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SOUTHERN BLUE AND FIN WHALES

by

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with Appendices by

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INTRODUCTION

OBJECTS OF THE WHALING INVESTIGATIONS

THE section of the Discovery investigations which consisted in direct observations on the whales brought into the whaling stations, required less elaborate preparations than were needed for the equipment of the ships, and it was therefore possible to start this branch of the work at a somewhat earlier date. The Marine Biological Station in South Georgia was opened in January 1925, and from the following February the observations were continued at South Georgia, and for a time at South Africa, until April 1927, during which period a total of 1683 whales were examined.

The present report is not to be regarded as final, for the investigations were reopened at South Georgia early in 1928, but in the meantime sufficient material has been gathered for a detailed examination of the results. There is still, of course, much to be done and the future prospects of the work are discussed towards the end of the report.

The procedure which has been followed in the work at whaling stations is based on the recommendations made in the *Report of the Interdepartmental Committee on Research and Development in the Dependencies of the Falkland Islands* (Cmd. 657, 1920). In this report the relation of the work on shore to the other investigations is explained, and a brief account is given of what was then known or conjectured of the distribution, migrations, breeding and other habits of the whales in question.

In discussing the problems which have to be studied it is necessary to remember that the main object of the work is to find out as much about the effect which whaling is having or is likely to have on the stock of whales as it is possible to discover by observations on the carcasses of whales which are brought into the whaling stations. The lines of investigation which may be expected to supply information bearing on this question may be roughly classified under the following headings: (1) a thorough examination of the specific characters (i.e. external features, bodily proportions, etc.[1]) of the various species, and the extent to which individual variation may occur; (2) an investigation of the reproductive processes and breeding habits, and the reproductive potentiality of the whole stock of whales; (3) the interrelations of breeding, migrations, feeding, etc.

[1] Osteological specimens are, of course, to be included in the examination of specific characters, but although some whale skeletons have been collected they are not ready for examination and cannot be reported on for some time.

Work under the first of these headings provides a basis upon which it will ultimately be possible to make a specific comparison between the whales of different localities (using this word in its broadest sense), and thus to ascertain whether there are, associated with different localities, any specific or sub-specific differences. From information of this kind one may be able to judge the possibility of the replenishment of the stock of whales in one locality from another, and to estimate within what limits it is possible for migrations to take place. The North and South Atlantic, for instance, must be regarded as two different localities in which both Blue and Fin whales commonly occur. They are rarely seen in equatorial waters as a general rule, but, as Harmer (1928) has pointed out, both species are caught off the coast of Ecuador, which is so near the equator that it is difficult to say whether they actually belong to the northern or southern hemisphere, or both. At any rate, the possibility of these whales crossing from one hemisphere to the other has to be considered. If it can be shown that there is even a slight racial distinction between the whales of the two hemispheres such a possibility is ruled out. Similarly, the whales found in South African waters must be compared in respect of their specific characters with those of the Dependencies of the Falkland Islands.

Perhaps the most important part of the work is concerned with the breeding of whales. This includes a study not only of their breeding habits, but also of their growth and life history. Information is needed on the seasons and localities at which pairing and parturition take place, the nature of the oestrous cycle, the frequency of the recurrence of pregnancy, the lengths of the periods of gestation and lactation, the rate of growth and the intervals between the various stages and events in the sexual life. With a knowledge of these processes it is possible to say in what circumstances hunting is liable to do the most damage and to judge the general ability of the stock of whales to withstand or recuperate from the effects of hunting on a large scale.

The study of breeding and growth is closely related to the problems of migration, distribution and feeding of the whales, many of which are, of course, beyond the scope of the work at whaling stations. It is here, however, that these direct observations on the whales may be made to supplement the work of the ships, which is concerned mainly with the whales' environment. The examination of the food in the stomachs of the whales, for example, is of value for comparison with the catches of plankton at sea, and by systematic measurements of the thickness of the blubber a check can be kept on the variations in the condition of the whales at different seasons.

Important information is to be had from a study of the different classes of whales which go to make up the populations of different localities. There is evidence of a certain amount of segregation of these classes (i.e. whales of different sexes, ages and stages in the reproductive cycle) and it is necessary to study their local movements and times of arrival and departure in different localities.

Since the breeding of whales is governed by a seasonal periodicity it is obviously desirable that observations should be made over the whole year, so that the whales can be studied at each stage in the reproductive cycle. The whaling season in the

Dependencies lasts only through the southern summer, but at South Africa it is conducted only during the winter. By visiting a whaling station at Saldanha Bay in Cape Colony for one season we were able to fulfil the double purpose of examining the whales in a different locality and of carrying the observations over a whole year.

On the South African coasts there are only two whaling centres of importance: at Saldanha Bay 60 miles north of Cape Town, and at Durban in Natal. A considerable number of whales are taken annually in these places, but the African coast as a whaling centre is hardly comparable with the Dependencies. At South Georgia, apart from the South Shetlands and South Orkneys, nearly 6000 whales were killed in the 1924–5 season. The two stations at Saldanha Bay took less than 1600 whales in 1925, and at Durban 1285 whales were taken in the same year. The average size of the whales at South African stations is also much smaller than at South Georgia and the South Shetlands.

It has already been explained that the work at South Georgia was conducted from the Marine Biological Station on King Edward's Point, at the whaling station of the Compaña Argentina de Pesca. Four whale boats operate from this station and the season lasts from October to May, as is also the case with the other companies at South Georgia. At South Africa the work was continued at Messrs Irvin and Johnson's station at Donkergat, Saldanha Bay. Here nine whale catchers were working during the season we were there, and the fact that with twice as many boats fewer and smaller whales were taken at this station than at South Georgia indicates the comparative richness of the latter locality from the point of view of the whaling industry.

We may take the opportunity here of acknowledging the courtesy we have received from the Norwegian community during the whole of our stay at South Georgia, particularly from Capt. V. Esbensen, the manager of the station at Grytviken, who has done much to facilitate our work.

THE SOUTHERN WHALING STATIONS

It is not within the scope of the present memoir to enter into an exhaustive description of the southern whaling industry, but a brief account of a southern whaling station and the routine of the whaler's operations will not be out of place.

The whale boats operate from one of two types of base. Either there is a shore station which is built at the water's edge in some cove or well-sheltered part of the coast, or there is a floating factory or factory ship which may be anchored throughout the season in a similar situation, or may operate at a distance from land. The central part of a shore station is the flensing platform, a wooden structure on which the dismemberment of the whale's carcass takes place, and which slopes gently down to the water. This platform may measure up to about 50 yards square and is fitted with a number of steam winches by means of which the flensing process is carried out. Built round the platform are sheds which house the various boilers in which the oil is extracted from the blubber, flesh, viscera and bones. Further back from the beach are a number of large tanks used for storing the oil. Various other buildings, such as living quarters, workshops, forges, store sheds, etc., bring the station up to the dimensions of a moderate-sized village. Altogether two or three hundred men are employed there.

Near the flensing platform is constructed a wharf or jetty for the accommodation of the whale boats and transport steamer. The latter is usually an oil tanker of about 8000 tons register which brings coal and other stores out to South Georgia and oil back to Europe. Two trips are generally made each year. The transport leaves South Georgia at the end of the season (usually the middle of May) with a full cargo of oil and with the majority of the men employed on the station. A few are left behind over the winter to take charge of the station and to prepare for the next season's work. In the following October the ship returns and within a few days whaling commences.

The floating factories are vessels of about 10,000 tons or more, and are equipped with all the necessary plant for the treatment of the carcasses. Their working expenses are less than those of a shore station, but their capacity is also less, and they are not able to utilize the carcass to the fullest advantage. The subject of floating factories, however, may be dimissed for the present as our own work has been conducted exclusively at land stations.

At King Edward's Cove four whale boats are employed by the Cia Argentina de Pesca. These boats spend nearly their whole time at sea, though they return to the station with their catches after an absence of from one to about three days. Usually they arrive during the night and are away again before dawn. Whales are generally to be found between ten and forty miles from the coast, and one or two at a time are usually brought in by the boats, though if they are only to be found a long way off the boats stay out longer and bring in a larger catch. It is desirable, however, that a whale should be brought back fairly soon after it is killed as decomposition sets in very rapidly, and, owing to the higher percentage of fatty acid which is formed, the value of the oil is seriously reduced in a whale which has been dead for several days. When whales are first brought in they are moored temporarily near the flensing platform, and when work starts in the morning they are hauled out of the water one by one and cut up with flensing knives aided by steam winches. By this means the biggest whale can be completely disposed of in little more than two hours. Work at the station commences at 6 a.m. and continues until 6 p.m. with intervals for meals. In the course of a day about twelve average sized whales can be dealt with, since work can be started on a second whale when the first is half finished.

The method of dealing with the carcass is as follows. A steel hawser connected with a powerful electric winch is attached to the whale's tail, and the body is drawn up until it is completely out of the water. It is now almost invariably lying half on its back and half on one side. Three long slits are cut in the blubber from the head to the tail, one from near the eye down the shoulder and flank (now the top of the whale) and the other two from the chin on one side and near the blowhole on the other side, along the body and as near the ground as possible. This virtually separates the blubber into three longitudinal strips, upon one of which the whale is resting. The two free strips are simultaneously peeled off from before backwards by wires from steam winches. By means of flensing knives the workers loosen enough blubber at the head end for the attachment of the wires, and separate it from the flesh as it is pulled away. After the tongue and a mass of filmy connective tissue beneath it have been removed from the lower jaw and thorax, the carcass is rolled over by means of a tackle passed over the shoulder and attached to the lower flipper, and the third strip of blubber is removed in the same way. The blubber is drawn away to a corner of the flensing platform, where it is cut into smaller pieces and put through a machine which slices it into yet smaller strips which are shot into the blubber boilers. A number of steam jets open into the boilers, and these rapidly melt out the oil.

Next the lower jaw is removed and the carcass is drawn over to another part of the platform so that a fresh whale can be taken up. The baleen plates, which are but lightly attached to the skull, are now removed *en bloc*. The head is separated from the body at the condyles and drawn up to the "bone platform" which is built immediately above a set of pressure boilers. Here it is cut up by a steam saw and the pieces are dropped into the boilers beneath.

The carcass is now opened up in the following manner. The whale is lying on its left side and a longitudinal cut is made down the mid-ventral line through the abdominal muscle wall and as far back as the anus. The wire from a winch is attached to the upper flipper and drawn tight enough to put considerable tension on the shoulder. Cuts are now made through the cartilaginous attachment of the ribs on this side to the backbone and when all these have been disarticulated the whole right shoulder, the right side of the abdominal wall and right side of the thorax come away with all the viscera attached. The shoulders and ribs are taken up to the bone platform, and there are separate boilers near by for the flesh and entrails. The remaining part of the carcass consists simply of the vertebral column with a considerable quantity of flesh. These are easily separated and taken to the appropriate boilers and the actual work of dismemberment is completed.

The best oil is obtained from the blubber, and with the least amount of trouble, but the bones provide a grade of oil which is very little inferior. From the meat, and especially the "guts", the oil contains a higher proportion of fatty acids and is thus of a poorer quality. The bonemeal and guano, consisting of the dried and powdered remains of the bones and flesh are sold as fertilisers. From the blubber there is hardly any residue left except a small quantity of fibrous material. The baleen is in fact the only part of the whole carcass which is not utilized.

METHODS OF WORK

Before an account is given of the routine observations made at the whaling stations and the methods by which conclusions can be drawn, something should be said of the investigations of this kind which have been made by previous workers.

The first attempt to carry out systematic observations on the whales brought into the whaling stations appears to be that of Cocks (1886–90), who published a series of papers on the catches at some Lapland whaling stations. He examined only a few whales personally, however, and most of his information was derived from the whalers.

Important work was done by True (1904), who examined some whales at a Newfoundland station in the course of his investigation of the specific identity of the whalebone whales of the western North Atlantic. True's observations were mostly confined to bodily measurements and the external characters, and were not so much concerned with the breeding and other habits of whales. The paper consists of an exhaustive examination of the specific characters of the Fin, Blue, Humpback, Little Piked whale, and North Atlantic Right whale, and is based to a large extent on the study of museum specimens. It contains excellent descriptions, however, of the external characters of these northern whales, and summarizes in many cases the descriptions given by other authors. The main object of the paper was to show that the whalebone whales of the western section of the North Atlantic are specifically identical with those of the eastern section.

Later, some observations were made by Haldane (1904–10) on whales brought into a Shetland whaling station. He published a series of brief papers dealing with various notes on the general biology of the whales he examined.

Lillie (1910) visited an Irish whaling station at Innishkea, Co. Mayo, and published a paper which was principally concerned with some anatomical details. The same author (1915) visited a whaling station and two floating factories at New Zealand and published some useful observations on the anatomy and habits of the Humpback.

Burfield (1912) and Hamilton (1914 and 1915) made some observations at the Bellmullet station in Ireland. The observations included the total length of the whale and twelve other measurements, notes on colour and some other external characters, and records of the stomach contents, external and internal parasites and various pathological specimens. A few foetuses also were measured.

At almost the same time (in the 1913–14 season) observations of the same kind were instituted, apparently for the first time in the southern hemisphere, by Major Barrett-Hamilton, who examined nearly 300 whales at Leith Harbour, South Georgia, between November 14, 1913, and January 16, 1914. His untimely death at South Georgia put an end to this work, and his notes were handed over to Mr M. A. C. Hinton of the British Museum (Natural History), who used them as the basis of an important paper (1925) on whales and whaling, in which also the results of various previous authors are summarized. In this paper all Barrett-Hamilton's observations are set out and various problems discussed, in particular those relating to the breeding and migrations of whales. Barrett-Hamilton's observations alone were not sufficiently extensive to lead to any very general conclusions as to the habits of whales, but the chief value of the paper lies in the fact that material from various other sources is brought together and considered as a whole. As an example of this, extensive lists of foetuses from the

North Atlantic are compiled from the records given by Collett (1911), Guldberg (1886), Cocks (1886–90), True (1904), Hamilton (1915) and others.

Several papers have been published by D'Arcy Thompson (1918, 1919 and 1928) which consist mainly of a general examination of the catches at Scottish whaling stations during the last twenty years, with notes on the various species and their habits, but these papers are not based on actual examination of the whales at the stations.

The routine of observations which has been carried out in our own work has consisted in making notes, in the case of each whale, on the following subjects: (1) Measurements of bodily proportions. (2) Description of the external characters. (3) Blubber, food, parasites, etc. (4) Genitalia. All measurements are recorded in metres or centimetres.

As the whale is drawn out of the water on to the flensing platform a note is made as to the date, species and sex, and the measurement series is commenced. The measurements are as follows:

1. *Total length.* This is measured in a straight line from the tip of the snout to the notch of the tail flukes. It is appreciably shorter than the overall length of the whale, but is the only reliable method of measuring the length.

2. *Lower jaw; projection beyond tip of snout.* This measurement is very rarely taken since, when the whale is lying on the flensing platform, the lower jaw is hardly ever in its natural position.

3. *Tip of snout to blowhole.* This is measured to the middle of the two slits of the blowhole.

4. *Tip of snout to angle of gape.* This is not a very reliable measurement and is often omitted when there is any difficulty in locating the angle of the gape.

5. *Tip of snout to centre of eye.*

6. *Tip of snout to tip of flipper.* This measurement must of course be taken only when the flipper lies in its natural position.

7. *Eye to ear, centres.*

8. *Notch of flukes to posterior emargination of dorsal fin.* This is the most reliable means of fixing the position of the dorsal fin.

9. *Flukes, width at insertion.* This is measured from the notch of the flukes to the nearest part of the anterior margin of the flukes.

10. *Notch of flukes to anus.*

11. *Notch of flukes to umbilicus.* This is taken to the centre of the umbilicus and can be done before or after flensing.

12. *Notch of flukes to end of ventral grooves.* The ventral grooves sometimes do not end evenly at a definite point, in which case this measurement cannot be taken.

13. *Anus to reproductive aperture, centres.* The centre of the reproductive aperture in females is taken as opposite the posterior end of the clitoris, and in males at the centre of the base of the penis when the latter is extruded.

14. *Dorsal fin, vertical height.*

15. *Dorsal fin, length of base.* This is a rather unsatisfactory measurement as it is very difficult, especially in the case of Blue whales, to say where the anterior part of the fin begins.

16. *Flipper, tip to axilla.* The axilla is taken as the most anterior point on the dorsal rim of the flipper.

17. *Flipper, tip to anterior end of lower border.*

18. *Flipper, length along curve of lower border.* Taken with the preceding measurement this gives the relative curvature of the flipper.

19. *Flipper, greatest width.*

20. *Severed head, condyle to tip.*

21. *Skull, greatest width.* This is not a very reliable measurement and can usually be taken only indirectly. The width of the head is measured from eye to eye, and that of the skull is determined by feeling for the bone behind the eye with the point of a knife.

22. *Skull length, condyle to tip of premaxilla.* To take this measurement it is necessary to cut down the tip of the snout until the premaxilla is found.

23. *Flipper, tip to head of humerus.* The head of the humerus is not often accessible, so that it is difficult to take this measurement systematically.

24. *Tail, depth at dorsal fin.* This is taken in a straight line from a point opposite the base of the dorsal fin.

25. *Flukes, notch to tip.* As the flukes are always cut off at sea this can only be taken in the case of foetuses.

26. *Flukes, total spread.* Taken only in the case of foetuses for the same reason.

Only measurements 1 to 16 can be taken when the whale is first drawn up. The rest are taken later on as opportunity permits.

Notes are made on the external characters as follows:

1. *Colour.* Routine notes are made only on features which are subject to variations. In Blue whales observations are made on such points as the number of white flecks over the posterior part of the ventral grooves, the size and degree of differentiation of the spots of pale colour over the back and flanks, the striations on the ventral surface of the tail flukes, etc. Among Fin whales there is some variation to be noted in the degree to which the dark pigment extends over the ventral surface, of which the greater part is white. In some also the dorsal pigment is lighter than in others.

2. *Baleen.* In the case of a large number of whales the number of baleen plates has been counted, and in still more cases the longest plates have been measured from base to tip. The spacing of the plates has also been measured. It does not appear, however, that these routine observations on the baleen lead to any very useful results, though measurement of the length of the plates in young whales has some bearing on the study of the whale's growth and feeding.

3. *Hair.* The hair which occurs on the mandibles and snout is subject to some variation, and routine notes as to the numbers and disposition of the hairs were made for some time. It does not appear, however, that differences were more than individual variations.

4. *Ventral Grooves.* Here again the numbers of grooves vary to some extent. They were counted in a number of cases, sufficient to show that the number depends only on individual variation. There is also some variation in the small grooves in the neighbourhood of the genital aperture in females.

5. *Palate and Tongue.* These show very little variation, and comparatively few notes were made under this heading.

As soon as the flensing process is commenced measurements can be made of the thickness of the blubber. The flensers make certain long cuts running longitudinally down the body of the whale in dorsal, lateral, and ventral positions, and piercing just to the depth of the blubber. A measurement was made regularly at two points on these cuts, the first at the apex of a V-shaped deflection of the dorsal cut near the shoulder, and the second at a point on the lateral cut opposite the dorsal fin. It is the latter rather than the former measurement which has been used in estimating the condition of the whales at different seasons.

Any external parasites are counted except when present in large numbers, and a note is made as to their position. Remarks are made also as to the number of healed or open scars which commonly occur on the flanks, and the appearance of a film of diatoms on the skin is noted.

Before flensing, observations are made on the external genitalia. In the case of males it has usually been noted whether the penis is extended or retracted, though this observation does not now appear to have much value. The penis is sometimes measured, but this should not be done unless one is certain that it is fully extruded. In the case of females records are made as to whether the genital aperture is open or closed and whether the vagina is congested or not. The mammary glands are best studied after the removal of the blubber, but if lactation is in progress it can usually (though not always) be observed as soon as the whale is out of the water. On one or two occasions milk has been found spouting out of the nipples as the whale was drawn up, and it was possible to collect a pure sample of it. By means of an incision into the gland after flensing, if the whale is fresh one can see at a glance whether lactation is taking place or not, or whether the whale is immature. In many cases the depth of the gland has been measured, and samples were occasionally preserved for histological examination.

At a later stage, when the longitudinal cut has been made down the abdominal muscles, one can draw out the internal genitalia by opening the peritoneum at the posterior end of the abdominal cavity. In males the testes are to be found against the coils of intestine just behind the bladder, and they can easily be pulled out and cut away. In females the uterus is found in the same way, but as it is often very large some trouble may be experienced in pulling it completely out, and it may be difficult to locate the ovaries which are often concealed in fold upon fold of the blanket-like uterine mesentery.

In the case of males the length, breadth and depth of the testis are measured, and if it is sufficiently fresh a small piece is preserved for histological examination. In the case of adult females (in immature females there is little object in systematically examining the genitalia) the ovaries are examined, and if a functional corpus luteum is present the uterus is searched from end to end for signs of a foetus. Before being opened, however, if there is not a large foetus present, the width of the uterus is measured across one cornu as it lies on the platform. After it is opened a note is made if there is congestion of the internal wall, and in some cases a piece is preserved for histological examination.

The ovaries are examined in some detail. A full series of observations consists in measurements of size and weight, counting all the corpora lutea, fresh and old, and measuring each in three dimensions, and describing the condition of the Graafian follicles and measuring the larger ones. It appears now, however, that if the presence of a functional corpus luteum, the number of corpora lutea and the size of the largest follicles are noted, the rest is not of much importance.

Shortly after the internal genitalia become accessible the stomach is exposed by the opening up of the carcass, and can be split with the touch of a knife. The possibility of the stomach being damaged by the harpoon, and the contents thus escaping, has to be borne in mind when it sometimes appears to be empty.

The series of observations is usually brought to a close by a brief examination of the intestines for internal parasites. Very occasionally it is possible in the final stages of the dismemberment of the carcass to examine the degree to which the vertebral epiphyses have fused with the centra.

When work is finished at the whaling station any specimens are taken back to the Biological Station and the notes are entered up in log-books. These are in the form of large ledgers of which three patterns are kept. The first, for general notes, has a double page for each whale, the pages being divided into a number of sections in which notes can be made under the various headings such as colour, food, internal genitalia, etc. In the second book all the measurements of bodily proportions are entered, and in the third particulars of every foetus found, including bodily measurements, external characters, etc.

The primary difficulty of investigating the habits of whales is that it is almost impossible to make direct observations on them. It is for instance impossible to keep one whale or a group of whales under observation for any length of time and direct observations on their breeding habits have been few and far between. Indirect methods must therefore be employed. By observations at whaling stations information is mainly gained (apart from questions regarding specific identity) by studying the seasonal changes which take place through the year in whales of the same species and sex and in the whale population as a whole. For instance the changes which take place through the year in the lengths of foetuses provide information on the seasons of pairing and parturition and the rate of growth of the foetus; the seasonal changes in the condition of the reproductive organs give rather more direct evidence on the breeding season; the times of year at which ovulating and lactating females and young calves are most abundant are to be examined in connection with the general sexual cycle; and the movements and migrations of the whales are to some extent reflected in the seasonal variations of the food and thickness of the blubber.

Perhaps the greatest difficulty in investigating the habits of whales lies in the fact that they do not conform to any definite rules. For instance there is an unmistakable pairing season in winter, but it is only the season at which the maximum number of pairings takes place. It appears that breeding can go on exceptionally through most, though probably not all, of the year. Again, the majority of whales leave the Dependencies in autumn on their northward migration, but there are always some to be found there throughout the year. Such examples could be extended indefinitely, and it is in consequence of this general irregularity that it is necessary to have a fairly large bulk of material on which to base inferences about the breeding and other habits of whales. The most that can be done in fact is to frame general rules about the behaviour of the majority, based on the average of a large number of individuals.

Through the courtesy of the Director of the British Museum (Natural History) we have received much assistance in some cases where a specially large number of whales has been required, from an examination of the Museum's statistics of the catches at whaling stations. These have been compiled by Sir Sidney Harmer from the returns of the whaling companies and give the date, species, sex, length and foetuses of many thousands of whales caught in various localities over a number of years. Much useful information is to be derived from these statistics, but their value is impaired by the fact that the figures cannot always be regarded as necessarily quite accurate, especially those relating to the sizes of the whales and the occurrence and lengths of the foetuses. Sir Sidney Harmer has, however, made an analysis of some of these figures in several reports by the British Museum to the Colonial Office on the progress of the whaling industry, and further reference to his work will be made later.

MATERIAL AND DATA

The whales examined in the course of the work at South Georgia and South Africa may be tabulated as follows:

		South Georgia			S. Africa	Total	
		Feb. to May 1925	Season 1925–6	Season 1926–7	Season 1926		
Blue	Males	50	58	155	120	383	
	Females	58	71	146	127	402	
	Total	**108**	**129**	**301**	**247**		**785**
Fin	Males	56	210	61	114	441	
	Females	75	139	62	75	351	
	Total	**131**	**349**	**123**	**189**		**792**
Sei	Males	—	—	14	4	18	
	Females	—	—	49	6	55	
	Total	—	—	**63**	**10**		**73**
Humpback	Males	1	5	—	2	8	
	Females	1	13	—	2	16	
	Total	**2**	**18**	—	**4**		**24**
Right	Males	—	1	—	1	2	
	Females	—	—	—	1	1	
	Total	—	**1**	—	**2**		**3**
Sperm	Males	—	—	4	1	5	
	Females	—	—	—	1	1	
	Total	—	—	**4**	**2**		**6**
				Total for all species			**1683**

The British Museum statistics available up to date are as follows:

Locality	Period covered	Number of whales
South Georgia	1913–25	37,462
South Shetlands	1918–24	17,291
South Orkneys	1922–26	1,749
Cape Colony	1920–25	3,650
Natal	1922–26	4,845
Angola	1924–25	781

Work was started at Grytviken, South Georgia, on February 5, 1925. By this date, the South Georgia whaling season was half finished, but both Blue and Fin whales were fairly plentiful and 241 whales were examined up to May 11 before the stations closed for the winter. Among these Blue and Fin whales were fairly equally represented and both large and small specimens were plentiful. The average size of the Blue whales, however, was small, more than half being actually immature. The catching was fairly regular during February, but few whales were taken in March until towards the end of the month. There was no special feature about the catches in April and May, except that fewer whales were caught as the season advanced.

The 1925–6 season opened in the middle of October, the first whale being examined on October 15. Up to Christmas the whales were phenomenally scarce, and of both species those which were taken were on the average very large. At the end of December there was a sudden and enormous increase in the numbers of whales, due to the unexpected appearance of an immense quantity of male Fin whales about 70 miles off the north-east coast of South Georgia. Later on they approached closer to the island and began to feed, and more females were caught with them. Blue whales remained scarce until the latter part of February and the beginning of March when a fair number of small ones were caught. The average size of the whales of both species declined considerably during the last two months of the season. The greatest number was caught in January and February, and of these the vast majority were Fin whales. The season continued into May, but we were unable to examine any more whales after the end of March owing to our departure for South Africa early in April. The total number of whales measured at South Georgia from February 1925 until Christmas was 296, but by March 29, 1926, the figure had risen to 738.

The work was resumed at Messrs Irvin and Johnson's whaling station at Saldanha Bay, Cape Colony, on June 15, 1926. Saldanha Bay lies about 60 miles north of Cape Town, and the whales are mostly caught from 20 to 30 miles off this part of the coast. Four hundred and fifty-four whales were examined between June 15 and October 11. The catches here are quite different from those at South Georgia except in the fact that the great majority are Blue and Fin whales. The majority of the whales are small and immature, only 10–20 per cent being adult. At South Georgia again there is a great deal of variation in the numbers of whales caught at different times, whereas at Saldanha Bay they are brought in in moderate numbers with great regularity throughout the season. This is partly due to the more settled weather off the African coast, but there is no doubt at all that the local whale population is subject to far less fluctuation off the south-west African coast than in the neighbourhood of South Georgia.

We left the Cape in October 1926, arriving again in South Georgia in November. Work was recommenced on November 15 and continued from then to April 25, 1927. This season's catch showed certain points of special interest. A feature of the first part of the 1925–6 season was the great scarcity of whales, especially of Blue whales. The 1926–7 season was characterized by a great abundance of Blue whales which was maintained right on to March, and a scarcity of Fin whales in the earlier part of the season. From the whaling industry's point of view the season was even more successful than the preceding one, for although whales were at no time quite so abundant as in January and February 1926, the supply was plentiful throughout the season. As in the last season the whales caught in November and December were on the average very large. During the second half of the season smaller whales began to appear and the average size became considerably less. A peculiar feature of this season's catch was the appearance towards the end of February of Sei whales. These were the first which had been caught at South Georgia during the whole of our stay, and through March and April they became very plentiful, 63 being examined before the end of the season.

It should be mentioned that the 1926–7 season was characterized by the phenomenal amount of ice which had drifted as far north as, and even farther than, South Georgia. There is little doubt that this was correlated in some way with the exceptional abundance of Blue whales throughout the season.

In May 1927 the Marine Biological Station was closed and the staff returned to England. It was reopened early in 1928 and work on the same lines was started again at the whaling station on February 15 by Messrs Fraser and Rayner.

EXTERNAL CHARACTERS

Among all the whales examined six distinct species are included, and representatives of each of these have occurred both at South Georgia and at Saldanha Bay. Not many whales have been examined apart from Blue and Fin whales, and the present memoir is really concerned only with the two latter species. The other species will no doubt be dealt with in due course when more material has been collected.

The following are the names now generally adopted for the six species mentioned above:

MYSTACOCOETI (Baleen whales)

BALAENOPTERIDAE (Rorquals)

Blue	*Balaenoptera musculus*
Fin	*B. physalus*
Sei	*B. borealis*
Humpback	*Megaptera nodosa*

BALAENIDAE (Right whales)

Southern Right ... ... *Balaena australis*

ODONTOCOETI (Toothed whales)

PHYSETERIDAE

Sperm ... ... *Physeter catodon*

Several other species not included in the above list have been taken from time to time in the Dependencies, but their value is negligible from the point of view of the whaling industry. Among these are the Bottlenose (*Hyperoödon*), the Killer or Grampus (*Orcinus orca*), the Lesser Rorqual (*Balaenoptera acutorostrata*) and the Ca'aing whale (*Globicephala melaena*). The Killer, though of little value, may be said to have some economic importance owing to its habit of occasionally attacking the larger whales and their calves.

At South African stations one other species is frequently taken, namely Bryde's whale (*Balaenoptera brydei*). This whale is not very well known, but it resembles the Sei whale and has been described by Olsen (1913, 1914/15 and 1926). Unfortunately none was brought in to the station at Saldanha Bay during our work there.

A general account of the bodily proportions and external and specific characters of Blue and Fin whales can best be given separately under each species.

BLUE WHALES

GENERAL REMARKS

This species together with the Fin whale constitutes over 90 per cent of the catches of most southern whaling stations. The two are caught nearly everywhere in roughly equal numbers, but the value of the Blue whale is greater owing not only to its greater size, but also to the fact that even allowing for its size, the yield of oil is slightly greater. The average yield of oil from a Blue whale is 70 to 80 barrels, but as many as 305 barrels were once obtained from a Blue whale at Walvis Bay, West Africa (see Risting, 1928, p. 41). A higher bonus is paid to the whalers for the capture of a Blue whale than for any other species, so that when more than one species is open to attack it is usually the Blue whale which suffers.

This species is widely distributed in temperate and arctic and antarctic waters, and it has been hunted more or less regularly since the invention of the harpoon gun, though during the period when the Humpback formed the main prey of the whalers, the largest specimens were sometimes avoided owing to the comparative lightness of the gear then used. At South Georgia it was caught in comparatively small numbers from 1904, when the industry started there, until about 1913 when the Humpback fishery began to decline. With some fluctuations a great increase in the catches of Blue whales took place during and after the war, and in the recent 1926–7 season greater numbers of this species were taken than ever before.

The largest Blue whale measured by us was No. 667. This was a female 28·5 m. long, or 93 ft. 6 in. Only two others measured 28·0 m. or over (No. 1281, 28·2 m., and No. 1417, 28·0 m.), but there were ten measuring between 27·0 m. and 28·0 m. All these were females. The method of measuring the total length from the tip of the snout to the notch of the flukes is the shortest measurement which could be called the total length, and it has already been explained that this is appreciably shorter than the overall length. One would therefore hardly expect to find a whale measuring 100 ft. (30·48 m.) according to this method, but if the projection of the lower jaw beyond the snout, and the tips of the flukes beyond the notch are included in the measurement, 100 ft. is not at all an improbable length for a Blue whale. The largest whale measured by Barrett-Hamilton at South Georgia was 95 ft. long, but this was taken from the notch of the flukes to the tip of the mandible. The length to the tip of the snout was 92 ft. This appears to be the longest measurement ever made up till now which can really be regarded as authentic. In a recent paper based on the statistics of the Norwegian Whalers' Association, Risting (1928) quotes five instances of whales measuring 100 ft. or more. The measurements, however, appear to be unreliable, for according to Risting's data the smallest pregnant Blue whale measured 63 ft. or 20 m. (allowance being made for Norwegian feet) and 11·4 per cent of the 71 ft. (22·5 m.) whales were pregnant. Now Blue whales are rarely adult at a length of less than 23·5 m. and it is in our opinion extremely improbable that 11·4 per cent of those measuring 22·5 m. were pregnant, or that a 20·0 m. Blue whale could be pregnant, and it must be supposed that some of the measurements were inaccurate.

The size of the Blue whale is also discussed at some length by True (1904) who concludes that the maximum authentic measurement of a Blue whale from the North Atlantic is 88 ft. 7 in. or 27·0 m. Authentic measurements from the South Atlantic were not to be had at that time and it appears that in the North Atlantic the whales in general do not attain to so great a size as in the south. More recently, however, a huge Blue whale, said to measure 98 ft., was killed in the Panama Canal, and Harmer (1923), from an examination of the cervical vertebrae, estimates that the reputed length was not exaggerated. The fact that the average size of the Blue whales of South Georgia is considerably greater than that of the corresponding form in the North Atlantic is commented on by Hinton, who suggests that if it could be shown that the Blue whales of the two regions do not mingle in equatorial waters, the difference in size might be regarded as sufficient ground for recognizing the two forms as distinct sub-species. In the same paper, however, Hinton mentions that the small size of the whales examined by True at Newfoundland suggests that during the whaling season the herds in that region consist principally of adolescent individuals with a few young adults. In view of the fact that at south-west African stations the average size of the whales is extremely low, solely on account of the high percentage of immature whales which are caught there, it does not seem impossible that a similar factor may operate in more than one part of the North Atlantic and that the comparatively small average size of the whales taken there may be due to a high percentage of immature whales in the catches.

Before going on to an analysis of the systematic measurements of bodily proportions it will be convenient here to examine the sex ratio and the differences which exist between the two sexes.

In investigating the proportions between the numbers of existing male and female whales certain difficulties arise which make it impossible to estimate the ratio with accuracy. It is certain that Rorquals of one sex sometimes associate in large herds, and it may be assumed that members of one sex may move to some extent (though perhaps a limited extent) in different places or at different times from members of the other sex. Consequently one sex might actually exist in smaller numbers than the other and yet be caught in greater numbers in some particular locality.

The ratio of the numbers of each sex which are born could be estimated from the sex ratio of foetuses, but the number of foetal records is hardly great enough for this purpose. Some good material, however, is to be found in the statistics of the catches at various whaling stations, for here there are records of the numbers of each sex taken through a considerable number of seasons and at several different localities, and the number of whales recorded is so large that it might be expected to some extent to swamp any differences due to local movements of the whales.

The British Museum statistics cover the following localities and seasons:

(*a*) *Dependencies of the Falkland Islands.*

South Georgia, 1913–25	18,484	Blue whales
South Shetlands, 1918–24	7,625	,,
South Orkneys, 1922–26	519	,,

(*b*) *South Africa.*

Cape Colony, 1920–25	2,667	,,
Natal, 1922–26	927	,,

Analysis of these figures gives the following results:

(*a*) *Dependencies of the Falkland Islands.*

Of all whales recorded 53 per cent were males.

Of 22 seasons in different localities there were five with from 51 to 57 per cent of females. One season had equal numbers of males and females. The remaining 16 seasons all showed a majority of males. Of these, 14 seasons showed 50 to 60 per cent of males and two seasons showed between 60 and 70 per cent of males.

(*b*) *South Africa.*

Of all whales recorded 53 per cent were females.

Of 14 seasons in different localities 10 showed a majority of females, all between 50 and 60 per cent. In the four remaining seasons there were 51 to 58 per cent males.

From the above we see that while males have been found to be more numerous at South Georgia and the other Dependencies, at South African stations larger numbers of females have been taken. Among the Blue whales examined by us at both localities there was a slight majority of females. 51 per cent of the whales and 60 per cent of the foetuses were female. The results are therefore rather inconclusive though the total of all Blue whales, of which there are records, consists of 48 per cent females and 52 per cent males. Any attempt to explain these differences must, however, be very speculative. The main fact is that in general there is very little difference in the abundance of the two sexes.

It is well known that among the Rorquals the female reaches a greater size than the male, and it will be interesting to examine briefly the extent of the difference which exists. The largest recorded specimen of each sex hardly provides a fair comparison in itself. Perhaps the best criterion of the difference in size is to be found in a comparison of the lengths at which each sex becomes adult. It will be shown later that up to a point the rate of growth of the two sexes is probably equal, but that the female appears to begin growing faster than the male some time after it is weaned, and that when sexual maturity is reached there is a definite difference between the two. The mean length at which sexual maturity is reached in the female Blue whale can be fairly accurately estimated at 23·7 m. and the corresponding length in the male at 22·6 m. Thus there is approximately 1 m. difference between the two or the length of the male is 95·4 per cent of that of the female. The largest female measured was 28·5 m. and the largest male only 26·45 m. Thus although the largest specimen met with of either sex is perhaps a matter of chance, this seems to show that there must be an increased divergence in size after maturity is reached. The difference between these two specimens was 2·05 m., and the length of the male was 92·5 per cent of the female.

Besides the difference in size there are one or two differences between the sexes in respect of the bodily proportions, but these will be considered in the general analysis of the measurement records.

EXTERNAL PROPORTIONS

It has already been explained that an essential part of the work at whaling stations is to establish as thoroughly as possible the external characters of the southern whales and the limits of the ordinary individual variations which may occur. There has been no evidence to show that the southern whales differ specifically from the corresponding northern forms, or that there are racial distinctions among the southern species themselves, but the equatorial regions appear to constitute something of a natural barrier between the whales of the two hemispheres (so far at least as the genus *Balaenoptera* is concerned) and the circumstances are therefore not unfavourable to the development of separate sub-species. Similarly, it is not proved that the whales of the Dependencies are the same whales which are found at a different time of year in South African waters, so that here again some distinction may exist. Consequently a basis is required for the comparison of the whales of different localities, and the first step will be to quote the average condition (in respect of the external characters) of a large number of whales in each region.

The bodily proportions, recorded by the system of measurements described on p. 265, are of course included in this connection among the external characters. The entire series of measurements has hardly ever been carried out on any one whale, for some of them, such as the length of the flipper measured from the head of the humerus, are difficult to obtain and have been performed only on a small number of whales. However, a more or less complete series has been recorded in some 783 Blue whales and 692 Fin whales.

The actual measurements of each whale are of course of little value for purposes of comparison, and they have therefore been reduced in the case of each whale to percentages of the total length.

As a preliminary analysis of the measurements the following table shows the mean value of all the measurements taken for male and female Blue whales, expressed as percentages of the total length:

	Measurement	South Georgia				South Africa				Total			
		Males		Females		Males		Females		Males		Females	
		Mean value	No. of measurements	Mean value	No. of measurements	Mean value	No. of measurements	Mean value	No. of measurements	Mean value	No. of measurements	Mean value	No. of measurements
1	Total length	100	—	100	—	100	—	100	—	100	—	100	—
2	Lower jaw, projection beyond tip of snout	1·53	8	1·72	10	—	—	1·00	2	1·53	8	1·52	12
3	Tip of snout to blowhole	17·93	238	18·03	243	16·90	116	17·07	123	17·59	354	17·71	366
4	Tip of snout to angle of gape	19·36	105	19·05	107	18·88	102	18·75	91	19·12	207	18·91	198
5	Tip of snout to centre of eye	20·53	255	20·40	266	19·52	119	19·60	126	20·21	374	20·14	392
6	Tip of snout to tip of flipper	42·99	229	43·00	230	42·20	106	42·18	110	42·74	335	42·73	340
7	Eye to ear (centres)	5·49	215	5·35	218	5·36	115	5·31	116	5·44	330	5·34	334
8	Notch of flukes to posterior emargination of dorsal fin	24·46	169	24·56	184	25·01	101	25·28	101	24·67	270	24·82	285
9	Flukes, width at insertion	5·17	245	5·24	249	5·24	120	5·26	126	5·20	365	5·25	375
10	Notch of flukes to anus	28·98	256	29·19	268	29·85	116	30·34	123	29·25	372	29·55	391
11	Notch of flukes to umbilicus	45·50	252	45·49	259	46·93	115	46·95	124	45·94	367	45·96	383
12	Notch of flukes to end of ventral grooves	42·52	157	42·82	163	44·20	91	45·40	99	43·13	248	43·79	262
13	Anus to reproductive aperture (centres)	6·13	239	2·57	268	6·90	107	2·67	118	6·37	346	2·60	386
14	Dorsal fin, vertical height	1·28	154	1·23	183	1·35	96	1·23	101	1·30	250	1·23	284
15	Dorsal fin, length of base	4·49	173	4·19	195	4·53	108	4·38	105	4·51	281	4·26	300
16	Flipper, tip to axilla	9·84	224	9·85	223	9·98	109	9·74	114	9·89	333	9·81	337
17	Flipper, tip to anterior end of lower border	13·20	159	13·13	175	13·10	90	12·90	101	13·17	249	13·05	276
18	Flipper length along curve of lower border	13·88	152	13·85	171	13·81	88	13·64	98	13·85	240	13·77	269
19	Flipper, greatest width	3·66	171	3·65	181	3·68	87	3·64	98	3·67	258	3·65	279
20	Severed head, condyle to tip	24 81	170	24·93	183	23·82	66	24·26	67	24·53	236	24·75	250
21	Skull, greatest width	11·53	156	11·53	174	10·45	64	11·30	55	11·21	220	11·48	229
22	Skull length, condyle to tip of premaxilla	26·99	1	23·81	2	23·02	3	22·10	2	24·01	4	22·93	4
23	Flipper, tip to head of humerus	14·71	1	15·24	2	14·59	2	13·86	3	14·63	3	14·41	5
24	Tail, depth at dorsal fin	9·57	142	9·37	129	8·61	96	8·64	91	9·18	238	9·07	220

The number of measurements actually made under each heading is quoted to show the reliability of each mean result. The majority are based on over a hundred readings and are therefore very reliable, but measurements Nos. 2, 22 and 23 are based on two or three readings only and owing to the individual variation which naturally occurs, are not to be depended on for purposes of accurate comparison.

It is seen from the table that the only marked difference in bodily proportion between the sexes is that shown by measurement No. 13, in which the mean distance between the anus and reproductive aperture works out at more than twice as great in the male as in the female. In the other measurements the differences are comparatively insignificant, though there is a very slight indication that in males the head is relatively slightly larger than in females, while in the latter the tail measurements are slightly greater. It will be shown below, however, that as a whale grows larger the head becomes slightly larger in proportion to the tail and the slight difference in these measurements is very probably due to the fact that females are on the average a little larger than males.

As a result of this comparison between the sexes it may be said that no distinction is apparent in respect of the bodily proportions except in the case of the interval between the anus and reproductive aperture. This distinction of course is simply due to the fact that the penis occupies a more anterior position than the vulva.

A comparison between the general average measurements from South Georgia and South Africa shows a corresponding difference between the relative sizes of the head and tail which in this case is much more marked. The mean value of all the anterior measurements is distinctly greater in the South Georgia whales, while the posterior measurements are, with one exception, greater in the South African whales. This exception is found in No. 24—"Depth of tail at dorsal fin"—which is, on the average, greater for South Georgia whales. A possible explanation of this is that, in general, the blubber of whales taken at South Georgia tends to be relatively thicker than at South Africa, and since the blubber is very massive in the mid-dorsal and ventral lines on the tail, the effect of an increase in thickness would be quite likely to exaggerate this particular measurement.

The fact that the tail is, on the average, relatively large in South African whales, and the head relatively large in South Georgia whales, is undoubtedly due to the difference in the average sizes of the whales from the two localities.

The manner in which the bodily proportions vary according to the size of the whale may now be considered. It has been found that there is a very definite variation of this description, and it follows that the value of the general average measurements, which include whales of any and every size, is much reduced for purposes of comparison.

In the following tables the mean value of each (percentage) measurement has been worked out as far as possible for each metre of whale-length, foetuses being included.

Male Blue Whales: South Georgia

Measurements expressed as percentages of total length.

	Metre lengths	2. Lower jaw, projection beyond tip of snout			3. Tip of snout to blowhole			4. Tip of snout to angle of gape			5. Tip of snout to centre of eye		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	1–2	—	—	—	5	12·80–16·67	14·45	4	14·40–18·82	17·24	5	16·00–19·84	18·33
,,	2–3	—	—	—	7	13·86–16·74	14·76	8	16·52–19·07	17·58	8	17·62–20·93	18·66
,,	3–4	—	—	—	3	14·51–16·38	15·36	3	16·00–17·81	17·16	3	17·87–20·11	18·65
,,	4–5	—	—	—	1	—	15·16	1	—	18·32	1	—	18·74
Whale	16–17	—	—	—	—	—	—	1	—	15·90	2	16·85–17·52	17·18
,,	17–18	—	—	—	13	13·88–16·90	15·81	8	16·85–18·75	17·93	15	16·20–19·77	18·42
,,	18–19	1	—	1·39	14	14·21–17·95	16·04	13	17·47–20·11	18·53	21	15·72–20·33	18·63
,,	19–20	2	1·36–1·54	1·45	18	14·92–20·94	16·58	13	17·69–22·88	19·06	22	17·53–23·04	19·12
,,	20–21	1	—	1·57	14	15·21–19·18	17·16	10	16·96–20·09	18·55	17	17·76–20·49	19·53
,,	21–22	2	1·24–1·61	1·43	16	15·72–18·60	17·49	14	16·90–21·71	19·52	22	16·90–20·93	19·71
,,	22–23	1	—	1·18	21	14·00–19·98	17·72	10	17·82–21·43	19·44	23	16·22–22·14	20·05
,,	23–24	—	—	—	38	16·46–21·24	18·44	14	18·57–22·45	20·08	43	19·41–23·01	20·36
,,	24–25	—	—	—	56	17·00–21·02	19·06	15	19·47–21·30	20·54	59	19·29–24·79	21·25
,,	25–26	1	—	2·35	25	16·47–20·62	18·72	5	19·39–21·33	20·61	32	19·41–22·84	21·04
,,	26–27	—	—	—	3	18·13–20·38	19·01	2	19·47–19·66	19·56	3	20·53–21·92	21·03

	Metre lengths	10. Notch of flukes to anus			11. Notch of flukes to umbilicus			12. Notch of flukes to end of ventral grooves			13. Anus to reproductive aperture, centres		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	1–2	5	28·80–32·92	30·67	5	44·74–49·69	46·44	5	41·93–51·32	45·67	5	3·11–6·58	5·66
,,	2–3	7	29·50–34·17	31·71	8	44·55–52·38	46·67	8	38·13–50·00	44·06	8	3·72–7·39	5·88
,,	3–4	3	28·74–33·07	31·43	3	41·09–48·00	45·47	3	38·22–45·87	43·28	3	5·17–6·62	5·97
,,	4–5	1	—	30·11	1	—	45·68	1	—	43·79	1	—	6·11
Whale	16–17	2	30·38–32·05	31·22	2	47·20–48·66	47·93	—	—	—	2	4·42–4·75	4·59
,,	17–18	15	28·61–32·11	30·56	14	45·89–48·86	47·56	9	40·46–47·43	44·95	15	3·67–8·01	6·14
,,	18–19	20	27·69–32·24	30·24	20	45·21–51·32	47·79	12	41·64–48·15	44·85	21	3·50–8·31	6·37
,,	19–20	21	28·39–32·99	30·20	22	44·79–50·00	47·11	13	41·97–49·61	45·09	19	3·66–7·93	5·81
,,	20–21	16	27·82–32·35	30·13	15	44·36–47·83	46·52	8	42·19–44·83	43·81	16	3·12–8·79	5·78
,,	21–22	22	27·79–31·29	29·56	21	43·66–47·80	46·14	15	40·00–45·97	43·32	21	3·72–7·85	6·08
,,	22–23	23	27·43–31·63	28·91	23	41·33–47·66	45·19	18	40·44–48·01	43·43	22	4·25–8·63	6·45
,,	23–24	42	26·61–30·34	28·35	41	41·63–47·86	44·75	26	39·49–47·86	42·91	40	4·10–8·39	6·23
,,	24–25	60	25·00–30·96	28·13	59	41·04–47·98	44·50	39	34·44–45·82	41·24	52	3·84–7·89	6·14
,,	25–26	31	25·84–29·30	27·92	32	41·70–47·20	44·17	19	38·54–45·47	41·85	28	3·37–7·66	6·10
,,	26–27	3	27·50–29·11	28·20	3	42·41–44·80	43·81	3	40·92–42·72	41·98	3	5·16–7·50	6·30

	Metre lengths	18. Flipper, length along curve of lower border			19. Flipper, greatest width			20. Severed head, condyle to tip			21. Skull, greatest width		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	1–2	4	13·60–18·82	15·78	4	3·20–4·30	3·71	—	—	—	2	13·82–14·40	14·11
,,	2–3	5	14·00–18·60	17·25	7	3·75–5·12	4·30	—	—	—	—	—	—
,,	3–4	3	17·24–18·60	17·81	3	4·53–4·73	4·62	—	—	—	—	—	—
,,	4–5	1	—	17·26	1	—	4·42	—	—	—	—	—	—
Whale	16–17	—	—	—	2	3·56–4·01	3·78	2	20·77–22·42	21·60	1	—	11·50
,,	17–18	5	13·29–14·40	13·95	7	2·86–4·03	3·53	7	20·96–23·45	22·59	8	8·89–12·78	11·35
,,	18–19	12	12·59–17·76	14·22	17	2·93–4·37	3·70	17	19·78–25·80	23·26	17	9·76–13·26	11·37
,,	19–20	13	12·21–15·00	13·74	16	3·09–4·17	3·61	12	21·13–24·87	23·27	12	10·59–12·04	11·26
,,	20–21	12	13·12–14·68	13·73	11	3·36–3·88	3·59	9	22·77–25·49	24·39	8	10·31–12·10	11·18
,,	21–22	16	11·27–14·60	13·20	16	3·19–3·97	3·55	17	21·13–25·81	24·37	15	10·28–12·27	11·09
,,	22–23	12	10·67–16·56	14·15	13	3·18–4·27	3·68	20	20·00–27·20	24·68	15	9·98–12·38	11·54
,,	23–24	21	12·99–15·79	14·19	26	3·11–4·15	3·74	30	22·91–27·47	25·61	29	10·21–12·82	11·80
,,	24–25	37	12·50–14·84	13·71	40	3·11–4·16	3·68	35	23·63–28·48	25·85	33	10·55–13·30	11·72
,,	25–26	21	12·60–14·75	13·82	21	3·09–3·93	3·65	20	23·93–28·01	25·80	17	10·86–12·60	11·71
,,	26–27	2	13·61–13·69	13·65	2	3·33–3·89	3·61	1	—	24·89	1	—	10·86

Male Blue Whales: South Georgia

Measurements expressed as percentages of total length.

