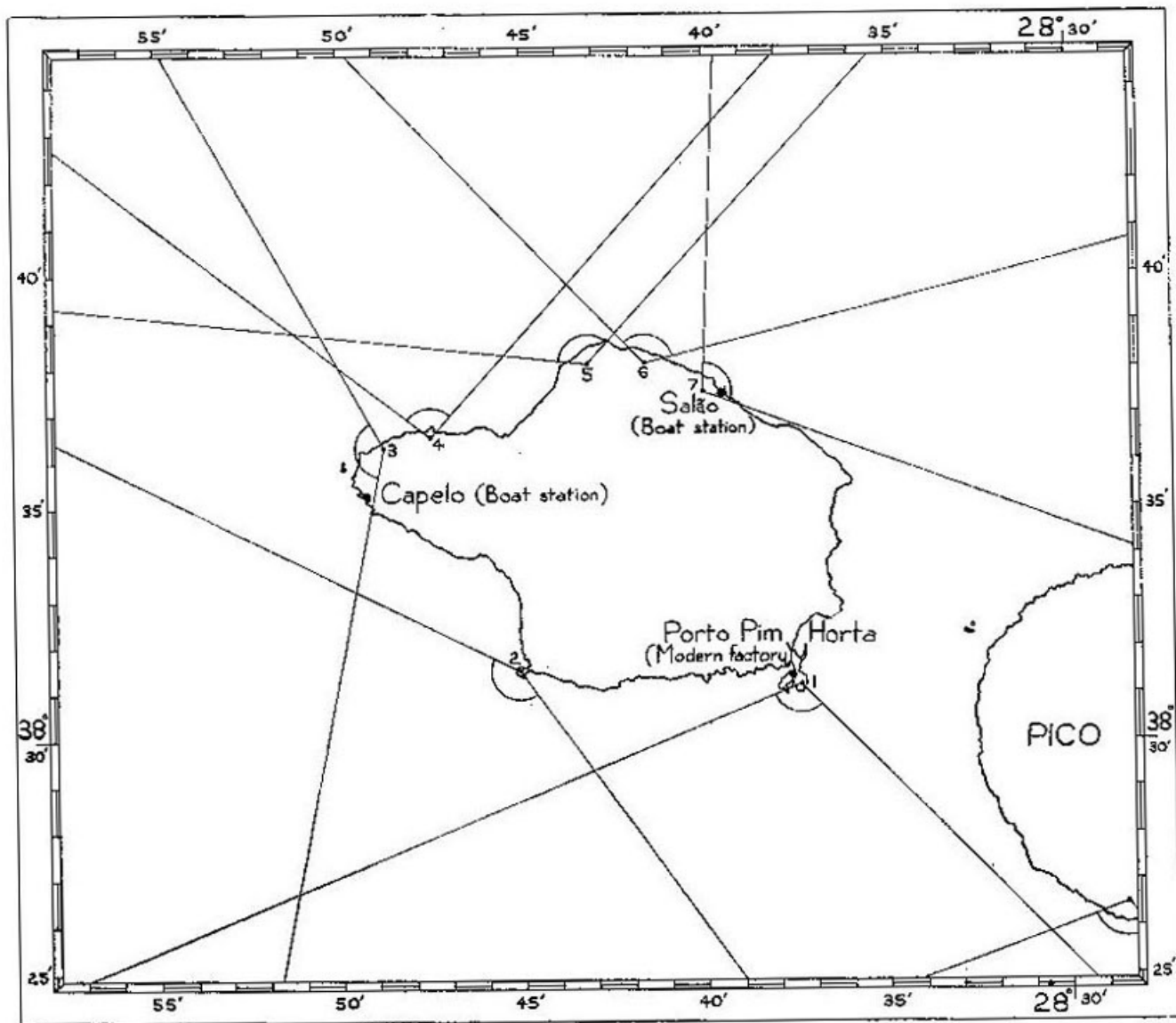


Fig. 5. Open boat whaling in Fayal. Look-outs and their arcs of search. The numbers refer to Table 5.