	Metre lengths	6. Tip of snout to tip of flipper			7. Eye to ear, centres			8. Notch of flukes to posterior emargination of dorsal fin			9. Flukes, width at insertion		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	1–2	5	40·00–46·77	43·46	4	6·40–7·14	6·91	5	25·20–29·19	27·30	5	6·30–8·55	7·25
,,	2–3	8	41·30–48·84	44·33	8	6·44–8·09	6·95	6	25·00–29·77	27·26	8	6·67–8·37	7·39
,,	3–4	3	44·16–47·13	45·45	3	6·40–6·94	6·65	3	25·86–27·76	26·76	3	5·67–8·27	6·75
,,	4–5	1	—	43·16	1	—	6·53	1	—	26·74	1	—	7·16
Whale	16–17	1	—	38·87	1	—	5·43	—	—	—	1	—	5·22
,,	17–18	12	40·00–42·25	40·90	13	4·91–6·63	5·40	11	24·44–28·35	26·04	13	4·86–5·97	5·37
,,	18–19	17	38·56–44·56	41·58	16	4·53–6·22	5·28	15	22·22–27·03	25·17	17	4·57–6·19	5·30
,,	19–20	20	38·92–43·49	41·32	17	5·01–6·00	5·28	11	23·67–27·39	25·25	21	4·71–5·74	5·21
,,	20–21	16	39·16–43·87	41·71	14	4·29–5·63	5·22	7	24·78–26·96	26·01	16	4·68–5·88	5·28
,,	21–22	20	40·84–45·03	42·63	17	4·79–5·77	5·34	14	23·51–28·89	25·18	22	4·64–6·07	5·32
,,	22–23	20	39·42–46·30	42·81	20	4·67–6·07	5·50	19	22·60–26·73	24·39	23	4·67–5·88	5·18
,,	23–24	37	39·74–49·15	44·06	35	4·94–6·91	5·57	31	22·08–26·29	23·89	38	4·76–5·86	5·27
,,	24–25	55	38·02–47·85	44·36	52	4·04–6·25	5·55	39	21·23–26·45	23·87	59	4·32–6·02	5·11
,,	25–26	27	40·48–46·32	43·69	27	4·88–6·10	5·38	20	21·93–26·00	23·73	32	3·92–5·88	5·05
,,	26–27	2	43·86–44·59	44·22	3	5·22–5·77	5·49	2	22·69–25·33	24·01	3	4·69–5·09	4·86

	Metre lengths	14. Dorsal fin, vertical height			15. Dorsal fin, length of base			16. Flipper, tip to axilla			17. Flipper, tip to anterior end of lower border		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	1–2	5	1·18–1·86	1·58	5	3·94–5·59	4·73	4	10·56–11·29	11·01	5	12·80–17·31	14·73
,,	2–3	6	1·25–2·33	1·81	6	4·50–5·84	5·36	8	9·50–12·56	11·43	7	13·00–16·74	15·68
,,	3–4	3	1·72–2·31	1·86	3	4·02–4·42	4·24	3	11·67–12·07	11·91	3	16·00–16·09	16·06
,,	4–5	1	—	2·11	1	—	5·47	1	—	12·21	1	—	16·21
Whale	16–17	—	—	—	—	—	—	2	10·03–12·75	11·39	1	—	14·83
,,	17–18	13	1·16–1·59	1·33	12	3·30–6·24	4·11	15	8·22–10·17	9·39	7	11·16–13·77	13·03
,,	18–19	15	0·85–1·61	1·28	13	2·93–7·05	4·61	17	8·24–11·47	9·89	13	12·21–16·72	13·48
,,	19–20	13	1·09–1·83	1·28	13	2·79–6·65	4·03	21	8·42–11·03	9·83	14	11·60–14·40	13·22
,,	20–21	9	0·94–1·59	1·24	10	2·95–5·76	4·27	15	8·13–10·19	9·21	12	12·37–13·93	13·03
,,	21–22	14	0·60–1·98	1·24	14	3·02–6·77	4·22	19	7·91–11·55	9·74	17	11·26–14·01	12·78
,,	22–23	17	0·98–1·79	1·32	19	3·54–7·14	4·64	17	8·22–12·08	9·71	12	10·22–15·25	13·35
,,	23–24	24	0·34–1·84	1·18	30	2·51–6·05	4·45	36	8·74–11·92	10·14	22	12·51–14·95	13·46
,,	24–25	31	0·65–1·76	1·26	40	2·45–7·57	4·90	51	7·66–12·16	9·94	38	11·89–14·27	13·19
,,	25–26	15	0·59–1·60	1·33	20	2·91–7·47	4·88	28	8·51–12·20	9·99	21	12·04–14·26	12·56
,,	26–27	2	1·04–1·59	1·31	2	4·23–4·63	4·43	3	9·26–9·81	9·62	2	12·96–13·04	13·00

	Metre lengths	22. Skull length, condyle to tip of premaxilla			23. Flipper, tip to head of humerus			24. Tail, depth at dorsal fin			25. Flukes, notch to tip		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	1–2	—	—	—	—	—	—	5	9·60–11·18	10·46	3	9·47–12·37	11·01
,,	2–3	—	—	—	—	—	—	6	10·40–13·02	11·46	6	12·38–15·81	13·77
,,	3–4	—	—	—	—	—	—	3	10·09–11·21	10·74	3	12·33–13·07	12·58
,,	4–5	—	—	—	—	—	—	1	—	11·16	1	—	12·63
Whale	16–17	—	—	—	—	—	—	—	—	—	—	—	—
,,	17–18	—	—	—	—	—	—	10	8·15–12·18	9·87	—	—	—
,,	18–19	—	—	—	—	—	—	9	8·87–10·01	9·36	—	—	—
,,	19–20	—	—	—	—	—	—	8	8·29–10·95	9·60	—	—	—
,,	20–21	—	—	—	—	—	—	7	9·36–10·78	10·00	—	—	—
,,	21–22	—	—	—	—	—	—	11	9·07–10·92	9·99	—	—	—
,,	22–23	—	—	—	—	—	—	13	7·11–11·15	9·34	—	—	—
,,	23–24	1	—	26·99	—	—	—	26	8·13–10·85	9·35	—	—	—
,,	24–25	—	—	—	—	—	—	38	8·10–11·45	9·52	—	—	—
,,	25–26	—	—	—	—	—	—	18	8·57–10·20	9·38	—	—	—
,,	26–27	—	—	—	—	—	—	1	—	8·32	—	—	—

Male Blue Whales: South Africa

Measurements expressed as percentages of total length.

	Metre lengths	2. Lower jaw, projection beyond tip of snout			3. Tip of snout to blowhole			4. Tip of snout to angle of gape			5. Tip of snout to centre of eye		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	2	12·36–13·13	12·75	2	17·50–17·98	17·74	2	18·00–18·75	18·38
Whale	15–16	—	—	—	1	—	17·06	—	—	—	1	—	20·09
,,	16–17	—	—	—	2	16·09–16·99	16·54	2	18·34–19·76	19·05	2	18·82–19·88	19·35
,,	17–18	—	—	—	20	15·20–17·68	16·22	17	17·71–19·71	18·27	19	16·96–20·29	18·70
,,	18–19	—	—	—	33	14·84–18·31	16·63	31	16·94–19·95	18·44	33	17·58–20·38	19·08
,,	19–20	—	—	—	23	14·95–18·25	16·49	21	17·10–19·59	18·48	23	17·72–20·68	19·12
,,	20–21	—	—	—	13	15·98–18·91	17·00	12	18·16–19·75	18·92	14	18·76–20·25	19·51
,,	21–22	—	—	—	1	—	17·16	1	—	19·45	1	—	20·23
,,	22–23	—	—	—	7	16·80–19·13	17·78	5	19·26–20·45	19·72	7	20·00–21·11	20·53
,,	23–24	—	—	—	6	17·06–19·67	18·35	3	19·61–22·01	20·54	7	19·49–22·18	20·86
,,	24–25	—	—	—	7	17·74–19·63	18·67	6	19·79–20·85	20·26	7	20·41–21·51	21·01
,,	25–26	—	—	—	1	—	17·72	1	—	21·63	2	20·54–22·62	21·58
,,	26–27	—	—	—	2	16·73–19·70	18·22	2	19·15–21·29	20·22	2	19·62–22·24	20·93

	Metre lengths	10. Notch of flukes to anus			11. Notch of flukes to umbilicus			12. Notch of flukes to end of ventral grooves			13. Anus to reproductive aperture, centres		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	2	28·54–31·25	29·90	2	43·82–46·25	45·03	—	—	—	2	6·25–6·74	6·50
Whale	15–16	1	—	29·37	1	—	45·80	1	—	43·27	1	—	7·58
,,	16–17	2	30·09–30·47	30·28	2	47·20–47·34	47·27	2	42·49–44·84	43·67	2	7·51–7·67	7·59
,,	17–18	18	28·20–32·17	30·22	18	45·62–51·76	47·76	14	43·19–50·00	45·29	18	3·99–8·41	7·17
,,	18–19	33	28·23–32·11	30·32	32	45·22–49·31	47·53	27	40·27–47·55	44·64	29	3·17–8·60	6·78
,,	19–20	22	27·96–32·49	30·40	23	45·34–49·74	47·30	17	42·93–46·43	44·72	18	4·15–8·42	6·82
,,	20–21	14	27·55–31·75	29·83	14	44·71–48·50	46·68	10	39·90–46·89	43·92	13	4·35–8·13	6·97
,,	21–22	1	—	31·12	1	—	46·68	1	—	42·11	1	—	7·32
,,	22–23	7	27·73–29·60	29·01	6	44·98–46·46	45·99	5	42·14–45·23	43·49	7	4·62–7·42	6·78
,,	23–24	7	26·60–29·76	28·55	7	39·96–45·69	44·24	3	39·75–43·78	41·95	7	6·03–7·51	6·76
,,	24–25	7	27·46–29·96	29·10	7	44·47–46·77	45·71	7	40·08–45·15	43·00	7	4·95–7·79	6·80
,,	25–26	2	27·38–29·27	28·33	2	44·25–45·56	44·91	2	40·48–43·24	41·86	2	6·94–7·14	7·04
,,	26–27	2	28·52–29·23	28·88	2	44·81–44·87	44·84	2	40·30–41·54	40·92	2	6·15–6·84	6·50

	Metre lengths	18. Flipper, length along curve of lower border			19. Flipper, greatest width			20. Severed head, condyle to tip			21. Skull, greatest width		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	2	12·58–14·00	13·29	2	3·75–3·82	3·78	—	—	—	—	—	—
Whale	15–16	—	—	—	—	—	—	—	—	—	—	—	—
,,	16–17	2	13·96–13·98	13·97	2	3·79–3·83	3·81	2	23·37–23·60	23·49	2	11·54–11·92	11·73
,,	17–18	12	12·89–14·32	13·72	9	3·35–3·77	3·57	10	20·45–23·88	22·79	9	9·83–11·29	10·48
,,	18–19	25	12·91–15·83	13·86	26	3·27–3·91	3·68	19	21·33–25·52	23·42	19	9·78–12·68	11·02
,,	19–20	14	12·93–14·86	13·81	14	3·22–4·01	3·65	10	22·14–24·68	23·08	9	10·53–11·86	11·05
,,	20–21	12	12·60–14·69	13·79	14	3·29–3·93	3·67	10	22·40–25·62	23·85	10	10·21–12·44	11·27
,,	21–22	1	—	14·65	1	—	3·75	1	—	24·71	1	—	11·44
,,	22–23	7	13·50–14·86	14·12	6	3·32–3·96	3·75	3	24·67–25·41	24·92	3	11·05–11·22	11·15
,,	23–24	6	13·43–15·11	13·88	6	3·42–4·04	3·69	4	25·21–27·06	26·23	4	10·26–11·30	10·96
,,	24–25	5	12·83–14·78	13·46	5	3·38–3·87	3·64	4	25·25–26·80	25·78	4	11·00–11·70	11·46
,,	25–26	2	13·10–13·82	13·46	2	3·78–3·89	3·80	1	—	25·10	1	—	11·74
,,	26–27	2	12·96–13·19	13·08	2	3·46–3·80	3·63	2	23·54–27·00	25·27	2	11·00–11·41	11·21

Male Blue Whales: South Africa

Measurements expressed as percentages of total length.

	Metre lengths	6. Tip of snout to tip of flipper			7. Eye to ear, centres			8. Notch of flukes to posterior emargination of dorsal fin			9. Flukes, width at insertion		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	2	42·70–43·75	43·23	—	—	—	2	27·50–28·09	27·80	—	—	—
Whale	15–16	1	—	43·27	1	—	5·94	1	—	24·00	1	—	5·05
,,	16–17	2	41·66–41·89	41·78	2	5·55–7·10	6·33	2	25·44–26·08	25·76	2	4·73–6·31	5·52
,,	17–18	16	40·28–42·90	41·60	20	4·99–5·85	5·34	15	22·86–28·11	24·96	21	4·70–5·97	5·34
,,	18–19	30	37·00–44·06	41·64	33	4·95–5·99	5·36	28	23·48–28·00	25·71	33	4·70–5·80	5·32
,,	19–20	21	36·20–45·03	41·62	21	4·74–5·62	5·27	17	23·82–29·95	25·38	23	4·31–5·88	5·23
,,	20–21	13	37·29–44·38	42·16	14	4·77–5·57	5·25	13	23·56–27·12	24·86	14	4·65–5·50	5·14
,,	21–22	1	—	43·71	1	—	5·22	1	—	25·17	1	—	4·94
,,	22–23	7	42·57–47·05	44·01	6	4·22–6·03	5·26	7	22·71–25·98	24·51	7	4·66–5·72	5·23
,,	23–24	5	41·49–45·53	43·68	6	5·25–5·82	5·46	6	22·84–25·63	24·99	7	5·02–5·49	5·21
,,	24–25	6	41·96–44·67	43·69	7	5·10–5·69	5·40	7	22·24–25·74	24·39	7	4·67–5·07	4·95
,,	25–26	2	44·79–46·83	45·81	2	5·56–6·15	5·86	2	22·06–23·94	23·00	2	4·40–5·08	4·74
,,	26–27	2	41·54–44·68	43·11	2	5·12–5·86	5·49	2	23·19–23·85	23·52	2	4·62–5·02	4·82

	Metre lengths	14. Dorsal fin, vertical height			15. Dorsal fin, length of base			16. Flipper, tip to axilla			17. Flipper, tip to anterior end of lower border		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	2	0·45–0·63	0·54	2	2·70–3·75	3·23	2	10·00–10·11	10·06	2	12·36–13·75	13·06
Whale	15–16	—	—	—	1	—	1·26	—	—	—	—	—	—
,,	16–17	2	0·88–1·24	1·06	2	3·83–6·75	5·29	2	9·76–10·03	9·90	2	13·20–13·33	13·27
,,	17–18	16	1·03–1·80	1·34	17	2·86–6·98	4·86	16	9·12–11·11	9·80	12	12·36–13·62	13·04
,,	18–19	30	0·70–1·87	1·34	30	2·43–6·65	4·52	31	8·86–11·09	9·83	25	11·98–14·78	13·14
,,	19–20	18	0·73–1·78	1·24	19	2·63–6·05	4·34	21	9·32–10·97	10·05	14	12·47–13·68	13·17
,,	20–21	13	0·79–1·84	1·42	13	3·90–6·25	4·90	14	8·99–10·92	9·94	14	12·21–13·90	13·05
,,	21–22	1	—	1·65	1	—	5·49	—	—	—	1	—	13·64
,,	22–23	6	1·02–1·55	1·29	7	2·88–4·50	3·87	7	8·85–10·77	10·13	7	12·39–14·07	13·36
,,	23–24	5	1·07–1·59	1·25	7	3·43–6·28	4·84	7	9·22–10·68	10·15	6	12·76–14·04	13·19
,,	24–25	3	0·92–1·43	1·14	7	3·28–5·44	4·08	6	8·55–11·07	9·86	5	11·98–13·25	12·65
,,	25–26	—	—	—	2	3·47–6·55	5·01	2	10·42–10·52	10·47	2	12·54–13·20	12·87
,,	26–27	1	—	1·71	2	4·23–4·94	4·59	2	9·38–10·27	9·83	2	12·27–12·74	12·50

	Metre lengths	22. Skull length, condyle to tip of premaxilla			23. Flipper, tip to head of humerus			24. Tail, depth at dorsal fin			25. Flukes, notch to tip		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	—	—	—	2	8·99–10·00	9·50	2	8·09–10·00	9·05
Whale	15–16	—	—	—	—	—	—	1	—	8·84	—	—	—
,,	16–17	—	—	—	—	—	—	2	8·46– 8·85	8·65	—	—	—
,,	17–18	1	—	23·43	—	—	—	15	7·82–11·14	8·68	—	—	—
,,	18–19	1	—	22·50	1	—	14·47	26	7·57– 9·74	8·55	—	—	—
,,	19–20	—	—	—	1	—	14·71	17	7·83– 9·11	8·52	—	—	—
,,	20–21	1	—	23·12	—	—	—	13	8·03– 9·98	8·88	—	—	—
,,	21–22	—	—	—	—	—	—	1	—	9·15	—	—	—
,,	22–23	—	—	—	—	—	—	6	8·30– 9·77	8·80	—	—	—
,,	23–24	—	—	—	—	—	—	5	8·12–10·09	8·99	—	—	—
,,	24–25	—	—	—	—	—	—	6	7·36– 8·96	8·22	—	—	—
,,	25–26	—	—	—	—	—	—	2	7·22– 8·21	7·71	—	—	—
,,	26–27	—	—	—	—	—	—	2	8·65– 9·01	8·83	—	—	—

Female Blue Whales: South Georgia

Measurements expressed as percentages of total length.

	Metre lengths	2. Lower jaw, projection beyond tip of snout			3. Tip of snout to blowhole			4. Tip of snout to angle of gape			5. Tip of snout to centre of eye		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	1	—	1·10	5	11·61–13·40	12·69	5	14·06–16·56	15·99	5	16·48–18·18	17·49
,,	1–2	—	—	—	4	13·93–15·96	14·90	4	16·92–18·62	17·58	4	18·46–20·21	19·03
,,	2–3	—	—	—	6	13·94–15·71	15·00	7	17·31–18·20	17·64	7	18·01–19·62	18·52
,,	3–4	—	—	—	—	—	—	—	—	—	—	—	—
,,	4–5	—	—	—	6	14·77–17·54	15·52	4	17·51–18·12	17·77	6	17·27–19·06	18·26
,,	5–6	—	—	—	1	—	13·46	1	—	16·73	1	—	16·23
,,	6–7	—	—	—	1	—	14·30	1	—	18·10	1	—	17·78
Whale	16–17	—	—	—	3	14·58–17·42	16·17	3	14·03–18·35	16·55	4	15·20–19·52	17·86
,,	17–18	1	—	1·85	6	14·61–17·21	15·99	3	16·85–18·54	17·90	6	17·25–19·55	18·51
,,	18–19	2	1·48–1·59	1·54	18	13·70–19·34	16·43	16	15·38–20·44	18·11	21	16·43–21·21	18·81
,,	19–20	1	—	1·38	18	13·95–19·49	16·24	16	15·31–22·56	18·28	22	16·53–24·12	19·05
,,	20–21	1	—	1·46	15	15·44–18·75	17·24	13	16·38–20·53	19·05	18	17·37–20·90	19·59
,,	21–22	—	—	—	12	14·65–19·38	17·30	10	16·84–20·85	19·08	12	17·44–22·86	19·91
,,	22–23	1	—	1·77	15	16·63–19·65	17·85	9	18·90–20·66	19·56	16	19·56–21·83	20·28
,,	23–24	—	—	—	20	16·48–20·96	18·38	6	19·06–21·37	20·09	22	18·53–21·80	20·70
,,	24–25	1	—	1·57	25	15·94–20·45	18·29	4	19·67–20·52	20·07	27	19·20–22·67	20·82
,,	25–26	2	1·82–2·48	2·15	49	16·43–21·60	19·16	7	18·38–21·18	20·12	53	19·21–22·87	21·18
,,	26–27	1	—	1·63	49	16·54–20·65	18·89	8	19·01–21·44	20·38	53	19·43–23·67	21·16
,,	27–28	—	—	—	8	16·21–19·56	18·41	1	—	19·93	9	20·04–21·08	20·58
,,	28–29	—	—	—	2	18·75–19·68	19·22	1	—	21·81	2	20·54–22·09	21·32

	Metre lengths	10. Notch of flukes to anus			11. Notch of flukes to umbilicus			12. Notch of flukes to end of ventral grooves			13. Anus to reproductive aperture, centres		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	5	29·09–31·25	30·47	5	46·02–46·88	46·36	—	—	—	5	1·65–3·09	2·34
,,	1–2	4	28·19–33·85	31·62	4	44·15–49·23	47·58	4	42·55–53·85	48·20	4	2·01–2·31	2·13
,,	2–3	7	29·37–33·65	31·26	7	44·66–53·55	47·61	7	40·78–50·71	44·92	7	1·94–3·40	2·67
,,	3–4	—	—	—	—	—	—	—	—	—	—	—	—
,,	4–5	6	29·55–32·70	31·52	6	41·24–48·96	46·33	6	42·59–46·01	44·39	6	2·27–3·15	2·69
,,	5–6	1	—	34·03	1	—	50·00	1	—	50·00	1	—	3·08
,,	6–7	1	—	29·84	1	—	43·65	1	—	41·90	1	—	1·90
Whale	16–17	4	28·75–33·84	31·29	4	46·60–51·69	49·12	1	—	45·26	4	2·08–3·12	2·56
,,	17–18	7	29·80–32·87	31·56	7	46·54–49·58	48·19	3	42·74–48·19	45·51	7	2·02–3·37	2·38
,,	18–19	21	28·57–32·95	31·09	21	45·50–49·15	47·35	16	42·41–47·85	44·43	21	1·37–3·99	2·77
,,	19–20	22	27·75–32·37	30·67	22	45·13–50·79	47·70	12	43·81–47·74	45·67	22	1·72–3·51	2·63
,,	20–21	19	25·75–32·25	29·65	16	45·32–48·54	46·34	10	41·79–47·14	44·09	17	1·74–3·15	2·50
,,	21–22	13	28·57–31·79	29·54	12	43·60–46·91	45·63	7	40·71–45·47	43·36	13	1·90–3·29	2·55
,,	22–23	15	27·97–30·77	29·55	15	44·35–49·09	45·90	10	41·85–46·15	43·69	15	2·22–3·12	2·64
,,	23–24	21	27·97–31·43	29·64	20	43·88–49·57	45·99	10	41·29–46·54	43·22	22	1·48–3·04	2·34
,,	24–25	28	25·51–30·53	28·53	27	41·90–46·99	44·64	19	38·66–44·17	42·18	28	2·01–3·07	2·48
,,	25–26	54	25·78–31·20	28·16	52	41·80–47·52	44·37	35	37·98–44·75	41·78	54	1·56–3·17	2·47
,,	26–27	54	24·23–31·23	28·25	53	40·90–47·60	44·28	34	39·70–44·10	41·68	54	1·69–3·73	2·56
,,	27–28	9	27·57–30·50	28·75	9	42·73–46·04	44·21	3	41·29–43·24	42·26	9	1·92–3·63	2·55
,,	28–29	2	27·27–27·86	27·57	2	43·62–45·00	44·31	1	—	40·78	2	2·13–2·68	2·41

	Metre lengths	18. Flipper, length along curve of lower border			19. Flipper, greatest width			20. Severed head, condyle to tip			21. Skull, greatest width		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	5	10·91–14·29	12·74	5	3·09–4·40	3·78	—	—	—	1	—	15·46
,,	1–2	4	15·00–17·09	16·07	4	3·77–4·10	3·93	—	—	—	3	14·73–15·43	15·18
,,	2–3	6	15·49–16·04	16·16	6	2·82–4·29	3·90	—	—	—	1	—	14·55
,,	3–4	—	—	—	—	—	—	—	—	—	—	—	—
,,	4–5	5	17·71–19·06	18·45	6	4·24–4·85	4·50	—	—	—	—	—	—
,,	5–6	1	—	16·73	1	—	4·62	—	—	—	—	—	—
,,	6–7	1	—	19·52	1	—	4·76	—	—	—	—	—	—
Whale	16–17	2	14·15–14·46	14·31	2	3·63–3·69	3·66	2	23·09–24·02	23·56	3	9·85–11·11	10·67
,,	17–18	5	13·41–15·32	14·13	4	3·37–3·93	3·63	5	21·07–24·30	23·31	5	10·50–12·92	11·74
,,	18–19	13	13·06–15·30	13·97	13	3·30–4·10	3·60	9	21·50–26·24	23·33	9	10·90–12·29	11·45
,,	19–20	14	12·42–15·11	13·64	16	2·91–3·98	3·63	15	21·99–25·34	23·28	14	10·71–12·41	11·60
,,	20–21	14	12·77–14·98	13·77	16	2·25–3·97	3·52	15	21·84–26·42	24·05	13	10·58–12·40	11·49
,,	21–22	9	12·12–15·08	13·85	9	3·04–3·93	3·61	11	23·70–26·43	24·58	9	11·03–12·71	11·89
,,	22–23	9	13·02–15·06	14·33	10	3·35–4·04	3·74	11	24·12–26·20	24·96	10	11·10–12·23	11·65
,,	23–24	14	12·72–14·96	14·13	16	3·17–3·97	3·63	13	23·93–27·23	25·51	15	10·43–12·55	11·65
,,	24–25	18	12·09–16·19	14·14	20	2·99–4·13	3·62	20	23·68–27·35	25·15	17	10·39–12·85	11·55
,,	25–26	33	12·01–15·94	13·87	35	3·32–4·19	3·67	40	23·81–27·98	25·79	37	10·16–13·56	11·75
,,	26–27	31	12·22–15·17	13·75	32	3·32–4·18	3·74	33	23·18–28·03	25·62	32	9·47–12·97	11·60
,,	27–28	6	11·44–15·86	13·17	7	3·25–4·00	3·59	6	24·19–25·91	25·15	6	10·33–11·66	11·06
,,	28–29	2	13·65–14·18	13·92	1	—	3·71	2	25·36–26·42	25·89	2	11·74–11·79	11·77

Female Blue Whales: South Georgia

Measurements expressed as percentages of total length.

	Metre lengths	6. Tip of snout to tip of flipper			7. Eye to ear, centres			8. Notch of flukes to posterior emargination of dorsal fin			9. Flukes, width at insertion		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	5	40·63–43·64	41·71	2	7·53–7·69	7·61	5	25·77–29·69	·27·37	5	6·59–9·38	8·26
,,	1–2	4	43·08–46·28	44·21	4	6·53–7·79	7·23	4	24·12–28·46	26·69	4	7·54–8·20	7·39
,,	2–3	7	42·79–45·28	44·51	5	5·10–7·14	6·45	7	26·21–29·86	27·21	7	6·25–9·06	7·71
,,	3–4	—	—	—	—	—	—	—	—	—	—	—	—
,,	4–5	5	43·04–44·94	44·46	6	6·00–6·82	6·42	5	23·86–28·81	26·80	5	6·54–8·26	7·42
,,	5–6	1	—	43·27	1	—	5·96	1	—	25·00	1	—	6·15
,,	6–7	1	—	46·03	1	—	5·87	1	—	27·46	1	—	8·89
Whale	16–17	4	37·78–42·45	40·54	3	4·61–5·26	4·99	1	—	23·73	4	5·54–5·71	5·61
,,	17–18	6	38·44–42·74	40·70	6	4·66–5·95	5·29	4	23·95–27·24	25·23	7	4·46–5·90	5·27
,,	18–19	17	38·44–42·55	40·91	19	4·92–6·20	5·24	20	22·31–27·46	25·27	19	4·86–6·43	5·38
,,	19–20	18	38·86–44·61	41·71	20	4·65–6·87	5·26	17	23·66–27·95	26·03	20	4·69–6·30	5·42
,,	20–21	17	39·45–44·40	42·37	13	4·68–5·91	5·38	11	23·74–27·54	25·25	17	4·90–5·96	5·45
,,	21–22	12	38·05–44·29	42·34	10	4·88–5·85	5·37	7	24·14–25·89	25·11	13	4·76–5·79	5·29
,,	22–23	13	41·08–44·28	42·46	14	4·98–5·88	5·39	12	22·67–26·40	24·84	14	4·67–5·87	5·20
,,	23–24	19	41·84–45·73	43·63	15	4·85–6·03	5·42	13	22·55–25·80	24·28	18	4·69–5·93	5·30
,,	24–25	24	38·84–46·56	43·61	21	4·91–6·20	5·54	18	22·27–25·69	24·18	25	4·78–6·07	5·23
,,	25–26	49	41·38–46·00	43·90	46	4·84–6·06	5·38	37	20·51–26·94	23·87	50	4·26–5·62	5·10
,,	26–27	43	40·92–46·96	43·91	41	4·77–5·77	5·37	37	21·72–25·97	23·76	52	4·52–6·06	5·17
,,	27–28	6	41·87–44·28	42·64	8	4·96–5·91	5·33	6	23·25–24·80	24·11	6	4·49–5·54	4·91
,,	28–29	2	40·71–44·82	42·77	2	5·21–5·46	5·33	1	—	23·05	3	4·60–4·82	4·74

	Metre lengths	14. Dorsal fin, vertical height			15. Dorsal fin, length of base			16. Flipper, tip to axilla			17. Flipper, tip to anterior end of lower border		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	5	0·55–1·03	0·83	4	4·12–4·67	4·47	5	8·79–10·31	9·48	5	10·91–13·19	12·18
,,	1–2	4	0·82–1·33	1·14	4	3·02–4·92	4·20	4	10·00–12·02	10·81	4	14·62–15·96	15·22
,,	2–3	7	1·17–2·64	1·67	6	3·85–4·85	4·44	7	10·10–15·38	11·65	6	14·42–16·23	15·30
,,	3–4	—	—	—	—	—	—	—	—	—	—	—	—
,,	4–5	5	1·53–2·06	1·78	5	2·91–5·57	4·40	5	12·50–14·12	13·09	5	16·67–17·88	17·40
,,	5–6	1	—	2·33	1	—	6·54	—	—	—	1	—	14·42
,,	6–7	1	—	1·43	1	—	4·44	1	—	13·02	1	—	18·73
Whale	16–17	2	1·23–1·47	1·35	2	3·69–3·79	3·74	3	9·61–10·70	10·05	2	13·54–13·81	13·68
,,	17–18	4	0·95–1·57	1·22	6	3·35–5·25	4·14	6	8·91– 9·89	9·48	5	12·92–14·45	13·41
,,	18–19	17	0·77–1·80	1·23	19	1·18–6·54	3·67	18	7·98–11·75	9·83	13	12·20–14·36	13·20
,,	19–20	16	0·87–2·55	1·40	18	2·98–5·67	4·18	21	7·32–11·08	9·71	14	11·65–14·21	12·87
,,	20–21	14	0·70–1·84	1·29	14	2·60–6·22	4·04	17	8·93–12·27	9·82	15	12·40–14·23	13·04
,,	21–22	9	1·05–1·86	1·40	9	3·02–4·57	4·02	12	8·53–11·04	9·67	9	11·89–14·20	13·26
,,	22–23	12	0·67–1·75	1·25	13	2·94–7·40	4·34	12	8·81–10·83	9·79	9	12·00–14·61	13·56
,,	23–24	14	0·63–2·07	1·27	16	1·92–5·56	4·17	18	8·85–11·52	10·13	14	11·92–14·23	13·37
,,	24–25	19	0·62–1·62	1·18	20	2·35–6·02	4·09	19	8·21–11·29	9·94	18	11·80–14·84	13·46
,,	25–26	37	0·66–1·53	1·20	33	3·10–6·32	4·46	42	8·69–12·55	10·14	34	11·12–14·80	13·11
,,	26–27	33	0·61–1·68	1·17	35	3·05–6·69	4·56	42	8·02–11·79	9·80	33	11·43–14·75	13·01
,,	27–28	6	0·54–1·39	1·04	6	2·44–6·62	3·91	8	8·30–11·27	9·67	6	10·83–15·68	12·57
,,	28–29	1	—	1·17	2	4·18–4·62	4·40	2	9·64–10·11	9·88	2	12·86–13·05	12·96

	Metre lengths	22. Skull length, condyle to tip of premaxilla			23. Flipper, tip to head of humerus			24. Tail, depth at dorsal fin			25. Flukes, notch to tip		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	—	—	—	5	9·09–10·94	10·01	3	9·09– 9·89	9·45
,,	1–2	—	—	—	—	—	—	4	9·02–11·17	9·81	4	10·77–12·29	11·57
,,	2–3	—	—	—	—	—	—	6	9·61–12·32	10·95	5	11·55–14·72	13·26
,,	3–4	—	—	—	—	—	—	—	—	—	—	—	—
,,	4–5	—	—	—	—	—	—	6	9·65–12·78	10·93	3	12·11–14·77	13·43
,,	5–6	—	—	—	—	—	—	—	—	—	1	—	11·55
,,	6–7	—	—	—	—	—	—	—	—	—	1	—	10·79
Whale	16–17	—	—	—	—	—	—	1	—	8·87	—	—	—
,,	17–18	—	—	—	—	—	—	2	9·39– 9·94	9·67	—	—	—
,,	18–19	—	—	—	—	—	—	13	8·23–10·07	8·95	—	—	—
,,	19–20	1	—	22·67	1	—	15·71	11	8·16–10·31	9·39	—	—	—
,,	20–21	—	—	—	—	—	—	4	8·74– 9·85	9·20	—	—	—
,,	21–22	—	—	—	—	—	—	4	7·98–10·07	9·13	—	—	—
,,	22–23	—	—	—	—	—	—	8	8·57–10·18	9·33	—	—	—
,,	23–24	—	—	—	—	—	—	9	7·89–11·00	9·77	—	—	—
,,	24–25	1	—	24·95	—	—	—	14	8·25–11·06	9·54	—	—	—
,,	25–26	—	—	—	—	—	—	30	7·78–11·37	9·65	—	—	—
,,	26–27	—	—	—	—	—	—	28	7·84–10·65	9·23	—	—	—
,,	27–28	—	—	—	—	—	—	4	7·47– 9·07	8·32	—	—	—
,,	28–29	—	—	—	—	—	—	1	—	10·71	—	—	—

Female Blue Whales: South Africa

Measurements expressed as percentages of total length.

	Metre lengths	2. Lower jaw, projection beyond tip of snout			3. Tip of snout to blowhole			4. Tip of snout to angle of gape			5. Tip of snout to centre of eye		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	1	—	12·50	1	—	16·07	1	—	17·86
Whale	13–14	—	—	—	2	13·11–13·84	13·48	2	14·61–14·84	14·73	2	14·98–15·63	15·30
,,	14–15	—	—	—	—	—	—	—	—	—	—	—	—
,,	15–16	—	—	—	—	—	—	—	—	—	—	—	—
,,	16–17	—	—	—	7	14·49–16·86	16·04	7	16·86–19·56	18·16	7	16·92–19·68	18·65
,,	17–18	—	—	—	16	15·47–17·61	16·53	15	17·13–19·52	18·47	16	18·04–20·55	18·98
,,	18–19	1	—	1·04	25	15·28–18·08	16·47	22	17·47–19·14	18·25	28	17·89–19·94	18·88
,,	19–20	—	—	—	23	15·26–18·14	16·63	19	17·10–20·25	18·60	23	17·78–20·66	19·17
,,	20–21	1	—	0·95	11	15·19–18·20	17·17	8	18·13–20·00	19·26	12	17·93–21·49	20·02
,,	21–22	—	—	—	8	16·58–19·02	17·82	7	18·43–20·66	19·63	8	19·21–21·27	20·33
,,	22–23	—	—	—	5	17·18–19·55	17·92	2	19·64–20·22	19·93	5	20·23–21·79	20·74
,,	23–24	—	—	—	2	17·55–19·28	18·42	1	—	20·75	2	20·21–21·38	20·79
,,	24–25	—	—	—	6	16·23–20·16	18·45	2	18·47–20·96	19·72	6	18·88–22·37	20·92
,,	25–26	—	—	—	7	17·73–19·84	19·63	3	20·12–21·67	20·99	7	20·43–22·29	21·09
,,	26–27	—	—	—	9	18·25–19·73	18·96	3	20·60–21·02	20·75	9	21·17–22·98	21·49
,,	27–28	—	—	—	1	—	18·19	—	—	—	1	—	20·07

	Metre lengths	10. Notch of flukes to anus			11. Notch of flukes to umbilicus			12. Notch of flukes to end of ventral grooves			13. Anus to reproductive aperture, centres		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	1	—	30·36	1	—	44·64	—	—	—	1	—	1·79
Whale	13–14	2	32·62–33·93	33·28	2	50·54–52·28	51·41	2	48·75–50·19	49·97	2	2·02–2·87	2·45
,,	14–15	—	—	—	—	—	—	—	—	—	—	—	—
,,	15–16	—	—	—	—	—	—	—	—	—	—	—	—
,,	16–17	7	30·92–33·93	31·76	7	47·33–49·70	48·59	6	45·56–48·03	46·44	7	2·50–3·27	2·91
,,	17–18	15	29·66–33·23	31·39	16	42·29–50·38	47·80	11	43·50–46·59	45·09	14	1·97–3·75	2·62
,,	18–19	27	28·95–32·25	30·79	26	46·13–50·26	47·77	20	42·89–48·05	45·20	26	2·05–3·14	2·69
,,	19–20	23	24·12–33·07	30·56	24	40·67–49·37	47·09	18	40·52–46·98	44·57	22	1·95–3·12	2·65
,,	20–21	11	26·98–31·95	29·61	11	43·84–48·50	46·68	9	42·23–46·33	44·06	10	2·39–2·98	2·71
,,	21–22	8	28·77–31·05	29·74	8	45·47–47·46	46·53	6	42·69–45·21	44·05	8	1·87–3·05	2·62
,,	22–23	5	28·19–31·13	29·55	5	44·19–46·81	45·54	4	38·93–45·14	42·63	5	2·24–2·58	2·39
,,	23–24	2	29·18–30·18	29·65	2	45·91–46·23	46·07	2	42·30–42·55	42·43	2	2·72–2·96	2·84
,,	24–25	6	27·57–30·17	28·62	6	44·15–47·62	45·60	4	41·73–45·55	43·66	5	2·01–3·29	2·87
,,	25–26	7	28·40–31·13	28·30	7	42·80–47·10	44·81	7	39·30–44·31	42·74	7	2·33–2·89	2·60
,,	26–27	9	27·35–30·07	28·27	9	43·20–46·24	44·73	9	40·61–45·48	42·37	9	2·29–3·04	2·69
,,	27–28	1	—	28·84	1	—	46·50	1	—	44·11	1	—	2·75

	Metre lengths	18. Flipper, length along curve of lower border			19. Flipper, greatest width			20. Severed head, condyle to tip			21. Skull, greatest width		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	1	—	3·57	—	—	—	—	—	—
Whale	13–14	2	13·91–14·98	14·45	2	3·66–4·49	4·07	—	—	—	—	—	—
,,	14–15	—	—	—	—	—	—	—	—	—	—	—	—
,,	15–16	—	—	—	—	—	—	—	—	—	—	—	—
,,	16–17	2	14·62–14·63	14·63	2	3·63–3·66	3·65	3	21·30–24·75	22·84	2	10·71–10·87	10·79
,,	17–18	15	12·62–14·60	13·56	13	3·31–4·04	3·74	8	23·18–25·72	24·13	7	10·33–13·50	11·24
,,	18–19	22	12·43–14·45	13·72	22	3·22–3·87	3·64	16	22·37–24·49	23·14	12	9·89–11·58	10·79
,,	19–20	18	12·84–15·72	13·84	17	3·18–3·95	3·68	11	22·52–25·29	23·58	8	10·31–11·59	11·00
,,	20–21	8	12·75–14·27	13·53	9	3·28–3·72	3·55	7	23·10–25·95	24·29	7	10·99–12·20	11·53
,,	21–22	8	12·80–13·95	13·42	8	3·29–3·78	3·56	4	23·11–24·76	24·05	2	11·44–11·71	11·58
,,	22–23	4	12·45–14·06	13·03	4	3·41–3·83	3·62	2	25·22–25·80	25·51	1	—	11·36
,,	23–24	2	13·53–13·66	13·60	2	3·56–3·59	3·58	1	—	26·41	1	—	10·90
,,	24–25	5	11·88–14·31	13·19	5	3·44–3·90	3·68	3	22·57–27·21	25·65	3	10·88–12·75	11·88
,,	25–26	6	12·85–14·41	13·58	6	3·39–3·70	3·59	5	24·16–27·08	25·96	5	10·60–12·37	11·68
,,	26–27	6	12·33–14·85	13·72	7	3·18–3·75	3·60	6	25·75–28·35	26·48	6	11·11–15·91	12·08
,,	27–28	—	—	—	1	—	3·41	1	—	25·00	1	—	10·66

Female Blue Whales: South Africa

Measurements expressed as percentages of total length.

	Metre lengths	6. Tip of snout to tip of flipper			7. Eye to ear, centres			8. Notch of flukes to posterior emargination of dorsal fin			9. Flukes, width at insertion		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	1	—	41·07	—	—	—	1	—	26·80	1	—	8·93
Whale	13–14	2	37·53–37·83	37·73	2	5·02–5·23	5·12	2	27·46–27·49	27·48	2	6·13–6·29	6·23
,,	14–15	—	—	—	—	—	—	—	—	—	—	—	—
,,	15–16	—	—	—	—	—	—	—	—	—	—	—	—
,,	16–17	6	39·88–42·60	41·19	7	4·14–5·67	5·29	6	24·32–26·68	25·74	7	4·76–5·86	5·25
,,	17–18	13	39·54–42·94	41·38	14	5·04–5·67	5·34	12	23·89–27·97	25·55	15	4·80–5·87	5·36
,,	18–19	22	39·45–43·27	41·44	25	4·78–5·68	5·27	22	23·11–27·39	25·49	28	5·05–6·02	5·35
,,	19–20	23	39·21–45·18	41·45	22	4·67–5·47	5·22	17	24·50–28·35	25·95	24	4·68–5·97	5·27
,,	20–21	11	39·75–44·22	42·13	10	5·12–5·87	5·41	9	23·26–26·75	25·29	12	4·78–5·59	5·31
,,	21–22	8	40·55–43·52	42·87	8	5·23–5·67	5·41	6	23·96–26·16	25·04	8	4·66–5·53	5·10
,,	22–23	3	42·27–43·18	42·80	4	4·54–5·85	5·37	4	23·78–24·16	24·00	5	4·86–5·50	5·19
,,	23–24	2	42·93–44·44	43·69	1	—	5·45	2	23·98–25·50	24·74	2	5·07–5·66	5·37
,,	24–25	6	39·96–45·67	43·53	6	5·17–5·60	5·40	4	23·58–25·46	24·74	6	4·98–5·34	5·19
,,	25–26	6	42·51–46·24	44·11	7	5·10–5·82	5·39	7	23·24–27·02	24·69	7	4·63–5·27	5·09
,,	26–27	8	42·48–45·59	44·48	9	5·00–5·93	5·35	9	21·82–24·81	23·82	9	4·41–5·26	5·05
,,	27–28	1	—	42·68	1	—	5·22	1	—	25·18	1	—	4·96

	Metre lengths	14. Dorsal fin, vertical height			15. Dorsal fin, length of base			16. Flipper, tip to axilla			17. Flipper, tip to anterior end of lower border		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	1	—	0·89	1	—	3·57	1	—	10·71	1	—	12·50
Whale	13–14	2	1·22–2·32	1·97	2	3·58–6·37	4·98	2	10·19–10·61	10·40	2	12·90–13·86	13·38
,,	14–15	—	—	—	—	—	—	—	—	—	—	—	—
,,	15–16	—	—	—	—	—	—	—	—	—	—	—	—
,,	16–17	6	1·00–1·42	1·18	5	2·95–4·06	3·48	6	8·92–10·59	9·86	2	13·49–13·60	13·55
,,	17–18	12	0·89–1·62	1·25	12	3·44–5·90	5·18	15	8·88–10·39	9·54	16	12·01–13·48	12·86
,,	18–19	21	0·84–2·09	1·26	23	2·76–7·49	4·74	26	8·81–10·86	9·96	22	11·78–13·84	13·06
,,	19–20	19	0·94–1·85	1·25	19	2·54–6·70	4·26	21	8·57–11·25	9·69	19	10·99–14·55	13·04
,,	20–21	10	0·79–1·90	1·34	10	2·23–5·74	3·96	10	8·28–10·15	9·41	9	11·50–13·45	12·67
,,	21–22	5	0·99–1·24	1·11	7	2·84–4·76	3·93	8	8·83–10·67	9·65	8	12·21–13·48	12·84
,,	22–23	5	1·09–1·52	1·24	5	3·08–6·71	4·41	4	9·03–10·04	9·51	4	12·04–13·12	12·38
,,	23–24	1	—	1·31	1	—	4·73	2	8·64–9·72	9·18	2	12·15–12·98	12·57
,,	24–25	3	0·91–1·65	1·35	4	4·14–6·65	5·24	5	8·82–10·28	9·55	5	11·39–13·58	12·59
,,	25–26	7	0·54–1·47	1·02	7	2·79–4·71	3·72	7	8·59–10·94	9·53	5	12·39–13·23	12·80
,,	26–27	9	0·85–1·76	1·26	9	3·22–4·69	3·93	7	9·20–10·91	10·03	6	11·65–13·94	12·85
,,	27–28	1	—	0·91	1	—	4·22	1	—	11·02	1	—	13·89

	Metre lengths	22. Skull length, condyle to tip of premaxilla			23. Flipper, tip to head of humerus			24. Tail, depth at dorsal fin			25. Flukes, notch to tip		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	—	—	—	1	—	8·93	1	—	9·82
Whale	13–14	—	—	—	—	—	—	2	10·71–10·75	10·73	—	—	—
,,	14–15	—	—	—	—	—	—	—	—	—	—	—	—
,,	15–16	—	—	—	—	—	—	—	—	—	—	—	—
,,	16–17	—	—	—	—	—	—	5	7·37–8·87	8·24	—	—	—
,,	17–18	—	—	—	—	—	—	11	7·97–9·44	8·66	—	—	—
,,	18–19	2	22·00–22·10	22·05	—	—	—	18	7·45–9·57	8·45	—	—	—
,,	19–20	—	—	—	2	13·82–15·10	14·46	17	6·58–8·89	8·21	—	—	—
,,	20–21	—	—	—	1	—	12·65	8	7·31–9·61	8·70	—	—	—
,,	21–22	—	—	—	—	—	—	6	8·06–9·52	8·78	—	—	—
,,	22–23	—	—	—	—	—	—	3	7·27–9·62	8·60	—	—	—
,,	23–24	—	—	—	—	—	—	2	9·01–10·57	9·79	—	—	—
,,	24–25	—	—	—	—	—	—	4	8·68–10·08	9·36	—	—	—
,,	25–26	—	—	—	—	—	—	7	7·78–10·23	8·78	—	—	—
,,	26–27	—	—	—	—	—	—	7	8·06–9·86	8·90	—	—	—
,,	27–28	—	—	—	—	—	—	1	—	7·72	—	—	—

The above tables have been drawn up for two purposes: (*a*) As a criterion of the alterations in bodily proportions which occur as the total length of the whale increases. (*b*) To provide a standard of comparison between the whales of South Georgia or South Africa and the whales of any other localities.

The first object is considered below. As regards the second, the tables have been prepared to provide for such cases as that of an investigator who, having procured a number of measurements of Blue whales from a locality in some other part of the world, wishes to ascertain whether these whales differ in any way from those of the South Georgia or South African region. Such measurements would be compared with averages given in the table under the appropriate whale-lengths, but it would also be required to know how much deviation could be allowed for individual variation. For this reason the maximum and minimum readings of the measurements from which each average is calculated are quoted in the table in addition to the average figure itself. The value for this purpose of these maxima and minima is of course dependent on the number of readings from which they are taken and the number of readings is therefore also quoted in each case. Under some whale-lengths the number of readings is insufficient to show the extent of deviation which might occur, but by reference to other columns there would be no difficulty in forming an idea of how much margin should be allowed for individual variation. In this way a series of measurements of even a single whale from some other locality could be profitably compared with the averages given in the tables.

Comparisons of bodily proportions are in general best made by reference to the tables themselves, but the variations of the bodily proportions according to the length of the whale are more conveniently shown by means of charts. In Figs. 1 to 23 the averages shown in the table are plotted for each metre of whale-length in the case of measurements 3, 4, 5, 6, 8, 10, 11, 12, 13, 18, 20 and 24. The other measurements do not show any definite variation with the whale-length or other points of interest.

The figures show in the first place no significant difference in the shapes of the curves for the two sexes except in the case of No. 13 (anus to reproductive aperture) to which reference has already been made. In the second place no distinction can be drawn in respect of these curves between whales of South Georgia and South Africa, at least so far as the majority of the graphs are concerned. There are some slight differences between the whales of the two localities in respect of the interval between the anus and reproductive aperture in males (Fig. 19), the length of the flipper (Figs. 20 and 21) and the depth of the tail (Figs. 22 and 23), but these are really very slight and need not be regarded as of any significance.

With the exception then of the genito-anal measurements the averages for male and female Blue whales may be considered together. The averages for foetuses have not been included in the graphs as there are not yet sufficient data upon which to base sound conclusions so far as they are concerned.

It will be seen that in both sexes the percentage measurements referring to the anterior end of the whale (see Figs. 1 to 10) show a more or less regular proportional

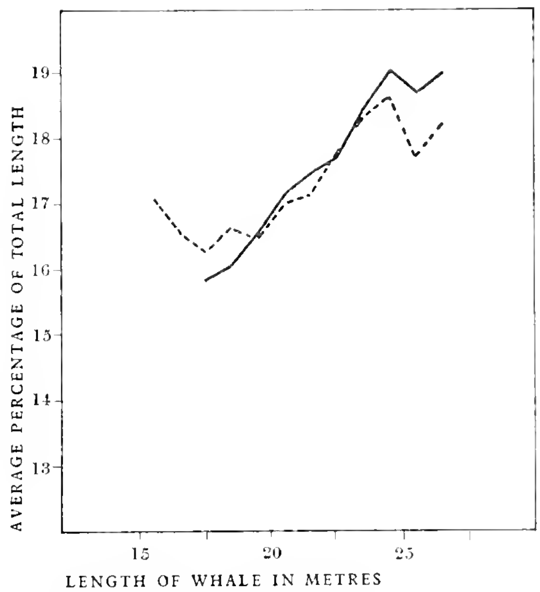


Fig. 1. Male Blue whales. Measurement No. 3.
Tip of snout to blowhole.

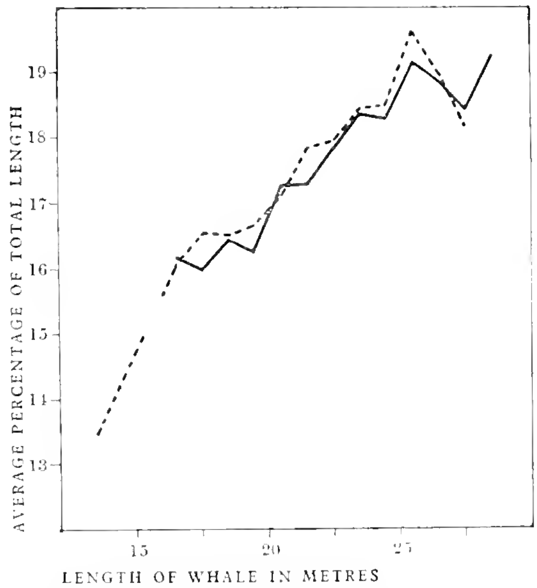


Fig. 2. Female Blue whales. Measurement No. 3.
Tip of snout to blowhole.

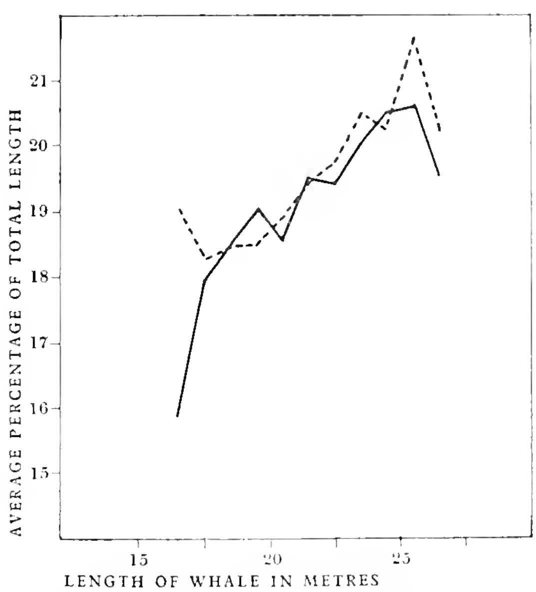


Fig. 3. Male Blue whales. Measurement No. 4.
Tip of snout to angle of gape.

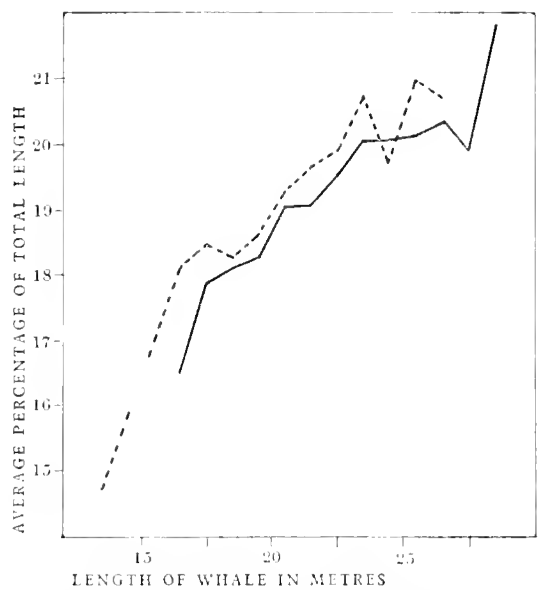


Fig. 4. Female Blue whales. Measurement No. 4.
Tip of snout to angle of gape.

——— South Georgia whales. - - - - South African whales.

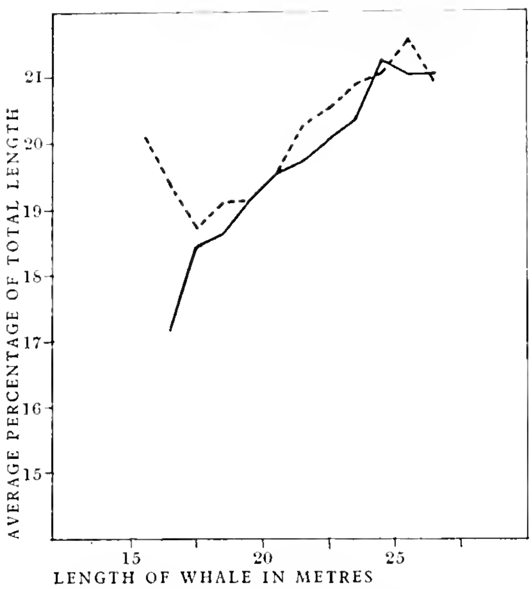


Fig. 5. Male Blue whales. Measurement No. 5. Tip of snout to centre of eye.

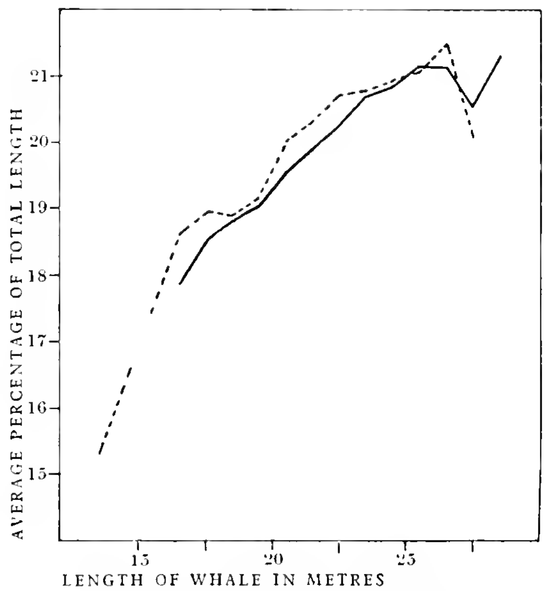


Fig. 6. Female Blue whales. Measurement No. 5. Tip of snout to centre of eye.

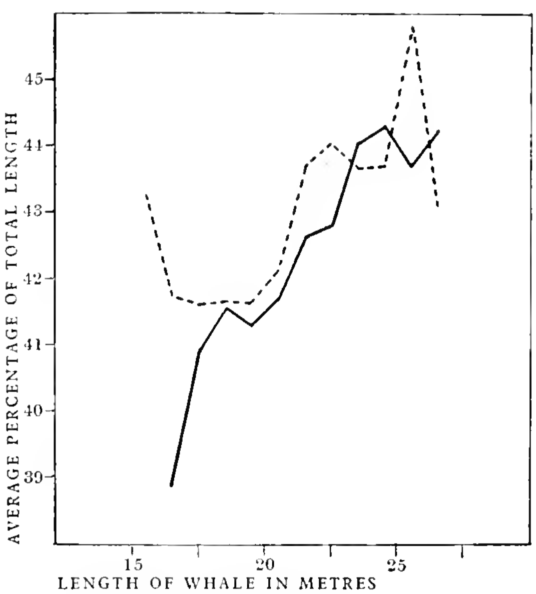


Fig. 7. Male Blue whales. Measurement No. 6. Tip of snout to tip of flipper.

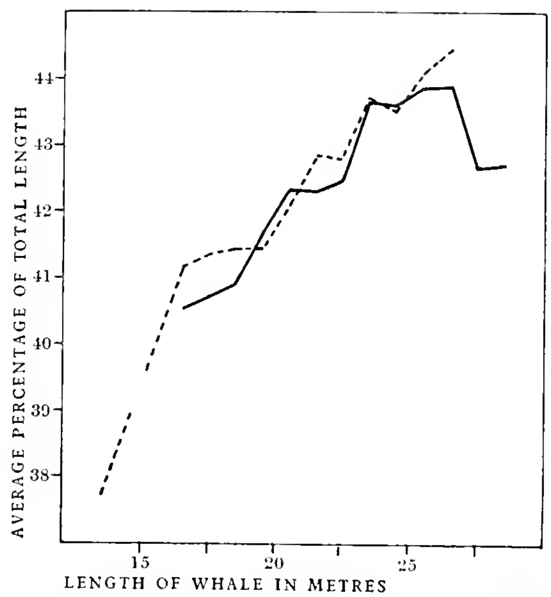


Fig. 8. Female Blue whales. Measurement No. 6. Tip of snout to tip of flipper.

——— South Georgia whales. - - - - South African whales.

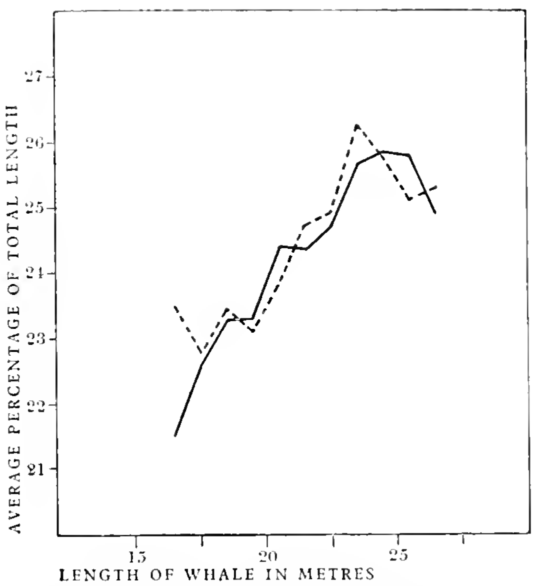


Fig. 9. Male Blue whales. Measurement No. 20. Severed head, condyle to tip.

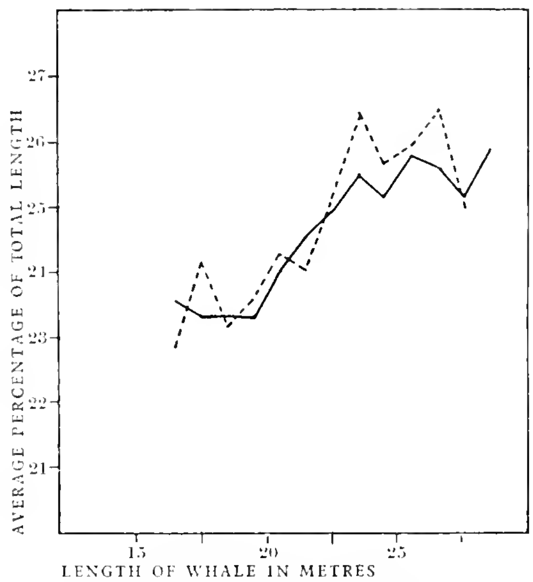


Fig. 10. Female Blue whales. Measurement No. 20. Severed head, condyle to tip.

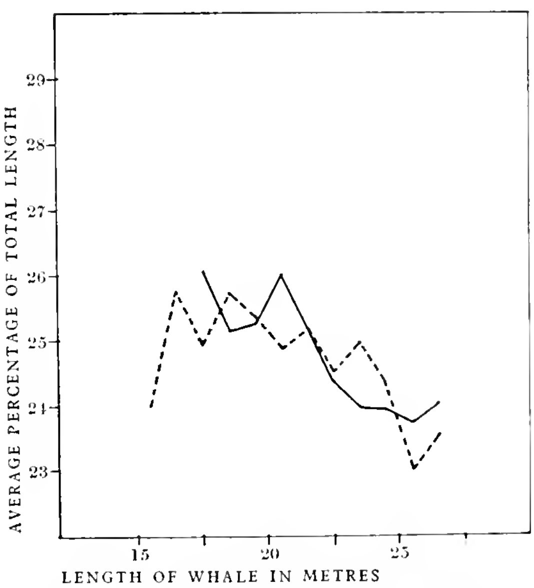


Fig. 11. Male Blue whales. Measurement No. 8. Notch of flukes to posterior emargination of dorsal fin.

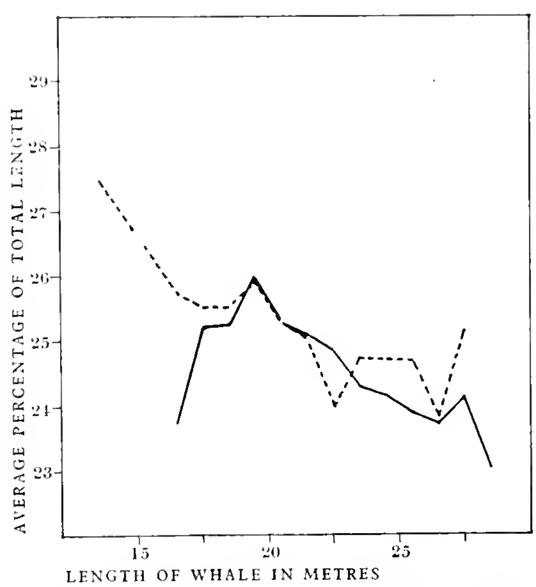


Fig. 12. Female Blue whales. Measurement No. 8. Notch of flukes to posterior emargination of dorsal fin.

——— South Georgia whales. - - - - South African whales.

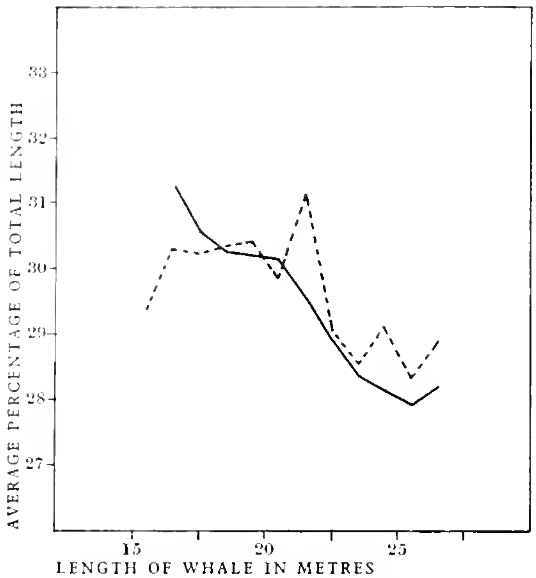


Fig. 13. Male Blue whales. Measurement No. 10. Notch of flukes to anus.

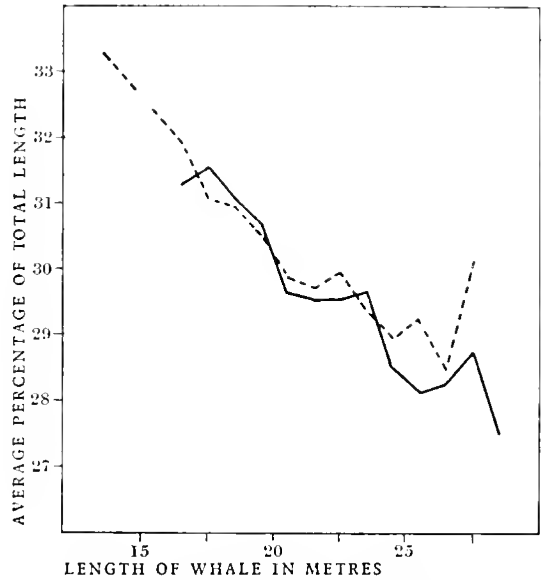


Fig. 14. Female Blue whales. Measurement No. 10. Notch of flukes to anus.

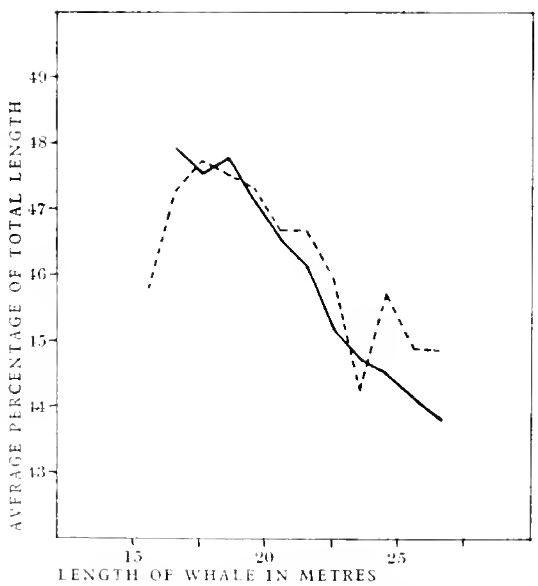


Fig. 15. Male Blue whales. Measurement No. 11. Notch of flukes to umbilicus.

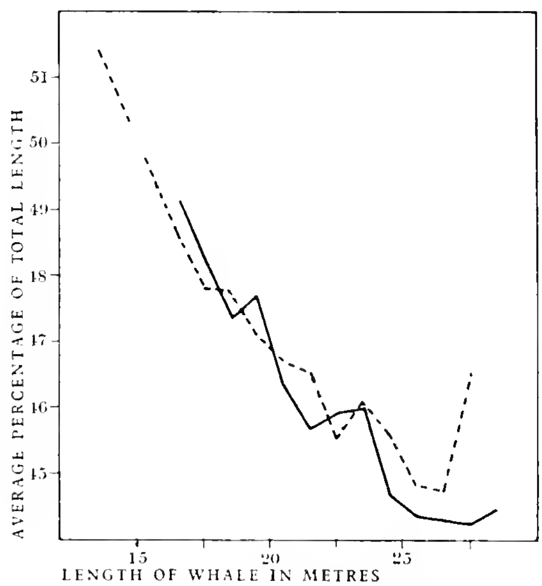


Fig. 16. Female Blue whales. Measurement No. 11. Notch of flukes to umbilicus.

——— South Georgia whales. - - - - South African whales.

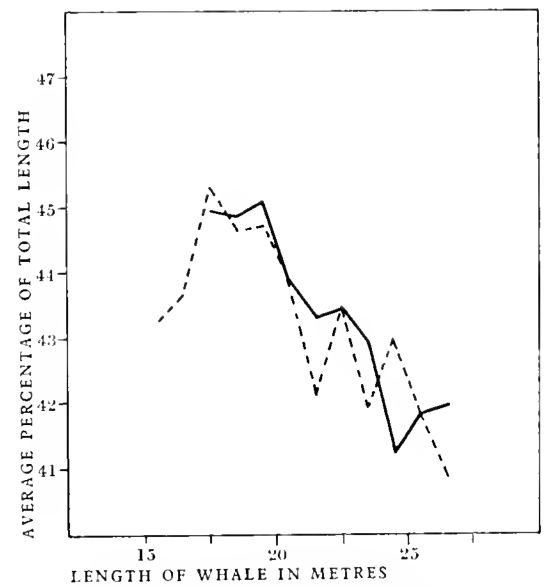


Fig. 17. Male Blue whales. Measurement No. 12. Notch of flukes to end of ventral grooves.

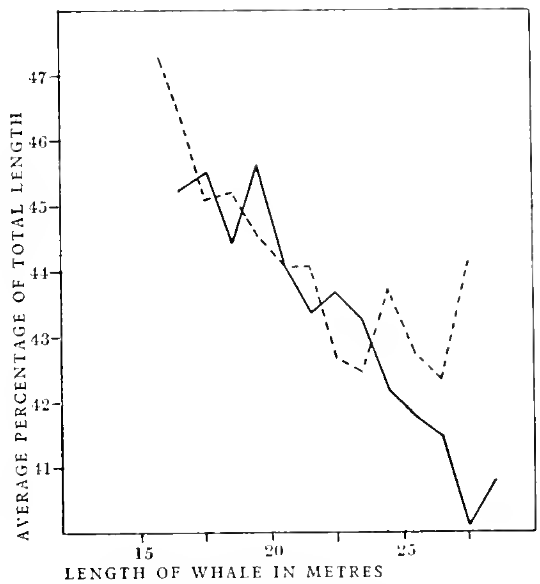


Fig. 18. Female Blue whales. Measurement No. 12. Notch of flukes to end of ventral grooves.

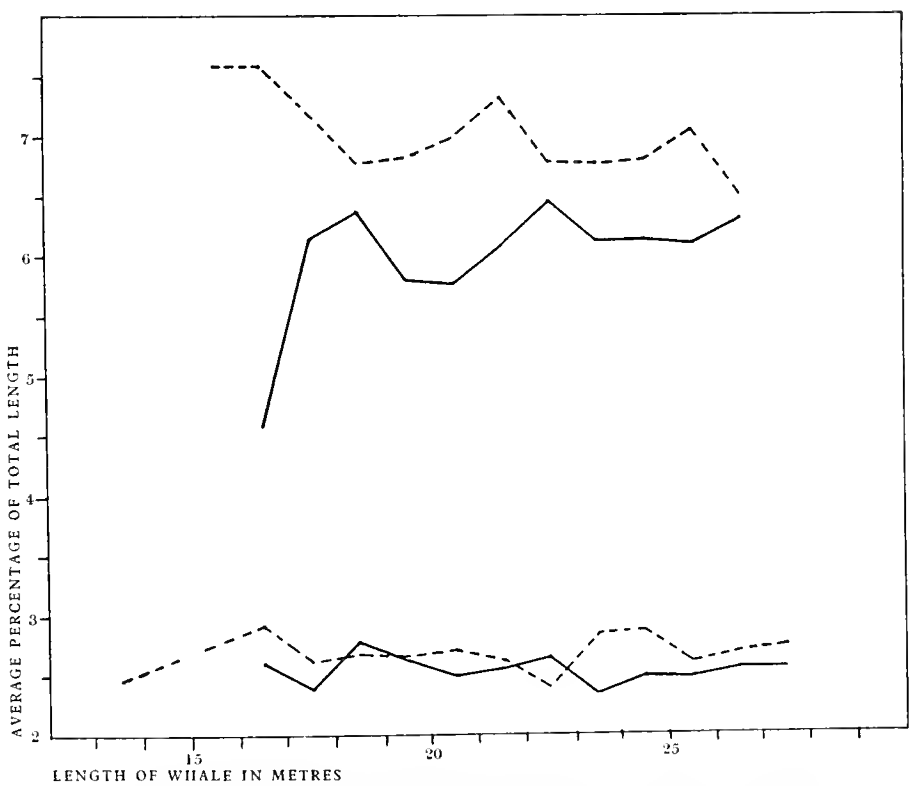


Fig. 19. Blue whales (upper curves males, lower curves females). Measurement No. 13. Anus to reproductive aperture.

——— South Georgia whales. - - - - South African whales.

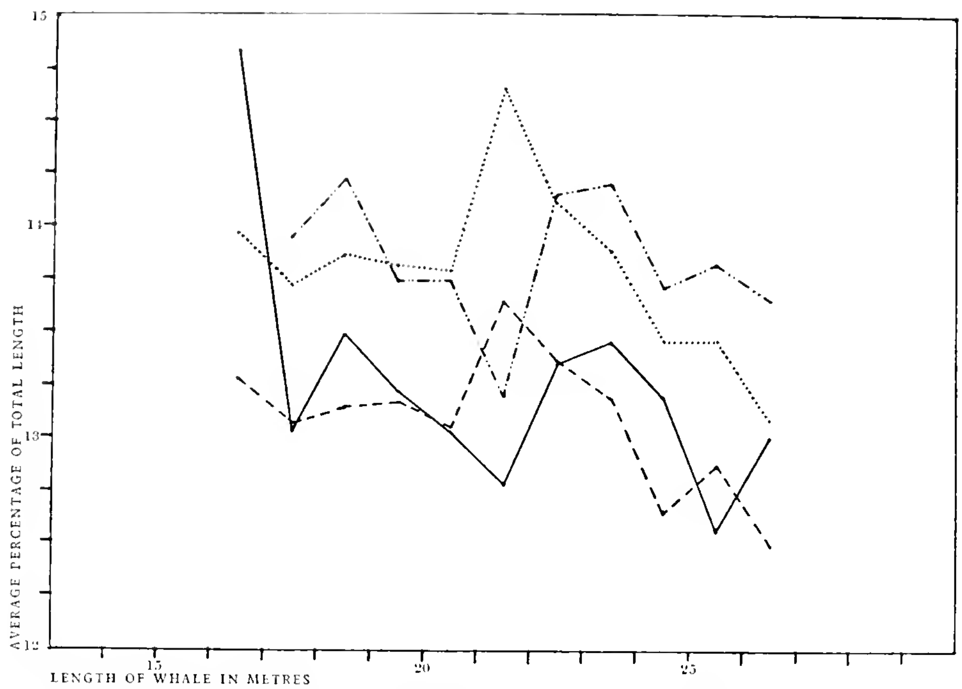


Fig. 20. Male Blue whales. Measurement No. 17. Flipper, tip to anterior end of lower border. Measurement No. 18. Flipper, length along curve of lower border. (See below.)

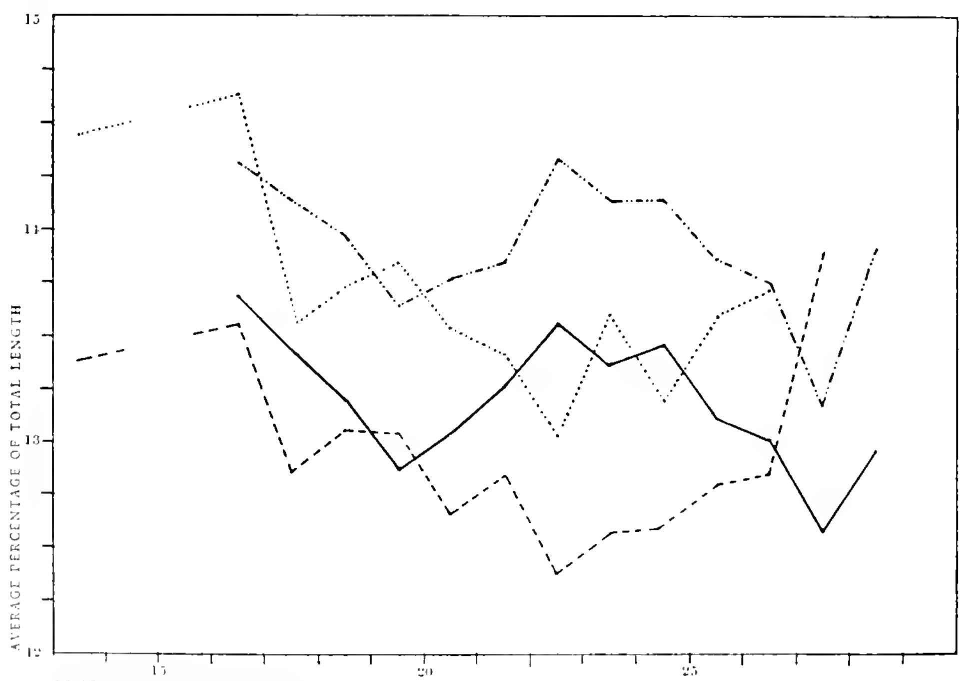


Fig. 21. Female Blue whales. Measurement No. 17. Flipper, tip to anterior end of lower border. Measurement No. 18. Flipper, length along curve of lower border.

S. Georgia, S. Africa } Measurement No. 17. S. Georgia, S. Africa } Measurement No. 18.

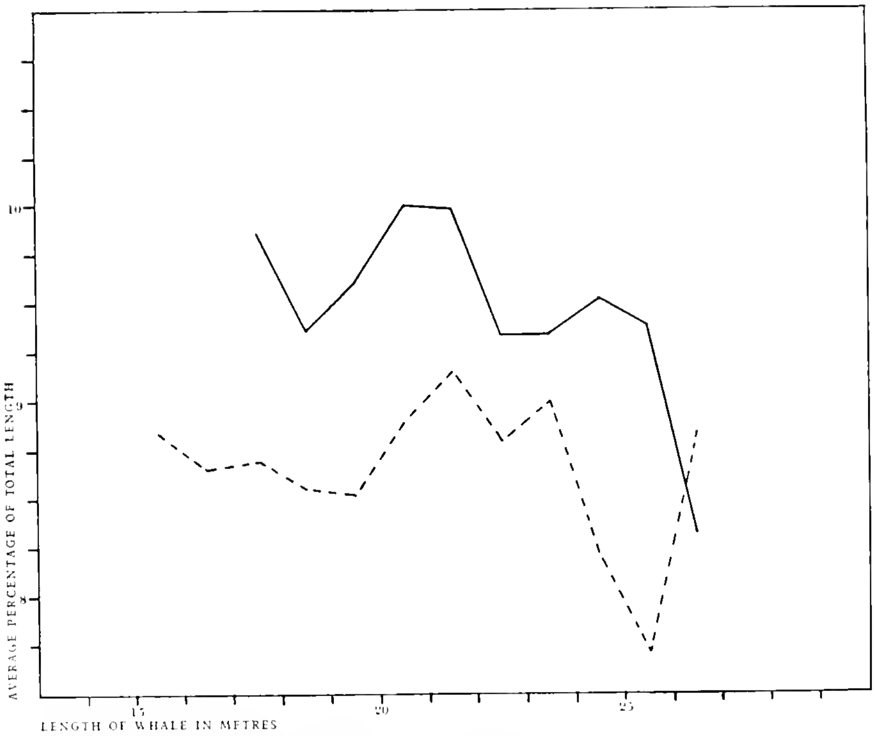


Fig. 22. Male Blue whales. Measurement No. 24. Depth of tail at dorsal fin.

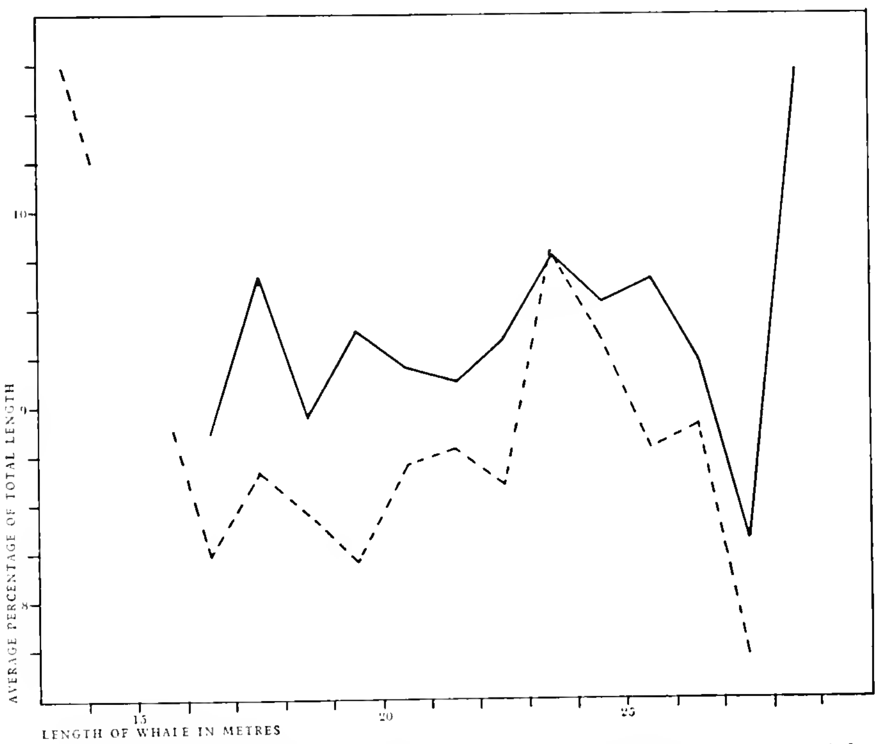


Fig. 23. Female Blue whales. Measurement No. 24. Depth of tail at dorsal fin.

——— South Georgia whales. - - - - - South African whales.

increase as the total length of the whale increases from 16 to 26 m. At about 26 m. in females and 25 m. in males a change occurs in this process and the size of the head begins to decrease in proportion to the rest of the body, as is shown by a sudden turning down of the curve when the greater lengths are reached.

Contrasting strongly with this we find a lag in growth of the tail region. The curves for measurements of the posterior part of the body (Figs. 11 to 18) are almost mirror images of those for the anterior part. In the graphs of the first two or shorter measurements (notch of flukes to dorsal fin, and to anus, Figs. 11 to 14) the lag is less marked than in the two longer measurements (notch of flukes to umbilicus and to ventral grooves, Figs. 15 to 18), so that although the whole tail region undergoes a proportional decrease to compensate for the increase of the head and shoulders, the greatest lag in growth occurs in the region between the anus and the umbilicus. Corresponding

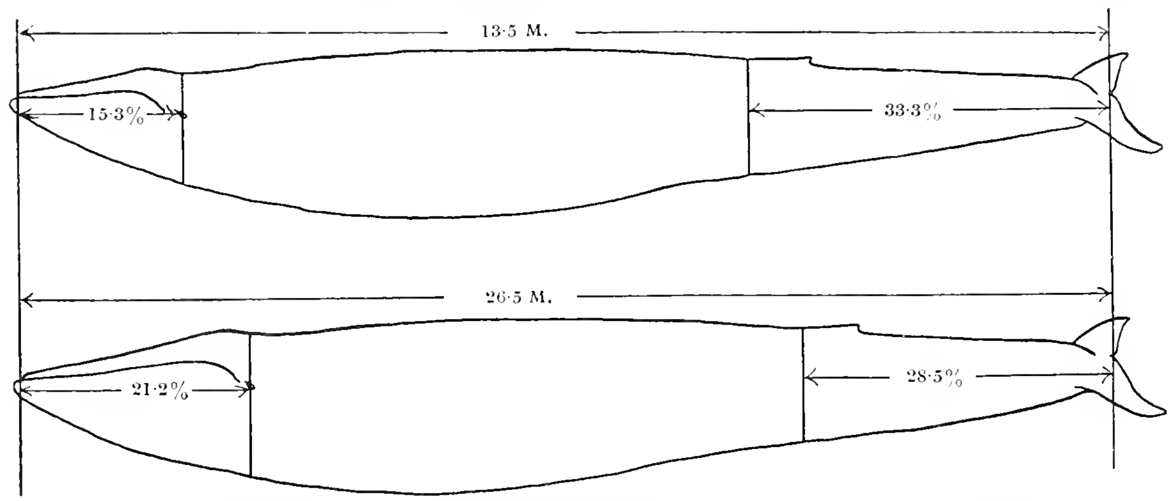


Fig. 24. Greatest difference in average relative sizes of the head and tail in small and large female Blue whales.

to the slight reduction in the size of the head at 25 or 26 m., there is a tendency for a slight increase in the size of the tail at about these lengths.

The proportions of the head and tail in 13·5 m. and 26·5 m. whales are contrasted in the outline sketches in Fig. 24.

Hinton (1915, p. 75), dealing with twenty male Humpbacks examined by Barrett-Hamilton, found that measurements of (*a*) snout to axilla, (*b*) notch of flukes to penis, (*c*) notch of flukes to navel, (*d*) notch of flukes to posterior insertion of the dorsal fin, become relatively shorter as growth proceeds, and concluded that, during adolescence, the thoracic region was the principal seat of growth in the Humpback bull. An examination of the percentage measurements of immature and mature Fin and Blue whales listed by Hinton (pp. 104 and 134) reveals a proportional increase anteriorly and a decrease posteriorly similar to that which has been described above.

The general conclusion is that with increasing total length, up to a point, the anterior part of the body up to the axilla becomes relatively larger and the posterior part correspondingly smaller. It may reasonably be inferred that so long as these steady changes in bodily proportions are taking place full physical maturity has not yet been reached. It is possible, however, that the rather profound change indicated after 25 m. in males and 26 m. in females is concerned with physical maturity, but more measurements of these very large whales are needed before one can ascertain whether the relative proportions of the body alter at this period or whether perhaps abnormally large whales are abnormal in their proportions as well as in their size.

So far only the mean values of the measurements have been considered. The individual variations which occur are best examined by the method of frequency curves; that is, the range of values over which each measurement varies may be divided into groups and the number of individual measurements for each group may be plotted out to form a curve. Owing to the fact that a certain amount of variation depends on the length of the whale it is not permissible to draw curves which include all the measurements which have been made. There are relatively large numbers of measurements for males about 23 and 24 m. and females about 25 and 26 m. Thus by using the bodily measurements of males measuring from 23·00 m. to 24·99 m. and all females from 25·00 m. to 26·99 m. we have enough material for the construction of curves which will at least show the nature and approximate extent of the individual variations which occur. One could perhaps apply a correction for length, but the value of the result would hardly be sufficient to make such an enormous task worth while.

In the following tables and in Figs. 25 to 44 this plan is carried out. In the tables the range of values obtained for each measurement (still of course expressed as percentages of the total length) is divided into an arbitrary number of groups. The individual readings of each measurement for male Blue whales from South Georgia measuring from 23·00 m. to 24·99 m. and females from 25·00 m. to 26·99 m. are sorted out, and the number which fall into each of the groups are shown.

VARIATION OF MEASUREMENTS

Blue Whales: South Georgia

Males, 23–25 m.; females 25–27 m.

3. Tip of snout to blowhole

Range of values (% of total length)	Number of readings ♂	♀
16·0–16·5	1	1
16·5–17·0	3	1
17·0–17·5	8	4
17·5–18·0	6	11
18·0–18·5	14	14
18·5–19·0	17	19
19·0–19·5	18	22
19·5–20·0	18	17
20·0–20·5	5	5
20·5–21·0	2	3
21·0–21·5	2	—
21·5–22·0	—	1

4. Tip of snout to angle of gape

Range of values (% of total length)	Number of readings ♂	♀
18·0–18·5	—	1
18·5–19·0	1	—
19·0–19·5	3	2
19·5–20·0	5	1
20·0–20·5	7	5
20·5–21·0	10	2
21·0–21·5	2	4
21·5–22·0	—	—
22·0–22·5	1	—

5. Tip of snout to centre of eye

Range of values (% of total length)	Number of readings ♂	♀
19·0–19·5	3	3
19·5–20·0	8	6
20·0–20·5	16	12
20·5–21·0	21	19
21·0–21·5	23	31
21·5–22·0	21	20
22·0–22·5	4	10
22·5–23·0	3	4
23·0–23·5	2	—
23·5–24·0	—	1
24·0–24·5	—	—
24·5–25·0	1	—

6. Tip of snout to tip of flipper

Range of values (% of total length)	Number of readings ♂	♀
38–39	1	—
39–40	1	—
40–41	2	1
41–42	2	7
42–43	8	14
43–44	21	26
44–45	29	22
45–46	20	16
46–47	5	6
47–48	2	—
48–49	—	—
49–50	1	—

7. Eye to ear (centres)

Range of values (% of total length)	Number of readings ♂	♀
3·75–4·00	—	1
4·00–4·25	1	—
4·25–4·50	—	—
4·50–4·75	—	—
4·75–5·00	2	5
5·00–5·25	7	18
5·25–5·50	29	29
5·50–5·75	24	27
5·75–6·00	19	6
6·00–6·25	3	1
6·25–6·50	1	—
6·50–6·75	—	—
6·75–7·00	1	—

13. Anus to reproductive aperture (centres)

Range of values (% of total length)	Number of readings ♂	♀
1·5–2·0	—	10
2·0–2·5	—	42
2·5–3·0	—	48
3·0–3·5	—	7
3·5–4·0	1	1
4·0–4·5	9	—
4·5–5·0	19	—
5·0–5·5	—	—
5·5–6·0	4	—
6·0–6·5	9	—
6·5–7·0	22	—
7·0–7·5	19	—
7·5–8·0	7	—
8·0–8·5	2	—

14. Dorsal fin, vertical height

Range of values (% of total length)	Number of readings ♂	♀
0·2–0·4	1	—
0·4–0·6	1	—
0·6–0·8	3	6
0·8–1·0	10	8
1·0–1·2	9	18
1·2–1·4	14	23
1·4–1·6	9	13
1·6–1·8	7	2
1·8–2·0	1	1

15. Dorsal fin, length of base

Range of values (% of total length)	Number of readings ♂	♀
2·0–2·5	1	—
2·5–3·0	2	—
3·0–3·5	11	7
3·5–4·0	10	15
4·0–4·5	8	13
4·5–5·0	10	16
5·0–5·5	16	8
5·5–6·0	5	6
6·0–6·5	4	2
6·5–7·0	1	1
7·0–7·5	1	—
7·5–8·0	1	—

16. Flipper, tip to axilla

Range of values (% of total length)	Number of readings ♂	♀
7·5–8·0	1	—
8·0–8·5	1	2
8·5–9·0	5	9
9·0–9·5	11	14
9·5–10·0	18	19
10·0–10·5	33	21
10·5–11·0	12	9
11·0–11·5	2	4
11·5–12·0	3	5
12·0–12·5	1	—
12·5–13·0	—	1

17. Flipper, tip to anterior end of lower border

Range of values (% of total length)	Number of readings ♂	♀
11·0–11·5	—	2
11·5–12·0	1	4
12·0–12·5	4	14
12·5–13·0	16	8
13·0–13·5	16	19
13·5–14·0	18	11
14·0–14·5	4	6
14·5–15·0	1	3

VARIATION OF MEASUREMENTS

Blue Whales: South Georgia

Males, 23–25 m.; females 25–27 m.

8. Notch of flukes to posterior emargination of dorsal fin

Range of values (% of total length)	Number of readings ♂	♀
20·5–21·0	—	1
21·0–21·5	2	1
21·5–22·0	1	5
22·0–22·5	7	3
22·5–23·0	6	10
23·0–23·5	11	10
23·5–24·0	9	10
24·0–24·5	15	11
24·5–25·0	6	11
25·0–25·5	8	6
25·5–26·0	1	2
26·0–26·5	4	2
26·5–27·0	—	2

9. Flukes, width at insertion

Range of values (% of total length)	Number of readings ♂	♀
4·25–4·50	2	1
4·50–4·75	7	9
4·75–5·00	23	28
5·00–5·25	24	31
5·25–5·50	22	20
5·50–5·75	12	9
5·75–6·00	6	2
6·00–6·25	1	2

10. Notch of flukes to anus

Range of values (% of total length)	Number of readings ♂	♀
22·5–23·0		1
23·0–23·5		—
23·5–24·0	—	—
24·0–24·5		1
24·5–25·0	—	—
25·0–25·5	1	—
25·5–26·0	1	2
26·0–26·5	3	4
26·5–27·0	9	5
27·0–27·5	10	11
27·5–28·0	19	22
28·0–28·5	18	23
28·5–29·0	18	13
29·0–29·5	13	14
29·5–30·0	7	5
30·0–30·5	2	5
30·5–31·0	1	—
31·0–31·5	—	2

11. Notch of flukes to umbilicus

Range of values (% of total length)	Number of readings ♂	♀
39·0–39·5	—	1
39·5–40·0	—	—
40·0–40·5	—	
40·5–41·0	—	1
41·0–41·5	1	—
41·5–42·0	3	3
42·0–42·5	2	5
42·5–43·0	4	7
43·0–43·5	4	11
43·5–44·0	14	15
44·0–44·5	18	17
44·5–45·0	17	10
45·0–45·5	18	14
45·5–46·0	7	5
46·0–46·5	6	9
46·5–47·0	1	5
47·0–47·5	3	—
47·5–48·0	2	2

12. Notch of flukes to end of ventral grooves

Range of values (% of total length)	Number of readings ♂	♀
33–34	—	1
34–35	2	—
35–36	—	—
36–37	—	—
37–38	1	1
38–39	—	—
39–40	7	6
40–41	12	14
41–42	12	20
42–43	13	13
43–44	7	11
44–45	7	4
45–46	2	—
46–47	1	—
47–48	1	—

18. Flipper, length along curve of lower border

Range of values (% of total length)	Number of readings ♂	♀
12·0–12·5	—	4
12·5–13·0	7	9
13·0–13·5	10	10
13·5–14·0	15	10
14·0–14·5	15	15
14·5–15·0	9	10
15·0–15·5	1	5
15·5–16·0	1	1

19. Flipper, greatest width

Range of values (% of total length)	Number of readings ♂	♀
3·1–3·2	3	—
3·2–3·3	2	—
3·3–3·4	1	5
3·4–3·5	6	9
3·5–3·6	6	12
3·6–3·7	11	10
3·7–3·8	10	8
3·8–3·9	10	6
3·9–4·0	9	8
4·0–4·1	6	5
4·1–4·2	2	4

20. Severed head, condyle to tip

Range of values (% of total length)	Number of readings ♂	♀
22·5–23·0	1	—
23·0–23·5	—	1
23·5–24·0	2	4
24·0–24·5	3	5
24·5–25·0	8	7
25·0–25·5	9	15
25·5–26·0	17	6
26·0–26·5	10	20
26·5–27·0	10	10
27·0–27·5	4	3
27·5–28·0	—	1
28·0–28·5	1	1

21. Skull, greatest width

Range of values (% of total length)	Number of readings ♂	♀
9·0–9·5	—	1
9·5–10·0	—	—
10·0–10·5	1	1
10·5–11·0	5	8
11·0–11·5	15	18
11·5–12·0	18	19
12·0–12·5	15	16
12·5–13·0	7	5
13·0–13·5	1	—
13·5–14·0	—	1

24. Tail, depth at dorsal fin

Range of values (% of total length)	Number of readings ♂	♀
6·0–6·5	1	—
6·5–7·0	—	—
7·0–7·5	—	—
7·5–8·0	—	3
8·0–8·5	3	6
8·5–9·0	10	7
9·0–9·5	16	11
9·5–10·0	17	14
10·0–10·5	6	13
10·5–11·0	9	3
11·0–11·5	2	1

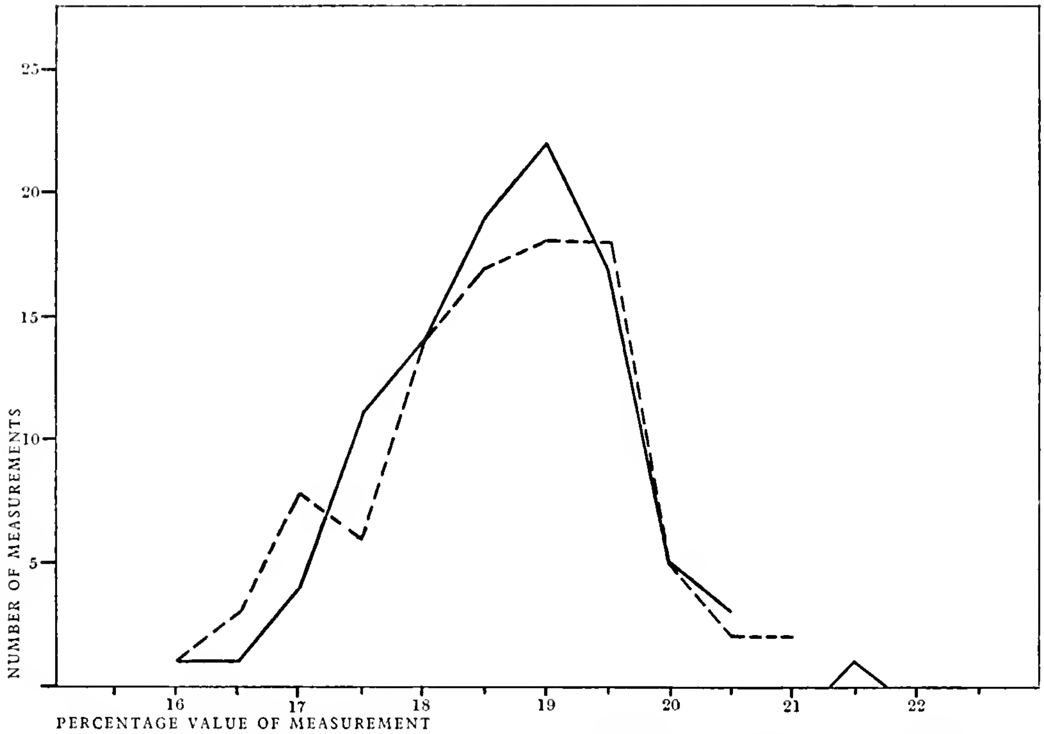


Fig. 25. Blue whales. Variations of measurement No. 3. Tip of snout to blowhole.

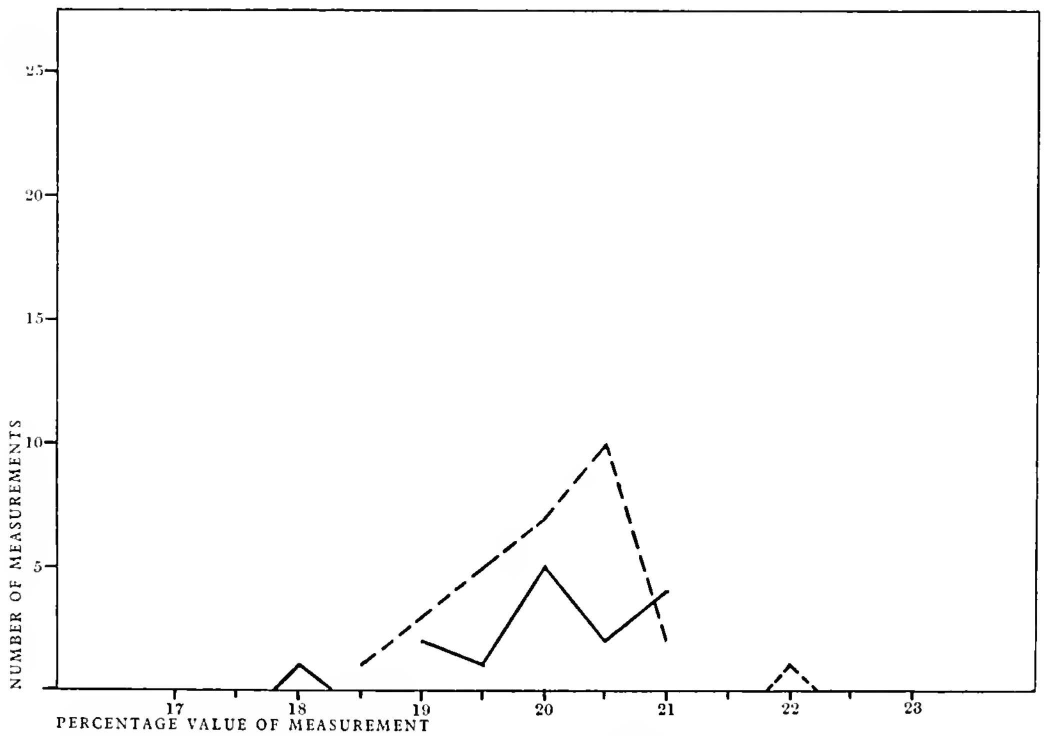


Fig. 26. Blue whales Variations of measurement No. 4. Tip of snout to angle of gape.

- - - - - Males. ——— Females.

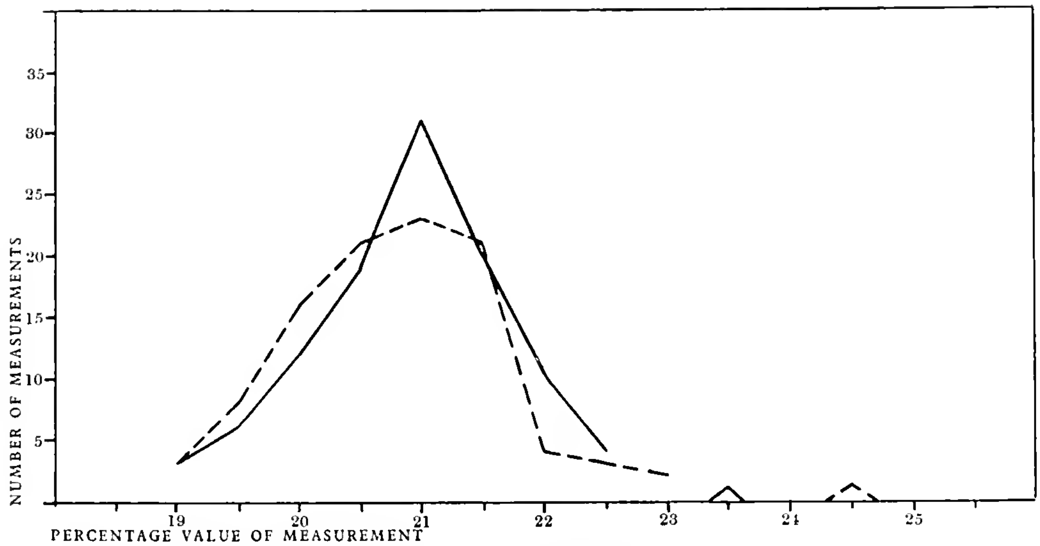


Fig. 27. Blue whales. Variations of measurement No. 5. Tip of snout to centre of eye.

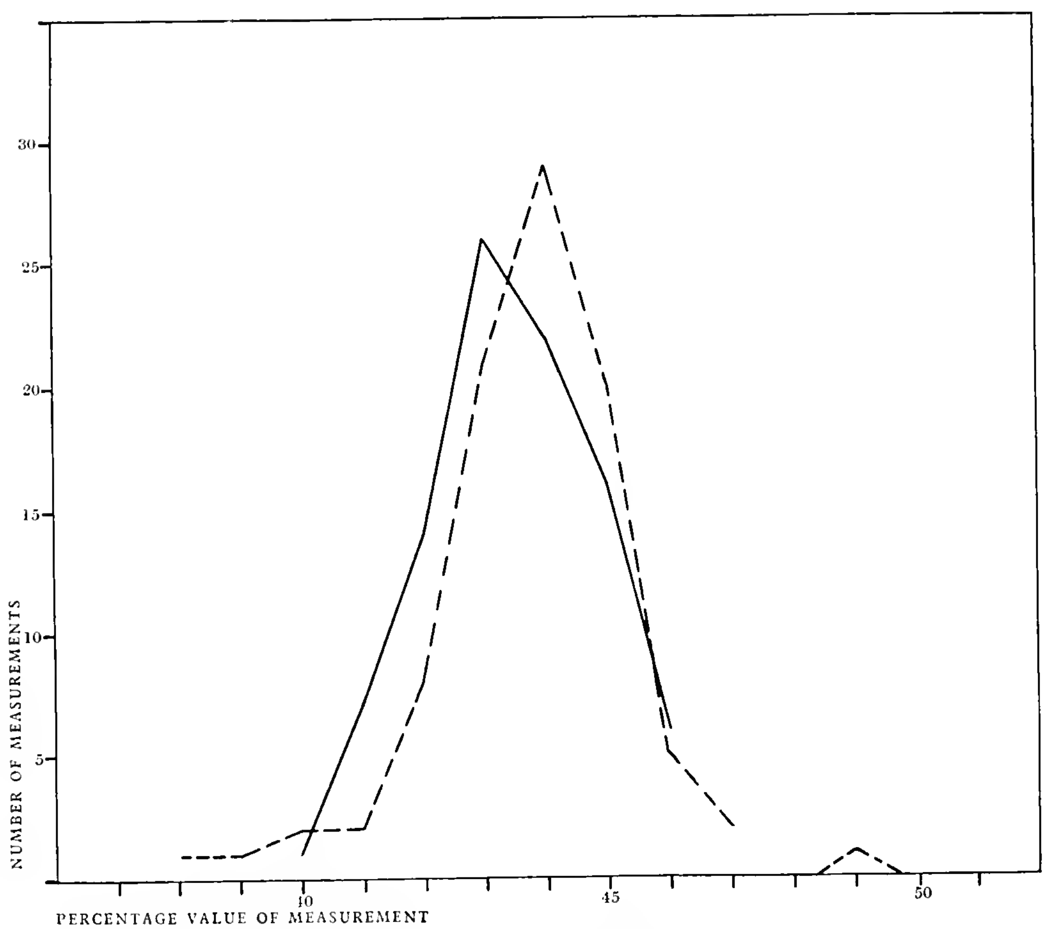


Fig. 28. Blue whales. Variations of measurement No. 6. Tip of snout to tip of flipper.

- - - - - Males. —— Females.

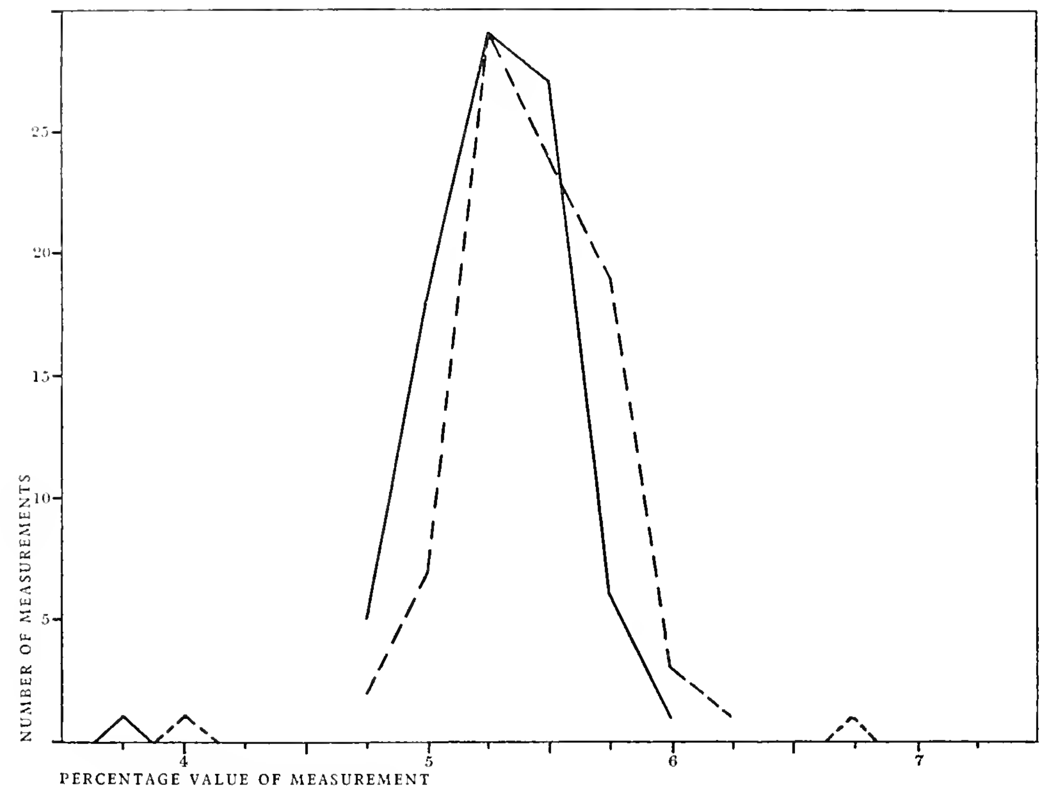


Fig. 29. Blue whales. Variations of measurement No. 7. Eye to ear, centres.

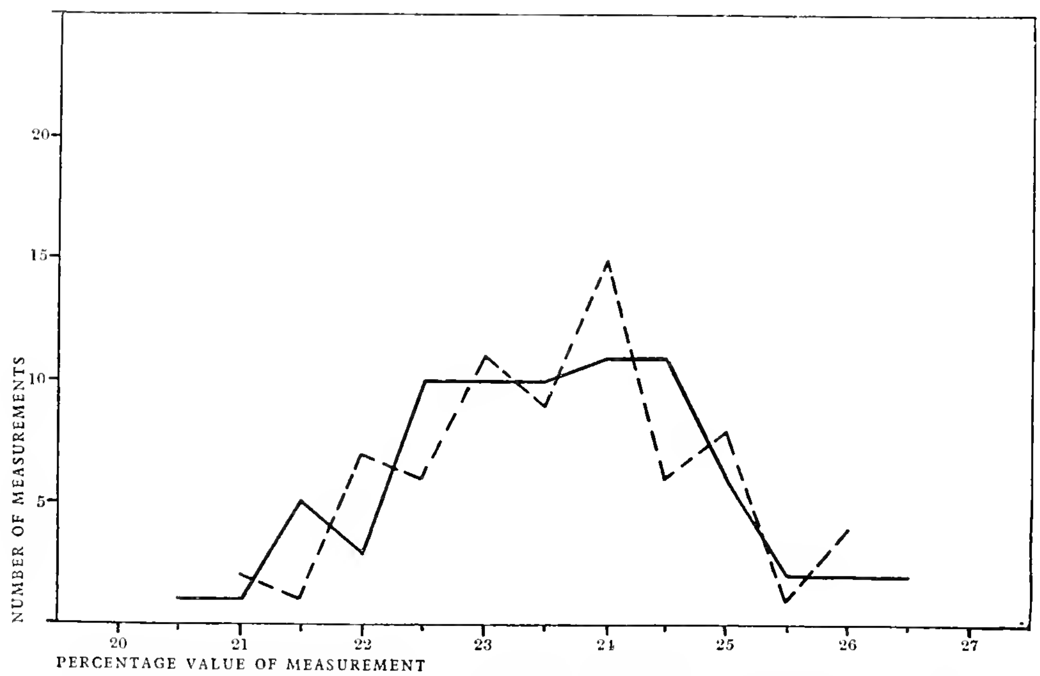


Fig. 30. Blue whales. Variations of measurement No. 8. Notch of flukes to posterior emargination of dorsal fin.