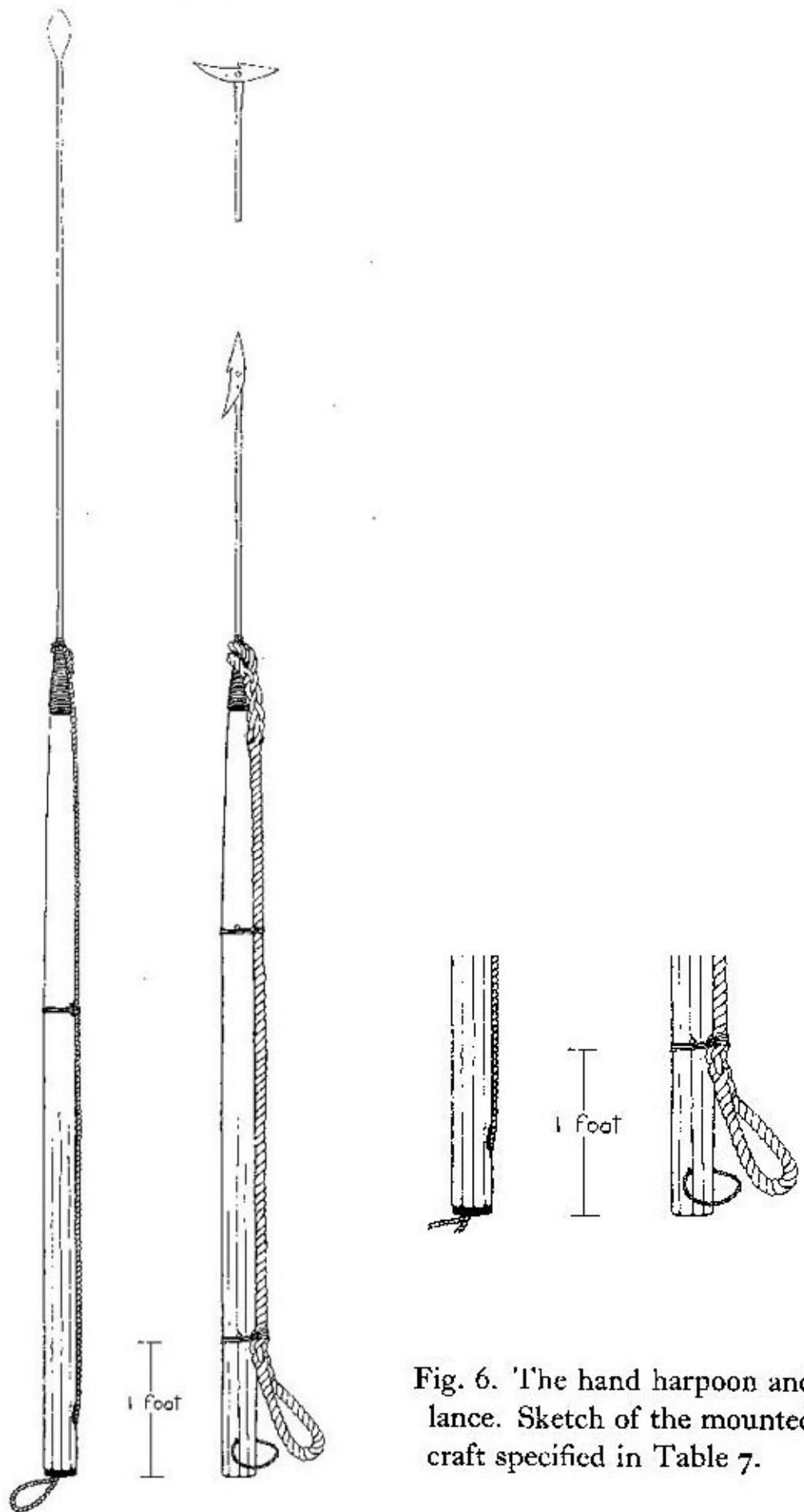


Fig. 6. The hand harpoon and lance. Sketch of the mounted craft specified in Table 7.



— | foot | —

Fig. 7. Pico knife.