- - - - - Males. ——— Females.

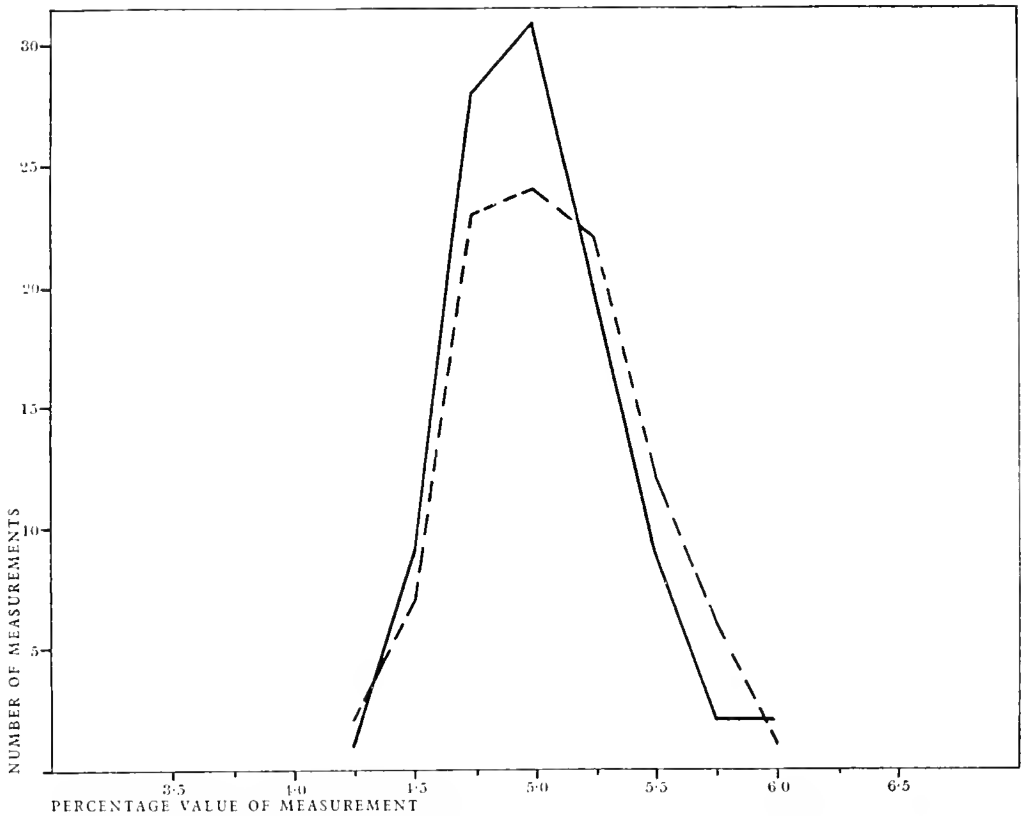


Fig. 31. Blue whales. Variations of measurement No. 9. Flukes, width at insertion.

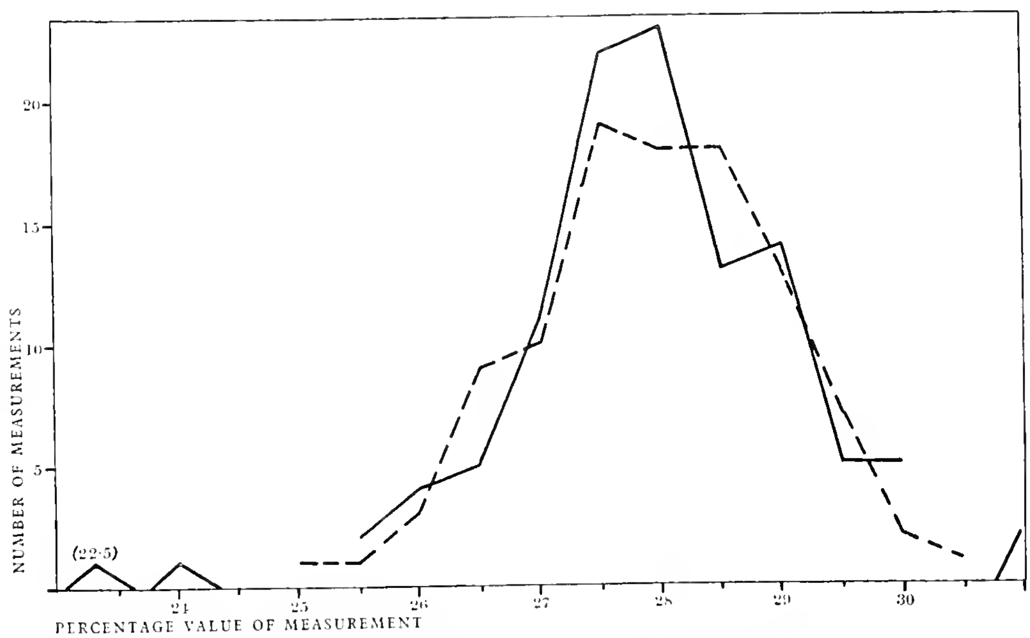


Fig. 32. Blue whales. Variations of measurement No. 10. Notch of flukes to anus.

- - - - - Males. ——— Females.

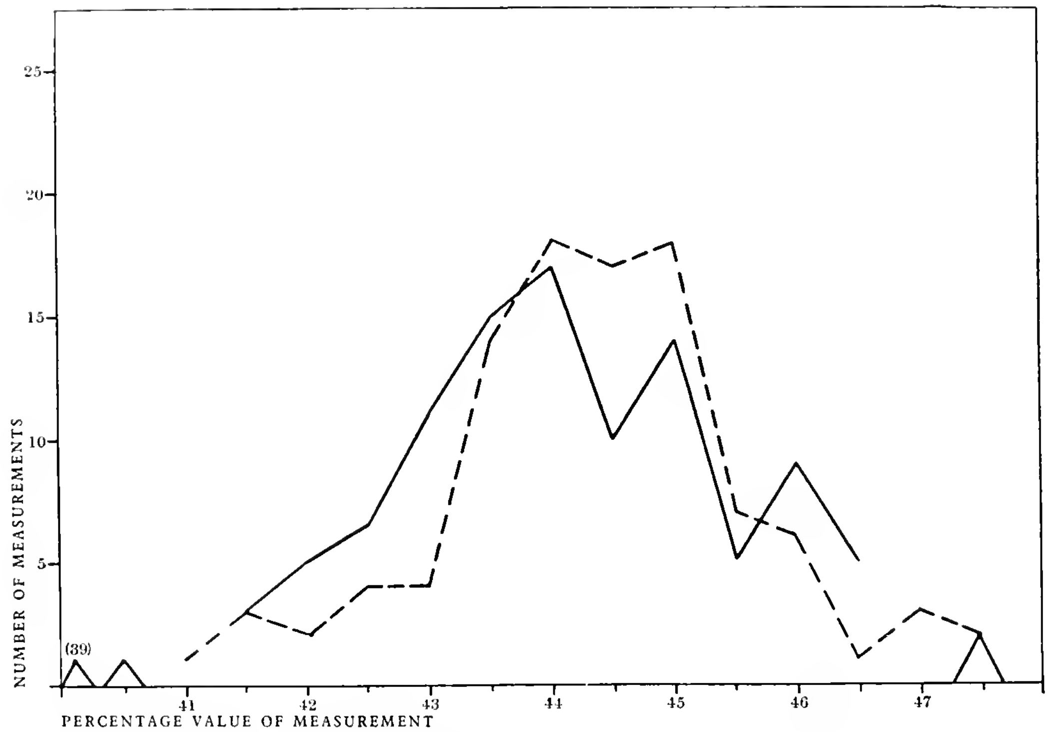


Fig. 33. Blue whales. Variations of measurement No. 11. Notch of flukes to umbilicus.

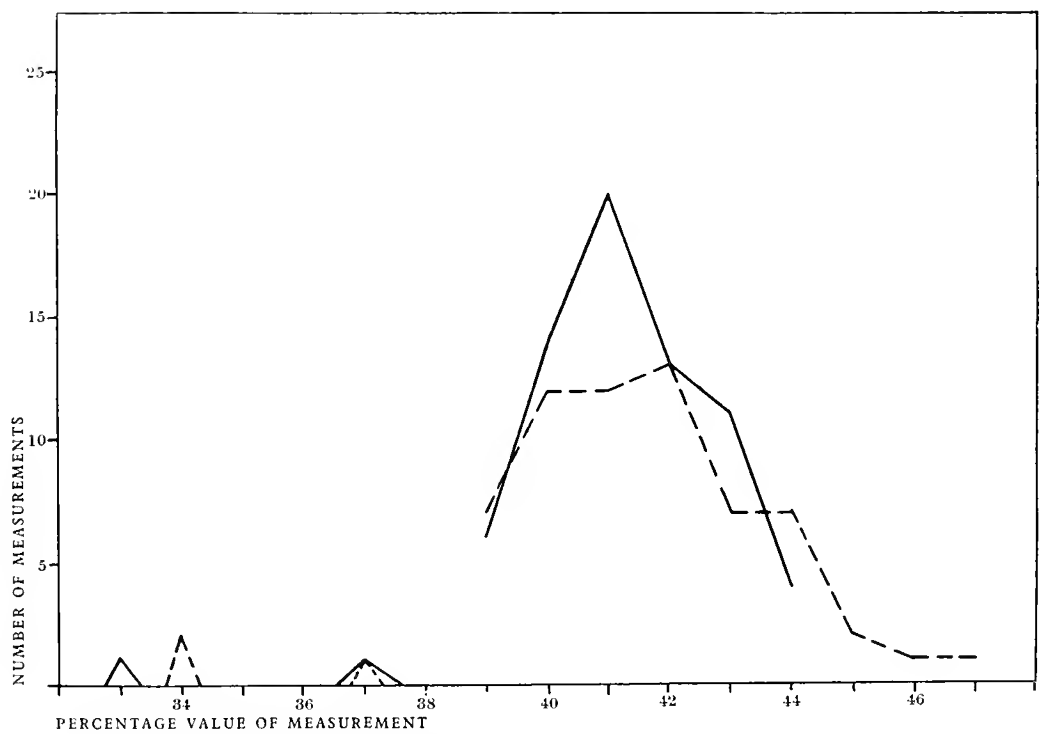


Fig. 34. Blue whales. Variations of measurement No. 12. Notch of flukes to end of ventral grooves.

- - - - - Males. ——— Females.

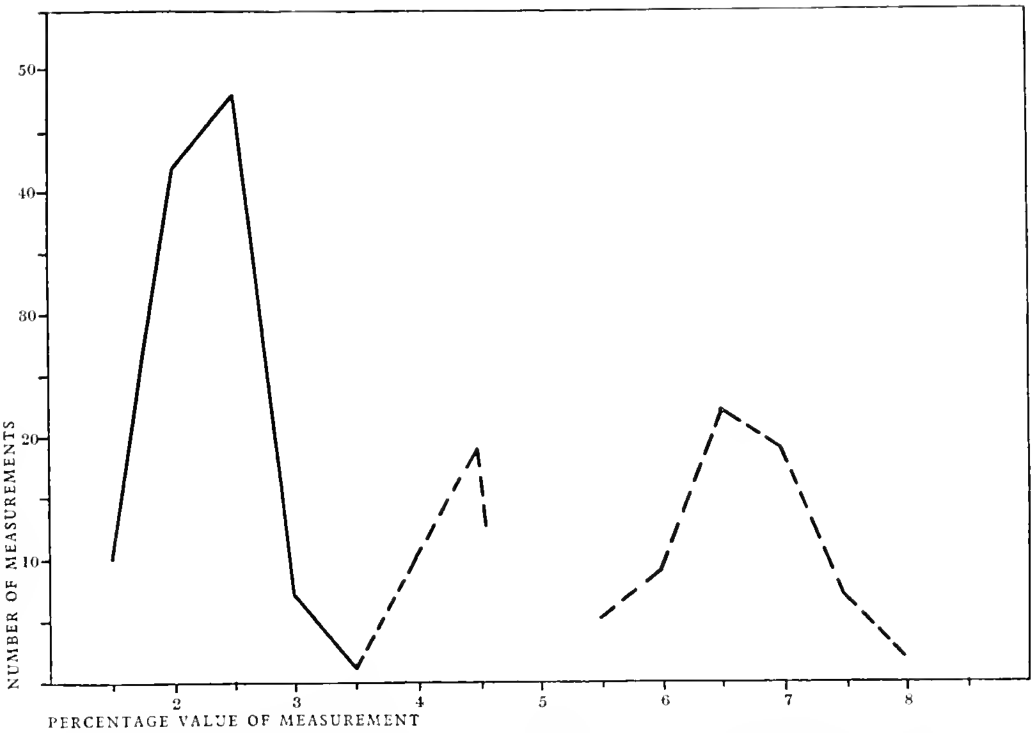


Fig. 35. Blue whales. Variations of measurement No. 13. Anus to reproductive aperture, centres.

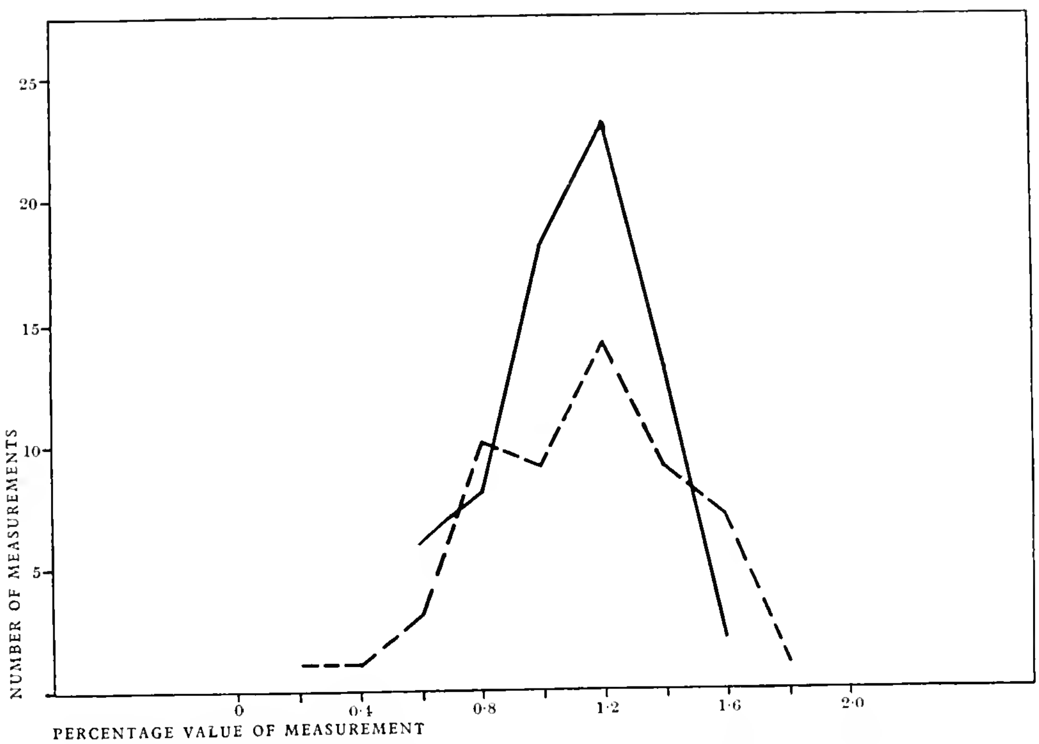


Fig. 36. Blue whales. Variations of measurement No. 14. Dorsal fin, vertical height.

- - - - - Males. ——— Females.

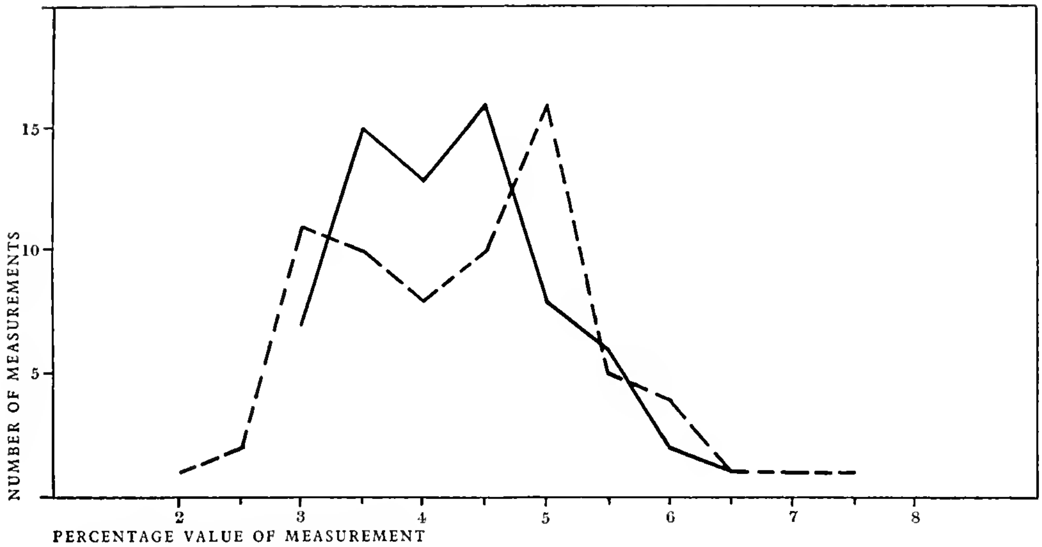


Fig. 37. Blue whales. Variations of measurement No. 15. Dorsal fin, length of base.

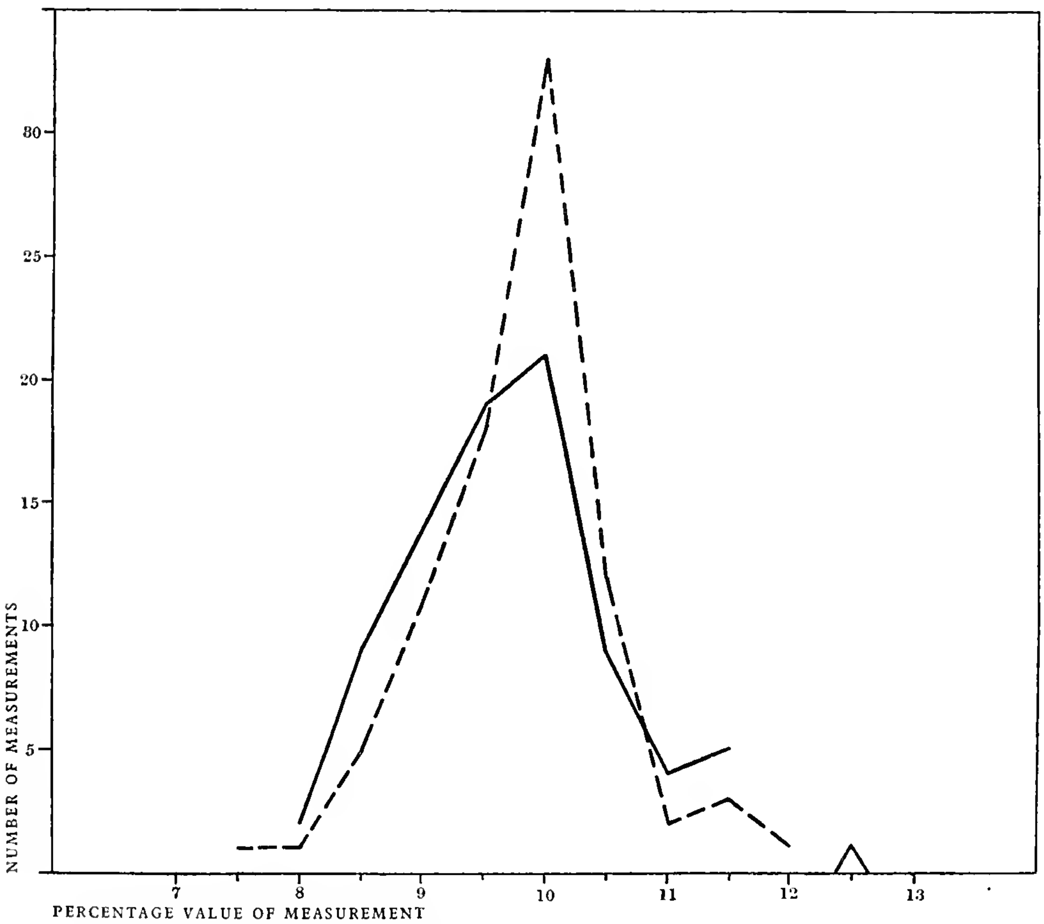


Fig. 38. Blue whales. Variations of measurement No. 16. Flipper, tip to axilla.

- - - - - Males. ——— Females.

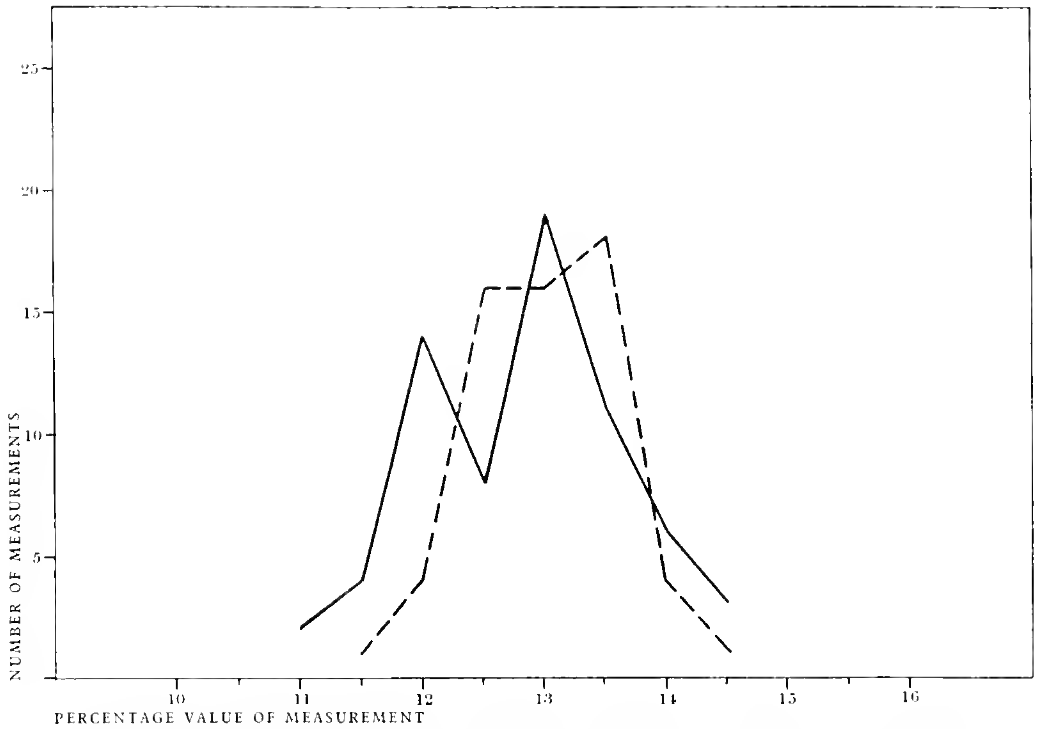


Fig. 39. Blue whales. Variations of measurement No. 17. Flipper, tip to anterior end of lower border.

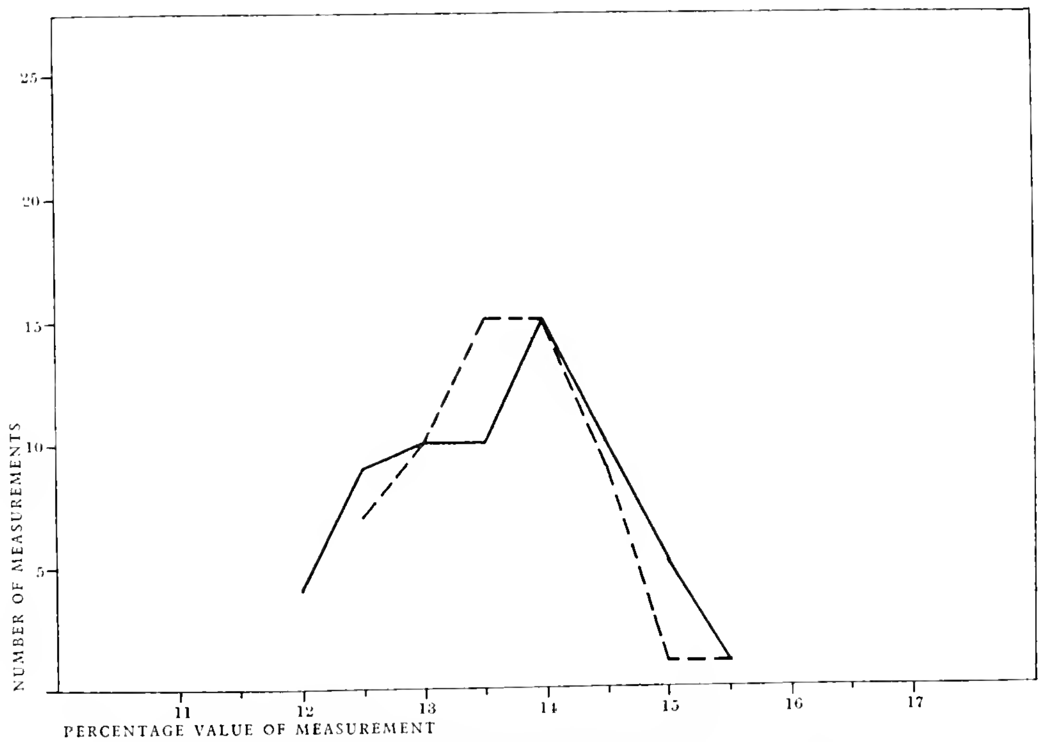


Fig. 40. Blue whales. Variations of measurement No. 18. Flipper, length along curve of lower border.

- - - - - Males. ——— Females.

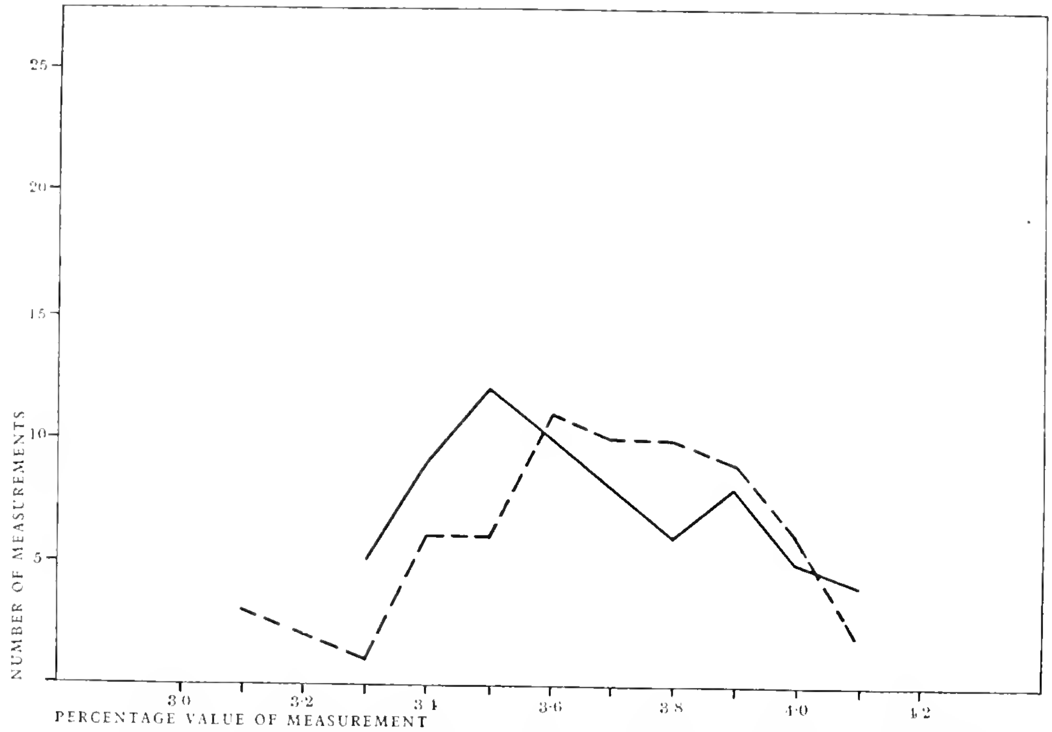


Fig. 41. Blue whales. Variations of measurement No. 19. Flipper, greatest width.

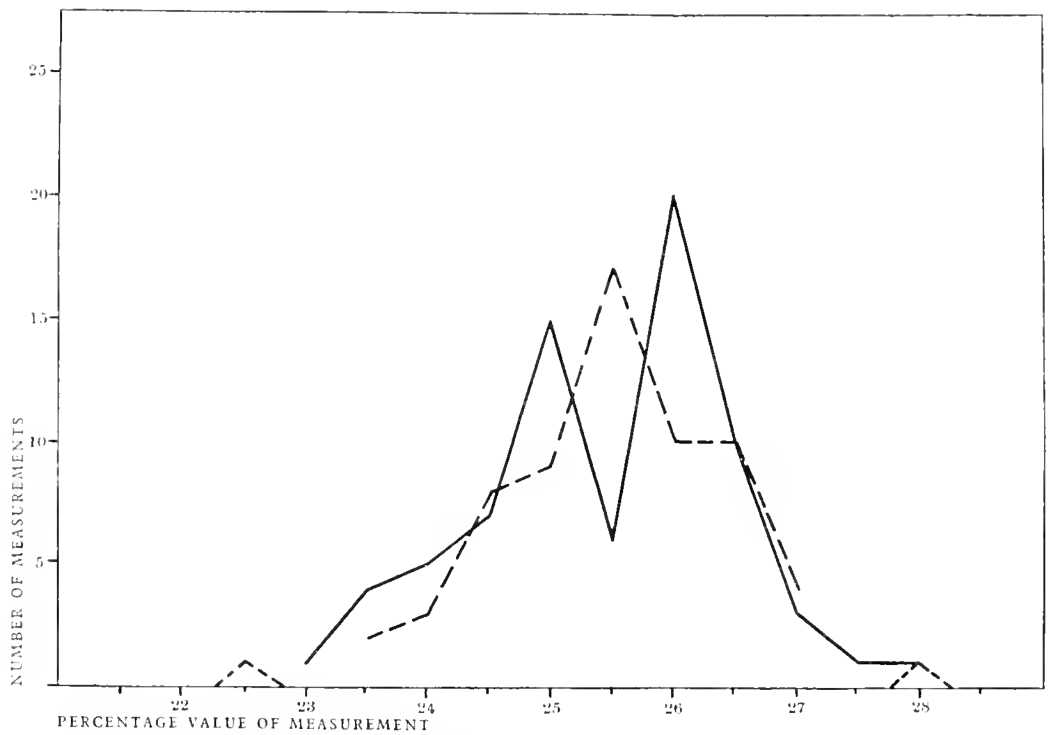


Fig. 42. Blue whales. Variations of measurement No. 20. Severed head, condyle to tip.

- - - - - Males. ——— Females.

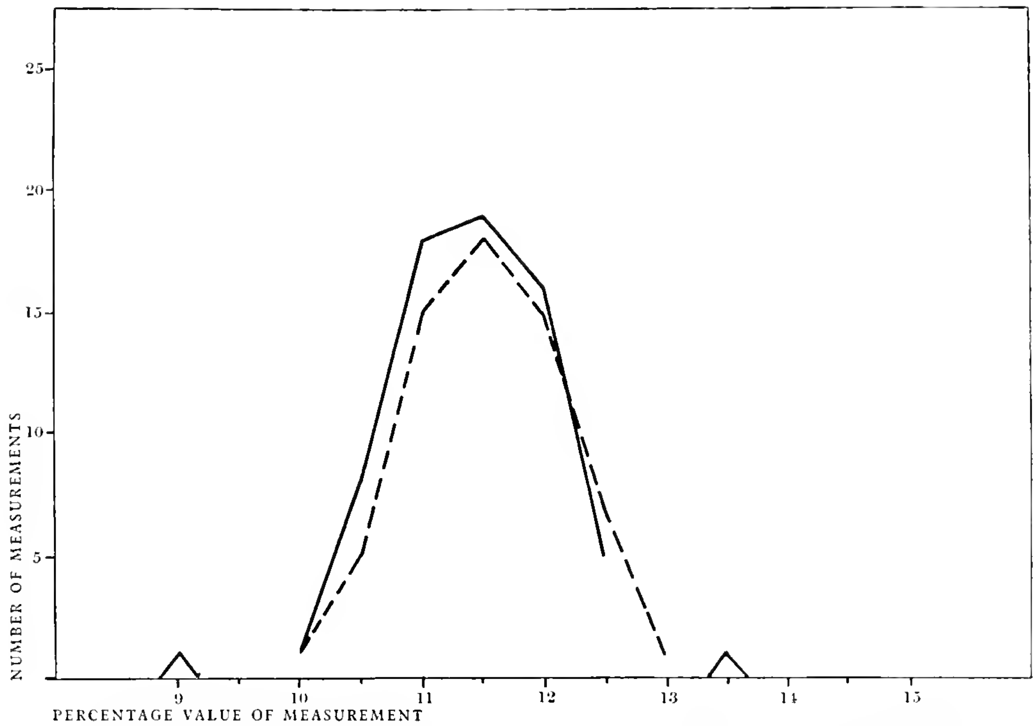


Fig. 43. Blue whales. Variations of measurement No. 21. Skull, greatest width.

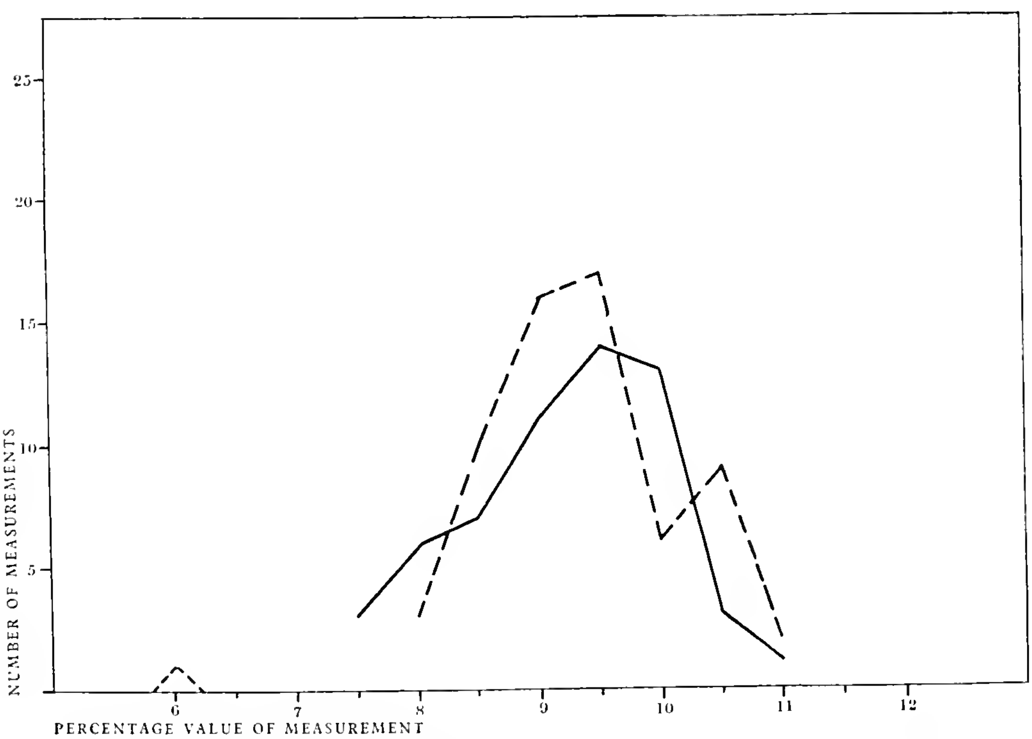


Fig. 44. Blue whales. Variations of measurement No. 24. Tail, depth at dorsal fin.

- - - - - Males. ——— Females.

We may consider first the degree of variation shown by each measurement. In this respect the actual spread of the curve is not to be relied on, for the range of percentage measurement values (shown as abscissae) is not on the same scale in all the charts. Perhaps the best idea of the amount of variation is to be had by dividing the largest reading by the smallest. Thus, in No. 21, "Greatest width of skull," except for two "outsize" measurements, the largest reading is only 1·3 times as great as the smallest, indicating a narrow range of variation, while in No. 14, "Vertical height of dorsal fin," the largest reading is nine times as great as the smallest, indicating a very wide range of variation. It should be mentioned, however, that No. 14 (like Nos. 12 and 15) is a bad measurement in the sense that it is difficult to take it each time in a uniform manner, and the wide range of the readings may be due, to a limited extent, to this cause.

It will be unnecessary to discuss the range of variation of each measurement, as this can be seen at a glance from the tables, and the information may be supplemented by reference to the charts on pp. 298–307.

Normal variation should give normal frequency curves from data treated in this way, and with one or two exceptions the curves are undoubtedly of this type. Minor irregularities can be attributed to the comparatively limited data from which they are constructed.

Of the curves which do not conform to the normal frequency type measurement No. 4 (males) may be quickly disposed of since its lack of shape is simply due to paucity of data. Measurement No. 8 is somewhat erratic, but would probably resolve itself into a normal curve with more data. The curves which need more careful examination are those of measurements Nos. 13, 15, 17 and 20, for either in one or both sexes these curves show a tendency to resolve themselves into two peaks. One object of studying the variations of the external characters is to find whether by any chance more than one race is to be distinguished among the whales examined, and if any measurement constituted a distinguishing feature between two such races the probable effect would be two separate maxima in the frequency curve. On the other hand, two peaks in this curve, if not very marked, might be due to chance (unless constructed from a great number of readings) or to faults in the actual taking of the measurements, for there are one or two cases in which there is always some doubt as to the exact point to which the measurement should be taken.

Although measurement No. 20 increases relatively as the whale length becomes greater, the variations of measurements Nos. 13, 15 and 17 are independent of the length of the whale. Thus for these three measurements we may compare the curves already obtained with curves constructed from the whole of the data relating to Blue whales instead of only those between certain lengths. In other words, we may see whether these double-peaked curves can be shown to be in reality single when a larger amount of data is used. In measurement No. 20 this irregularity appears only in the curve for females. Now the length of the head is very little affected by the length of the body between about 23 and 28 m. (see table on p. 282), so that we may at least draw

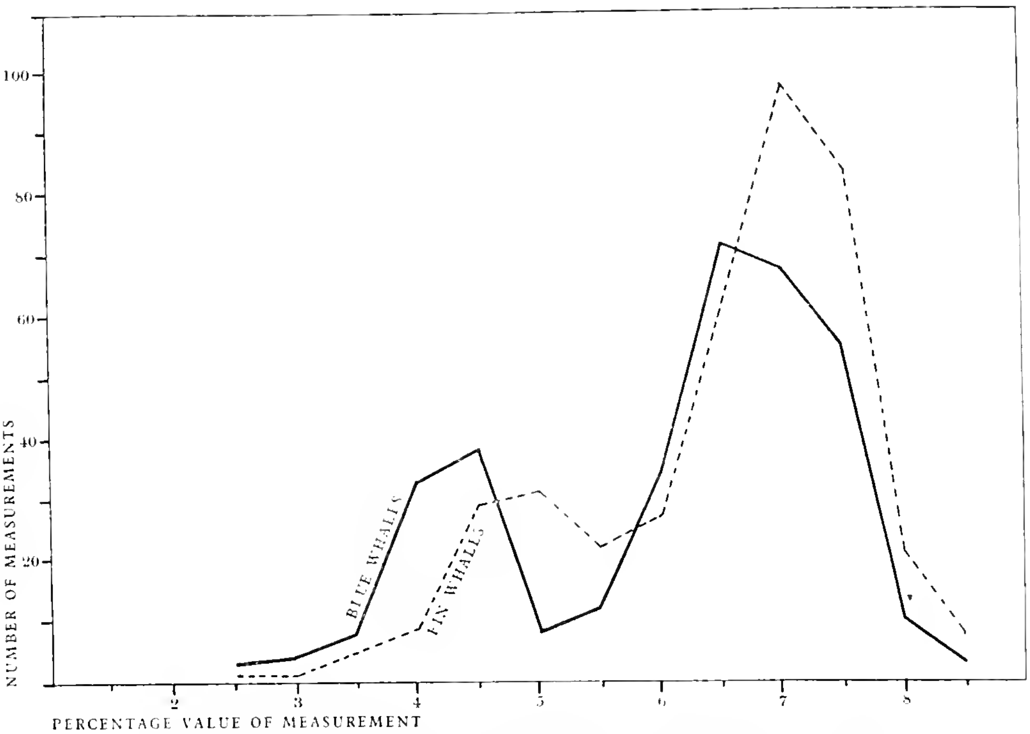


Fig. 45. Male Blue and Fin whales. Variations of measurement No. 13. Anus to reproductive aperture. (Whales of all sizes.)

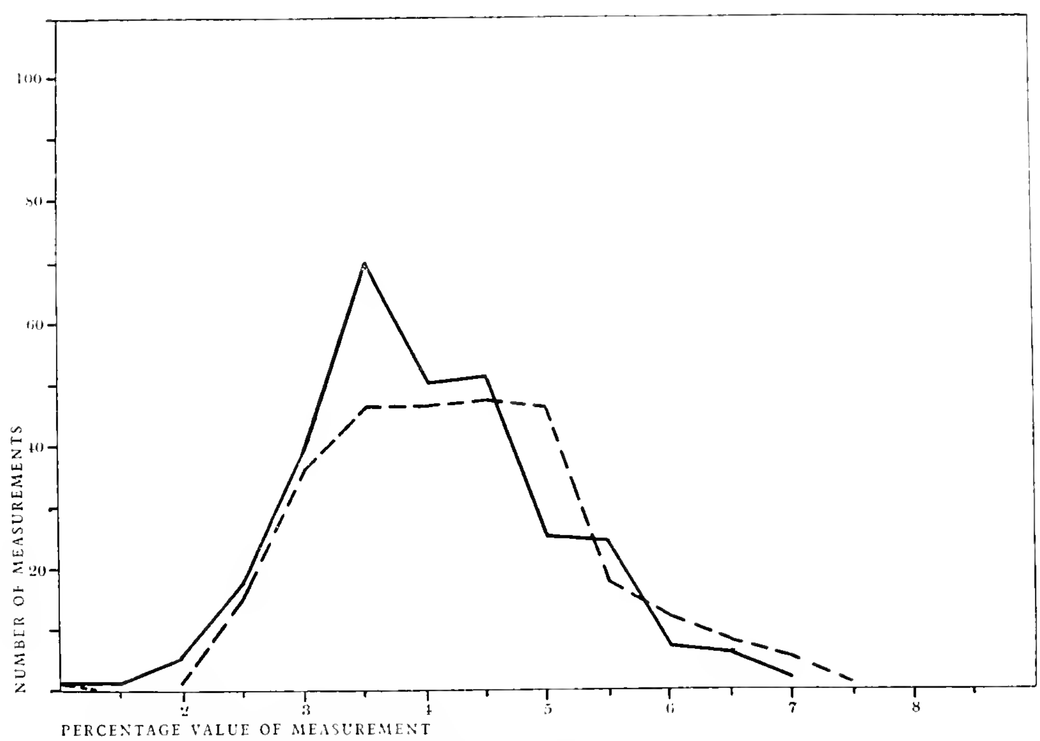


Fig. 46. Blue whales. Variations of measurement No. 15. Dorsal fin, length at base. (Whales of all sizes.)

- - - - - Males. Females.

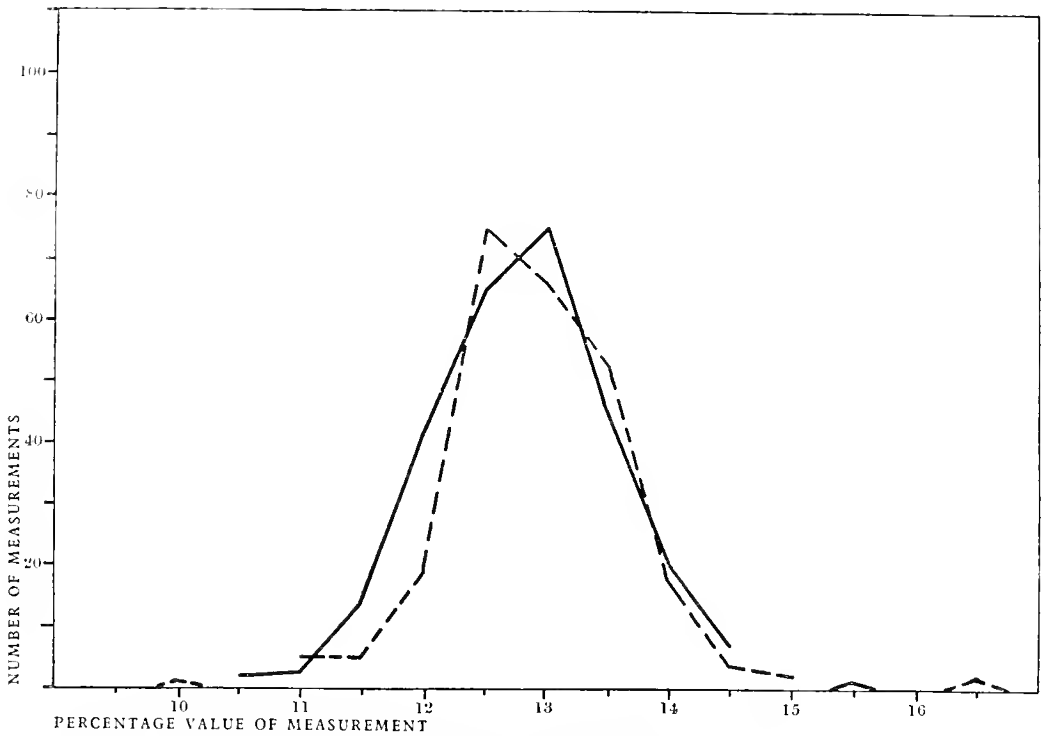


Fig. 47. Blue whales. Variations of measurement No. 17. Flipper, tip to anterior end of lower border. (Whales of all sizes.)

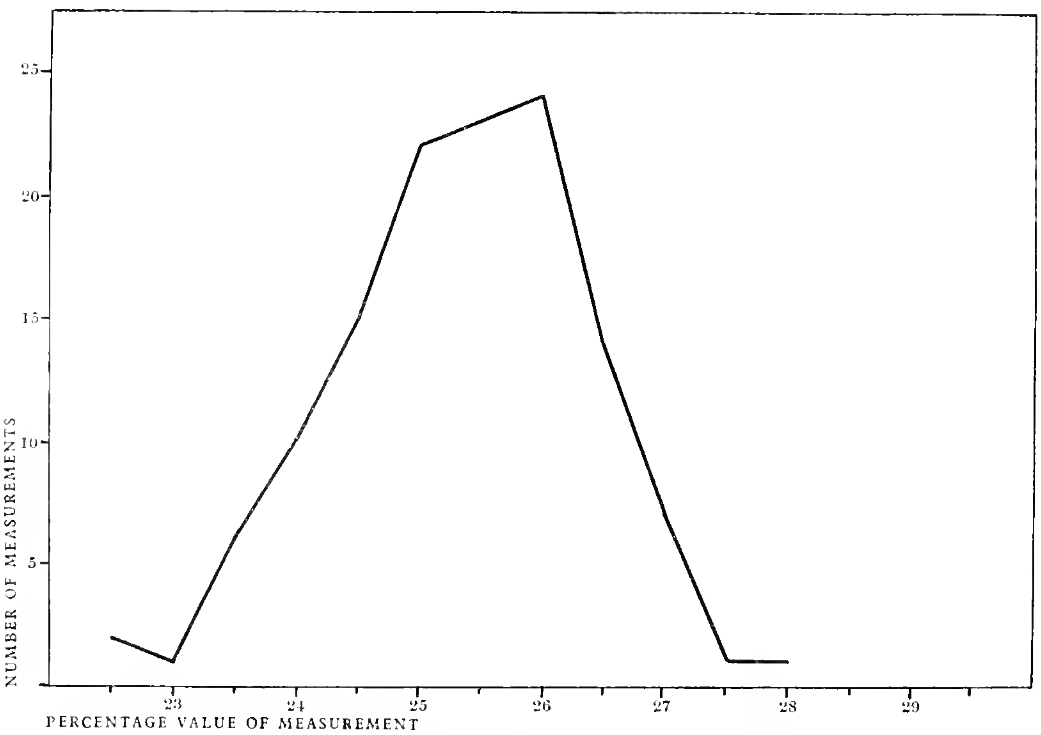


Fig. 48. Blue whales. Variations of measurement No. 20. Severed head, condyle to tip. (Whales of 23·00 to 27·99 metres.)

- - - - - Males. ——— Females.

a curve for this measurement from a somewhat larger number of readings by taking all Blue females between 23 m. and 28 m. instead of, as before, between 25 m. and 27 m.

In Figs. 45, 46, 47 and 48 these revised curves are shown. Those for measurements Nos. 13, 15 and 17 are constructed on readings from whales of all sizes, while that for No. 20 is on readings from whales between 23 m. and 28 m.

It is now seen that the curves of Nos. 15, 17 and 20 have resolved themselves into more or less normal frequency curves, and that the two peaks which appeared previously were therefore due only to insufficient data. As to measurement No. 13 it has been found on further investigation and from information recently received from Mr Fraser at South Georgia, that the two peaks in the curves result from the fact that the measurement has been taken sometimes before and sometimes after flensing, and it appears that this process displaces the penis so as to shorten the distance between it and the anus. The same phenomenon occurs in Fin whales and for purposes of comparison the curve for this species is also shown in Fig. 45.

COLOUR

Various descriptions have from time to time been given of the colouring of Blue whales from the North Atlantic. Of these the best seems to be that of True (1904), who gives an exhaustive general description and detailed notes of the nature and variations of the pigmentation of twenty-two Blue whales examined by himself. Barrett-Hamilton made brief notes on some half-dozen of the Blue whales he examined, but it appears that no thorough account of the colouring of these whales from the southern hemisphere has yet been given.

The following is based on our own observations on whales of the South Atlantic:

The pigmentation of Blue whales is subject to considerable individual variation, and the majority of the records we have made in respect of this character have dealt simply with the more variable features.

Except on the under surface of the flippers the Blue whale's body is covered nearly all over with a groundwork of dark blue-grey which varies to some extent in depth of colour in different individuals. Most of the body is covered with a pale mottling which consists of small, roughly oval marks of a colour which is similar to, but lighter than the blue-grey background. Typical examples of these spots are shown in Plate XXVII, figs. 1 and 2. Plate XXXVII, fig. 4, gives a close-up view of part of the back of the whale shown in Plate XXVII, fig. 1, taken at a point just opposite the reflexed flipper. These pale spots show a good deal of individual variation in respect of their size, number and sharpness of contrast with the darker background. They rarely appear on the head (see Plate XXVIII, fig. 1) and are not commonly present on the mandible, flippers or tail flukes. They are most thickly distributed along the flanks from the eye back to the tail and are often very numerous in the shoulder region. Their normal arrangement here is shown in Plate XXVIII, fig. 1. These marks are on the average about 4 in. long by about 3 in. wide, but vary in different individuals and on different parts of the body. For instance, they are generally very small just behind the eye and relatively larger along the posterior part of the flanks. In individuals in which these marks are in general small they are usually relatively sharply defined, while in other individuals they are bigger and more diffuse, in which case they often coalesce to a large extent and may occupy actually more space than the dark background. In others again they may be of medium size and if very numerous run together so as almost to obliterate the darker colour. Plate XXVIII, fig. 2, gives an example of a whale in which the spots are moderately large, very numerous and coalescing to an unusual extent.

These pale spots may also be seen here and there on the ventral grooves, where, however, they are less noticeable than on other parts of the body. On the ventral grooves there are almost invariably a number of white flecks more or less similar in size and shape to the pale bluish spots. The numbers in which these spots occur constitutes the most marked feature of the variations in the pigmentation of Blue whales. A typical or average condition is shown in Plate XXX, fig. 1, but Figs. 1, 2 and 3 in Plate XXIX and Figs. 1, 2 and 3 in Plate XXX form a series which illustrate the range of variation. These white flecks tend to be grouped on each side towards the posterior end of the ventral grooves. They are usually also fairly numerous beneath the flipper on each side and are sometimes even more plentiful here than at the posterior end of the ventral grooves. In extreme cases there may be hardly a white fleck anywhere, as in Plate XXIX, fig. 1, or the whole grooved area behind the flipper region may be a mass of white as in Plate XXX, fig. 3. On the whale illustrated in this photograph the flecks, though very numerous, were not very sharply defined and had to some extent coalesced so as to produce a cloudy white effect. Plate XXIX, fig. 3, and Plate XXX, figs. 1 and 2, show intermediate conditions. The flecks shown in Plate XXIX, fig. 3, are mostly grouped further forward than usual, whilst these shown in Plate XXX, fig. 2, are concentrated well back and to each side. Not infrequently there is a white splash over the umbilicus as in Plate XXX, fig. 3. The white flecks sometimes extend behind the umbilicus, and cases have been recorded in which the white has coalesced on each side of the umbilicus to form a pair of transversely placed, elongated white patches which are usually, but not always, symmetrical (see Plate XXXI, fig. 1).

Slightly pitted white spots occur frequently on the flanks and tail region, but these are healed scars and will be considered separately in another section (p. 373).

The flippers are pigmented over the greater part of the outer surface, but have little and sometimes no pigment on the inner, or ventral, surface. There is a certain amount of individual variation here. A common condition is that shown in Plate XXX, fig. 1, where there is a streak of pigment running from a point near the apex of the flipper, forwards to about the middle of the inner surface and a small patch curving over the anterior part of the lower border from the outer surface of the flipper. Frequently, however, the inner surface is pure white. An example of this is shown in Plate XXVII, fig. 1. In this whale the flipper has been almost cut in half and the distal part turned forward so that the inner surface is shown. In other cases, which are not very common, almost the whole of the inner surface is covered with streaky pigment (see Plate XXXI, fig. 2). Though the outer surface of the flipper is nearly all pigmented the tip is usually white.

One other variable feature in the pigmentation of Blue whales appears on the under surface of the flukes. The upper surface is normally of a uniform blue-grey. The under surface is rather paler and in most cases shows a number of fine whitish striations which run in an antero-posterior direction (Plate XXXI, fig. 3). These are not usually very noticeable and sometimes are not to be seen at all. In other individuals they are strongly marked, and in one case (whale No. 819) they were so pronounced that the anterior half of the ventral surface of the flukes was practically white. It is a fairly general rule that well-marked fluke striations are associated with a lack of pigment under the flippers.

From the photographs and description given by True of the pigmentation of Blue whales from the North Atlantic it is certain that there is no important difference in this respect between the Blue whales of the North and South Atlantic. In fact, so far as the pattern of the pigmentation is concerned, his account might be applied in almost every detail to the whales we have examined in the south.

In the foetus the first signs of external pigmentation appear when it measures about 0·5 m. Up to this stage the body has a uniform pinkish or greyish appearance. Now, however, there is a faint darkening on the head, round the jaws and inside the mouth. The pigment seems to appear first on the extremities and to spread over the dorsal surface from the head backwards. At about 1·5 m. pigment can be recognized on the head, rostrum and mandible, along the anterior part of the back, and on the dorsal surface of the flukes. At about 2·0 m. it becomes general over the dorsal surface but remains rather thin except on the head and extremities. From about 2·5 to 3·0 m. all the markings of the adult pigmentation become distinguishable except on the ventral surface. It is not until the length increases to 4 or 5 m. that the whole pattern is completed and even the large foetuses of 5 or 6 m. remain paler than the adult with less sharply defined spots and flecks.

BALEEN

As in the case of the colour of whales, observations have been made on the baleen with the main object of studying the variations which may occur. There are also points of interest in a comparison of the development of the baleen with the rate of growth of the young whale.

Routine observations included the counting of the numbers of plates, measuring the length of the longest plates from base to tip (excluding the terminal bristles) and the spacing of the longest plates (by measuring the average spacing of ten). A few measurements were made of the width of the plates at the base, but this is an awkward measurement to make and difficult to perform accurately.

The baleen is of great importance from the systematic point of view, for the species of a whale can almost always be recognized from a single whalebone plate. In Blue whales it is rather coarse and short and is of a uniform blue-black colour not differing much except in tone from the colour of the skin. The bristles on the inner edges of the plates are of the same dark colour.

It will be convenient first to consider certain features of the development and growth of the baleen. The body of the foetus is practically perfected while the latter still measures only about half a metre, but although in essential features it differs little at this length from the adult whale, no trace of baleen appears until considerable

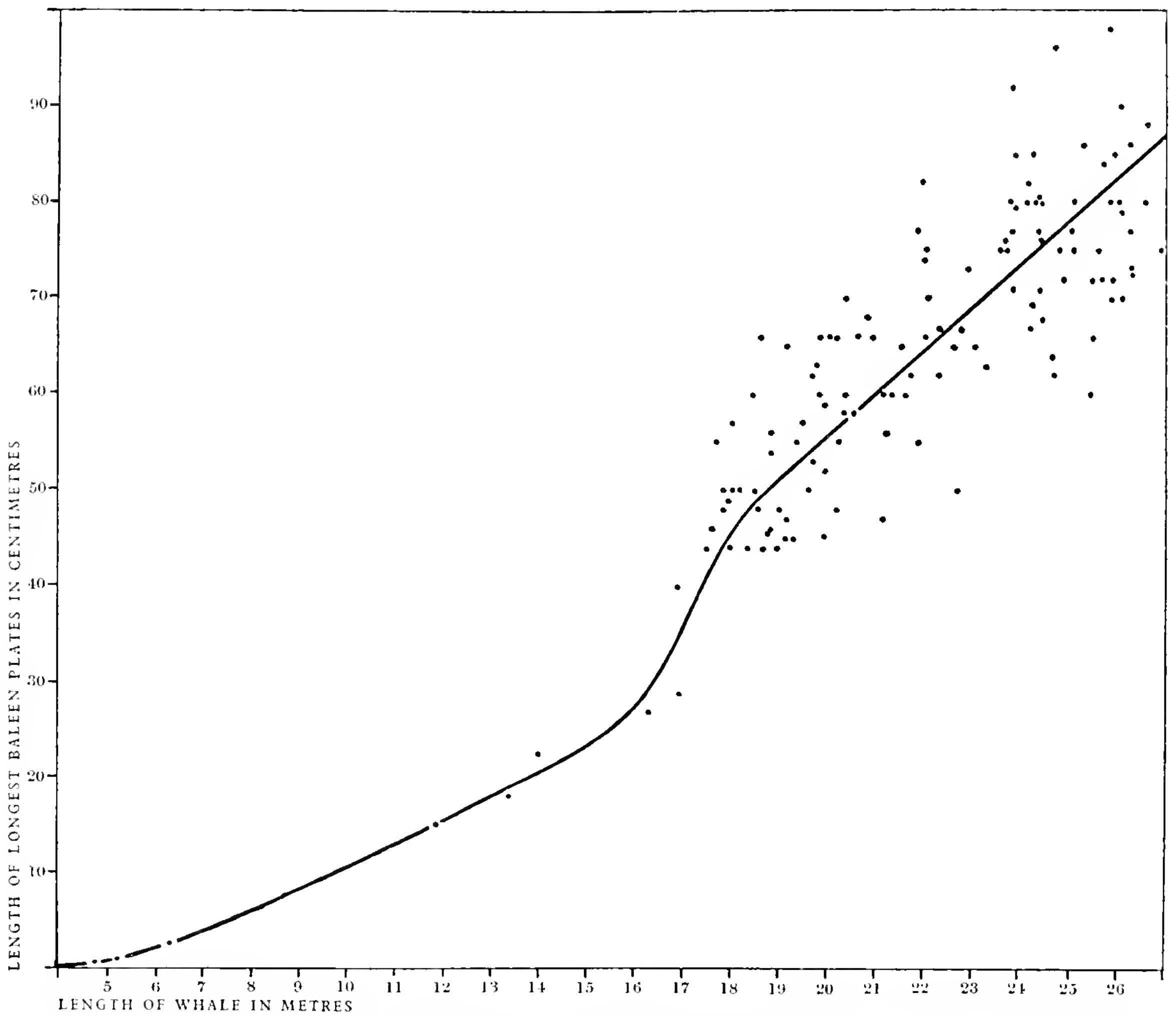


Fig. 49. Mean curve of growth of baleen in Blue whales. The plotted points represent the length of the baleen in individual whales.

further growth has taken place. Details of the development and histology of the baleen of Blue whales are given in an important memoir by Tullberg (1883) and the matter need therefore be dealt with only very briefly here. The first rudiments of the two blocks of plates are found after the foetus reaches a length of 2 m. or more. Then two plain strips of a soft whitish material appear, one on each side of the upper jaw. At 2·5 to 3 m. minute transverse ridges appear on these strips and later develop into whalebone plates. The two rudimentary strips appear first along the outer edges of the mouth leaving a broad, more or less flat palate between. As the plates grow the basic strips spread inwards until, when they are fully developed, no part of the palate remains except a narrow ridge in the median line. This condition, however, is not reached until long after the whale is born. Even when the foetus is ready for birth the longest plates measure only about 2·5 to 3·0 cm. and are arranged along the outer edge of the jaw, leaving a wide area of uncovered palate.

The rate of growth of the baleen in relation to the rate of growth of the whale can be examined in quite a simple manner by plotting the recorded lengths of the longest plates against the length of the whale. There are unfortunately very few baleen measurements for whales between 7·0 and 17·0 m., but there are just enough to indicate the course taken by the curve of growth. In Fig. 49 all the records of the lengths of the longest baleen plates are shown, and it will be seen that the plotted points may be divided in a sense into two groups. The first of these consists of the points derived from whales measuring 17·0 m. or more and forms a wide but regular series sloping upwards from baleen lengths of about 40 cm. to lengths of 70 to 100 cm. for the largest whales. This must mean that though there is some little individual variation in the length of the baleen, the plates must grow by about 5 cm. for every increase of 1 m. in the length of the whale. The second group consists of only a very few points derived from foetuses and young whales of less than 17·0 m. These points fall into a comparatively well-defined line which indicates a rate of growth appreciably slower than in the larger whales. The important feature of the graph, however, is that if a line is drawn to represent the average slope of the plotted points, or in other words the mean rate of growth of the baleen, the part built on the smaller group of points is not directly continuous with the part built on the larger group, and one must conclude that there is a sudden spurt in the growth of the plates during the whale's growth from about 16 to 18 m. The possibility arises that this is some functional development. The question, however, will be dealt with when the growth of the calf is considered and it will be shown that the sudden increase in size of the baleen plates is in fact almost certainly associated with a change from a diet of milk to a diet of krill.

As to other features of the chart we see that considerable individual variation occurs, but that there is no particular grouping which might suggest any racial distinction. Taken as a whole, the plotted points show that in general the length of the plates varies fairly uniformly with the length of the whale.

Observations on the numbers of baleen plates (excluding some subsidiary inner plates which are not seen from the outside) show that they vary from about 250 to 400 on each side. A sufficiently thorough analysis of the records is given by the table of frequencies given at top of page 316.

This gives an idea of the numbers of baleen plates normally present in southern Blue whales and the extent to which the numbers may vary. It also shows that there is no significant difference in this respect between males and females or between the Blue whales of South Georgia and South Africa.

As regards the width of the baleen at the base only twelve measurements were made

Blue Whales

Number of plates on one side	Males		Females	
	S. Georgia	S. Africa	S. Georgia	S. Africa
240–260	—	—	—	—
260–280	2	—	—	—
280–300	1	—	5	—
300–320	10	1	8	2
320–340	10	1	9	3
340–360	1	1	2	2
360–380	1	—	2	—
380–400	1	—	2	—
Total	26	3	28	7
Average No. of plates	318	327	324	326
Maximum ,, ,,	395	347	380	354
Minimum ,, ,,	270	310	280	306

in the case of Blue whales, and as the number is so small they are shown individually in the following table:

Males			Females		
Whale length	Baleen width	Width as percentage of baleen length	Whale length	Baleen width	Width as percentage of baleen length
*17·80	38	79·0	18·80	43	93·5
*18·55	55	89·0	*22·00	56	74·7
*18·80	45	83·5	22·75	48	71·7
23·10	53	94·7	24·25	55	80·0
23·30	67	106·0	*26·10	61	67·8
24·10	63	77·0	26·30	75	87·5

Those marked with an asterisk are South African whales. There are few enough data here for any comparisons to be made, but it can be said that there is no indication of any difference in the width of the baleen between either males and females or South Georgian and South African whales.

Measurements of the spacing of the largest baleen plates similarly give only negative results. The distance separating these plates varies from about 1·0 cm. in 16·0 m. whales to about 2·5 cm. in 27·0 m. whales. The readings are plotted in Fig. 50 from which it will be seen that no particular distinction exists between males and females or between whales of South Georgia and South Africa.

VENTRAL GROOVES

The presence of ventral grooves is common to all the Balaenopteridae and their arrangement in Blue, Fin and Sei whales is very similar. In Blue whales they run from a point slightly behind the tip of the mandible back to a point rather behind the umbilicus (see Plate XXX, fig. 3). Laterally they extend round to the shoulders and up to the level of the eye (Plate XXVIII, fig. 1) or slightly below it. Here they are very short and one or two run forwards into the corner of the mouth. A few grooves immediately below this run forwards for a short distance along the side of the mandible, but the rest stop short on the lower edge leaving the side of the mandible smooth. The longest grooves are those in the mid-ventral line and it is only these that

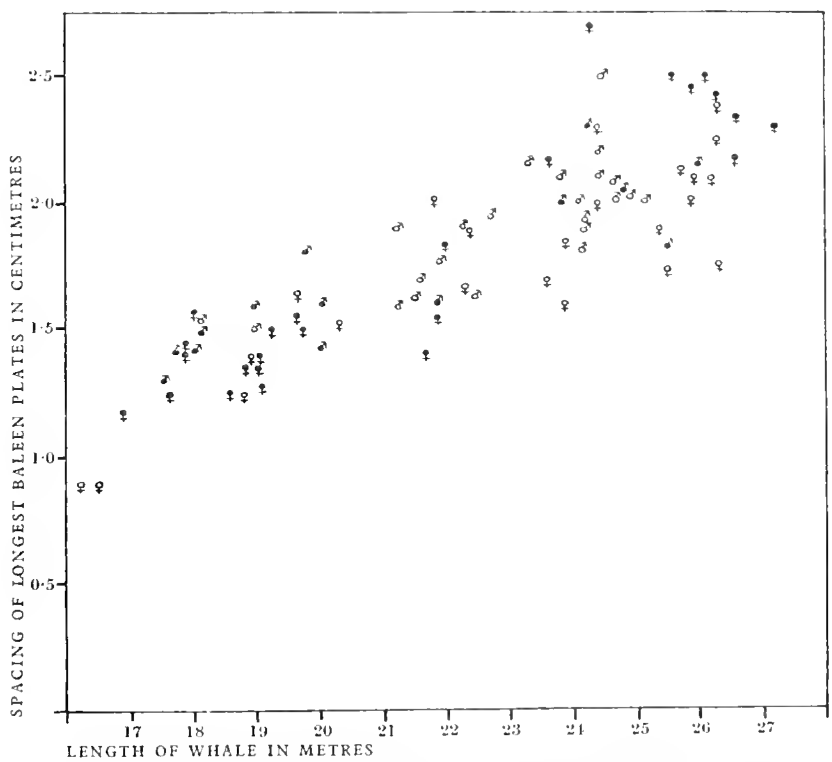


Fig. 50. Spacing of the baleen in Blue whales. The plotted points represent the spacing of the baleen in individual whales. (Black symbols represent South African whales, and circular ones South Georgia whales.)

run back as far as the umbilicus. The rest become progressively shorter so that their posterior ends form a line which curves forwards to the axilla. Posteriorly the median grooves may end evenly behind the umbilicus, as in Plate XXX, fig. 3, but there is a certain amount of variation here, for some grooves may extend further back than others, or the posterior ends may be broken up and very indefinite, and sometimes in males there is a median groove continuous with the umbilicus and genital aperture (see Plate XXIX, fig. 3, Plate XXX, figs. 1 and 2, and Plate XXXI, fig. 4).

On each side of the genital aperture in females there is often, in addition to the mammary grooves, a varying number of small grooves not more than a foot or two long which may be mentioned here though they are quite separate from the main mass of grooves. These are to be seen in Plate XXX, figs. 1 and 3. The four rough sketches in Fig. 51 show some typical examples and give an idea of the kind of variations which occur.

The best method of estimating the number of the main ventral grooves is to count their anterior terminations, beginning at the middle of the chin and counting along the mandible past the angle of the gape up to the last groove near the eye, and doubling the result.

The estimation of the number of grooves is of no particular value except (as in the case of other characters) for the purpose of fixing the normal condition and range of variation of this character for purposes of general comparison. Differences which occur in the numbers of ventral grooves of whales from South Georgia are evidently due simply to individual variation, for the differences between parent and foetus (in cases where the ventral grooves of the foetus are fully developed) are of the same order as the differences between adults. Whale No. 54 for instance had 94 grooves and its foetus had 78, while whale No. 154 had 80 grooves and its foetus 96.

The variations in the numbers of grooves is best shown by the following table, in which the records are analysed on the same principle as the table for numbers of baleen plates given on p. 316.

Blue Whales

Number of ventral grooves	Males		Females	
	S. Georgia	S. Africa	S. Georgia	S. Africa
70–80	4	4	2	2
80–90	7	6	8	5
90–100	8	1	8	5
100–110	1	3	7	1
110–120	1	—	4	1
Total	21	14	29	14
Average	90	85	95	89
Maximum	118	102	116	112
Minimum	70	70	76	70

An inspection of the above table shows again that no distinction exists between the sexes, and the fact that the averages for South African whales are slightly lower than for South Georgia is more likely due to the small number of records than to the existence of any real distinction.

The ventral grooves appear in the foetus earlier than the baleen plates. The first traces are to be found when the foetus measures from about 1·0 to 1·25 m. The anterior ends appear to materialize first and then spread backwards, and by the time the foetus reaches 2·0 m. they are usually sufficiently complete and well defined to be counted.

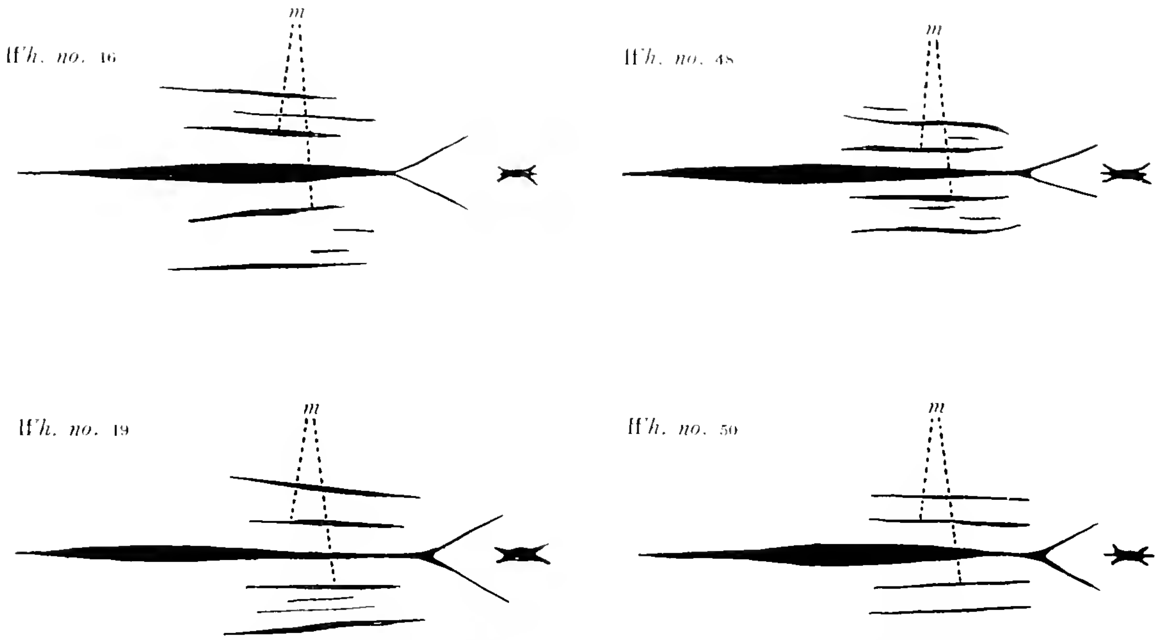


Fig. 51. Mammary grooves, genital aperture, etc., of female Blue whales (semi-diagrammatic); to show variation of the extra grooves in this region. *m*, mammary grooves.

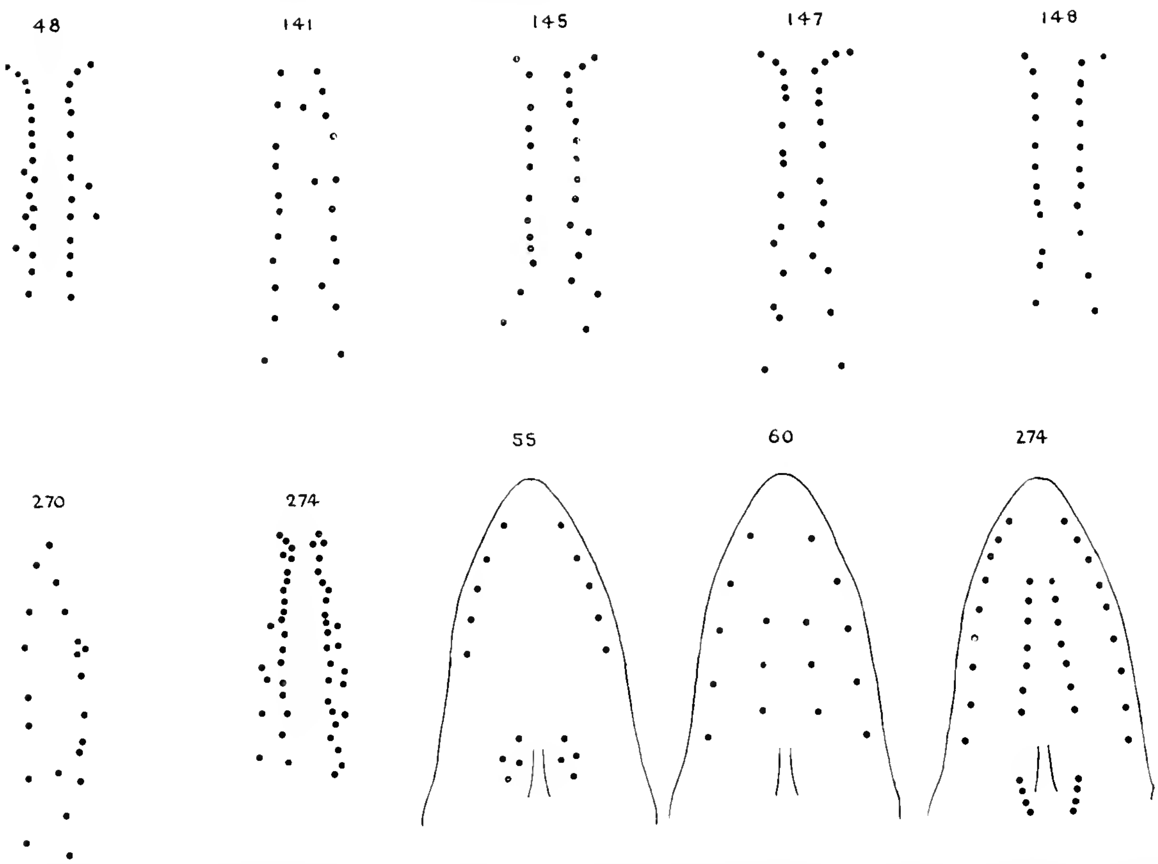


Fig. 52. Diagrams showing different arrangement of the hairs on the chin of seven and the rostrum of three Blue whales. The beard in each case is sketched from a view immediately in front of the mouth, and the rostral hairs from a dorsal aspect. The numerals refer to individual whales.

HAIR

In both Blue and Fin whales hairs occur (*a*) at the symphysis of the mandibles, (*b*) along each ramus of the lower jaw, (*c*) on the dorsal surface of the rostrum. They are best developed in young whales and foetuses, for in old whales they tend to become rather short and reduced in number.

Previous descriptions of the hairs have been given by Lillie (1910) and Japha (1911). The latter gives an account of the structure and histology of the hairs in five species of whalebone whales and six species of toothed whales.

The "beard" consists, in most whales, of between twenty and forty hairs arranged in two vertical rows which are often a little asymmetrical, and which tend to diverge slightly. The actual length of the rows is about 1 ft. in medium sized whales. In Fig. 52 the arrangement of the chin hairs of seven Blue whales and the hairs on the rostrum of three are shown.

Along each mandible there is normally a row of a few hairs varying in number from about two to a dozen. In Fin and Sei whales two rows on each side are occasionally found, but this does not seem to occur in Blue whales.

Blue Whales

Number of hairs on chin	Males		Females	
	S. Georgia	S. Africa	S. Georgia	S. Africa
8–11	1	—	1	—
12–15	—	—	—	—
16–19	—	—	—	—
20–23	2	—	5	—
24–27	11	—	9	1
28–31	8	—	14	—
32–35	5	—	4	—
36–39	2	3	1	1
40–43	2	1	1	—
44–47	—	—	2	—
48–51	1	—	—	—
Total	32	4	37	2
Average	29	38	29	31
Maximum	50	43	44	37
Minimum	9	36	10	25

On the rostrum also the number of hairs is very variable. It is practically impossible to examine the hairs on both sides since on the flensing platform the whale lies with the dorsal surface of the head resting on the ground, but usually there are between ten and twenty on one side. There is usually a row along the edge of the rostrum, a small group near the blowhole, and a few odd hairs in other positions.

The hairs of the chin have been counted more systematically than those of the mandible and rostrum, and a table of the type used for the numbers of baleen plates and ventral grooves may be drawn up to show the extent of variation.

Here, as usual, no difference is found between males and females. There are only half a dozen records from South African whales, but these fall well within the limits of variation shown by South Georgian whales, and we may therefore suppose that the whales of the two localities do not differ in this respect.

In the foetus, hairs are numerous and well developed at an early stage. In the foetus of No. 270, which measured 0·55 m., the hairs were represented by small white spots in the positions where they would later have grown out, but in No. 1151 which measured 0·445 m. the incipient hairs were already distinct.

FIN WHALES

GENERAL REMARKS

The characters of the Fin whale may be dealt with in the same manner and in the same order as those of the Blue whale. Since each step is fully explained in the section on the Blue whale much repetition may be avoided here, and though the Fin whale is of at least as great commercial importance as the Blue, less space need be devoted to it.

The average yield of oil from a Fin whale is 35 to 50 barrels, as compared with 70 to 80 from a Blue whale[1]. The distribution and history of the hunting of the Fin whale is very similar to that of the Blue whale. It was caught only in small numbers at South Georgia and the other Dependencies up to about 1912, but during and since the war it has been taken regularly in great quantities.

The largest Fin whale we examined measured 24·53 m., or 80 ft. 5 in. This was a female, No. 478. There were altogether four females measuring over 24·0 m. (Nos. 478, 200, 263 and 463). As No. 478 was the largest out of nearly 800 Fin whales one would expect that the limit for this species is somewhere about 25·0 m. (or 82 ft.), so far at least as the length is measured from the tip of the snout to the notch of the flukes. The largest Fin whale measured by Barrett-Hamilton was 82 ft. long, measured from the tip of the mandible, or 80 ft. 3 in. from the tip of the snout. Risting (1928) mentions that the largest Fin whale among his records measured 27·3 m. or 89 ft. 6 in. This is one from a great number of records, but it has already been pointed out that we are unable to put entire confidence in the accuracy of Risting's data.

As to the Fin whales of the North Atlantic, a female of 24·55 m. or 80 ft. 6 in. has been recorded by Cocks (1887), but it is uncertain how this was measured. The largest whale examined by True was 21·5 m. or 70 ft. 8 in.

In order to examine the sex ratio of Fin whales we may, as in the case of Blue whales, use the British Museum statistics of catches at the southern whaling stations during previous years. These include the following:

[1] It appears that, owing to improved methods, a somewhat higher yield has been obtained in recent seasons.

(*a*) *Dependencies of the Falkland Islands.*

South Georgia, 1913–25	15,535	Fin whales
South Shetlands, 1918–24	9,153	,,
South Orkneys, 1922–26	1,208	,,

(*b*) *South Africa.*

Cape Colony, 1920–25...	2,131	,,
Natal, 1922–26	1,439	,,

Analysis of the figures gives the following results:

(*a*) *Dependencies of the Falkland Islands.*

Of all whales examined 54 per cent were males.

Of 22 seasons in different localities there were six with from 51 per cent to 55 per cent of females. The remaining sixteen seasons all showed a majority of males. Of these, 12 seasons showed 50 to 60 per cent of males, three seasons showed 60 to 70 per cent of males and one exceptional season (1924–5 at the South Orkneys) showed as much as 82 per cent of males.

(*b*) *South Africa.*

Of all whales recorded 56 per cent were males.

Of 14 seasons in different localities only one showed a majority of females (54 per cent). The other 13 seasons all showed a majority of males of which eleven fell between 50 and 60 per cent and two between 60 and 70 per cent.

Here we have a more decisive result than in the case of Blue whales, males being in an all-round majority both in the Dependencies and in South African waters. Our own records agree with this, for 56 per cent of the whales examined and 54 per cent of the foetuses were males. It seems difficult, therefore, to avoid the conclusion that among Fin whales males are in a slight majority. Of all the Fin whales of which we have records 45 per cent are females and 55 per cent males.

As to the differences which exist between the sexes the male Fin whale becomes mature on the average at 19·4 m., and the female on the average at just 20·0 m. Thus there is approximately 0·6 m. difference between the two, or the length of the male is 97 per cent of that of the female. As in Blue whales the difference between the largest specimen of each sex is even more marked, for the largest female measured 24·53 m. and the largest male only 22·40 m., giving a difference of 2·13 m., the length of the male being 91·3 per cent of that of the female. Thus it is on the whole probable that there is an increased divergence in size after sexual maturity is reached.

EXTERNAL PROPORTIONS

A more or less complete series of measurements has been carried out on some 692 Fin whales, and the following table shows the average value of all the measurements taken for male and female Fin whales, expressed as percentages of the total length.

	Measurement	South Georgia				South Africa				Total			
		Males		Females		Males		Females		Males		Females	
		Average value	No. of measurements	Average value	No. of measurements	Average value	No. of measurements	Average value	No. of measurements	Average value	No. of measurements	Average value	No. of measurements
1	Total length	100		100		100		100		100		100	
2	Lower jaw, projection beyond tip of snout	1·18	4	1·07	8	—	—		—	1·18	4	1·07	8
3	Tip of snout to blowhole	19·18	269	19·26	216	18·06	105	18·01	74	18·86	374	18·94	290
4	Tip of snout to angle of gape	20·28	190	20·52	145	19·44	88	19·63	68	20·01	278	20·24	213
5	Tip of snout to centre of eye	21·12	314	21·23	257	20·18	111	20·24	75	20·87	425	21·00	332
6	Tip of snout to tip of flipper	41·79	256	41·67	205	40·55	100	40·51	71	41·44	356	41·37	276
7	Eye to ear (centres)	4·96	280	4·84	207	4·87	101	4·83	70	4·93	381	4·84	277
8	Notch of flukes to posterior emargination of dorsal fin	24·27	240	24·65	179	24·97	84	25·40	59	24·45	324	24·83	238
9	Flukes, width at insertion	5·01	272	4·98	223	5·21	114	5·10	75	5·07	386	5·01	298
10	Notch of flukes to anus	28·07	306	28·42	252	29·75	108	29·69	75	28·51	414	28·71	327
11	Notch of flukes to umbilicus	45·34	288	45·20	247	47·10	107	46·92	71	45·82	395	45·59	318
12	Notch of flukes to end of ventral grooves	44·23	204	43·87	146	45·44	80	45·57	57	44·57	284	44·35	203
13	Anus to reproductive aperture (centres)	6·89	290	2·85	246	6·84	100	2·79	72	6·88	390	2·83	318
14	Dorsal fin, vertical height	2·49	243	2·36	185	2·51	88	2·47	65	2·50	331	2·39	250
15	Dorsal fin, length of base	6·04	231	5·64	169	5·96	91	5·66	64	6·02	322	5·65	233
16	Flipper, tip to axilla	8·31	284	8·26	217	8·14	102	8·14	73	8·27	386	8·23	290
17	Flipper, tip to anterior end of lower border	11·28	191	11·07	144	11·13	85	11·04	66	11·23	276	11·06	210
18	Flipper, length along curve of lower border	11·61	175	11·43	125	11·44	82	11·49	66	11·56	257	11·45	191
19	Flipper, greatest width	2·83	203	2·77	159	2·80	76	2·71	60	2·82	279	2·75	219
20	Severed head, condyle to tip	25·63	222	25·85	180	24·69	67	24·87	48	25·41	289	25·64	228
21	Skull, greatest width	10·96	204	11·19	144	10·31	64	10·52	46	10·80	268	11·03	190
22	Skull length, condyle to tip of premaxilla	25·80	2	25·54	2	23·03	1	23·91	3	24·88	3	24·39	5
23	Flipper, tip to head of humerus	13·19	4	12·23	3	10·87	1	12·49	4	12·73	5	12·38	7
24	Tail, depth at dorsal fin	9·29	188	9·39	128	8·38	79	8·54	58	9·02	267	9·13	186

The results shown in this table are much the same as those which appear in the table for Blue whales. Apart from measurement No. 13 (anus to reproductive aperture) there is no particular difference between the sexes. There appears to be no sexual difference in respect of the relative sizes of the head and tail, for some of the measurements are a shade bigger in one sex, while others are a shade smaller.

The only difference between the Fin whales of South Georgia and South Africa lies in the relative sizes of the head and tail, the head measurements being consistently larger in South Georgian whales, and the tail measurements in South African whales, except in the case of No. 24 (depth of tail at dorsal fin) which, as in Blue whales, is slightly greater among the South Georgian whales. As has already been explained, these differences in the relative sizes of the head and tail are simply due to the greater average size of the whales at South Georgia.

In the following tables the average value of each measurement is shown for Fin whales at each metre of whale-length.

Male Fin Whales: South Georgia

Measurements expressed as percentages of total length

	Metre lengths	2. Lower jaw, projection beyond tip of snout			3. Tip of snout to blowhole			4. Tip of snout to angle of gape			5. Tip of snout to centre of eye		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	2	1·02–1·23	1·13	4	12·86–14·29	13·86	4	16·43–17·90	16·99	4	17·14–19·75	17·89
,,	1–2	2	0·55–0·98	0·77	16	13·73–15·83	15·09	16	16·18–20·33	17·93	16	16·67–20·66	19·02
,,	2–3	3	0·93–1·89	1·27	10	13·96–16·67	15·73	10	16·98–19·63	18·55	10	17·92–20·37	19·57
,,	3–4	—	—	—	6	13·71–18·67	15·51	6	16·29–18·93	18·14	6	18·00–20·33	19·29
,,	4–5	1	—	0·68	3	15·37–16·09	15·79	2	17·73–19·54	18·64	3	18·11–19·54	18·91
Whale	13–14	—	—	—	1	—	13·65	—	—	—	—	—	—
,,	14–15	—	—	—	2	15·14–16·67	15·91	2	16·55–18·84	17·70	3	16·90–19·18	18·38
,,	15–16	—	—	—	2	16·67–19·05	17·86	1	—	18·24	5	18·01–22·88	19·91
,,	16–17	—	—	—	4	17·75–18·51	18·16	4	18·51–20·00	19·42	5	18·20–21·21	19·67
,,	17–18	—	—	—	7	16·91–19·31	17·76	6	18·02–20·46	19·14	11	18·71–21·46	20·20
,,	18–19	—	—	—	18	17·39–20·27	18·80	16	18·86–21·39	20·19	23	18·32–22·20	20·90
,,	19–20	2	1·28–1·51	1·40	57	17·21–21·94	19·19	44	19·01–21·99	20·45	69	16·24–24·03	21·10
,,	20–21	2	0·73–1·20	0·97	110	17·50–21·74	19·30	78	17·80–22·28	20·41	121	19·02–23·28	21·33
,,	21–22	—	—	—	62	17·46–21·80	19·45	36	18·20–22·05	20·29	71	19·12–23·25	21·29
,,	22–23	—	—	—	5	17·11–21·29	19·90	3	18·27–21·61	20·45	5	18·89–22·32	21·31
,,	23–24	—	—	—	1	—	19·49	—	—	—	1	—	21·40

	Metre lengths	10. Notch of flukes to anus			11. Notch of flukes to umbilicus			12. Notch of flukes to end of ventral grooves			13. Anus to reproductive aperture, centres		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	4	29·63–33·34	30·89	4	45·92–48·72	47·17	—	—	—	4	6·17–7·86	6·93
,,	1–2	16	29·41–32·81	30·95	16	44·04–53·12	48·15	11	44·92–55·00	49·40	16	6·42–7·94	7·11
,,	2–3	10	29·63–31·76	30·79	10	45·56–48·30	46·97	10	43·33–47·99	46·06	10	6·47–7·78	7·06
,,	3–4	5	27·81–33·23	31·02	4	44·57–49·87	47·93	4	45·33–51·08	48·14	6	6·00–7·20	6·63
,,	4–5	3	28·42–29·89	28·98	3	44·00–45·98	45·14	2	43·18–43·68	43·43	3	6·95–8·05	7·65
Whale	13–14	1	—	31·73	1	—	51·29	—	—	—	1	—	6·27
,,	14–15	3	29·93–31·34	30·40	3	47·96–49·30	48·75	1	—	46·60	3	4·58–8·50	6·17
,,	15–16	6	28·57–30·89	29·52	5	46·03–48·87	47·81	2	46·54–46·67	46·61	6	4·65–8·67	7·34
,,	16–17	5	27·27–30·15	28·81	3	44·85–47·38	46·23	3	45·56–46·43	45·99	5	4·29–8·48	6·67
,,	17–18	11	27·49–30·84	29·31	10	45·03–49·28	46·90	5	45·19–48·41	46·92	8	4·97–7·78	6·56
,,	18–19	22	27·25–31·05	28·49	23	43·80–49·05	45·50	11	42·78–47·41	44·22	20	3·58–8·52	6·39
,,	19–20	64	25·61–29·90	27·98	59	42·78–49·24	45·18	42	41·02–46·73	44·15	66	3·87–9·39	6·83
,,	20–21	120	22·81–30·52	27·94	110	40·87–49·00	45·33	83	41·22–47·58	43·99	119	3·88–8·40	6·61
,,	21–22	69	24·76–29·48	27·77	68	40·92–46·98	44·86	52	40·61–46·76	43·48	66	4·03–8·57	6·64
,,	22–23	5	25·82–28·26	27·20	5	42·19–46·14	44·12	5	41·20–44·81	42·77	5	6·22–7·95	7·16
,,	23–24	1	—	26·06	1	—	44·07	1	—	44·07	1	—	4·87

	Metre lengths	18. Flipper, length along curve of lower border			19. Flipper, greatest width			20. Severed head, condyle to tip			21. Skull, greatest width		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	1	—	10·71	4	2·86–3·46	3·10	—	—	—	3	14·29–17·14	16·03
,,	1–2	13	11·76–14·69	13·37	16	2·94–3·91	3·39	—	—	—	11	13·51–17·50	14·35
,,	2–3	8	13·33–15·56	14·75	8	3·30–3·77	3·59	—	—	—	5	10·98–15·51	13·62
,,	3–4	6	13·30–16·00	14·65	6	3·09–4·00	3·53	—	—	—	2	12·10–12·92	12·51
,,	4–5	2	15·45–15·63	15·54	2	3·37–3·64	3·51	1	—	24·60	—	—	—
Whale	13–14	1	—	11·07	1	—	3·32	1	—	22·14	1	—	9·00
,,	14–15	2	11·20–11·56	11·38	3	2·86–3·10	2·98	2	23·47–24·35	23·91	2	8·16–10·48	9·32
,,	15–16	2	10·57–12·06	11·32	5	2·47–3·02	2·84	6	21·86–26·03	23·35	6	10·06–12·00	11·05
,,	16–17	3	10·32–12·31	11·31	4	2·58–2·74	2·68	3	21·49–25·94	23·60	3	9·97–11·15	10·53
,,	17–18	3	11·49–11·98	11·75	6	2·33–2·96	2·63	7	23·39–26·73	25·00	7	10·38–11·96	11·20
,,	18–19	8	10·67–12·67	11·73	13	2·40–3·05	2·80	15	23·98–26·74	25·31	13	10·78–12·30	11·41
,,	19–20	38	10·23–12·73	11·63	44	2·35–3·40	2·86	49	23·56–30·10	25·73	45	9·11–12·82	11·02
,,	20–21	72	9·76–13·17	11·62	77	2·35–3·15	2·81	85	23·17–27·55	25·84	78	9·86–12·94	10·99
,,	21–22	43	9·74–12·86	11·57	47	2·33–3·29	2·85	50	23·78–27·64	25·78	45	9·81–11·75	10·82
,,	22–23	3	11·75–12·72	12·14	3	2·83–3·08	2·94	3	26·63–27·46	27·15	3	10·62–11·78	11·20
,,	23–24	—	—	—	—	—	—	1	—	25·64	1	—	10·04

Male Fin Whales: South Georgia

Measurements expressed as percentages of total length

	Metre lengths	6. Tip of snout to tip of flipper			7. Eye to ear, centres			8. Notch of flukes to posterior emargination of dorsal fin			9. Flukes, width at insertion		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	4	39·74–41·98	40·81	—	—		4	25·93–27·35	26·84	4	7·14–8·64	7·65
,,	1–2	15	39·22–44·53	41·91	14	5·88–7·50	6·82	16	24·77–28·33	26·48	16	6·30–9·09	7·47
,,	2–3	10	39·62–46·67	42·55	10	5·86–6·67	6·28	10	25·18–27·78	26·92	10	6·30–8·15	7·25
,,	3–4	6	40·00–44·00	42·15	6	5·71–6·67	6·23	6	27·07–31·46	29·00	6	6·18–8·00	7·15
,,	4–5	2	42·50–45·98	44·24	2	5·47–6·14	5·81	3	25·23–26·95	25·98	2	5·95–6·82	6·39
Whale	13–14	1	—	36·16	1		7·01		—	—	1	—	6·64
,,	14–15	2	36·97–40·82	38·90	3	4·58–5·24	5·00	2	24·69–25·17	24·93	2	5·37–5·63	5·50
,,	15–16	2	37·74–44·44	41·09	5	4·53–6·03	4·99	4	25·16–27·87	26·35	2	4·72–6·86	5·79
,,	16–17	4	38·99–41·42	39·72	4	4·40–4·94	4·77	4	23·39–26·46	24·44	4	5·03–5·67	5·32
,,	17–18	7	38·01–41·50	40·02	9	4·58–6·06	5·00	9	24·28–26·60	23·96	7	4·74–5·26	5·02
,,	18–19	18	39·24–44·29	41·70	17	4·57–5·35	4·86	17	22·28–25·99	24·19	18	4·50–5·33	5·03
,,	19–20	59	38·94–45·69	41·78	62	4·42–5·64	4·92	51	21·32–26·23	24·47	60	4·59–6·03	5·02
,,	20–21	99	37·22–45·95	41·86	109	4·23–6·37	5·02	91	21·87–28·92	24·25	109	4·11–6·08	5·04
,,	21–22	59	37·44–45·41	42·11	64	4·38–5·49	4·89	57	21·68–26·25	24·11	63	4·34–5·61	4·97
,,	22–23	4	42·69–44·64	43·66	5	4·04–5·18	4·85	5	22·71–23·66	23·37	5	4·27–5·09	4·69
,,	23–24	1	—	42·80	1	—	4·49	—	—	—	1	—	4·45

	Metre lengths	14. Dorsal fin, vertical height			15. Dorsal fin, length of base			16. Flipper, tip to axilla			17. Flipper, tip to anterior end of lower border		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	4	1·92–2·55	2·27	4	3·70–5·13	4·61	4	8·58–9·18	8·84	4	10·71–12·56	11·87
,,	1–2	16	2·10–4·32	2·80	16	4·59–6·61	5·51	16	8·24–10·16	9·26	16	11·74–14·12	12·79
,	2–3	9	2·26–3·67	2·71	9	3·77–7·78	5·75	10	9·43–11·48	10·30	10	12·94–14·81	14·27
,,	3–4	6	2·53–3·47	3·07	6	5·62–7·38	6·66	6	9·87–11·73	10·62	6	12·64–15·08	13·94
,,	4–5	3	2·95–4·14	3·58	2	6·82–6·90	6·86	3	10·11–12·64	11·14	2	14·71–14·77	14·74
Whale	13–14	—	—	—	—	—	—	—	—	—	1	—	10·33
,,	14–15	3	2·59–3·17	2·83	2	5·10–5·63	5·37	3	7·75–8·30	8·07	2	11·13–11·43	11·28
,,	15–16	5	1·87–2·79	2·28	2	6·48–6·92	6·70	5	6·80–9·33	7·91	2	10·50–11·75	11·13
,,	16–17	4	2·07–3·15	2·55	3	5·92–6·25	6·11	5	7·46–9·09	8·34	3	10·14–11·07	10·50
,,	17–18	9	2·12–3·04	2·43	6	4·68–7·58	5·83	10	7·25–8·82	8·02	6	10·20–11·73	11·23
,,	18–19	17	1·96–2·78	2·55	13	5·27–7·48	6·07	23	7·20–9·52	8·29	11	9·62–12·30	11·12
,,	19–20	51	1·33–3·08	2·47	47	4·39–9·35	6·04	63	6·64–10·80	8·32	41	10·12–12·50	11·36
,,	20–21	94	1·86–3·36	2·53	96	4·35–8·11	6·15	105	6·84–9·86	8·42	76	9·61–12·78	11·31
,,	21–22	56	1·39–3·47	2·43	57	3·33–7·62	5·90	64	6·60–10·24	8·39	46	8·37–12·52	11·26
,,	22–23	4	2·30–2·60	2·47	5	4·75–6·62	5·95	5	7·42–8·75	8·36	3	11·43–12·50	11·83
,,	23–24	—	—	—	—	—	—	1	—	8·90	—	—	—

	Metre lengths	22. Skull length, condyle to tip of premaxilla			23. Flipper, tip to head of humerus			24. Tail, depth at dorsal fin			25. Flukes, notch to tip		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	—	—	—	4	9·18–11·11	9·98	3	7·69–10·20	9·06
,,	1–2	—	—	—	—	—	—	14	8·82–11·35	10·31	15	10·08–13·75	11·35
,,	2–3	—	—	—	—	—	—	10	8·68–11·72	10·43	9	10·85–13·47	12·65
,,	3–4	—	—	—	—	—	—	6	8·28–15·47	10·87	6	10·96–13·67	12·50
,,	4–5	—	—	—	—	—	—	2	8·42–9·09	8·76	2	12·50–12·63	12·57
Whale	13–14	—	—	—	—	—	—	—	—	—	—	—	—
,,	14–15	—	—	—	—	—	—	1	—	8·84	—	—	—
,,	15–16	—	—	—	—	—	—	4	8·18–11·00	9·39	—	—	—
,,	16–17	—	—	—	—	—	—	3	8·88–9·11	8·97	—	—	—
,,	17–18	—	—	—	1	—	12·81	4	8·07–10·23	9·10	—	—	—
,,	18–19	—	—	—	—	—	—	12	8·56–10·75	9·83	—	—	—
,,	19–20	—	—	—	—	—	—	38	8·21–11·42	9·50	—	—	—
,,	20–21	2	25·42–26·18	25·80	1	—	13·29	75	8·01–11·35	9·26	—	—	—
,,	21–22	—	—	—	2	13·33–13·35	13·34	46	7·82–11·20	9·13	—	—	—
,,	22–23	—	—	—	—	—	—	5	8·39–9·87	8·80	—	—	—
,,	23–24	—	—	—	—	—	—	—	—	—	—	—	—

Male Fin Whales: South Africa

Measurements expressed as percentages of total length

	Metre lengths	2. Lower jaw, projection beyond tip of snout			3. Tip of snout to blowhole			4. Tip of snout to angle of gape			5. Tip of snout to centre of eye		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	—	—	—	1	—	18·05	—	—	—	1	—	19·47
,,	13–14	—	—	—	4	16·19–18·20	16·88	3	17·91–18·73	18·45	5	18·54–19·33	18·86
,,	14–15	—	—	—	20	15·36–19·31	17·23	17	17·45–20·44	18·82	22	17·34–20·95	19·34
,,	15–16	—	—	—	27	15·45–19·23	17·48	23	17·21–20·53	19·00	29	17·73–22·15	19·87
,,	16–17	—	—	—	18	16·76–19·10	17·91	19	17·64–20·48	19·32	19	18·82–20·84	19·99
,,	17–18	—	—	—	8	16·96–19·24	18·34	8	19·29–21·57	20·14	8	20·00–21·98	20·78
,,	18–19	—	—	—	2	18·89–19·36	19·13	1	—	20·28	1	—	21·11
,,	19–20	—	—	—	9	17·71–21·38	19·75	7	19·27–21·68	20·92	9	20·00–22·53	21·65
,,	20–21	—	—	—	12	18·18–20·88	19·41	9	19·66–21·22	20·35	13	20·49–22·74	21·37
,,	21–22	—	—	—	4	18·43–19·95	19·19	1	—	19·81	4	19·82–21·93	21·12

	Metre lengths	10. Notch of flukes to anus			11. Notch of flukes to umbilicus			12. Notch of flukes to end of ventral grooves			13. Anus to reproductive aperture, centres		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	1	—	31·14	1	—	52·03	—	—	—	1	—	4·07
,,	13–14	5	29·64–30·79	30·31	5	47·27–48·20	47·83	4	46·04–47·48	46·89	5	5·53–7·84	7·15
,,	14–15	21	28·24–33·00	30·23	21	44·59–51·52	47·93	11	43·58–48·48	46·14	16	3·34–8·22	6·83
,,	15–16	26	27·38–32·89	30·05	26	45·25–52·37	47·73	18	43·53–50·03	46·44	23	4·10–8·67	7·00
,,	16–17	19	27·73–31·49	29·64	18	45·76–49·48	47·13	15	41·74–46·73	45·50	19	2·73–8·08	6·44
,,	17–18	8	28·49–30·99	29·65	8	45·35–48·88	47·03	6	44·61–46·47	45·93	7	4·52–7·82	6·91
,,	18–19	3	28·61–29·48	29·18	3	45·28–47·75	46·62	3	44·63–46·68	45·34	3	6·67–7·69	7·12
,,	19–20	9	27·07–28·68	28·06	9	44·44–46·87	45·77	7	42·86–45·26	44·09	8	6·84–7·81	7·27
,,	20–21	13	27·23–29·71	28·04	12	42·89–48·31	45·26	12	40·90–45·89	43·75	13	5·84–8·31	7·34
,,	21–22	4	26·42–28·05	27·29	4	44·58–45·85	45·31	4	42·92–44·93	44·09	4	5·42–8·11	7·10

	Metre lengths	18. Flipper, length along curve of lower border			19. Flipper, greatest width			20. Severed head, condyle to tip			21. Skull, greatest width		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	1	—	11·79	1	—	2·85	1	—	24·39	1	—	10·24
,,	13–14	4	11·90–12·64	12·24	4	2·73–3·06	2·88	4	22·84–23·97	23·32	4	9·89–10·40	10·12
,,	14–15	20	10·36–12·57	11·30	18	2·56–2·99	2·80	12	21·82–25·69	23·38	14	9·09–11·11	10·38
,,	15–16	24	10·48–13·38	11·52	23	2·52–3·16	2·78	16	22·73–26·90	24·32	15	9·09–10·64	10·08
,,	16–17	12	10·19–12·12	11·40	11	2·11–3·03	2·73	14	23·27–25·72	24·52	11	9·27–11·37	10·21
,,	17–18	4	11·03–12·21	11·61	6	2·70–2·92	2·81	6	24·74–26·82	25·41	6	9·65–10·73	10·29
,,	18–19	3	11·24–11·78	11·43	2	2·59–3·02	2·81	2	25·83–25·89	25·86	2	10·00–10·93	10·47
,,	19–20	5	9·17–13·02	11·24	4	2·55–3·00	2·84	5	25·32–26·95	25·91	5	10·10–12·11	10·91
,,	20–21	8	9·63–12·17	11·20	5	2·70–2·93	2·84	5	24·77–26·32	25·51	4	10·02–11·63	10·63
,,	21–22	1	—	11·04	2	3·02–3·03	3·03	2	25·28–26·65	25·97	2	10·38–10·38	10·38

Male Fin Whales: South Africa

Measurements expressed as percentages of total length

	Metre lengths	6. Tip of snout to tip of flipper			7. Eye to ear, centres			8. Notch of flukes to posterior emargination of dorsal fin			9. Flukes, width at insertion		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	1	—	40·65	—	—	—	—	—	—	1	—	4·88
,,	13–14	4	37·99–41·09	39·69	4	4·75–5·18	4·98	4	24·78–25·76	25·13	5	5·32–5·61	5·45
,,	14–15	21	37·25–41·55	39·51	17	4·68–5·26	4·91	12	24·19–26·85	25·47	23	4·83–5·77	5·30
,,	15–16	25	37·99–44·30	40·48	23	4·53–5·33	4·89	21	24·19–27·48	25·34	29	4·79–5·83	5·22
,,	16–17	19	37·95–41·76	40·12	19	4·30–5·36	4·90	14	24·30–27·83	25·60	19	4·55–5·65	5·14
,,	17–18	8	40·00–42·86	41·38	8	4·71–5·06	4·87	6	24·53–25·36	24·99	8	4·63–5·23	4·92
,,	18–19	3	40·05–41·67	40·83	3	4·63–5·33	5·02	3	24·24–25·31	24·85	3	4·96–5·41	5·12
,,	19–20	6	40·10–44·05	42·10	9	4·79–5·27	5·01	8	22·31–25·26	24·02	9	4·59–5·31	4·90
,,	20–21	10	40·39–44·30	41·99	13	4·59–5·13	4·92	12	22·71–24·88	24·07	13	4·47–5·29	4·91
,,	21–22	3	41·04–42·30	41·85	4	4·51–4·91	4·70	4	23·04–24·37	23·88	4	4·15–5·20	4·66

	Metre lengths	14. Dorsal fin, vertical height			15. Dorsal fin, length of base			16. Flipper, tip to axilla			17. Flipper, tip to anterior end of lower border		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	—	—	—	—	—	—	1	—	8·54	1	—	11·54
,,	13–14	4	1·87–2·47	2·27	4	4·68–6·74	5·95	5	7·64–9·20	8·17	4	11·24–12·36	11·78
,,	14–15	16	1·93–2·94	2·61	16	3·80–7·17	5·84	21	7·38–9·00	8·19	20	9·82–12·16	10·96
,,	15–16	22	1·81–3·05	2·48	21	5·03–7·78	6·14	25	7·07–9·06	8·11	25	10·22–12·58	11·25
,,	16–17	15	2·16–3·07	2·55	15	4·49–7·27	5·70	19	7·29–8·67	8·02	12	9·81–11·82	11·10
,,	17–18	7	2·10–2·79	2·37	7	4·52–7·02	5·64	8	7·35–8·66	8·06	5	10·75–11·74	11·31
,,	18–19	3	2·83–3·29	3·03	3	4·77–7·50	6·11	3	7·72–8·81	8·17	3	10·83–11·51	11·12
,,	19–20	7	1·48–2·76	2·35	8	5·36–7·49	6·39	6	7·60–9·18	8·66	5	8·96–12·24	10·84
,,	20–21	11	1·89–3·07	2·57	13	4·95–8·37	6·31	11	7·08–8·94	8·10	8	9·58–11·88	10·90
,,	21–22	3	2·22–2·41	2·31	4	4·25–5·53	5·07	3	6·98–8·28	7·84	2	10·80–11·49	11·15

	Metre lengths	22. Skull length, condyle to tip of premaxilla			23. Flipper, tip to head of humerus			24. Tail, depth at dorsal fin			25. Flukes, notch to tip		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	—	—	—	—	—	—	1	—	7·49	—	—	—
,,	13–14	1	—	23·03	—	—	—	3	8·63–9·34	8·87	—	—	—
,,	14–15	—	—	—	1	—	10·87	11	7·18–10·10	8·64	—	—	—
,,	15–16	—	—	—	—	—	—	19	7·27–9·21	8·21	—	—	—
,,	16–17	—	—	—	—	—	—	14	7·66–9·12	8·30	—	—	—
,,	17–18	—	—	—	—	—	—	5	8·14–8·77	8·46	—	—	—
,,	18–19	—	—	—	—	—	—	3	7·44–8·91	8·23	—	—	—
,,	19–20	—	—	—	—	—	—	8	8·02–9·49	8·73	—	—	—
,,	20–21	—	—	—	—	—	—	11	7·89–9·78	8·53	—	—	—
,,	21–22	—	—	—	—	—	—	4	7·26–8·49	7·62	—	—	—

Female Fin Whales: South Georgia

Measurements expressed as percentages of total length

	Metre lengths	2. Lower jaw, projection beyond tip of snout			3. Tip of snout to blowhole			4. Tip of snout to angle of gape			5. Tip of snout to centre of eye		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	3	13·53–15·70	14·04	3	16·20–17·54	16·74	3	16·90–19·30	17·95
,,	1–2	2	0·82–1·23	1·03	12	13·64–17·44	15·53	12	15·46–19·66	18·28	12	17·27–20·44	19·21
,,	2–3	1		0·93	10	14·03–17·44	15·30	7	17·28–19·25	17·91	10	18·12–19·53	18·98
,,	3–4	—	—	—	6	14·95–16·67	15·66	6	17·66–19·18	18·41	6	18·48–20·00	19·26
,,	4–5	—	—	—	—	—		1	—	15·93	1	—	18·03
,,	5–6	—	—	—	—			—		—	—	—	—
,,	6–7	—	—	—	1	—	11·24	1	—	17·85	1	—	19·01
Whale	14–15	—	—		1	—	16·22	—	—	—	2	16·74–18·92	17·83
,,	15–16	1		0·65	4	15·03–17·76	16·45	2	18·95–19·15	19·05	7	16·12–20·07	17·93
,,	16–17	—			8	12·99–19·44	16·66	6	17·43–20·74	18·70	9	18·04–21·60	19·33
,,	17–18	—			8	15·57–19·88	18·04	7	18·37–20·59	19·76	10	19·03–21·59	20·42
,,	18–19	2	0·83–1·10	0·96	17	17·03–20·05	18·47	15	18·36–21·61	19·68	22	19·19–22·28	20·56
,,	19–20	2	1·09–1·53	1·31	16	17·10–20·46	18·93	13	19·43–21·48	20·43	20	19·58–22·25	21·12
,,	20–21	2	0·96–1·15	1·05	29	17·63–21·35	19·21	19	19·08–22·34	20·47	37	20·04–23·81	21·22
,,	21–22	1	—	1·24	59	17·62–21·84	19·79	34	18·84–22·93	20·89	66	19·68–24·52	21·67
,,	22–23	—	—	—	59	17·58–22·22	19·67	40	18·95–22·67	20·91	68	19·54–23·77	21·70
,,	23–24	—	—	—	12	17·32–21·07	19·92	7	19·78–22·37	21·20	13	20·78–22·77	21·89
,,	24–25	—		—	3	18·63–20·25	19·63	2	20·78–22·00	21·39	3	20·78–22·50	21·88

	Metre lengths	10. Notch of flukes to anus			11. Notch of flukes to umbilicus			12. Notch of flukes to end of ventral grooves			13. Anus to reproductive aperture, centres		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	3	30·08–32·46	31·73	3	47·37–50·70	49·55	—	—	—	3	1·75–2·82	2·31
,,	1–2	11	29·23–32·33	30·89	12	45·76–49·55	47·62	8	43·26–51·35	47·17	12	1·84–3·37	2·74
,,	2–3	10	29·05–32·17	30·82	10	44·83–49·61	47·19	9	44·91–48·20	46·73	10	2·33–3·73	2·74
,,	3–4	6	29·13–33·16	31·06	4	46·03–51·52	49·12	5	45·20–50·00	47·13	6	2·10–3·83	3·08
,,	4–5	1		32·79	1	—	48·01	1	—	48·01	1	—	2·81
,,	5–6	—	—	—	—	—	—			—		—	
,,	6–7	1	—	30·58	1	—	47·44	1		46·28	1	—	2·81
Whale	14–15	2	31·76–32·06	31·91	2	47·97–48·94	48·46	1		46·62	2	2·70–3·12	2·91
,,	15–16	7	30·26–32·89	31·01	7	46·38–50·00	48·04	2	46·05–48·16	47·11	7	1·49–3·83	2·87
,,	16–17	9	28·75–30·37	29·69	9	45·06–48·18	46·75	5	45·06–48·34	46·29	9	1·82–3·31	2·61
,,	17–18	10	27·45–31·32	29·20	9	44·51–47·76	46·39	6	41·08–46·59	44·34	9	2·30–4·08	3·05
,,	18–19	21	27·12–31·22	29·16	19	43·50–49·57	46·24	11	42·44–47·30	44·96	22	1·85–3·84	2·75
,,	19–20	20	26·73–30·05	28·37	20	41·48–47·31	45·18	12	41·22–46·04	44·05	19	1·82–3·28	2·56
,,	20–21	36	27·39–29·80	28·63	39	42·80–47·12	45·37	17	41·72–46·20	44·00	36	1·73–3·50	2·84
,,	21–22	67	26·04–30·00	28·00	65	42·40–47·52	44·89	41	39·53–46·30	43·41	66	1·84–3·95	2·89
,,	22–23	64	24·62–30·40	27·95	64	40·88–48·89	44·52	40	40·89–46·44	43·51	61	1·98–3·93	2·81
,,	23–24	13	26·69–28·99	27·70	10	42·16–46·52	44·39	9	41·52–44·81	43·33	12	2·17–3·13	2·68
,,	24–25	3	27·05–28·75	28·48	3	43·06–45·42	44·15	2	42·50–42·92	42·71	3	1·69–2·92	2·43

	Metre lengths	18. Flipper, length along curve of lower border			19. Flipper, greatest width			20. Severed head, condyle to tip			21. Skull, greatest width		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	3	12·35–14·91	13·31	3	3·50–3·53	3·52	—		—	2	15·29–17·54	16·42
,,	1–2	11	11·70–14·87	13·21	12	2·73–3·77	3·37	—		—	9	13·90–16·37	14·90
,,	2–3	9	12·86–14·03	13·48	10	3·10–3·72	3·43	—			2	13·58–14·16	13·87
,,	3–4	6	13·51–16·84	15·42	5	3·56–3·80	3·66				2	13·21–13·67	13·44
,,	4–5	1		15·93	1	—	3·98					—	—
,,	5–6	—	—	—		—						—	—
,,	6–7	1		14·88	1	—	3·64					—	—
Whale	14–15	—	—	—	1	—	2·62	—		—		—	—
,,	15–16	4	11·03–11·58	11·34	7	2·57–3·24	2·74	4	21·85–23·10	22·48	4	10·73–11·60	11·10
,,	16–17	4	10·56–11·23	10·75	6	2·42–3·12	2·73	6	23·94–24·59	24·25	5	10·61–11·87	11·21
,,	17–18	4	10·79–11·49	11·15	7	2·62–2·94	2·81	7	23·58–26·20	25·08	6	10·61–12·24	11·07
,,	18–19	5	10·52–11·94	11·17	7	2·38–3·11	2·69	11	23·73–26·39	25·34	11	9·79–12·37	10·70
,,	19–20	9	10·41–12·16	11·40	12	2·39–2·92	2·78	14	23·83–29·09	26·18	9	9·58–11·26	10·73
,,	20–21	22	10·48–13·60	11·54	31	2·42–3·14	2·76	35	24·15–27·50	25·77	30	10·25–12·50	11·03
,,	21–22	34	10·37–12·86	11·48	40	2·32–3·19	2·78	45	23·73–29·28	26·31	36	10·08–12·38	10·96
,,	22–23	34	9·73–12·65	11·54	38	2·46–3·21	2·80	44	23·79–30·52	26·18	38	9·46–11·50	10·76
,,	23–24	6	9·01–12·29	11·20	7	2·57–3·03	2·71	10	21·72–27·27	25·78	8	10·00–11·69	10·81
,,	24–25	3	10·83–11·96	11·23	3	2·61–2·79	2·68	4	22·83–27·08	25·45	1	—	10·42

Female Fin Whales: South Georgia

Measurements expressed as percentages of total length

	Metre lengths	6. Tip of snout to tip of flipper			7. Eye to ear, centres			8. Notch of flukes to posterior emargination of dorsal fin			9. Flukes, width at insertion		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	3	39·44–42·11	40·52	2	7·06–8·75	7·91	3	27·06–28·92	28·05	3	7·02–7·06	7·04
,,	1–2	11	37·08–43·22	41·45	9	6·15–7·49	6·65	12	23·93–28·21	26·33	12	6·49–8·98	7·50
,,	2–3	9	40·09–44·81	42·49	10	5·52–6·88	6·26	9	20·69–31·12	26·47	9	6·05–8·30	6·96
,,	3–4	6	43·33–45·38	44·09	5	6·06–6·58	6·31	6	25·83–28·95	27·47	6	6·79–8·42	7·52
,,	4–5	—	—	—	1	—	6·09	2	20·73–27·40	24·07	2	6·05–7·26	6·66
,,	5–6	—	—	—	—	—	—	—	—	—	—	—	—
,,	6–7	1	—	42·48	1	—	5·45	1	—	29·09	1	—	6·94
Whale	14–15	1	—	39·66	1	—	4·75	2	28·01–28·72	28·36	1	—	5·18
,,	15–16	3	35·16–40·13	38·30	5	4·39–5·05	4·76	4	25·66–28·29	26·49	4	4·61–6·13	5·32
,,	16–17	8	38·23–41·98	39·64	6	4·50–5·13	4·89	5	23·75–26·25	24·78	8	4·79–6·65	5·37
,,	17–18	8	37·35–42·61	40·92	9	4·60–5·10	4·96	8	24·85–27·84	26·06	8	4·91–5·31	5·17
,,	18–19	16	38·92–42·59	40·83	16	4·18–5·28	4·80	14	23·56–26·49	25·07	17	4·55–5·36	4·98
,,	19–20	16	39·38–42·75	41·35	14	4·42–5·52	4·71	14	23·47–26·34	24·85	17	4·37–5·53	4·97
,,	20–21	27	38·61–45·00	41·36	32	4·21–5·40	4·82	26	20·33–29·12	24·86	30	4·48–5·89	5·03
,,	21–22	58	38·94–46·81	42·09	59	4·49–6·32	4·90	50	19·08–26·48	24·38	63	4·40–5·72	5·00
,,	22–23	55	38·68–44·54	42·18	54	4·04–5·33	4·83	45	20·27–25·92	24·24	60	4·24–5·66	4·92
,,	23–24	10	40·48–43·10	42·54	9	4·52–5·13	4·83	9	22·76–24·59	23·90	12	4·29–5·13	4·73
,,	24–25	3	40·83–43·21	42·16	2	4·83–4·87	4·85	2	22·83–23·54	23·18	3	4·33–4·55	4·46

	Metre lengths	14. Dorsal fin, vertical height			15. Dorsal fin, length of base			16. Flipper, tip to axilla			17. Flipper, tip to anterior end of lower border		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	3	2·35–2·82	2·60	3	4·23–7·06	5·51	3	9·40–10·53	9·93	3	11·76–14·04	12·83
,,	1–2	12	2·24–3·77	2·91	12	4·18–6·18	5·07	12	8·18–10·77	9·58	12	11·70–15·17	12·81
,,	2–3	10	1·89–3·73	2·93	10	4·53–7·05	5·08	10	8·91–10·29	9·72	9	12·03–13·41	12·91
,,	3–4	6	3·00–4·33	3·45	6	6·01–7·67	6·63	6	9·31–12·12	10·54	6	13·21–15·76	14·66
,,	4–5	1	—	3·04	—	—	—	2	9·50–10·54	10·02	1	—	14·99
,,	5–6	—	—	—	—	—	—	—	—	—	—	—	—
,,	6–7	1	—	3·97	1	—	7·77	1	—	11·24	1	—	14·55
Whale	14–15	2	2·34–2·84	2·59	1	—	6·08	1	—	8·30	1	—	11·84
,,	15–16	4	2·12–2·76	2·47	3	4·93–5·81	5·33	7	7·15–8·58	8·00	5	10·32–11·18	10·72
,,	16–17	5	2·18–3·67	2·64	5	4·89–6·88	6·29	6	6·79–8·64	7·86	5	9·91–11·04	10·42
,,	17–18	7	2·24–3·02	2·56	6	4·37–7·93	5·82	9	7·47–9·78	8·33	7	9·25–11·82	10·80
,,	18–19	14	1·93–2·67	2·37	13	4·32–6·42	5·36	18	7·00–9·89	8·39	5	10·14–11·56	10·74
,,	19–20	16	1·94–3·45	2·57	13	4·27–6·43	5·47	17	7·27–9·33	8·35	11	10·15–11·91	11·30
,,	20–21	27	1·69–2·93	2·38	19	4·21–7·12	5·55	32	6·53–10·81	8·30	27	9·90–13·16	11·20
,,	21–22	50	1·74–3·20	2·30	50	4·28–7·78	5·66	58	6·86–10·70	8·26	37	9·41–12·38	10·97
,,	22–23	49	1·69–2·83	2·30	48	4·24–7·62	5·70	56	6·07–9·76	8·27	36	9·64–13·15	11·27
,,	23–24	9	1·97–2·71	2·24	9	4·18–7·52	5·74	10	7·58–9·12	8·00	7	9·48–12·03	11·01
,,	24–25	2	1·96–1·96	1·96	2	5·00–5·21	5·11	3	8·04–9·37	8·49	3	10·42–11·75	10·95

	Metre lengths	22. Skull length, condyle to tip of premaxilla			23. Flipper, tip to head of humerus			24. Tail, depth at dorsal fin			25. Flukes, notch to tip		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Foetus	0–1	—	—	—	—	—	—	3	9·40–11·28	10·40	3	9·40–10·53	9·93
,,	1–2	—	—	—	—	—	—	9	10·11–11·24	10·49	11	8·64–13·51	11·68
,,	2–3	—	—	—	—	—	—	9	9·30–10·94	10·04	9	8·62–14·34	12·42
,,	3–4	—	—	—	—	—	—	6	10·33–11·51	10·81	6	11·14–14·47	13·15
,,	4–5	—	—	—	—	—	—	2	8·42–10·54	9·48	2	11·66–12·88	12·27
,,	5–6	—	—	—	—	—	—	—	—	—	—	—	—
,,	6–7	—	—	—	—	—	—	1	—	8·93	1	—	12·23
Whale	14–15	—	—	—	—	—	—	1	—	10·43	—	—	—
,,	15–16	—	—	—	—	—	—	2	9·21–9·21	9·21	—	—	—
,,	16–17	—	—	—	—	—	—	4	8·56–10·31	9·38	—	—	—
,,	17–18	—	—	—	—	—	—	4	9·40–10·05	9·69	—	—	—
,,	18–19	—	—	—	—	—	—	10	8·77–10·46	9·70	—	—	—
,,	19–20	1	—	25·78	—	—	—	10	8·59–11·06	9·56	—	—	—
,,	20–21	—	—	—	—	—	—	15	8·71–10·59	9·32	—	—	—
,,	21–22	—	—	—	2	11·66–12·79	12·23	38	7·91–11·36	9·43	—	—	—
,,	22–23	1	—	25·30	1	—	12·25	34	7·51–10·77	9·38	—	—	—
,,	23–24	—	—	—	—	—	—	8	7·88–10·34	8·76	—	—	—
,,	24–25	—	—	—	—	—	—	2	8·33–8·96	8·65	—	—	—

Female Fin Whales: South Africa

Measurements expressed as percentages of total length

	Metre lengths	2. Lower jaw, projection beyond tip of snout			3. Tip of snout to blowhole			4. Tip of snout to angle of gape			5. Tip of snout to centre of eye		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	—	—	—	1	—	15·76	1	—	18·27	1	—	18·51
,,	13–14	—	—	—	1	—	16·24	1	—	18·30	1	—	18·97
,,	14–15	—	—	—	14	15·88–18·70	17·27	13	17·57–19·97	18·17	14	18·18–20·87	19·04
,,	15–16	—	—	—	24	16·58–19·05	17·87	20	18·10–21·00	19·41	25	18·82–21·32	20·08
,,	16–17	—	—	—	14	17·33–19·45	17·64	13	18·77–21·09	19·81	14	19·40–21·33	20·27
,,	17–18	—	—	—	9	17·84–19·59	18·86	9	20·00–21·05	20·47	9	20·73–22·11	21·19
,,	18–19	—	—	—	2	18·35–20·81	19·58	2	20·48–22·70	21·59	2	20·74–22·86	21·80
,,	19–20	—	—	—	1	—	19·53	1	—	21·46	1	—	21·87
,,	20–21	—	—	—	4	17·60–20·45	19·34	4	19·90–22·08	21·30	4	20·38–22·13	21·63
,,	21–22	—	—	—	4	18·98–20·28	19·44	4	20·14–21·42	20·54	4	20·83–22·31	21·37

	Metre lengths	10. Notch of flukes to anus			11. Notch of flukes to umbilicus			12. Notch of flukes to end of ventral grooves			13. Anus to reproductive aperture, centres		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	1	—	30·59	1	—	49·02	1	—	50·20	1	—	3·29
,,	13–14	1	—	29·89	—	—	—	1	—	45·39	1	—	3·69
,,	14–15	14	27·99–32·33	30·40	13	46·98–49·66	48·41	11	45·55–49·66	47·24	14	2·05–3·26	2·72
,,	15–16	25	28·30–31·76	30·11	25	45·04–51·48	47·55	19	44·06–48·43	45·69	23	1·90–3·79	2·86
,,	16–17	14	26·59–30·40	29·39	13	43·03–49·09	46·41	11	41·54–47·30	44·78	13	2·46–3·07	2·71
,,	17–18	9	27·19–32·39	29·19	8	43·86–48·42	45·54	6	43·27–47·59	44·96	9	1·69–3·31	2·50
,,	18–19	2	28·72–28·92	28·82	2	44·68–45·41	45·04	—	—	—	2	1·89–2·39	2·14
,,	19–20	1	—	28·39	1	—	44·27	1	—	43·75	1	—	3·39
,,	20–21	4	27·16–29·02	28·21	4	43·95–47·96	45·32	3	42·47–46·04	43·75	4	2·43–3·82	3·08
,,	21–22	4	27·12–29·95	28·44	4	43·87–47·22	45·30	4	42·45–46·30	44·24	4	3·06–3·24	3·15

	Metre lengths	18. Flipper, length along curve of lower border			19. Flipper, greatest width			20. Severed head, condyle to tip			21. Skull, greatest width		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	1	—	12·71	1	—	2·75	—	—	—	—	—	—
,,	13–14	1	—	11·00	1	—	2·58	—	—	—	—	—	—
,,	14–15	10	10·68–12·05	11·30	10	2·59–3·01	2·74	7	22·97–25·48	24·24	7	9·59–11·10	10·30
,,	15–16	24	10·23–13·29	11·34	23	2·40–2·89	2·69	16	23·38–25·57	24·36	15	9·72–10·79	10·24
,,	16–17	14	10·39–13·04	11·32	12	2·52–3·01	2·70	9	23·95–25·68	24·67	9	9·63–10·49	10·92
,,	17–18	6	10·70–12·06	11·53	5	2·54–2·92	2·73	7	25·07–26·32	25·68	7	9·46–11·27	10·45
,,	18–19	1	—	12·23	1	—	2·77	2	25·00–27·68	26·34	2	10·64–11·62	11·13
,,	19–20	1	—	10·94	1	—	2·76	—	—	—	1	—	10·68
,,	20–21	4	10·52–11·61	11·07	3	2·59–2·77	2·69	3	23·98–26·90	25·82	2	10·53–10·55	10·54
,,	21–22	4	10·40–11·47	11·07	3	2·69–2·92	2·81	4	24·77–26·56	25·59	3	10·42–11·32	10·95

Female Fin Whales: South Africa

Measurements expressed as percentages of total length

	Metre lengths	6. Tip of snout to tip of flipper			7. Eye to ear, centres			8. Notch of flukes to posterior emargination of dorsal fin			9. Flukes, width at insertion		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	1	—	37·65	1	—	4·78	1	—	27·37	1	—	5·25
,,	13–14	1	—	39·78	1	—	4·87	1	—	25·68	1	—	5·02
,,	14–15	12	37·92–41·74	39·52	13	4·63–5·21	4·86	11	24·83–27·70	26·28	14	4·79–5·61	5·28
,,	15–16	24	38·46–43·35	40·47	22	4·45–5·34	4·83	20	24·33–27·67	25·52	25	4·57–5·77	5·15
,,	16–17	12	38·62–42·34	40·46	13	4·43–5·03	4·80	11	24·02–27·20	25·14	14	4·56–5·69	5·16
,,	17–18	9	41·13–42·46	41·81	9	4·50–5·00	4·79	6	23·68–25·33	24·62	9	4·56–5·34	4·88
,,	18–19	2	41·49–43·78	42·63	2	4·95–5·30	5·12	1	—	24·79	2	5·00–5·03	5·01
,,	19–20	1	—	42·19	1		5·21	1	—	24·64	1	—	5·00
,,	20–21	4	41·25–42·22	41·60	4	4·54–4·78	4·65	3	23·56–24·70	23·94	4	4·67–4·84	4·78
,,	21–22	4	40·74–42·45	41·33	4	4·54–5·08	4·80	4	24·06–25·83	25·16	4	4·62–4·86	4·71

	Metre lengths	14. Dorsal fin, vertical height			15. Dorsal fin, length of base			16. Flipper, tip to axilla			17. Flipper, tip to anterior end of lower border		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	1	—	2·51	1	—	5·49	1	—	7·84	1	—	12·47
,,	13–14	1	—	2·29	1	—	6·64	1	—	8·12	1	—	10·63
,,	14–15	12	2·03–2·92	2·46	11	4·39–6·85	5·77	12	7·74–8·77	8·08	10	10·34–11·85	10·99
,,	15–16	21	1·90–3·74	2·50	21	4·57–7·72	5·89	25	7·17–9·90	8·16	24	9·64–12·89	11·05
,,	16–17	13	2·22–2·97	2·50	13	4·37–6·85	5·75	14	7·72–8·64	8·14	14	10·09–12·50	11·02
,,	17–18	7	2·08–2·69	2·34	7	4·39–6·88	5·72	9	7·44–8·85	8·26	6	10·59–11·83	11·19
,,	18–19	1	—	2·87	1	—	6·91	2	8·51–9·03	8·77	1	—	11·76
,,	19–20	1	—	2·97	1	—	6·51	1	—	8·12	1	—	10·68
,,	20–21	4	1·87–2·72	2·29	4	3·97–6·42	5·13	4	7·44–8·21	7·87	4	10·32–11·11	10·72
,,	21–22	4	2·12–2·59	2·40	4	4·61–6·02	5·13	4	7·53–8·25	7·98	4	10·21–11·34	10·83

	Metre lengths	22. Skull length, condyle to tip of premaxilla			23. Flipper, tip to head of humerus			24. Tail, depth at dorsal fin		
		No. of measurements	Range	Mean	No. of measurements	Range	Mean	No. of measurements	Range	Mean
Whale	12–13	—	—	—	—	—	—	1	—	8·24
,,	13–14	—	—	—	1	—	11·96	1	—	9·00
,,	14–15	—	—	—	—	—	—	11	7·45–9·45	8·51
,,	15–16	1	—	22·86	1	—	12·99	19	7·81–9·09	8·44
,,	16–17	1	—	23·47	1	—	12·16	11	7·87–8·99	8·32
,,	17–18	—	—	—	—	—	—	6	8·48–8·84	8·68
,,	18–19	1	—	24·52	1	—	12·87	1	—	8·62
,,	19–20	—	—	—	—	—	—	1	—	9·79
,,	20–21	—	—	—	—	—	—	3	8·63–8·94	8·74
,,	21–22	—	—	—	—	—	—	4	8·40–9·95	8·92

Graphical representations of selected measurements from the foregoing tables are shown in Figs. 53 to 75, and it will be seen that in general the results are very similar to those which appear in the case of Blue whales. There is no important difference between the curves for the two sexes, except of course in the case of measurement No. 13, and though a slight distinction appears between Fin whales of South Georgia and South Africa, which will be dealt with immediately, there is no difference between the shapes of the curves.

As in Blue whales, the anterior measurements (Figs. 53 to 62) show a relative increase as the whale-length increases. The increase is about 0·45 per cent per metre of whale-length as the whale-length increases from 14 to 22 m. The measurements referring to the posterior part of the body show a corresponding decrease.

A feature of the anterior measurement which is very noticeable in female Fin whales and is distinguishable in males (and, incidentally, in Blue whales of both sexes), is that the curves for South African whales fall in advance of the curves for South Georgian whales, to which, however, they correspond in shape. This means that the South African whales have relatively larger heads than those of the same total length at South Georgia. In Fin males the difference is about 0·7 per cent of the whale-length and in females about 0·8 per cent of the whale-length.

Among the posterior measurements we find that the female Fin whales again show a South African curve in advance of the South Georgian curve, which means that the South African whale has a relatively smaller tail than the South Georgian whale of the same size. In male Fin whales and Blue whales of both sexes this difference is not noticeable.

As growth is accompanied by a relative increase in the size of the head and a relative decrease in the length of the tail, one may say that the South African whales (female Fin whales especially) have heads and tails whose proportions correspond with whales 1 to 2 m. longer at South Georgia.

If the attainment of physical proportions goes on to some extent independently of growth in length, whales of the African coast would appear to be stunted and their smaller size accentuates the relatively increased size of the head and decreased size of the tail, while at South Georgia exactly the opposite happens. In support of this interpretation it may be pointed out that in the graphs of the anterior measurements a maximum head size is reached in Fin whales of South Africa at about 19 to 20 m. and the curve then drops to the level of the South Georgian whales which reach the maximum at about 23 m.

It is possible that this difference in the bodily proportions of South Georgian and South African whales is due to a slightly emaciated condition among the latter, caused by the relative scarcity of food.

As to the other measurements illustrated in Figs. 71 to 75, we find no difference between the whales of the two localities in respect of measurement No. 13 (Fig. 71) or of measurements Nos. 17 and 18 (Figs. 72 and 73), but the depth of the tail (Figs. 74 and 75) is again slightly greater in South Georgian whales. The size of the whale appears to make no difference to this measurement.

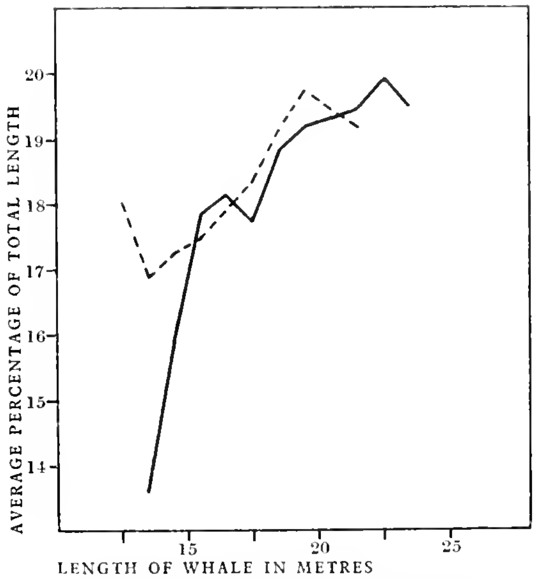


Fig. 53. Male Fin whales. Measurement No. 3. Tip of snout to blowhole.

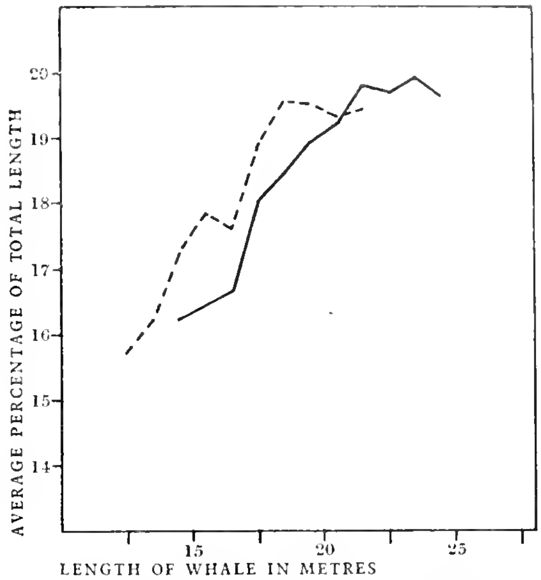


Fig. 54. Female Fin whales. Measurement No. 3. Tip of snout to blowhole.

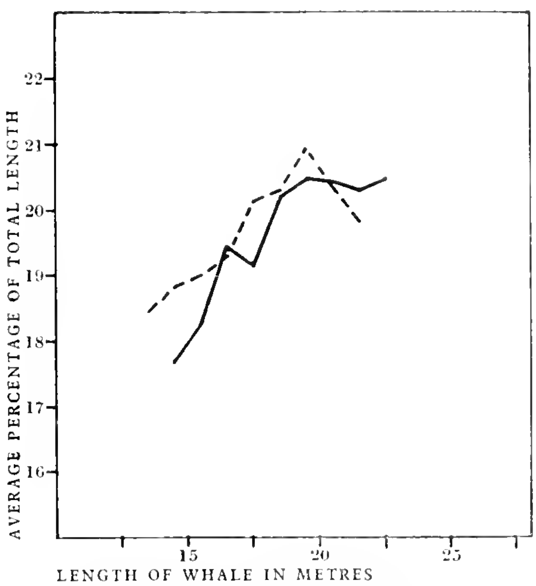


Fig. 55. Male Fin whales. Measurement No. 4. Tip of snout to angle of gape.

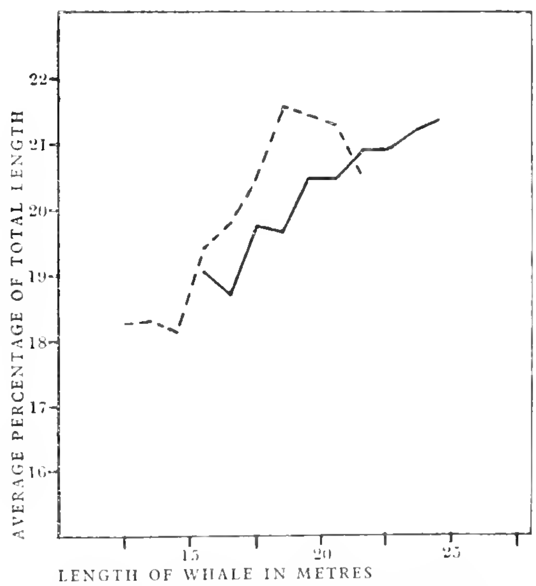


Fig. 56. Female Fin whales. Measurement No. 4. Tip of snout to angle of gape.

——— South Georgia whales. - - - - - South African whales.

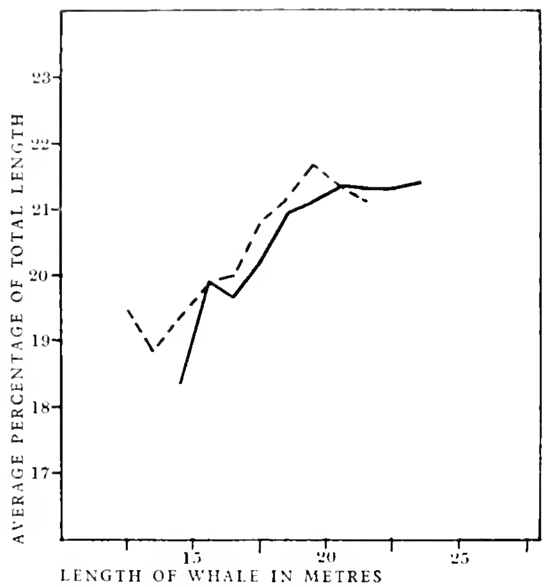


Fig. 57. Male Fin whales. Measurement No. 5. Tip of snout to centre of eye.

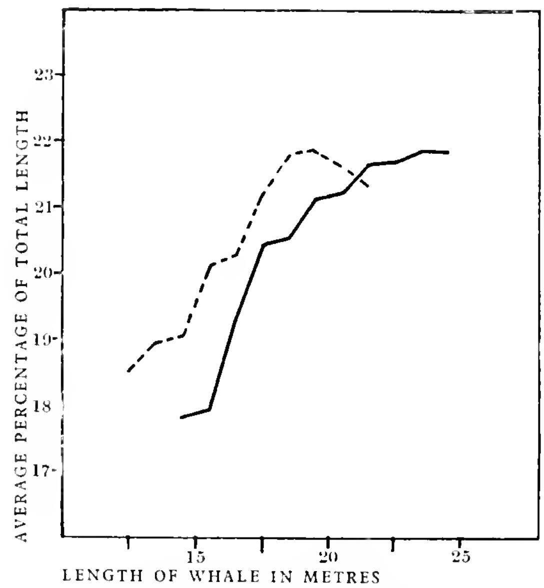


Fig. 58. Female Fin whales. Measurement No. 5. Tip of snout to centre of eye.

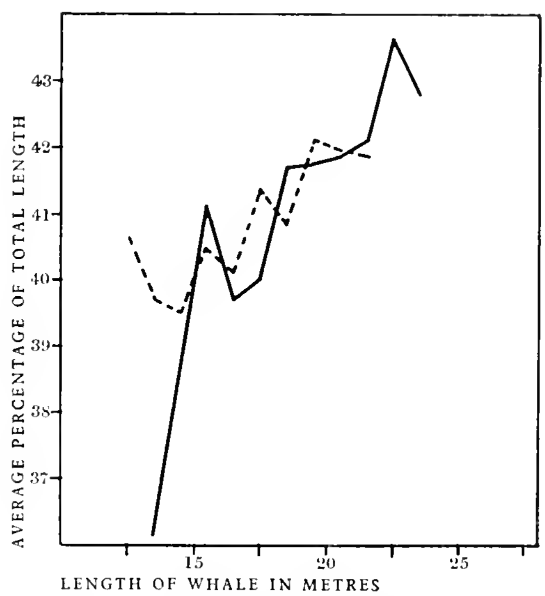


Fig. 59. Male Fin whales. Measurement No. 6. Tip of snout to tip of flipper.

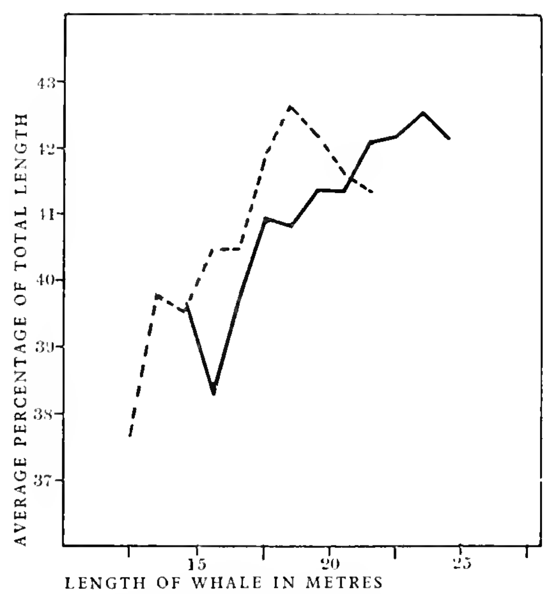


Fig. 60. Female Fin whales. Measurement No. 6. Tip of snout to tip of flipper.

——— South Georgia whales. - - - - - South African whales.

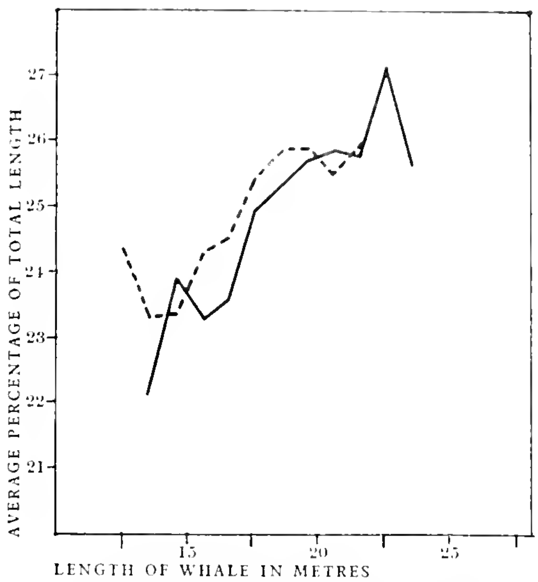


Fig. 61. Male Fin whales. Measurement No. 20. Severed head, condyle to tip.

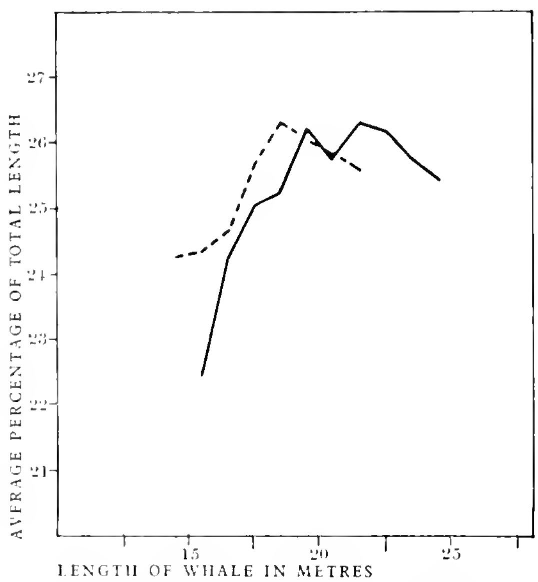


Fig. 62. Female Fin whales. Measurement No. 20. Severed head, condyle to tip.

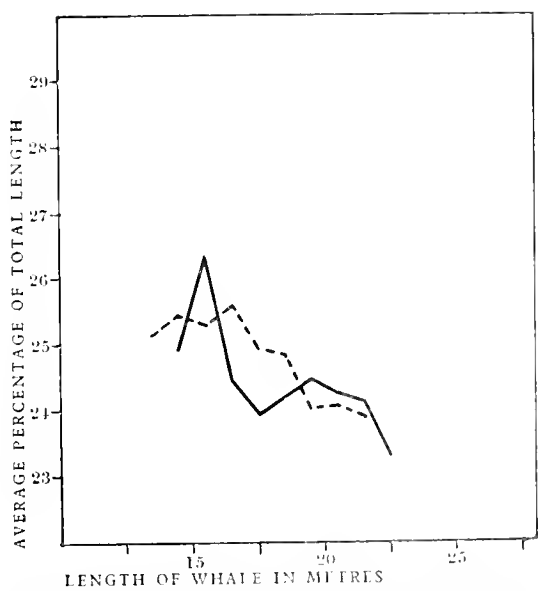


Fig. 63. Male Fin whales. Measurement No. 8. Notch of flukes to posterior emargination of dorsal fin.

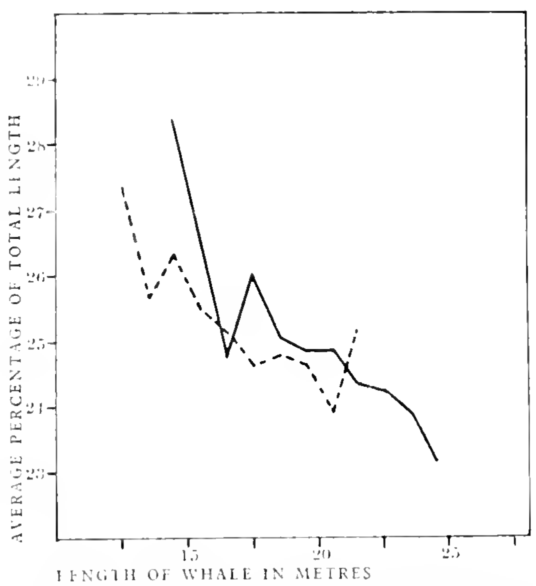


Fig. 64. Female Fin whales. Measurement No. 8. Notch of flukes to posterior emargination of dorsal fin.

——— South Georgia whales.

- - - - - South African whales.

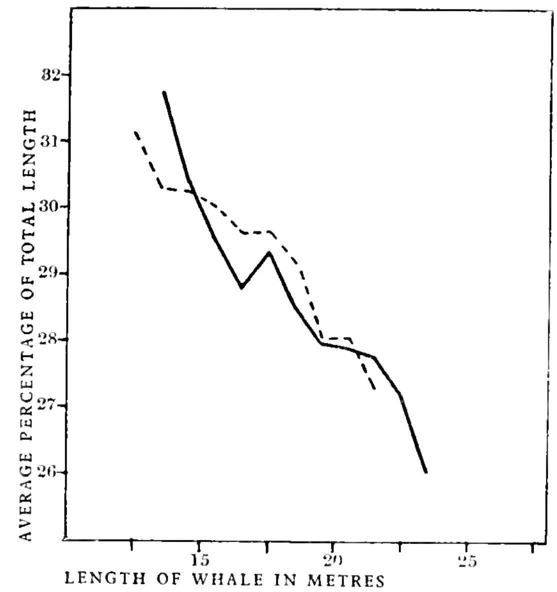


Fig. 65. Male Fin whales. Measurement No. 10. Notch of flukes to anus.

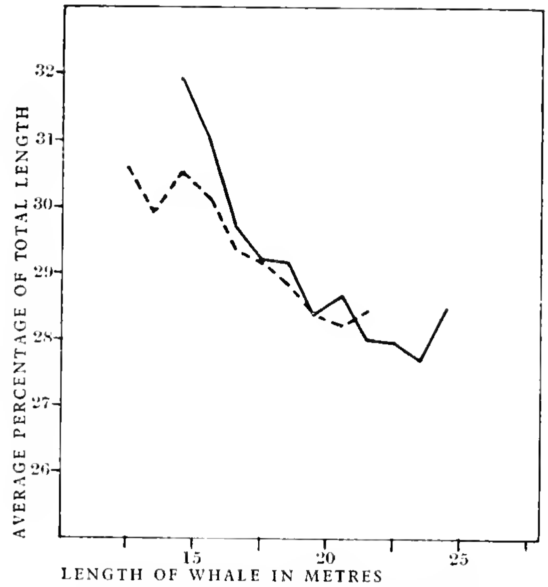


Fig. 66. Female Fin whales. Measurement No. 10. Notch of flukes to anus.

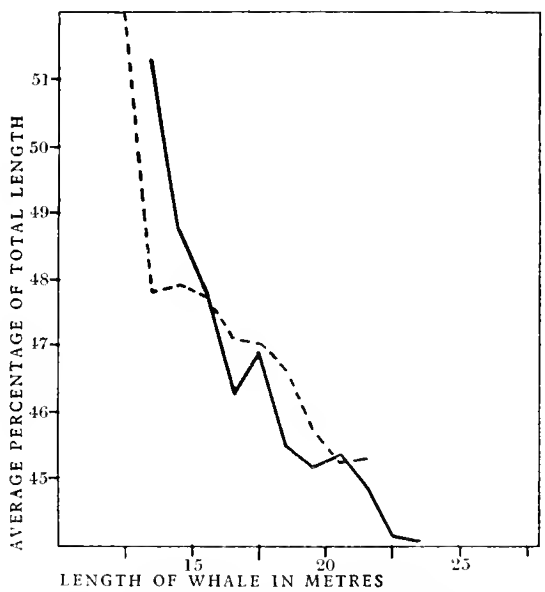


Fig. 67. Male Fin whales. Measurement No. 11. Notch of flukes to umbilicus.

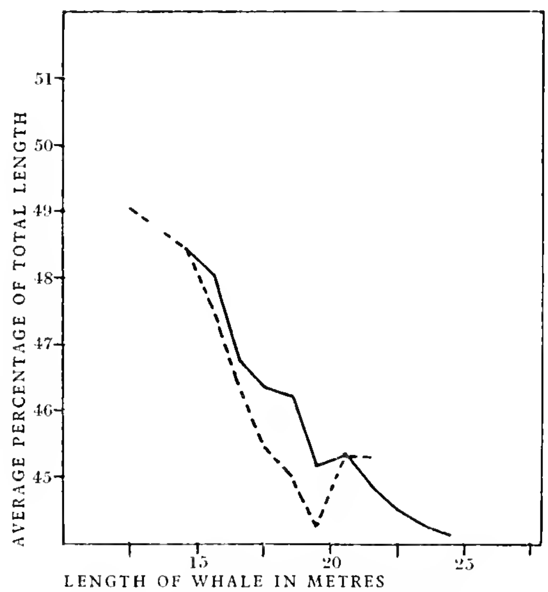


Fig. 68. Female Fin whales. Measurement No. 11. Notch of flukes to umbilicus.

——— South Georgia whales. - - - - South African whales.

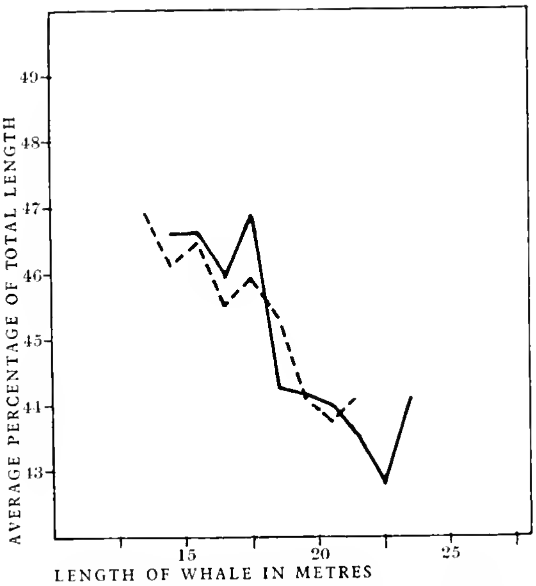


Fig. 69. Male Fin whales. Measurement No. 12. Notch of flukes to end of ventral grooves.

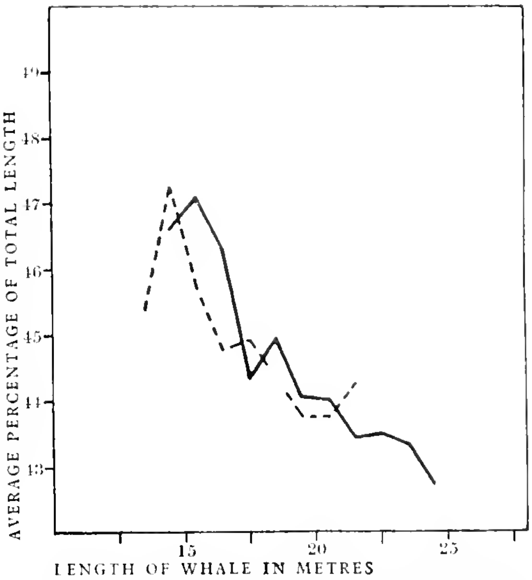


Fig. 70. Female Fin whales. Measurement No. 12. Notch of flukes to end of ventral grooves.

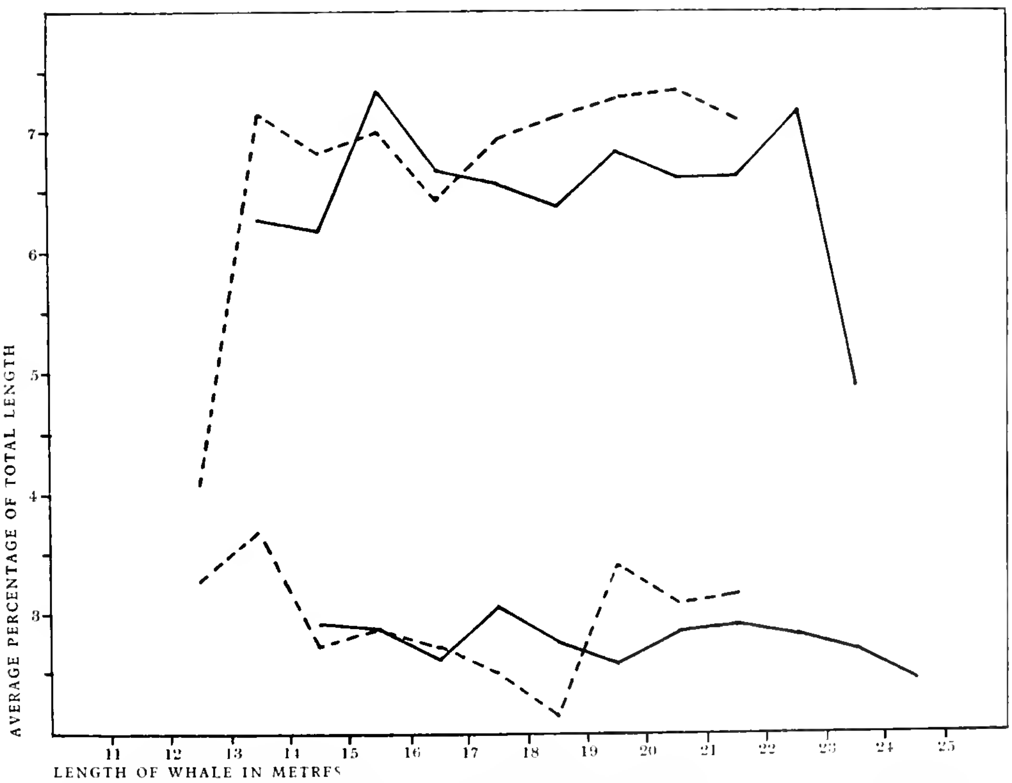


Fig. 71. Fin whales (upper curves males, lower curves females). Measurement No. 13. Anus to reproductive aperture.

——— South Georgia whales. - - - - - South African whales.

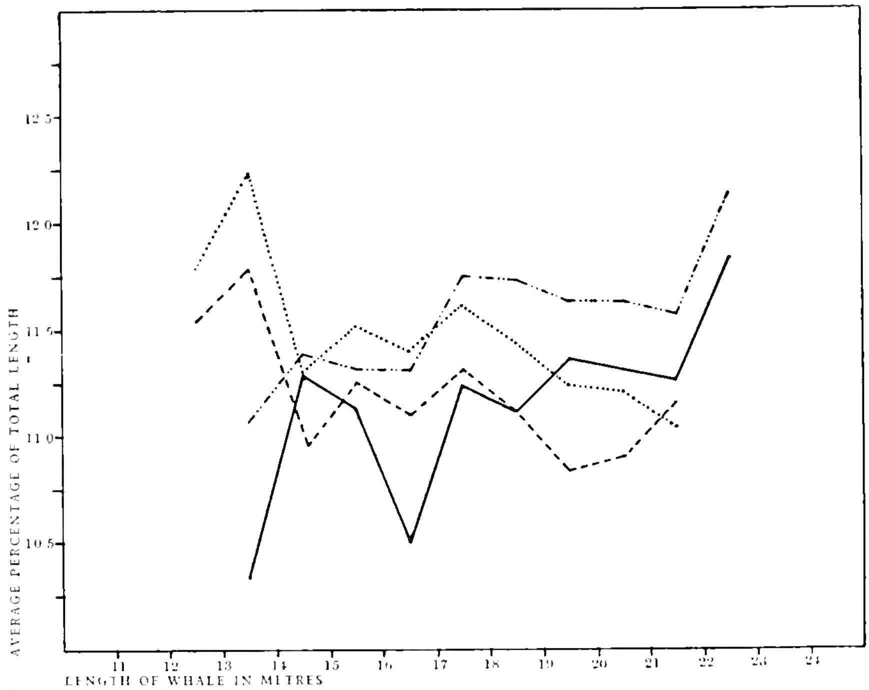


Fig. 72. Male Fin whales. Measurement No. 17. Flipper, tip to anterior end of lower border. No. 18. Flipper, length along curve of lower border. (See below.)

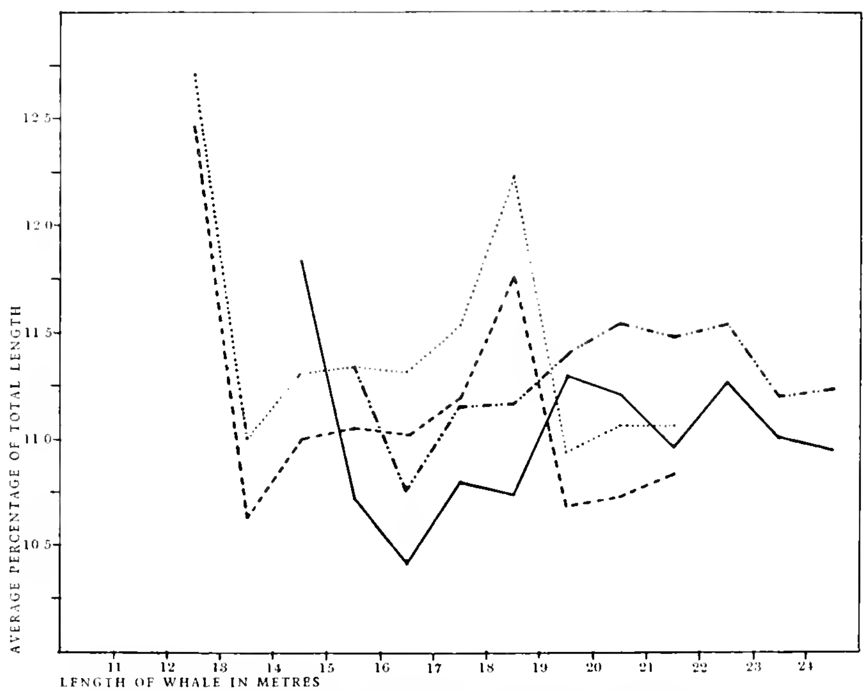


Fig. 73. Female Fin whales. Measurement No. 17. Flipper, tip to anterior end of lower border. No. 18. Flipper, length along curve of lower border.

——— S. Georgia, - - - - - S. Africa } Measurement No. 17.
—··—··—·· S. Georgia, ·········· S. Africa } Measurement No. 18.

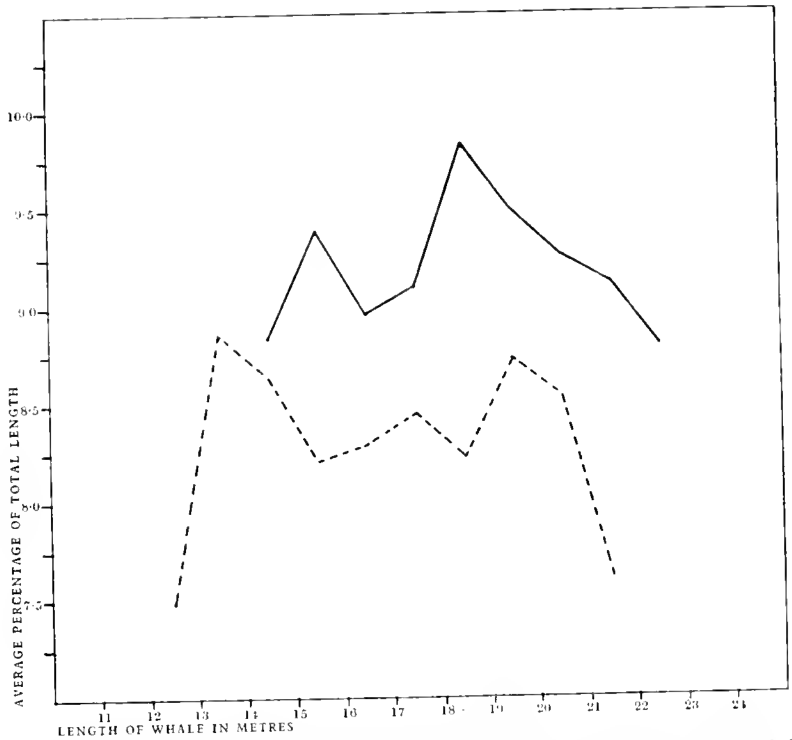


Fig. 74. Male Fin whales. Measurement No. 24. Tail, depth at dorsal fin.

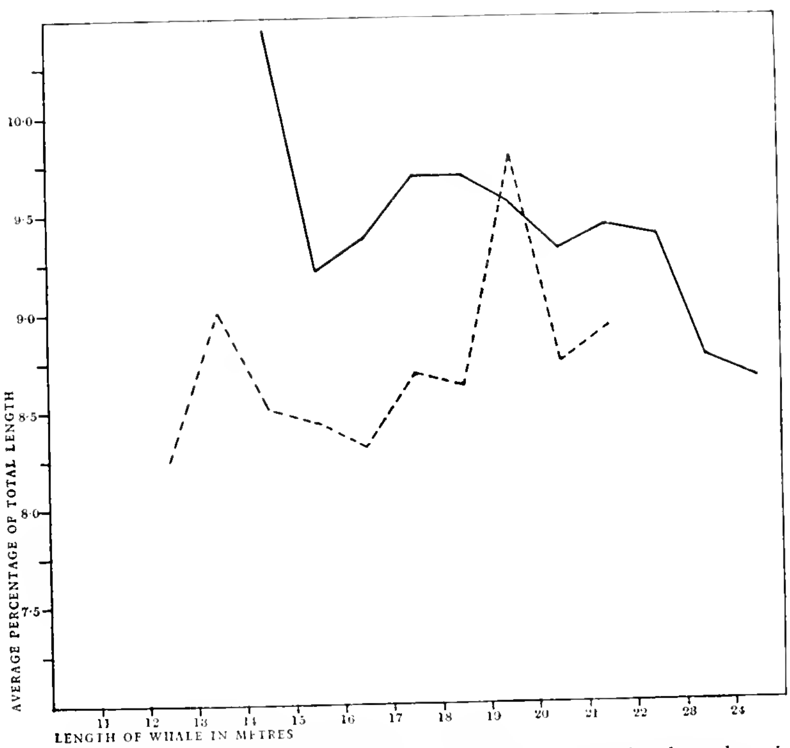


Fig. 75. Female Fin whales. Measurement No. 24. Tail, depth at dorsal fin.
——— South Georgia whales. - - - - - South African whales.

VARIATION OF MEASUREMENTS

Fin males (S. Georgia), 20 to 22 m. Fin females (S. Georgia), 21 to 23 m.

3. Tip of snout to blowhole

Range of values (% of total length)	Number of readings ♂	♀
17·0–17·5	1	—
17·5–18·0	12	5
18·0–18·5	15	4
18·5–19·0	28	16
19·0–19·5	49	25
19·5–20·0	28	20
20·0–20·5	22	28
20·5–21·0	13	10
21·0–21·5	2	5
21·5–22·0	2	3
22·0–22·5	—	1
22·5–23·0	—	1

4. Tip of snout to angle of gape

Range of values (% of total length)	Number of readings ♂	♀
17·5–18·0	1	—
18·0–18·5	2	—
18·5–19·0	2	2
19·0–19·5	14	4
19·5–20·0	17	7
20·0–20·5	26	10
20·5–21·0	27	15
21·0–21·5	11	17
21·5–22·0	10	10
22·0–22·5	4	4
22·5–23·0	—	5

5. Tip of snout to centre of eye

Range of values (% of total length)	Number of readings ♂	♀
19·0–19·5	2	—
19·5–20·0	7	4
20·0–20·5	17	7
20·5–21·0	46	18
21·0–21·5	39	31
21·5–22·0	42	28
22·0–22·5	24	24
22·5–23·0	13	11
23·0–23·5	2	6
23·5–24·0	—	3
24·0–24·5	—	1
24·5–25·0	—	1

6. Tip of snout to tip of flipper

Range of values (% of total length)	Number of readings ♂	♀
37–38	2	—
38–39	2	2
39–40	9	5
40–41	21	13
41–42	47	29
42–43	38	36
43–44	29	18
44–45	7	8
45–46	3	—
46–47	—	2

7. Eye to ear (centres)

Range of values (% of total length)	Number of readings ♂	♀
4·00–4·25	1	1
4·25–4·50	7	5
4·50–4·75	31	33
4·75–5·00	59	48
5·00–5·25	53	17
5·25–5·50	16	8
5·50–5·75	4	—
5·75–6·00	1	—
6·00–6·25	—	—
6·25–6·50	1	1

13. Anus to reproductive aperture (centres)

Range of values (% of total length)	Number of readings ♂	♀
1·5–2·0	—	3
2·0–2·5	—	23
2·5–3·0	—	56
3·0–3·5	—	35
3·5–4·0	1	—
4·0–4·5	1	—
4·5–5·0	14	—
5·0–5·5	19	—
5·5–6·0	13	—
6·0–6·5	12	—
6·5–7·0	41	—
7·0–7·5	52	—
7·5–8·0	27	—
8·0–8·5	4	—
8·5–9·0	1	—

14. Dorsal fin (vertical height)

Range of values (% of total length)	Number of readings ♂	♀
1·2–1·4	1	—
1·4–1·6	—	—
1·6–1·8	2	3
1·8–2·0	4	9
2·0–2·2	14	19
2·2–2·4	34	32
2·4–2·6	39	20
2·6–2·8	35	12
2·8–3·0	13	2
3·0–3·2	4	1
3·2–3·4	3	1
3·4–3·6	1	—

15. Dorsal fin, length of base

Range of values (% of total length)	Number of readings ♂	♀
3·0–3·5	1	—
3·5–4·0	2	2
4·0–4·5	1	6
4·5–5·0	12	13
5·0–5·5	23	26
5·5–6·0	39	19
6·0–6·5	27	13
6·5–7·0	24	10
7·0–7·5	20	4
7·5–8·0	3	5
8·0–8·5	1	—

16. Flipper, tip to axilla

Range of values (% of total length)	Number of readings ♂	♀
6·5–7·0	5	3
7·0–7·5	10	12
7·5–8·0	21	24
8·0–8·5	55	35
8·5–9·0	54	25
9·0–9·5	14	10
9·5–10·0	8	3
10·0–10·5	2	1
10·5–11·0	—	1

17. Flipper, tip to anterior end of lower border

Range of values (% of total length)	Number of readings ♂	♀
8·0–8·5	1	—
8·5–9·0	—	—
9·0–9·5	1	1
9·5–10·0	1	2
10·0–10·5	7	13
10·5–11·0	24	19
11·0–11·5	42	15
11·5–12·0	31	15
12·0–12·5	10	7
12·5–13·0	5	—
13·0–13·5	—	1

VARIATION OF MEASUREMENTS

Fin males (S. Georgia), 20 to 22 m. Fin females (S. Georgia), 21 to 23 m.

8. Notch of flukes to posterior emargination of dorsal fin

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
19·0–19·5	—	1
19·5–20·0	—	—
20·0–20·5	—	1
20·5–21·0	—	—
21·0–21·5	—	—
21·5–22·0	2	1
22·0–22·5	4	1
22·5–23·0	9	8
23·0–23·5	23	6
23·5–24·0	26	15
24·0–24·5	29	17
24·5–25·0	21	20
25·0–25·5	19	12
25·5–26·0	8	9
26·0–26·5	5	3
26·5–27·0	—	—
27·0–27·5	—	—
27·5–28·0	1	—
28·0–28·5	—	—
28·5–29·0	1	—

9. Flukes, width at insertion

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
4·00–4·25	2	1
4·25–4·50	3	7
4·50–4·75	23	22
4·75–5·00	51	38
5·00–5·25	60	36
5·25–5·50	22	14
5·50–5·75	9	5
5·75–6·00	1	—
6·00–6·25	1	—

10. Notch of flukes to anus

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
22·5–23·0	1	—
23·0–23·5	—	—
23·5–24·0	1	—
24·0–24·5	—	—
24·5–25·0	1	1
25·0–25·5	2	—
25·5–26·0	2	1
26·0–26·5	13	6
26·5–27·0	12	9
27·0–27·5	23	17
27·5–28·0	36	32
28·0–28·5	49	31
28·5–29·0	31	20
29·0–29·5	10	4
29·5–30·0	5	6
30·0–30·5	2	4
30·5–31·0	1	—

11. Notch of flukes to umbilicus

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
39–40	—	—
40–41	2	1
41–42	—	3
42–43	5	8
43–44	22	27
44–45	46	32
45–46	67	36
46–47	26	19
47–48	8	2
48–49	1	1
49–50	1	—

12. Notch of flukes to end of ventral grooves

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
39–40	—	1
40–41	2	5
41–42	12	8
42–43	26	17
43–44	32	19
44–45	29	17
45–46	24	9
46–47	6	5
47–48	1	—

18. Flipper, length along curve of lower border

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
8·5–9·0	1	—
9·0–9·5	—	—
9·5–10·0	2	1
10·0–10·5	1	2
10·5–11·0	9	16
11·0–11·5	37	17
11·5–12·0	32	14
12·0–12·5	27	13
12·5–13·0	4	4
13·0–13·5	2	—
13·5–14·0	—	—
14·0–14·5	—	1

19. Flipper, greatest width

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
2·3–2·4	3	1
2·4–2·5	1	2
2·5–2·6	2	6
2·6–2·7	11	12
2·7–2·8	21	20
2·8–2·9	42	17
2·9–3·0	26	11
3·0–3·1	13	7
3·1–3·2	3	1
3·2–3·3	2	1

20. Severed head, condyle to tip

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
23·0–23·5	3	—
23·5–24·0	1	2
24·0–24·5	3	4
24·5–25·0	14	6
25·0–25·5	30	9
25·5–26·0	29	19
26·0–26·5	24	16
26·5–27·0	14	13
27·0–27·5	15	9
27·5–28·0	2	5
28·0–28·5	—	2
28·5–29·0	—	2
29·0–29·5	—	1
29·5–30·0	—	—
30·0–30·5	—	—
30·5–40·0	—	1

21. Skull, greatest width

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
9·0–9·5	—	1
9·5–10·0	6	—
10·0–10·5	17	14
10·5–11·0	48	32
11·0–11·5	35	22
11·5–12·0	11	4
12·0–12·5	2	1
12·5–13·0	4	—

24. Tail, depth at dorsal fin

Range of values (% of total length)	Number of readings ♂	Number of readings ♀
6·5–7·0	—	1
7·0–7·5	—	—
7·5–8·0	3	2
8·0–8·5	17	7
8·5–9·0	24	15
9·0–9·5	34	19
9·5–10·0	28	10
10·0–10·5	12	8
10·5–11·0	—	8
11·0–11·5	3	1

To illustrate the variations likely to occur in the bodily proportions the tables on pp. 340, 341 are drawn up in the same way as for Blue whales. The range of percentage values for each measurement is divided into an arbitrary number of groups, and the individual readings for each measurement for male Fin whales from South Georgia, measuring from 20·00 to 21·99 m., and females from 21·00 to 22·99 m., are sorted out, and the number which fall into each group are shown.

The results are plotted in Figs. 76 to 95.

A comparison between the charts illustrating the above tables with the corresponding charts for Blue whales shows that the range of variation for each measurement corresponds closely in the two species, and it will not be necessary to comment on the separate measurements.

It may also be said that, with the exception of No. 13 (anus to reproductive aperture), all the curves approach as closely to the normal frequency type as one would expect with the amount of data on which they are constructed, and it may therefore be concluded that only normal variation occurs in these measurements.

The explanation of the two maxima in the curve of measurement No. 13 for males has been dealt with in the section on Blue whales.

COLOUR

The best description of the colouring of Fin whales from the North Atlantic, as of Blue whales, appears to be that of True (1904), who gives a general account of the features of the pigmentation of northern Fin whales and details of the colouring of ten specimens examined by himself. Of southern Fin whales Barrett-Hamilton made some brief notes on the colouring of thirty-nine whales examined by him at South Georgia.

The pattern of the pigmentation of southern Fin whales is perhaps more complex than that of Blue whales, but there is probably less individual variation. The most obvious feature is that pigment covers the whole of the back and flanks, while the ventral surface remains unpigmented. This pigment is of a bluish slate-grey, varying to some extent in tone and not at all unlike the groundwork colour of the skin of Blue whales. As was pointed out by True and others, the tone rapidly deepens on exposure to light and air until the skin becomes practically black.

The flippers are in general pigmented on the outer and white on the inner surface (though there may be a little pigment on the inner surface of the left flipper). The white of the inner surface reaches round the rim of the lower border of the flipper, and sometimes the tip is white dorsally. The upper surface of the tail flukes is entirely pigmented, and the under surface is white except at the anterior and posterior borders, where there is a margin of pigment.

The most remarkable feature of the colouring of Fin whales is that the pigment is arranged asymmetrically. This asymmetry is to be noticed on the outer ventral grooves, the side of the head and shoulders, the under surface of the flippers, the upper and lower jaws, the baleen, and inside the mouth. In reality it consists of a shifting of the

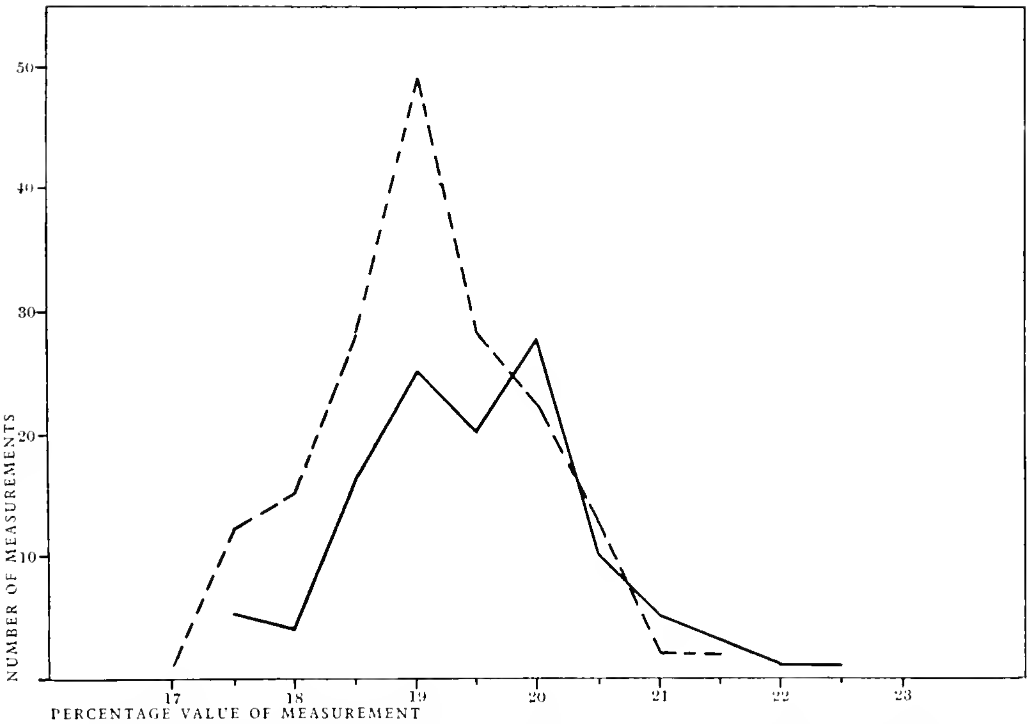


Fig. 76. Fin whales. Variations of measurement No. 3. Tip of snout to blowhole.

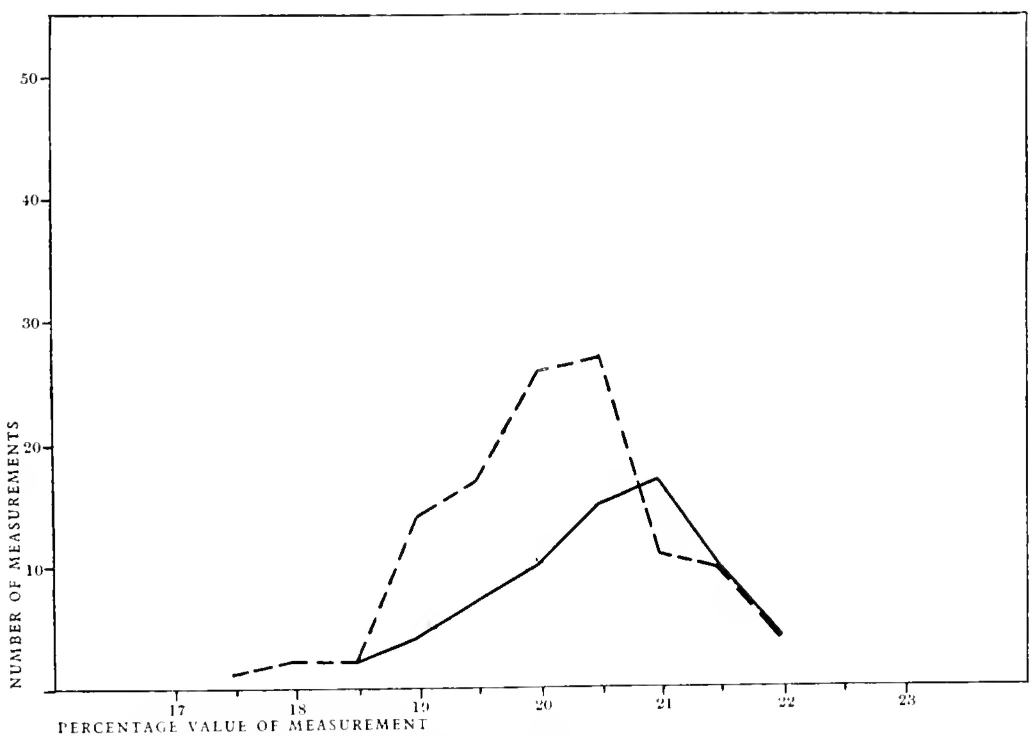


Fig. 77. Fin whales. Variations of measurement No. 4. Tip of snout to angle of gape.

- - - - - Males. ——— Females.

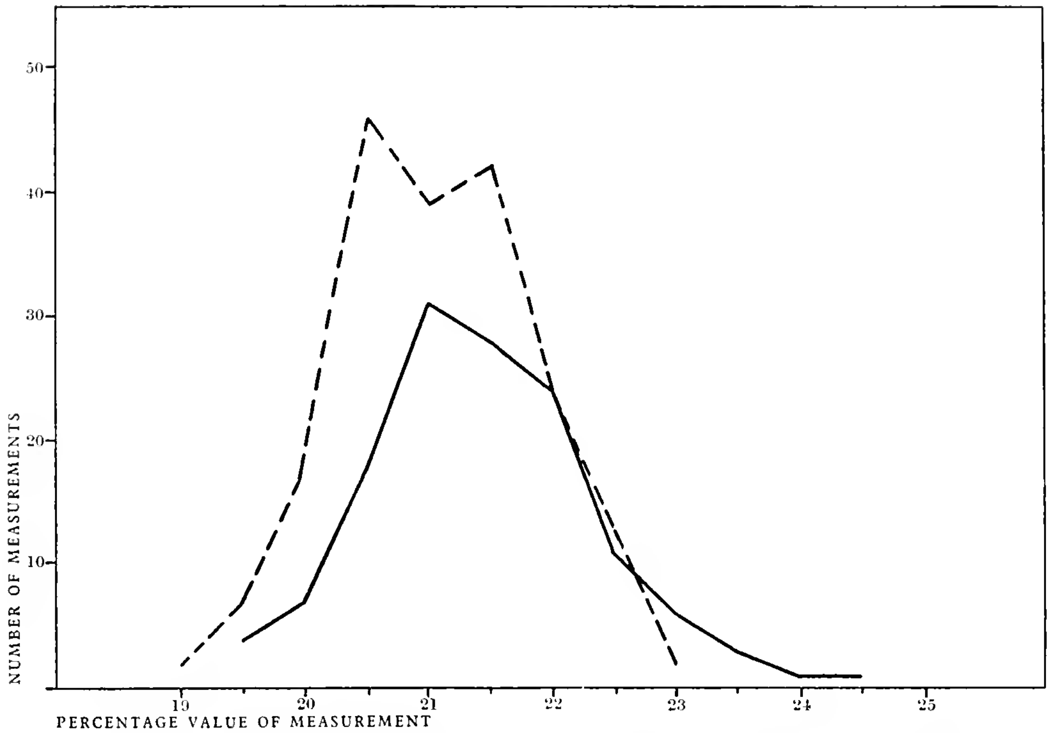


Fig. 78. Fin whales. Variations of measurement No. 5. Tip of snout to eye.

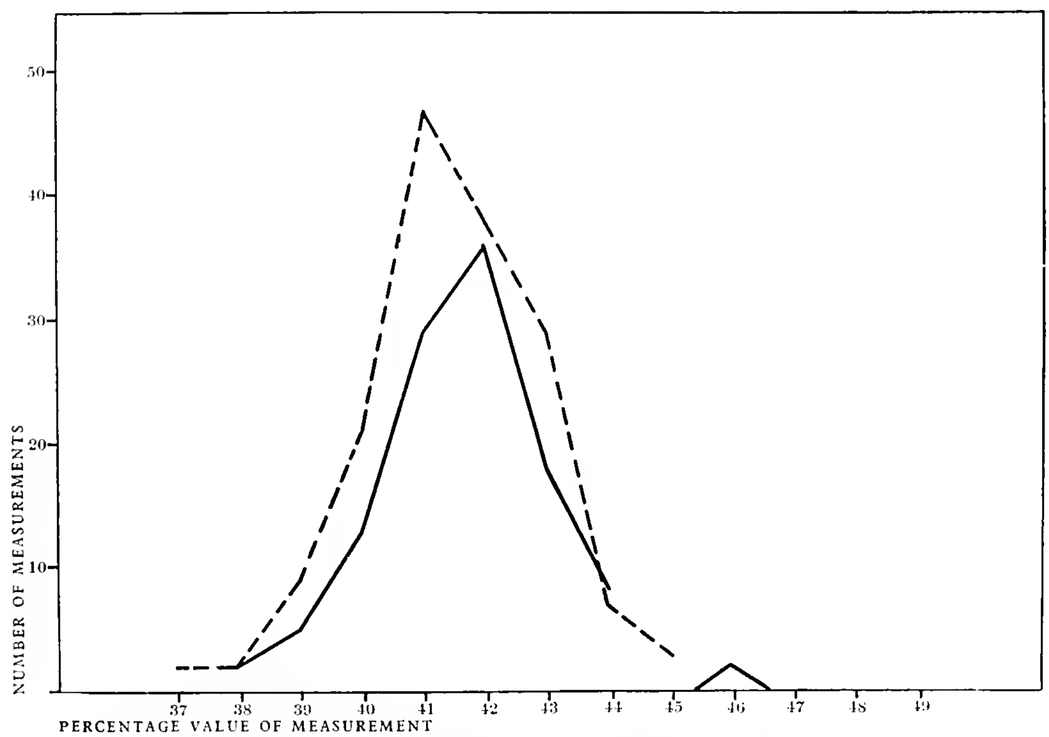


Fig. 79. Fin whales. Variations of measurement No. 6. Tip of snout to tip of flipper.

- - - - - Males. ——— Females.

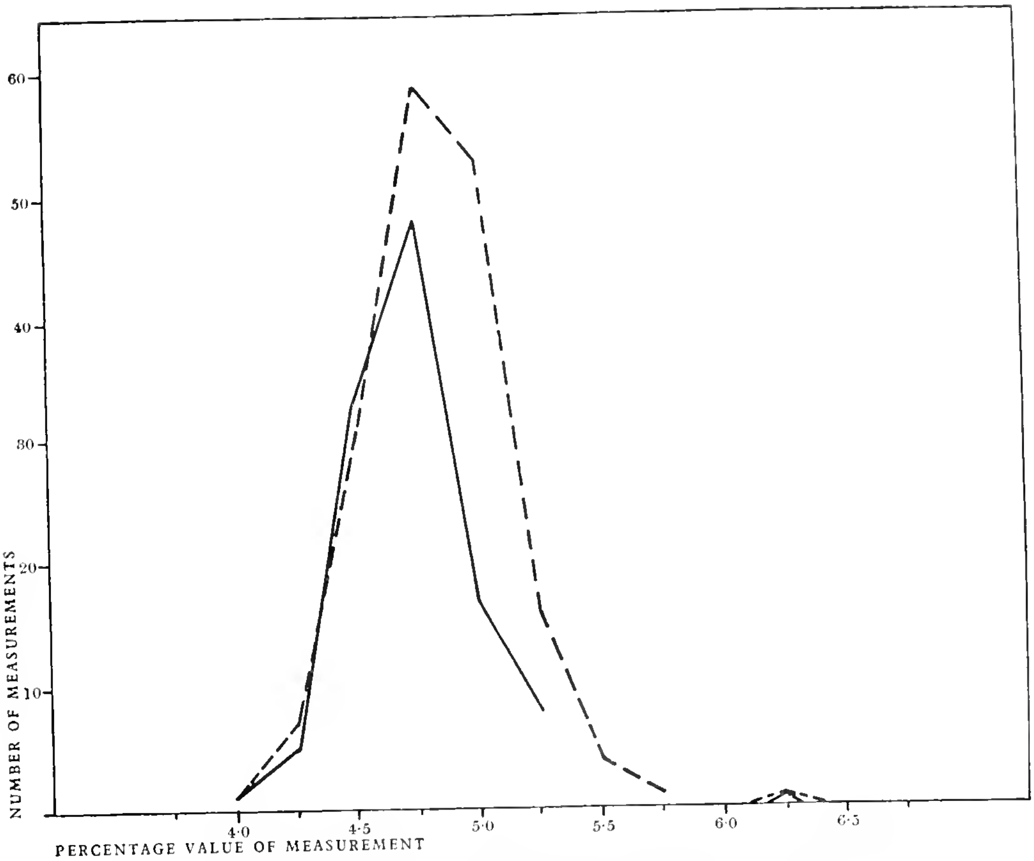


Fig. 80. Fin whales. Variations of measurement No. 7. Eye to ear, centres.

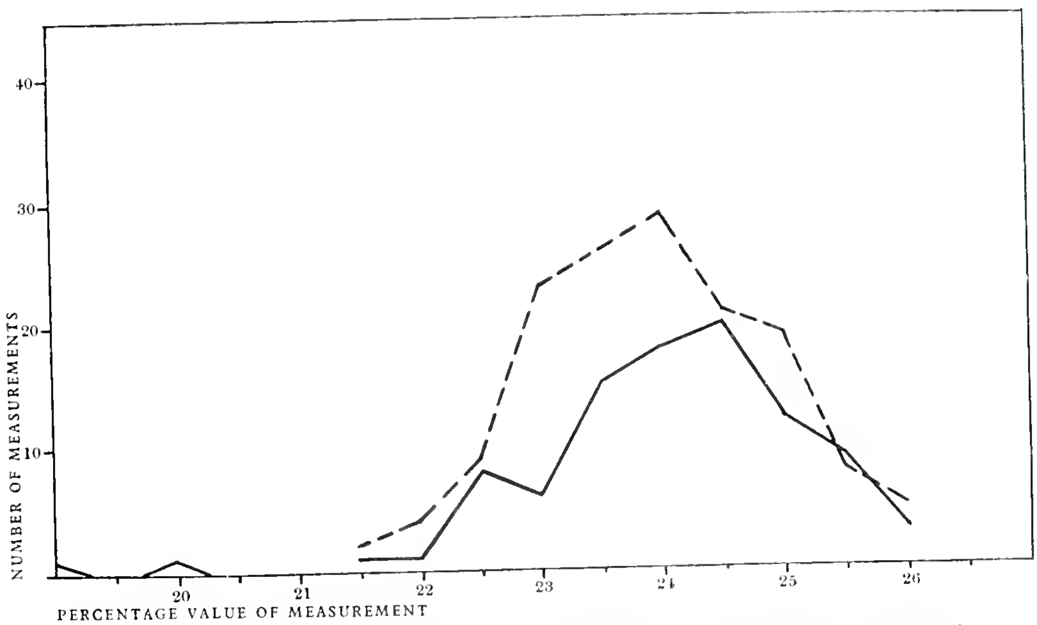


Fig. 81. Fin whales. Variations of measurement No. 8. Notch of flukes to posterior emargination of dorsal fin.

- - - - - Males. ——— Females.

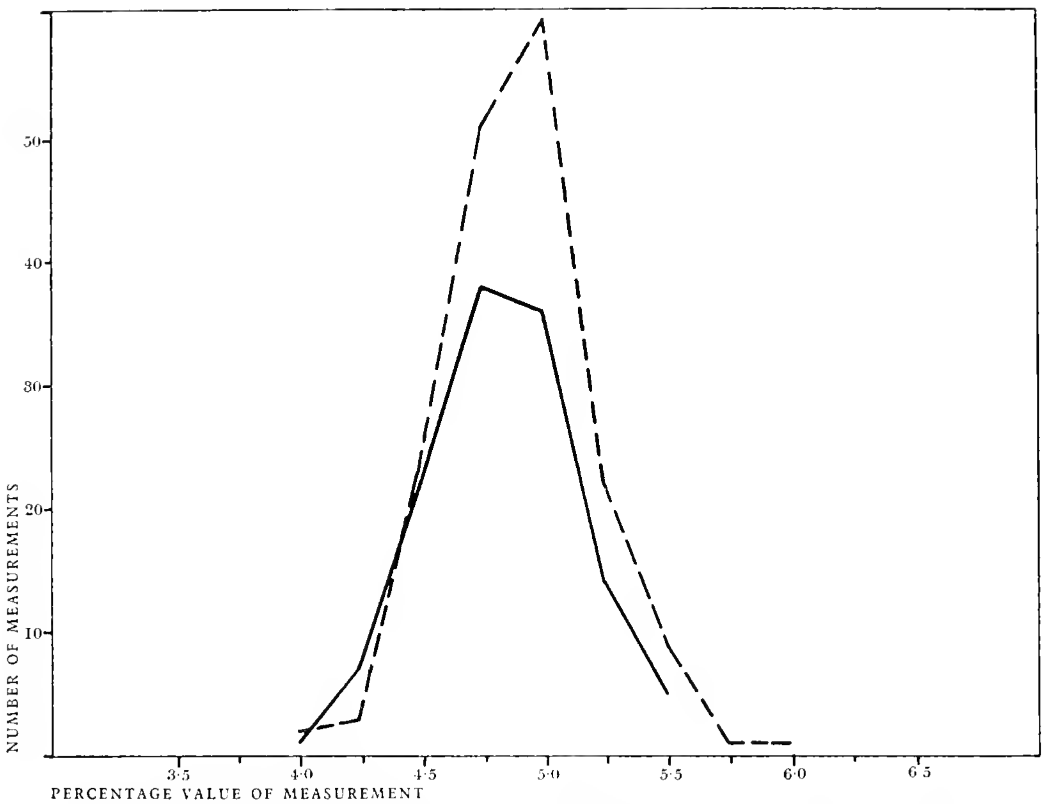


Fig. 82. Fin whales. Variations of measurement No. 9. Flukes, width at insertion.

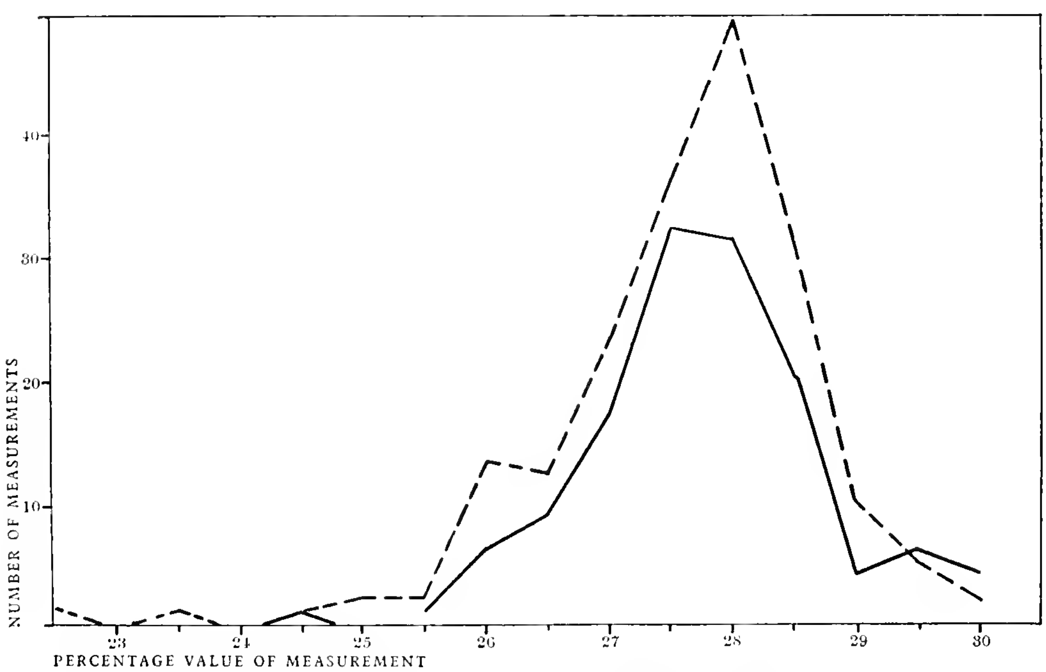


Fig. 83. Fin whales. Variations of measurement No. 10. Notch of flukes to anus.

- - - - - Males. ——— Females.

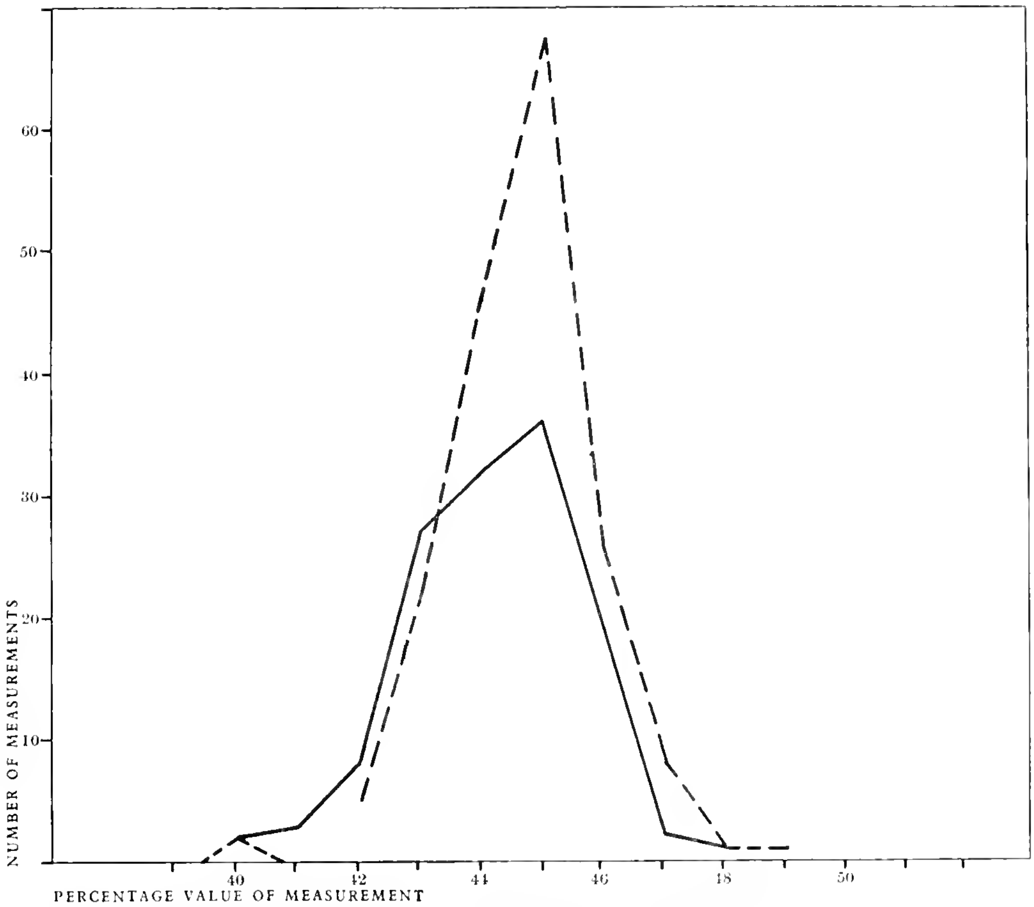


Fig. 84. Fin whales. Variations of measurement No. 11. Notch of flukes to umbilicus.

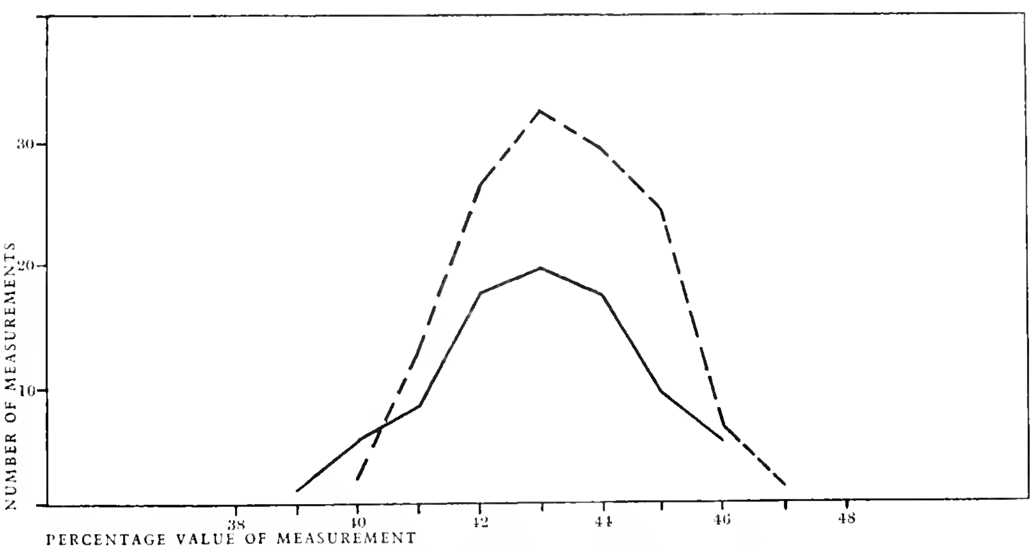


Fig. 85. Fin whales. Variations of measurement No. 12. Notch of flukes to end of ventral grooves.

- - - - - Males. ——— Females.

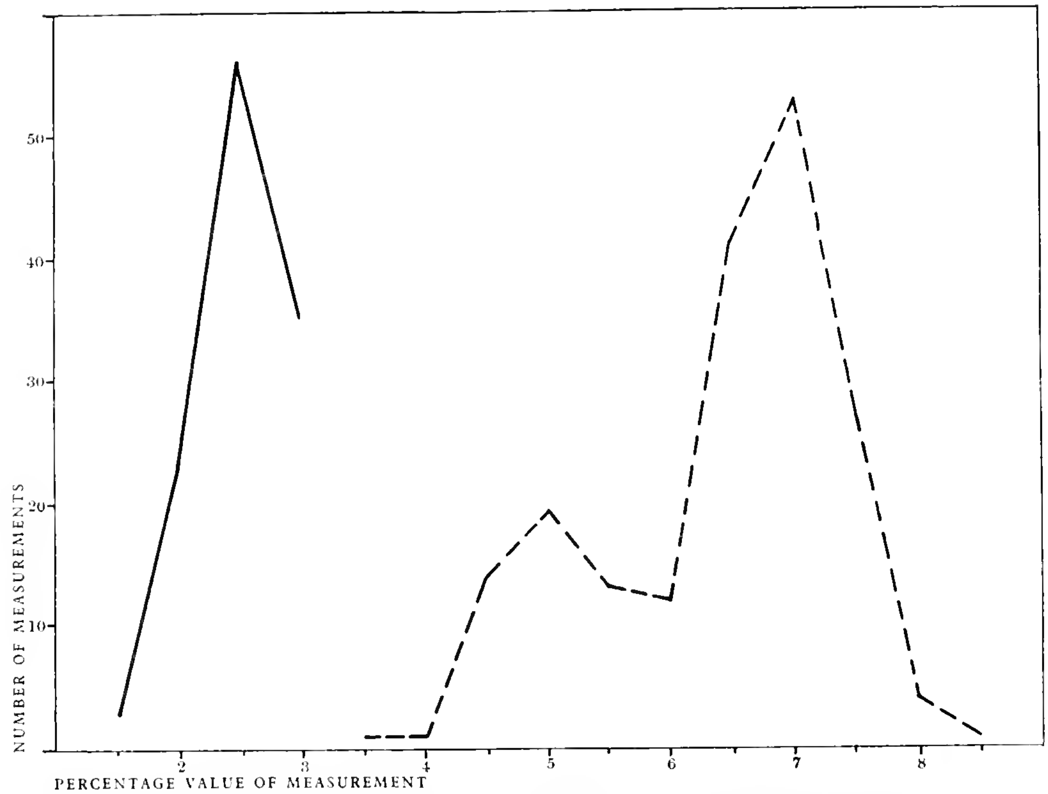


Fig. 86. Fin whales. Variations of measurement No. 13. Anus to reproductive aperture, centres.

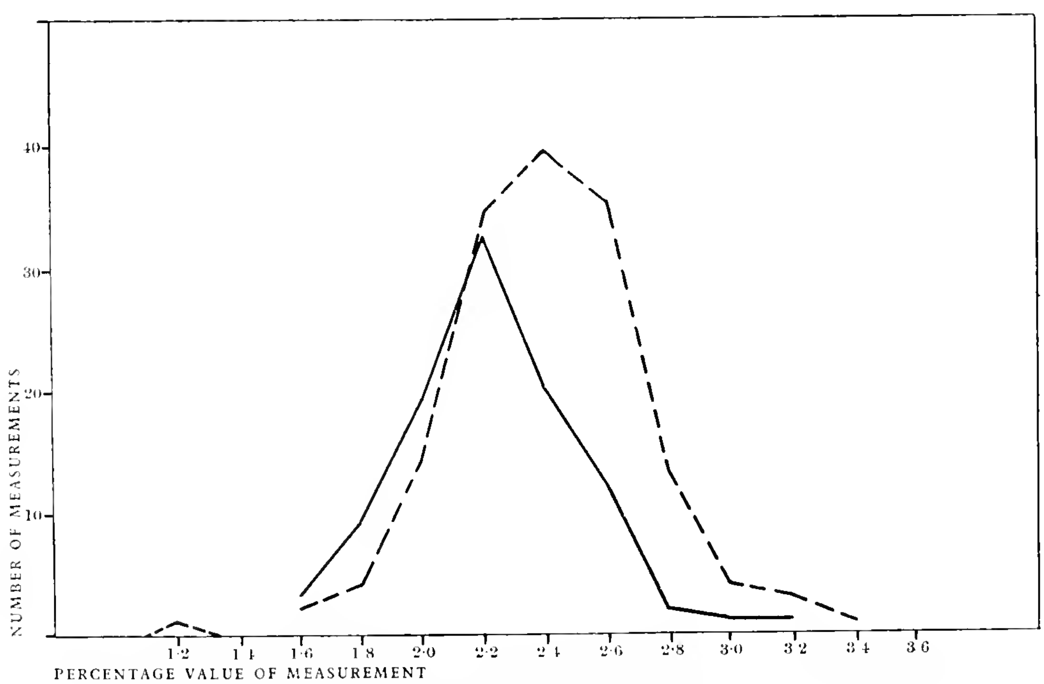


Fig. 87. Fin whales. Variations of measurement No. 14. Dorsal fin, vertical height.

- - - - - Males. ——— Females.

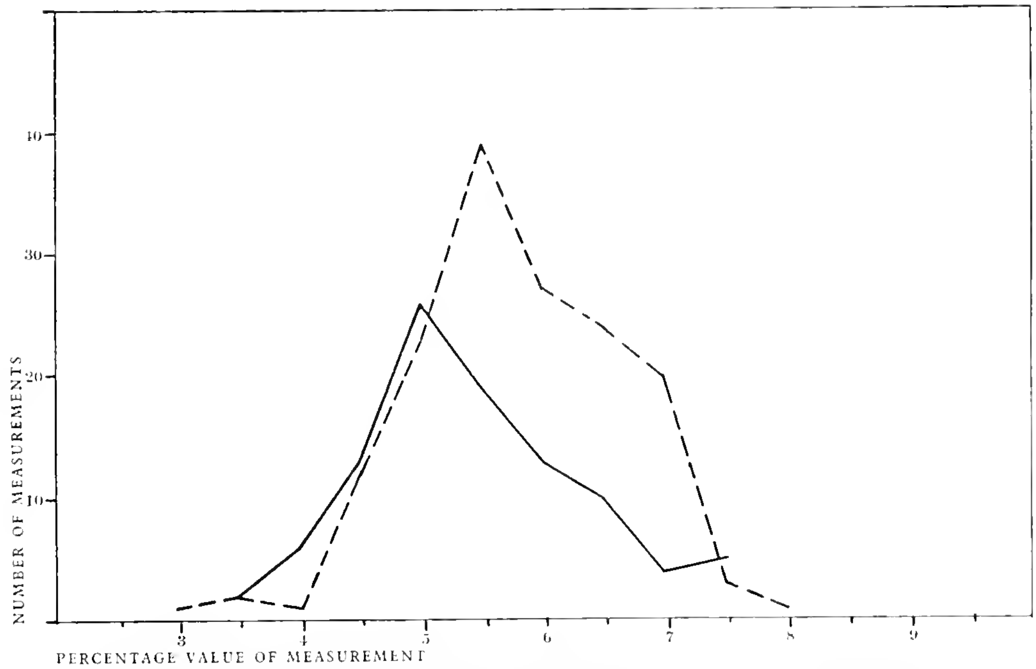


Fig. 88. Fin whales. Variations of measurement No. 15. Dorsal fin, length of base.

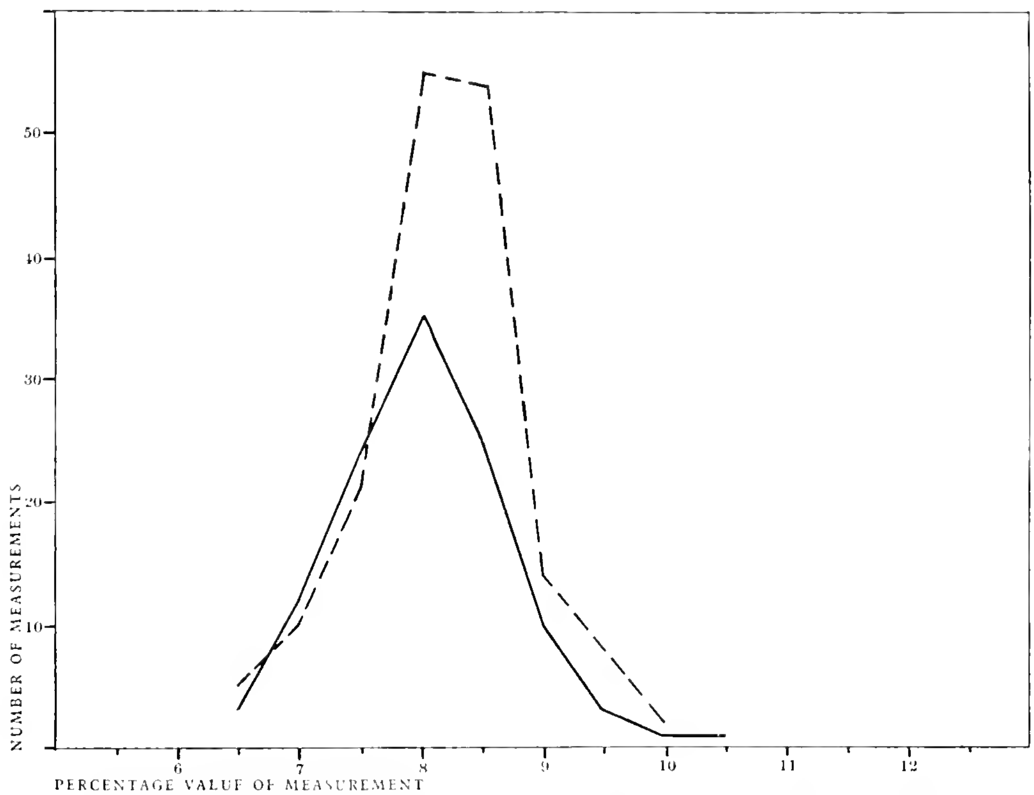


Fig. 89. Fin whales. Variations of measurement No. 16. Flipper, tip to axilla.

- - - - - Males. ——— Females.

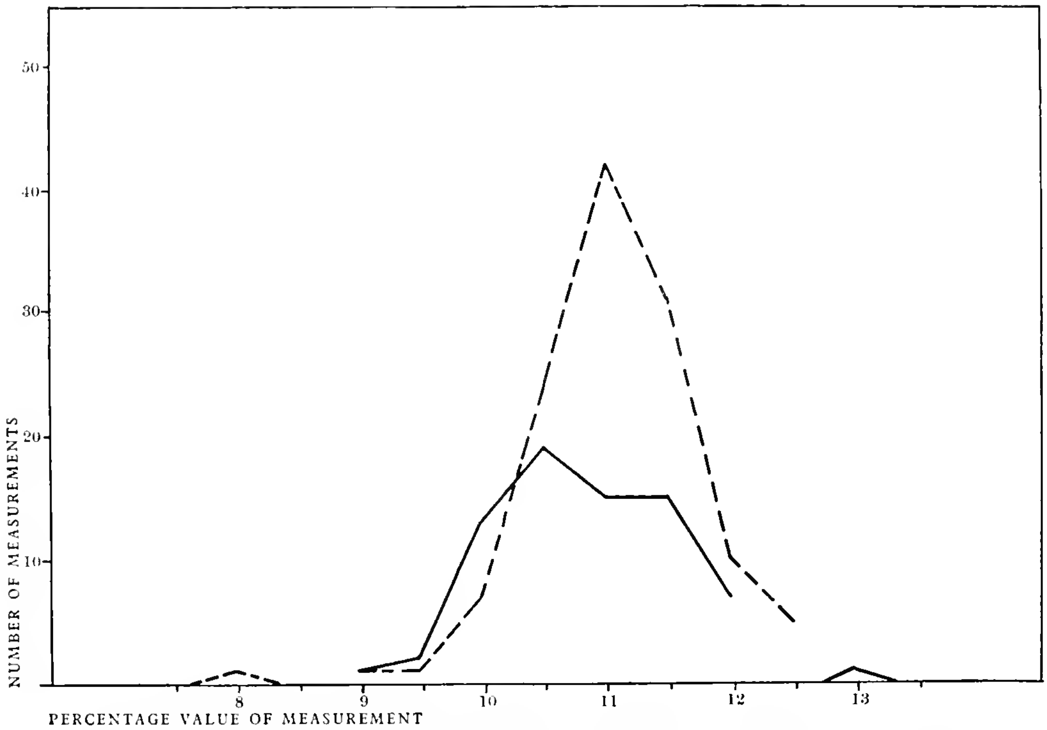


Fig. 90. Fin whales. Variations of measurement No. 17. Flipper, tip to anterior end of lower border.

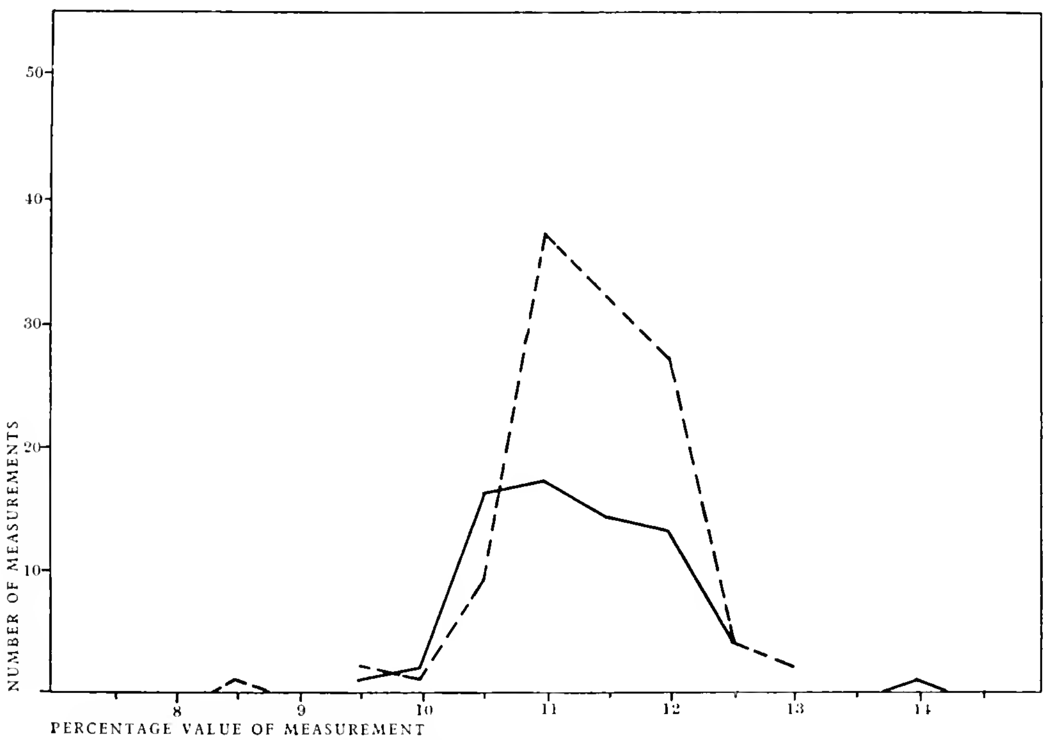


Fig. 91. Fin whales. Variations of measurement No. 18. Flipper, length along curve of lower border.

- - - - - Males. ——— Females.

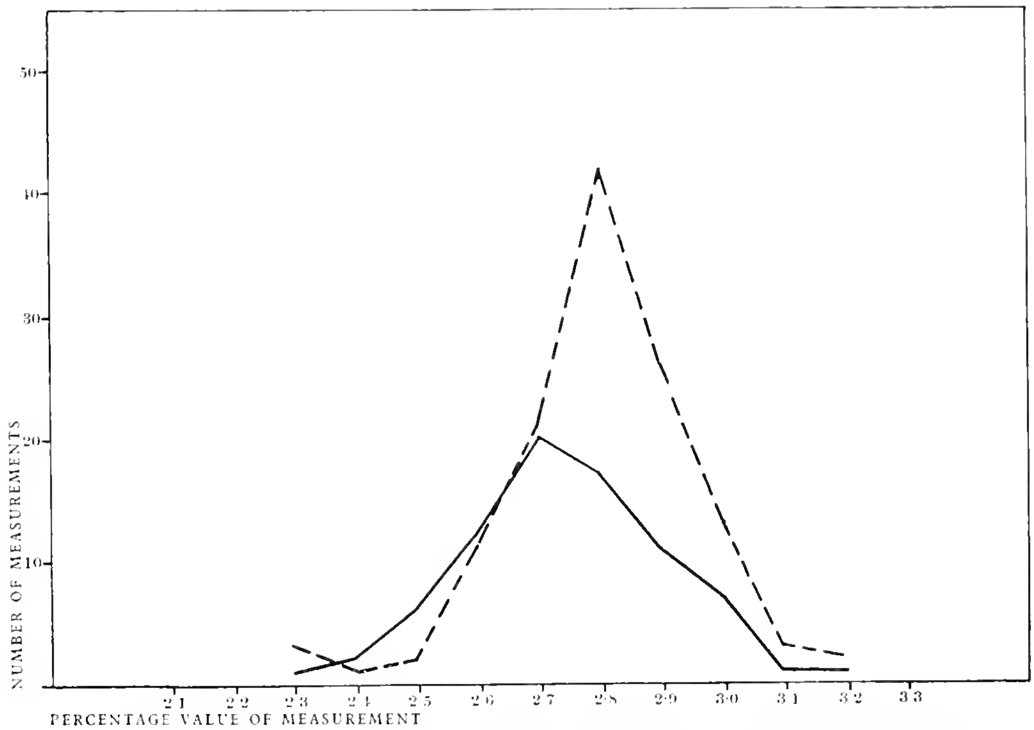


Fig. 92. Fin whales. Variations of measurement No. 19. Flipper, greatest width.

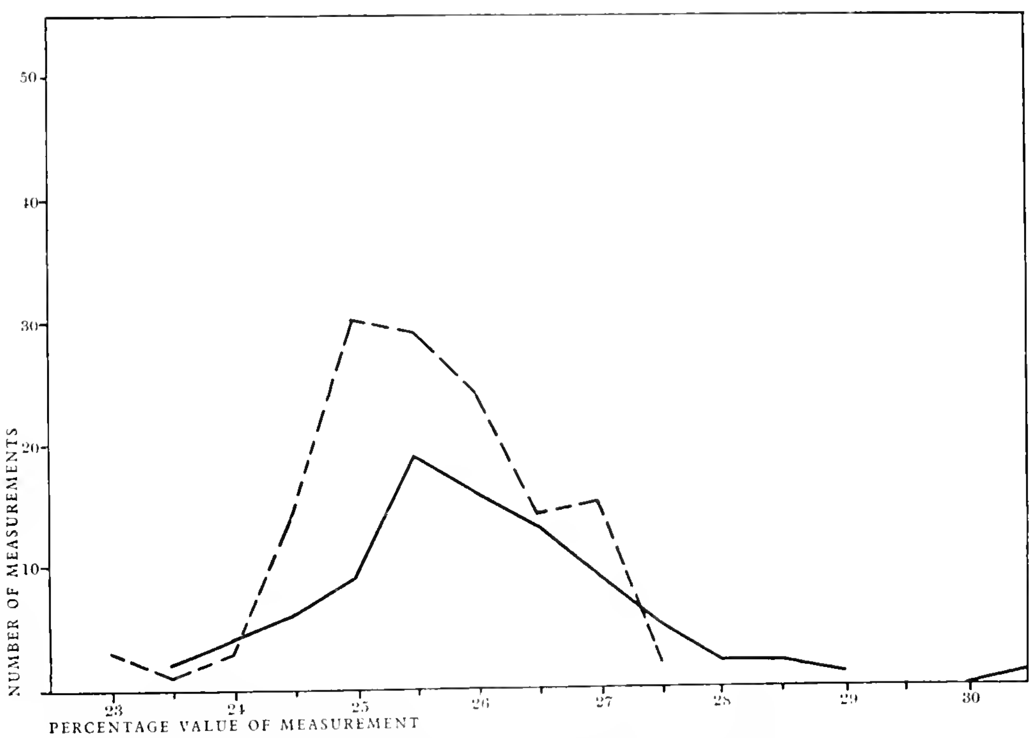


Fig. 93. Fin whales. Variations of measurement No. 20. Severed head, condyle to tip.

- - - - - Males. ——— Females.

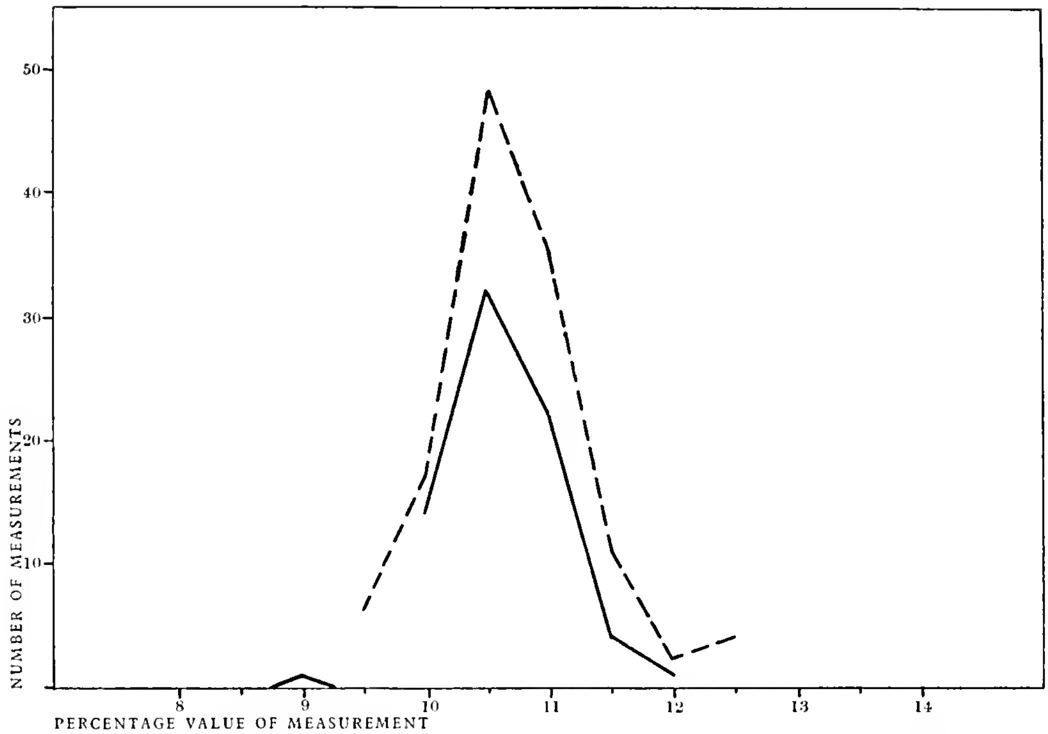


Fig. 94. Fin whales. Variations of measurement No. 21. Skull, greatest width.

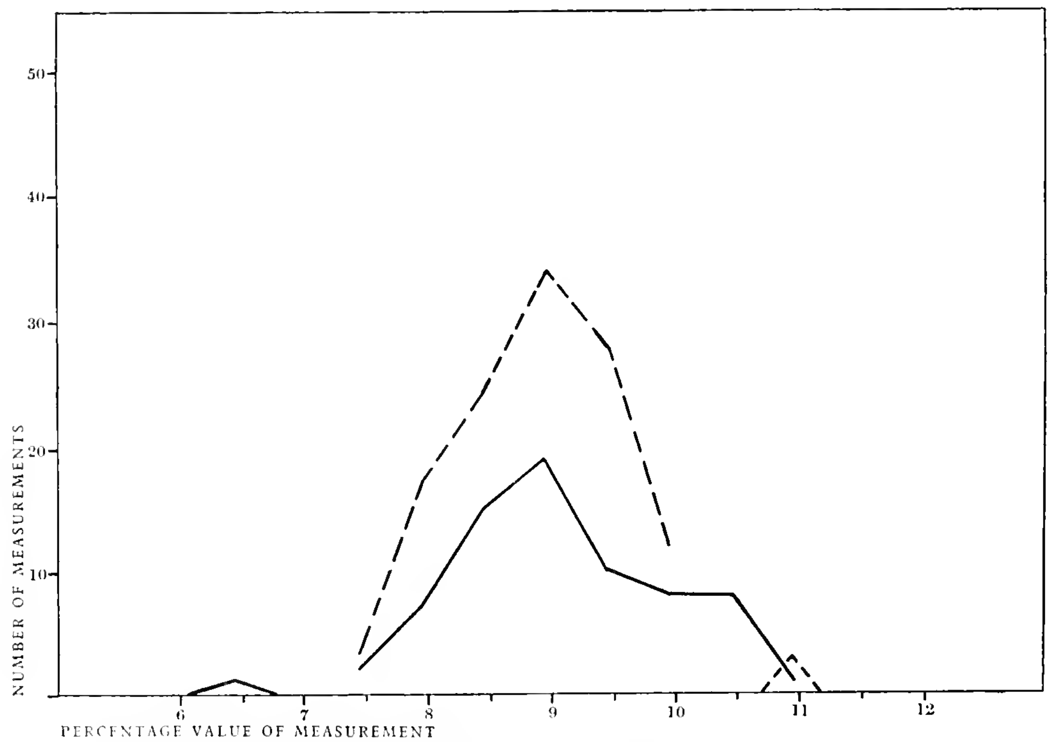


Fig. 95. Fin whales. Variations of measurement No. 24. Tail, depth at dorsal fin.

- - - - - Males. ——— Females.

whole mass of pigment slightly to the left side of the body, except inside the mouth, where it predominates on the right.

The junction of the ventral white area with the dorsal pigment is rather irregular, and in places without any very definite line of demarcation. In the thoracic region the pigment reaches down on each side in irregular projections over the outer ventral grooves (see Plate XXXII, fig. 2, and Plate XXXIV, fig. 1), which in places may be pigmented in the actual grooves but white on the ridges. The degree to which it extends over the grooves is variable, but the pigment on the left-hand side always reaches farther down than on the right. The ventral white area may reach without interruption to the ventral surface of the tail flukes, but frequently the pigmented area of the tail reaches farther down behind the anus to meet in the mid-ventral line and cut off the white area just in front of the flukes. At a point a short distance behind the anus there is on each side a narrow projection of pigment which reaches downwards and forwards towards the anus. These promontories may be so ill-marked as to be almost indistinguishable, or they may be about a yard long and meet at the anus. In Plate XXXIII, fig. 2, one of these promontories can be seen, but the other is obscured by high lights on the whale's skin. In this whale the white ventral area extended well back to the tail flukes, while in Plate XXXIII, fig. 1, which was a heavily pigmented whale, almost the whole of the white area behind the anus was obliterated by pigment. The rim of the pigment on each side, from about the region of the genital aperture (or sometimes farther forward) back to the tail flukes, may be fairly regular or may be broken up by a kind of mottled condition suggestive of galvanized iron.

In the head region the left mandible is pigmented externally while the right is white. The outer edges of the baleen plates are all pigmented on the left side except for a few at the extreme anterior end, which may or may not be white. On the right side the anterior baleen plates, more than a third of the total number on that side, are white. The rest are pigmented, and the demarcation is always sharp. The right upper jaw is pigmented opposite the dark plates and is white opposite the unpigmented plates. The left upper jaw is pigmented along the whole of its length. All these details are illustrated in Plate XXXII, figs. 1 and 2, which show the right and left sides of the head of the same whale. Inside the mouth the asymmetry of the pigmentation is reversed. The inner side of the right mandible is pigmented while that of the left is whitish, and on the tongue pigment is predominant on the right. Very little pigment is present on the palate though a few pale streaks are usually visible at the posterior end and the extreme anterior tip is sometimes pigmented. The bristles on the inside of the baleen plates are all unpigmented.

Certain light and dark streaks occur about the head and shoulders. There is always a well-marked narrow pale streak reaching backwards from the ear, which is well seen in Plate XXXII, fig. 2. It takes a slightly upward course at first and then turns down, becoming more diffuse and fading near the insertion of the flipper. There may also be an indefinite and not very pronounced pale streak running upwards and backwards from the axilla. There is regularly a V-shaped pale streak on the back. The apex of the V is opposite the insertion of the flippers and lies in the mid-dorsal line pointing forwards towards the snout. This mark is very noticeable in foetuses in which the dorsal pigment has started to develop.

A long black band, 2 to 3 in. wide at first but increasing in width, runs backwards and upwards from the eye (see Plate XXXIV, fig. 3). The asymmetry of the pigmentation is very noticeable here, for the right shoulder and right side of the head are very much paler than the left, and in consequence the black band stands out in great contrast on the right side, while on the left it can hardly be said to exist, since almost the whole shoulder region is pigmented.

On the whole, there is little individual variation in the pigmentation of Fin whales except around the ventral region posterior to the anus, and perhaps in the degree to which the pigment of the flanks extends over the ventral thoracic region. The restriction of the ventral white area and the prominence of the projecting strips of pigment behind the anus seem to go largely together and there is not really very much to say of the variation of an individual Fin whale, apart from the tone of the pigment, except that it is a heavily or lightly pigmented whale.

From the descriptions given by Sars (1865) and True (1904) of the colouring of Fin whales from the North Atlantic one must suppose that the whales of the North and South Atlantic are very similar if not identical in colour and arrangement of the pigment.

Pigment appears at a fairly early stage in the foetus. When the latter measures 0·5 m. to 1·0 m. it is present as a darkening of the skin on the top of the head, the anterior part of the back, the tip of the dorsal fin, the dorsal surface of the flukes and the outer surface of the flippers. At this stage the pigment is of a faint grey colour, confined apparently only to the superficial layer of skin, while the rest of the body is of a pinkish colour. As the pigment spreads backwards from the neck over the dorsal surface, the pale dorsal V-mark makes its appearance. The development of the colouring from now on through gestation consists in the deepening of the colour on the dorsal surface and the spreading of the pigment downwards over the flanks. The dorsal V-mark appears soon after the foetus measures 1·0 m. and it soon becomes even more prominent than in the adult whale. At 1·5 m. the lower jaw is well pigmented and the asymmetry of the colouring is already distinguishable. Before 3 m. is reached the pigmentation is similar to that of the adult except that the colour is still rather paler and the pigment has not reached so far down the flanks.

The asymmetry of the pigment appears to be an invariable feature of the colouring of Fin whales. Among northern Fin whales this asymmetry may on rare occasions be reversed, as described by Collett (1912), the right instead of the left being the darker side. No such case, however, has appeared among all the whales we have examined, and if such a reversal does occur in the south it must certainly be extremely rare.

It may be suggested, as a possible explanation of the shifting of the pigment over to the left side, that Fin whales swim slightly on their right side while under the water. Such a habit would seem rather peculiar, though perhaps not more so than the displacement of the pigment. We have made attempts to test this possibility by observations on whales at sea. While actually on the surface the Fin whales swim on an even keel. When they sound the last part of the body to disappear is the dorsal rim of the tail just above the insertion of the flukes. Our impression is that at the last moment there is a slight rotation to the right, but it is difficult to say for certain and more observations will be needed before the point can be confirmed.

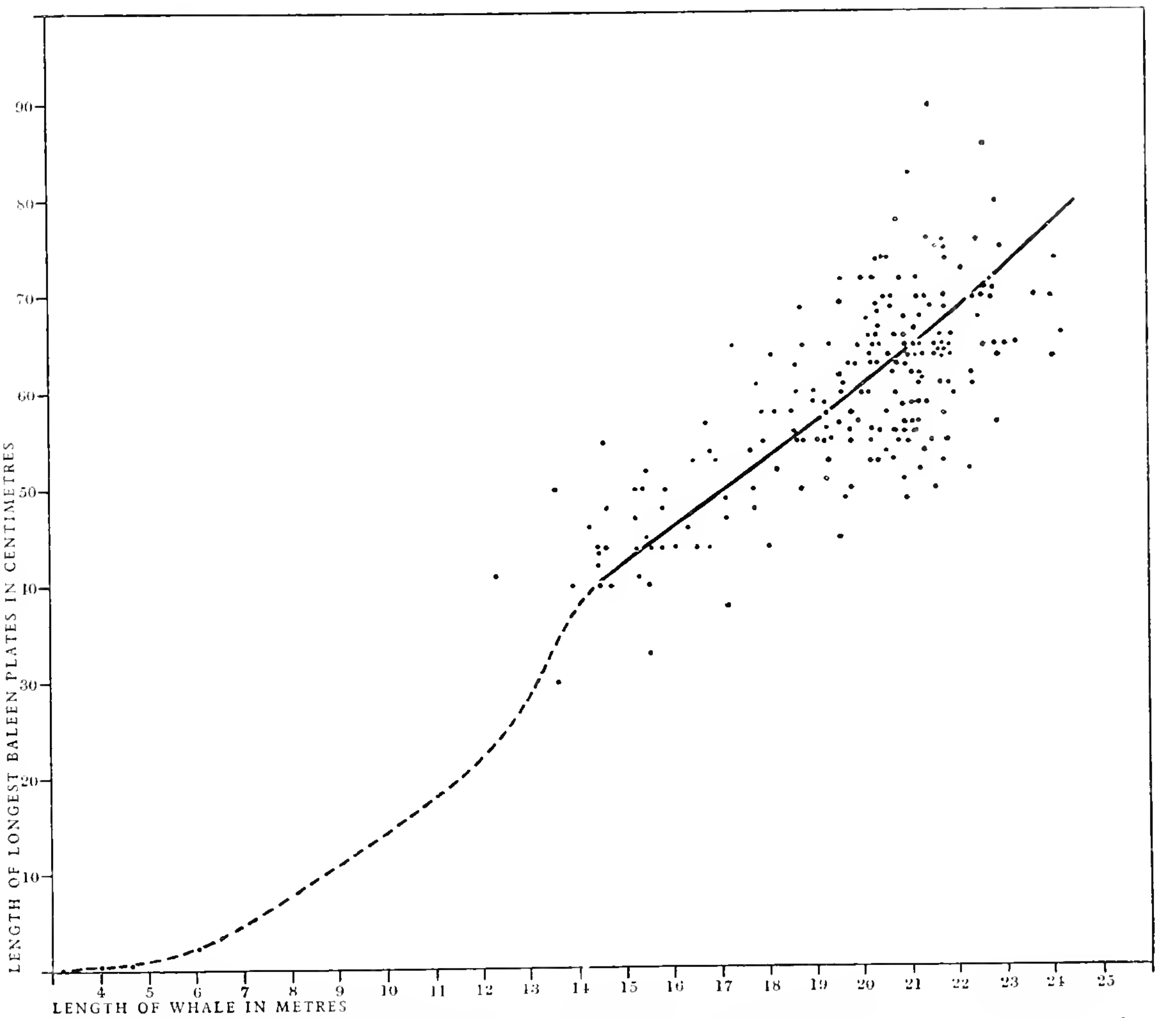


Fig. 96. Mean curve of growth of baleen in Fin whales. The plotted points represent the length of the baleen in individual whales.

BALEEN

The description already given of the development of the baleen in the Blue whale foetus applies equally to its development in the Fin whale foetus, and we may proceed with the growth of the baleen in relation to the growth of the whale.

The recorded lengths of the longest plates are plotted against the length of the whale in Fig. 96. Except for the records of baleen in foetuses there are in the case of Fin whales, no measurements of the length of the baleen in individuals of less than 12·0 m.

It is evident again that considerable individual variation takes place, but in this case the path of the plotted points indicates that the plates increase in length quite uniformly, at any rate from 14 m. onwards. Therefore if there is any sudden spurt in the rate of growth of the baleen in young Fin whales it must be supposed that it takes place before the whale reaches 14 m. It is fairly certain that this spurt in growth takes place in Blue whales and it is consequently very probable that something of the same sort occurs in Fin whales. The curve representing the mean rate of growth of the baleen plates is therefore drawn as a continuous line for whales of more than 14 m. and as a dotted line for the smaller whales where its shape depends rather on analogy with Blue whales. This dotted line is intended to represent the most probable course of the rate of growth, the suggestion being that the rate suddenly increases when the whale measures about 13 m.

The numbers of baleen plates in Fin whales are on the average greater than in Blue whales. The records may be tabulated as follows:

Fin Whales

Number of plates on one side	Males		Females	
	S. Georgia	S. Africa	S. Georgia	S. Africa
260–280	3	—	1	—
280–300	1	—	1	—
300–320	1	1	1	—
320–340			4	—
340–360	7		9	1
360–380	6	1	12	1
380–400	4	—	5	—
400–420	2	—	4	1
420–440	—	—	—	—
440–460	—	—	1	1
460–480	1	—	1	—
Total	25	2	39	4
Average	356	340	365	392
Maximum	460	366	473	440
Minimum	268	314	262	352

The above table gives an idea of the limits within which the numbers of baleen plates may be expected to vary and shows that there are no grounds for drawing any distinction between males and females, or between the whales of South Georgia and South Africa in respect of this particular character.

Observations on the baleen of Fin whales have also included the counting of the numbers of white plates (i.e. plates whose outer edges are white) on the right-hand side of the mouth. The results, analysed in the same way, are as follows:

Number of white plates	Males		Females	
	S. Georgia	S. Africa	S. Georgia	S. Africa
60–80	2		1	—
80–100	—	—		
100–120			1	1
120–140	6	4	12	2
140–160	15	2	17	4
160–180	8	3	13	1
180–200	3	3	3	1
200–220	1	—	—	—
Total	35	12	47	9
Average	152	157	155	146
Maximum	200	190	190	184
Minimum	68	120	77	118

Here again very similar results appear for the different sexes and localities. The two males from South Georgia with less than 80 white plates are rather aberrant, but need not be regarded as of any particular significance as the number of whales in which these white plates were counted is not very great.

Only seven measurements were made of the width of the baleen of Fin whales. These were as follows:

Males			Females		
Whale length	Baleen width	Width as a percentage of baleen length	Whale length	Baleen width	Width as a percentage of baleen length
*14·45	32	68·0	*15·35	34	68·0
19·75	40	71·5	*15·47	32	61·5
21·10	42	73·8	22·40	46	60·5
			23·00	46	71·0

Those marked with an asterisk are South African whales. Here again there are not sufficient data for a valid comparison to be made, but there is no suggestion of any difference between the sexes or the two localities.

Measurements of the spacing of the longest baleen plates also give negative results. The distance separating them varies from about 1·0 cm. in 14 m. whales to about 1·8 cm. in 23 m. whales, the increase varying uniformly with the length of the whale. The readings are plotted in Fig. 97 from which it will be seen that no special distinction exists between males and females, or between whales of South Georgia and South Africa.

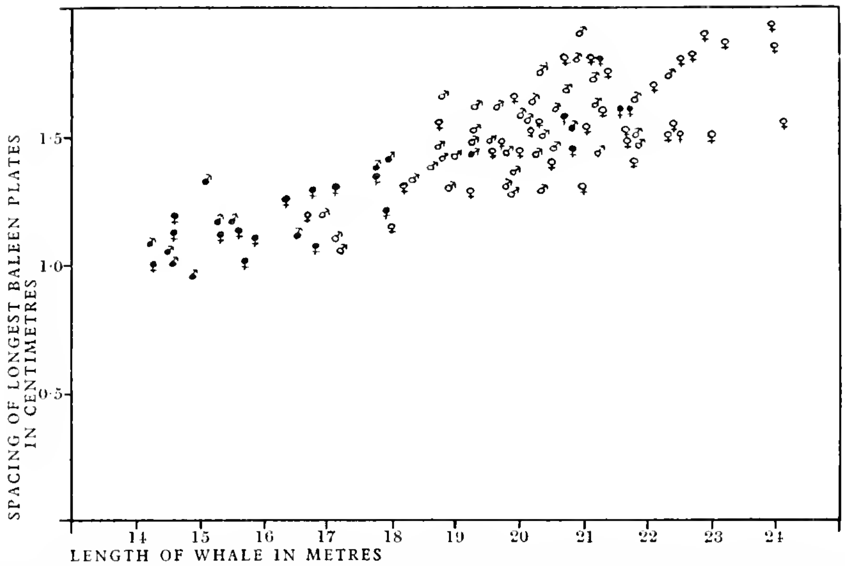


Fig. 97. Spacing of baleen plates in Fin whales. The plotted points represent the spacing of the baleen plates in individual whales. (Black symbols represent South African whales and circular ones South Georgia whales.)

VENTRAL GROOVES

The description already given of the ventral grooves in Blue whales may be taken as applying also, in almost every particular, to Fin whales. A minor distinction perhaps is to be found in the posterior endings of the grooves. In Blue whales they may end evenly in the neighbourhood of the umbilicus but in many cases may be continued beyond this point in the form of irregular or broken up extra grooves and there may be a median groove joining the umbilicus and genital aperture. In Fin whales, on the other hand, the grooves always end very evenly near the umbilicus, and the median

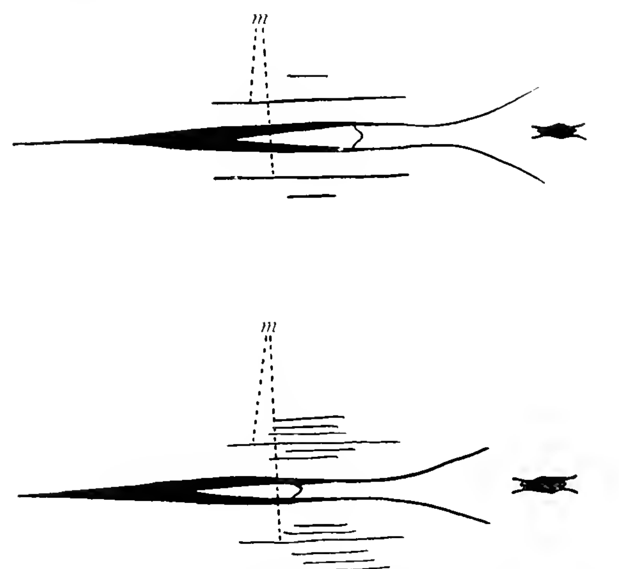


Fig. 98. Mammary grooves, genital aperture, etc., in female Fin whales (semi-diagrammatic); to show variations of the extra grooves in this region. *m*, mammary grooves.

Number of ventral grooves	Males		Females	
	S. Georgia	S. Africa	S. Georgia	S. Africa
60–70	1	—	—	—
70–80	10	2	5	1
80–90	7	3	12	10
90–100	4	3	8	2
100–110	3	—	6	—
110–120	—	—	3	—
Total	25	8	34	13
Average	84	85	91	85
Maximum	106	94	114	98
Minimum	68	76	72	78

grooves do not show a very marked apex to the grooved area. The endings of the grooves are shown in Plate XXXIII, figs. 1 and 3. Other illustrations of the ventral grooves of Fin whales are Plate XXXII, fig. 2, and Plate XXXIV, fig. 1. As in Blue whales there are some small extra grooves on each side of the reproductive aperture of the female. Examples of these are illustrated in Fig. 98.

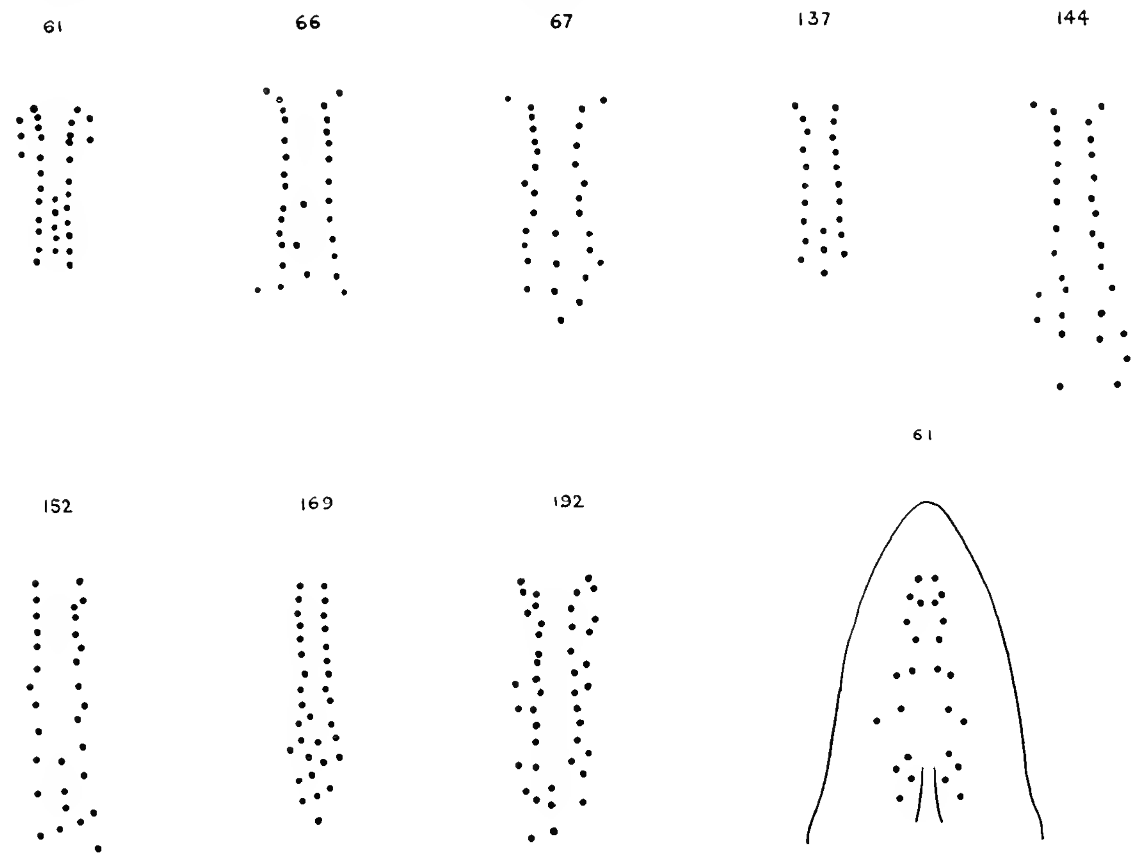


Fig. 99. Diagrams showing different arrangement of the hairs on the chin of eight and the rostrum of one Fin whale. The beard in each case is sketched from a position immediately in front of the mouth and the rostral hairs from a dorsal aspect. The numbers refer to individual whales.

In Fin whales again the number of ventral grooves which occur seems to be purely a matter of individual variation. Whale No. 67, for instance, had 72 grooves and its foetus 96; No. 179 had 92 and the foetus 88; and No. 186 had 100 grooves and the foetus 90.

The numbers of grooves recorded and the variations which occur are shown in the table at top of page 359.

Here again there is no particular distinction between the sexes and localities.

In development the ventral grooves have usually appeared by the time the foetus reaches 1 m., and the full number is present at about 2·0 m.

HAIR

The positions at which the hairs are found have already been described in the section on Blue whales. In Fig. 99 diagrams are shown of the arrangement of the hairs on the chin of eight Fin whales and the rostrum of one. The arrangement on the chin in Nos. 137 and 169 is very typical of Fin whales.

The hairs on the chin occur in about the same numbers as on Blue whales. The following is an analysis of the records made:

Number of hairs on chin	Males		Females	
	S. Georgia	S. Africa	S. Georgia	S. Africa
16–19	2	—	1	—
20–23	4	—	6	—
24–27	3	—	5	—
28–31	13	1	20	2
32–35	6	—	8	—
36–39	4	—	6	1
40–43	2	—	5	—
44–47	—	—	1	—
Total	34	1	52	3
Average	30	30	31	37
Maximum	40	30	44	39
Minimum	17	30	19	31

Thus the figures for males and females correspond very closely and the few readings from South Africa fall close to the averages for South Georgia.

FOOD, BLUBBER, AND EXTERNAL PARASITES

It will be convenient to consider the food of whales together with the blubber and parasites in this section. The three subjects are not so disconnected as they first appear to be, for variations in the condition of the blubber are directly dependent on the whale's feeding, and the study of certain parasites involves investigations into the structure, and normal and pathological conditions of the blubber.

FOOD

The food of whales is principally the concern of the ships employed in the investigations, for it is only by operations at sea that it can be effectively studied. A certain amount of information, however, is to be had from the examination of the stomach contents of the whales at the whaling stations. The species which constitute the whale's food can be determined, and a rough idea can be formed of the fluctuations in abundance and types of "krill" which occur on the whaling grounds.

The whales caught at South Georgia (excluding the Sperm whale) feed exclusively on *Euphausia superba* (Fig. 100) and have no other food whatever in their stomachs apart from a few specimens of the Amphipod *Euthemisto*, which is so abundant in the plankton round South Georgia that the whales can hardly help swallowing a certain quantity.

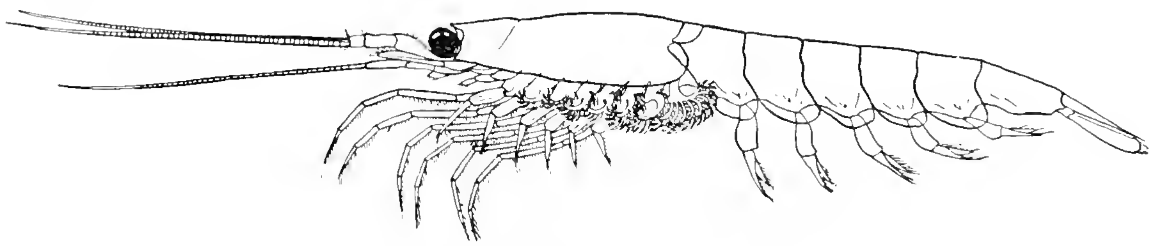


Fig. 100. Outline sketch of *Euphausia superba* (× $1\frac{2}{3}$ approx.).

Off the South African coast the little food in the stomachs was found to include *Euphausia recurva*, *E. lucens* and *Nyctiphanes africanus*, species which grow to a length of less than 1 in. Doubtless all species of Euphausian occurring in the locality are consumed without discrimination. One or two Humpbacks and one of the Fin whales examined at Saldanha Bay had fish in their stomachs. Sperm whales were feeding on cuttlefish, some of which appeared to have been of considerable size.

The question of the migrations of whales has not yet been referred to, but it may be mentioned here that there is a general movement northwards into warmer waters for breeding during the southern winter and southwards for feeding during the southern summer. Little food is available in the lower latitudes, but in certain parts of the Antarctic and sub-Antarctic waters *Euphausia superba* flourishes in immense quantities. It is to be found in dense shoals usually in the neighbourhood of land, and thus the great feeding grounds of the southern whales are situated in such places as the vicinity of South Georgia and the other Dependencies. The enormous abundance of the krill round South Georgia is revealed by an examination of the stomach contents of the whales caught there. Normally the stomach was found to be well filled with comparatively fresh Euphausiids and an empty stomach was at most times an uncommon occurrence. Plate XXXV, fig. 1, illustrates a typical case of the appearance of the stomach after a slight opening in it had been made.

The whales examined at Saldanha Bay showed a marked contrast. Here the stomach was normally found to be empty or to contain a very small quantity of food and the whales were correspondingly lean and ill-fed, except in cases where they appeared to have recently come north from the Antarctic.

One may sometimes receive a false impression of the amount of food in the stomach when a small cut is made in some part of its wall. Part of the stomach may be isolated from the rest by the weight of some mass of flesh for instance, when the whale has been partly cut up, and most of the food may have been pushed into or away from this particular part. Further, the whale's stomach is separated into several different compartments and one cannot always be certain which of these one is examining. It frequently happens that the stomach is torn or damaged in some way by the harpoon, so that much of its contents is lost in the body cavity. Allowance, however, can always be made for such an occurrence, as it can be detected by the presence of blood inside the stomach. Again, there is no doubt that a whale occasionally vomits when it is shot and the whole of the stomach contents may be lost. There has been more than one occasion on which we have noticed partly digested shrimps entangled in the bristles of the baleen, or inside the blowhole of a whale whose stomach was practically empty.

Allowing for these occasionally deceptive conditions, however, one can in many cases say whether the stomach is empty or whether there is much, a moderate amount of, or little food in it. Occasionally it is also worth while examining the contents of the intestines. This is always of a reddish-brown colour in whales which have been feeding on the ordinary krill. The whales examined at South Georgia usually had very well-filled intestines, while in those at Saldanha Bay the intestines rarely contained more than thin patches of food, those in which the stomach was empty often having only a little greenish substance.

In order to give an account of the fluctuations in abundance and type of the krill on which the whales examined were feeding it will be convenient to draw up a table showing for each half-month (*a*) the number of whales recorded as having empty stomachs or as having at least some food in the stomach, (*b*) the amount of food present in those cases where an opinion could be expressed, and (*c*) the dominant type of krill present. There are of course many more records of the actual presence of krill than there are of the amount of krill present. The "dominant type of krill" refers to the size of the individuals and the following symbols are used in the table:

L = *E. superba*. Large, from 5·5 cm. to 6·5 cm. (rostrum to tail).
M = ,, Medium sizes, from about 4·0 cm. to 5·0 cm.
S = ,, Small, up to about 4 cm.
X = ,, Mixtures of conspicuously different sizes.
R = *E. recurva*, etc., which do not show much variation in size.

This classification is very rough and is not to be regarded as referring to definite instars of *Euphausia* (which can, indeed, be determined only with very great difficulty); but it will serve to give a general idea of the kind of fluctuations which take place.

All krill-feeding species are included in the table.

Locality	Half-months	1925								1926								1927							
		No. of stomachs examined	" " with krill	" " empty	% with krill	No. with much krill	" " mod. krill	" " little krill	Predominating type of krill	No. of stomachs examined	" " with krill	" " empty	% with krill	No. with much krill	" " mod. krill	" " little krill	Predominating type of krill	No. of stomachs examined	" " with krill	" " empty	% with krill	No. with much krill	" " mod. krill	" " little krill	Predominating type of krill
South Georgia	January	—	—	—	—	—	—	—	—	24	12	12	50	1	1	5	M	15	14	1	93	1	1	4	X
	"	—	—	—	—	—	—	—	—	52	44	8	85	21	10	10	M	22	20	2	91	3	—	4	M
	February	1	1	—	(100)	1	—	—	M	65	59	6	91	26	17	10	M	10	8	2	80	2	2	—	X
	"	8	8	—	100	2	—	2	L	29	25	4	86	12	4	8	M	28	25	3	89	2	2	2	X
	March	11	10	1	91	8	—	—	L	21	21	—	100	11	5	5	M	26	22	4	85	3	—	3	X
	"	20	20	—	100	8	2	—	L	15	14	1	93	8	3	—	M	20	19	1	95	—	—	1	X
	April	10	9	1	90	3	1	1	L	—	—	—	—	—	—	—	—	18	14	4	78	—	—	3	X
	"	15	13	2	87	3	2	3	L	—	—	—	—	—	—	—	—	15	12	3	80	—	—	2	X
	May	5	5	—	100	1	—	3	L	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
South Africa	June																								
	"	—	—	—	—	—	—	—	—	36	13	23	36	—	2	9	R								
	July	—	—	—	—	—	—	—	—	20	12	8	60	1	2	9	R								
	"	—	—	—	—	—	—	—	—	10	4	6	40	—	—	4	R								
	August	—	—	—	—	—	—	—	—	19	4	15	47	—	1	3	R								
	"	—	—	—	—	—	—	—	—	54	30	24	56	3	6	19	R								
	September	—	—	—	—	—	—	—	—	15	4	11	27	—	—	4	R								
	"	—	—	—	—	—	—	—	—	37	12	16	57	3	2	16	R								
	October	—	—	—	—	—	—	—	—	14	10	4	40	1	1	7	R								
South Georgia	October	8	7	1	87	5	—	2	L	—	—	—	—	—	—	—	—								
	November	7	7	—	100	5	2	—	L	—	—	—	—	—	—	—	—								
	"	5	2	3	40	1	—	1	L	21	20	1	95	9	—	4	S								
	December	6	4	2	66	2	1	1	L	28	27	1	96	2	5	1	X								
	"	—	—	—	—	—	—	—	—	14	9	5	64	1	1	—	X								

The table suggests that fluctuations of the following nature took place in the food supply during the periods in which the whales were examined:

South Georgia, February to May 1925. Large krill were abundant and the whales well fed during February and March, but the supply seems to have been slightly reduced during April and May.

South Georgia, 1925–6 *Season*. Plenty of large krill were present in October and the first part of November, but they became scarcer later in November and in the first part of December. No whales were examined in the second half of December, but in January the large krill appear to have been suddenly replaced by a smaller type, scarce at first (unless the whales had difficulty in finding it) and then eaten in fair quantities. This krill seems to have become most plentiful in the earlier part of March. It is an interesting fact that the new type of krill which appeared in January was accompanied by a striking change in the whale population round South Georgia, for whales were very scarce during October, November and December, especially during December. But at about the new year immense numbers of Fin whales appeared. They were found first about 70 miles from the island and seemed to be finding very little food. Later they came closer to the coast and larger quantities of food were found in their stomachs.

Saldanha Bay, 1926. Food was extremely scarce here compared with South Georgia, as may be seen from the high proportion of empty stomachs. Even of those in which food was present the vast majority are noted as containing only a few very small Euphausiids.

South Georgia, 1926–7 *Season*. Food appears to have been fairly plentiful during the second part of November and first part of December, but to have fallen off a little in the second part of December. It was fairly plentiful again during January and February, but less abundant in March and April. The krill differed from that of other seasons in the fact that there was in most cases a noticeable mixing of Euphausiids of different sizes. These were not always mixed indiscriminately in the stomach. Large or small individuals might be found together in different parts of the mass of stomach contents, or patches of large ones might occur in a mass of smaller forms, suggesting that the whale had been feeding on separate shoals which differed in respect of the sizes of the individuals. During this season there was a high proportion of unusually small Euphausiids, though fully grown forms were also found from time to time.

BLUBBER

The highest grade of whale oil comes chiefly from the blubber, and the quantity and quality of the blubber is therefore a matter of direct importance to the whaler. If blubber were always of the same thickness and contained an invariable percentage of oil, the size of the whale would be the determining factor in the total yield of oil from the blubber. Other factors are present, however, which have an appreciable effect on the yield, although the size of the whale must of course be the predominant factor.

It is already known that differences of a regular nature occur in the thickness of the blubber. Risting (1912), speaking of the Humpback, says that on the average it is very fat in proportion to its size, and the blubber thickness varies according to the season and food. In a later work (1928) the same author states that the quantity of oil produced from a whale depends upon a number of factors, especially the size of the animal, thickness of the blubber and the content of fat in the blubber and carcass. Again, speaking of the stock of whales off the coast of South Africa, Risting mentions the extreme fatness of pregnant whales—a fact which is noticeable at South Georgia as well as at South Africa. Olsen (1914–15), reporting on the whales of South Africa, notes that Fin whales caught from March to June were nearly all small and lean. The fattest whales were females with foetuses. If accompanied by young the females were leaner.

Risting has used the total oil output of the whaling stations with the total number of whales caught to give a figure for the "fatness" of each season's catch in barrels of oil per "Blue whale unit." This unit is based upon the assumption that a Blue whale gives twice as much oil as a Fin whale, two and a half times as much as a Humpback, and six times as much as a Sei whale from the same field of operations. Calculated on these lines the results show that whales in the south (South Georgia and South Shetlands) are far more productive than those occurring further north, say at Saldanha Bay or Durban.

Other differences in the thickness of the blubber are recognized by the flensers at the whaling stations in South Georgia. Thus whales covered with the brownish-yellow film of diatoms are fatter than those without it, and the large Blue whales taken at the end of the season are fatter than those taken earlier.

During our three seasons' work at South Georgia and one at South Africa a large number of blubber measurements were obtained. It is not suggested that the work done in these areas is complete, for many more measurements must be collected before more than good general indications of the changes in the blubber can be shown. Further, it is unfortunate that the data in any year must be broken by a period of several months owing to the closing of the stations. Our measurements, however, are sufficient for tracing the effect of differences in the length of the whale, changes taking place during the year, the effect of pregnancy and lactation, and so on.

As explained on p. 267, the thickness of the blubber was generally measured at a point opposite the dorsal fin and on the flank midway between the mid-dorsal and mid-ventral lines.

Changes in blubber thickness with length of whale. The Blue and Fin whales taken at the whaling stations have a fairly definite range of size. Nearly all Blue whales measure from 17 m. to 26 m. and nearly all Fin whales from 15 m. to 23 m. By comparing the averages of blubber thickness for metre length differences between these limits it is possible to find whether the thickness of the blubber is correlated with the size of the whale. The results for each species and sex are shown graphically in Figs. 101 to 104. It is seen from these that in addition to differences in the volume of blubber present, due to the different sizes (i.e. areas) of the whales, there is a relative general increase in thickness with increasing whale length. The average difference in actual thickness of the blubber of the smallest and largest whales is about 2·5 cm.

The large whales captured off Saldanha Bay are relatively fat. The graphs show that they were actually fatter than whales of corresponding length at South Georgia, while South African whales at the average length at which sexual maturity is reached were leaner than those of South Georgia. The explanation of the differences in the average thickness will be apparent later when the thickness of the blubber in relation to the size of the whale is considered and the nature of the stock of whales off the South African coast is examined.

By calculation of the thickness of the blubber as a percentage of the total length of the whale, comparison is possible between the thickness of the blubber of all whales of the same species and sex apart from the changes due to differences in length. This method shows whether any seasonal increase or decrease in thickness occurs and —in the females—how much the blubber is affected by pregnancy and lactation.

Before considering the results it should be pointed out that at the station in Saldanha Bay the catch was almost entirely composed of immature animals giving a decided impression of leanness which contrasted strongly with the extra fatness of the few large whales captured there. This fact suggested that a separation of the measurements in both areas into two groups might show changes in the blubber of the immature

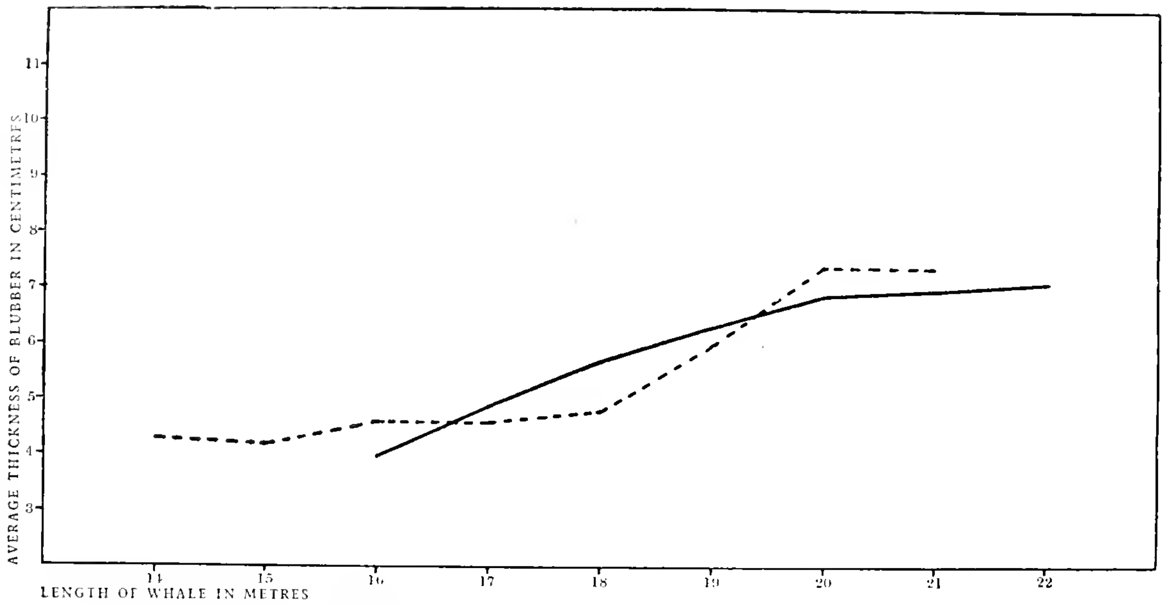


Fig. 101. Male Fin whales. Variations of thickness of blubber with length of whale.

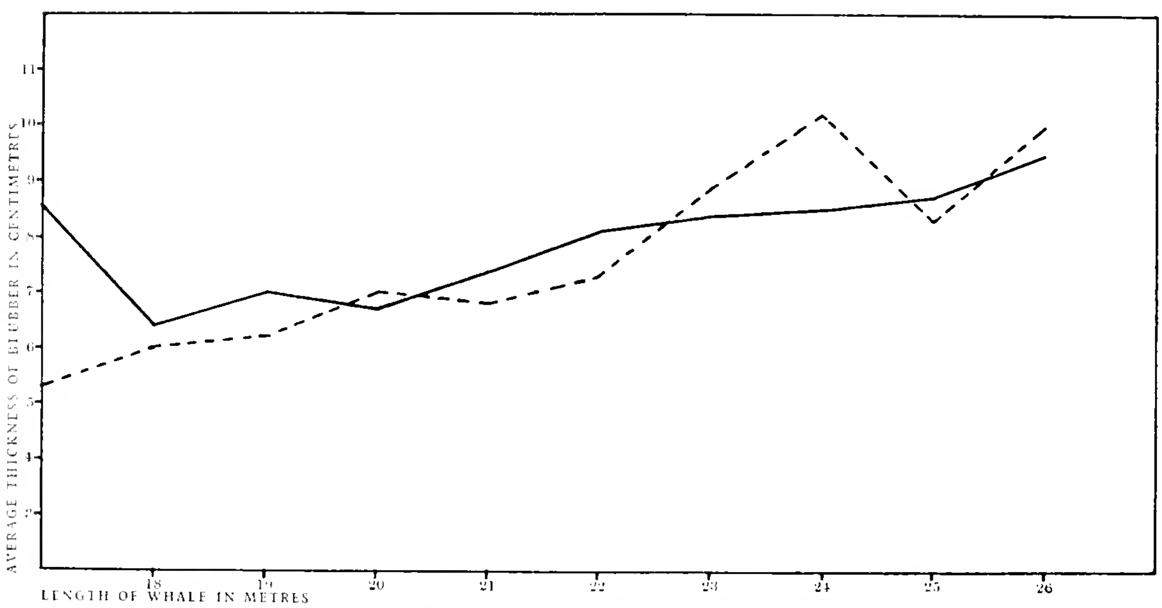


Fig. 102. Male Blue whales. Variations of thickness of blubber with length of whale.

——— South Georgia whales. - - - - - South African whales

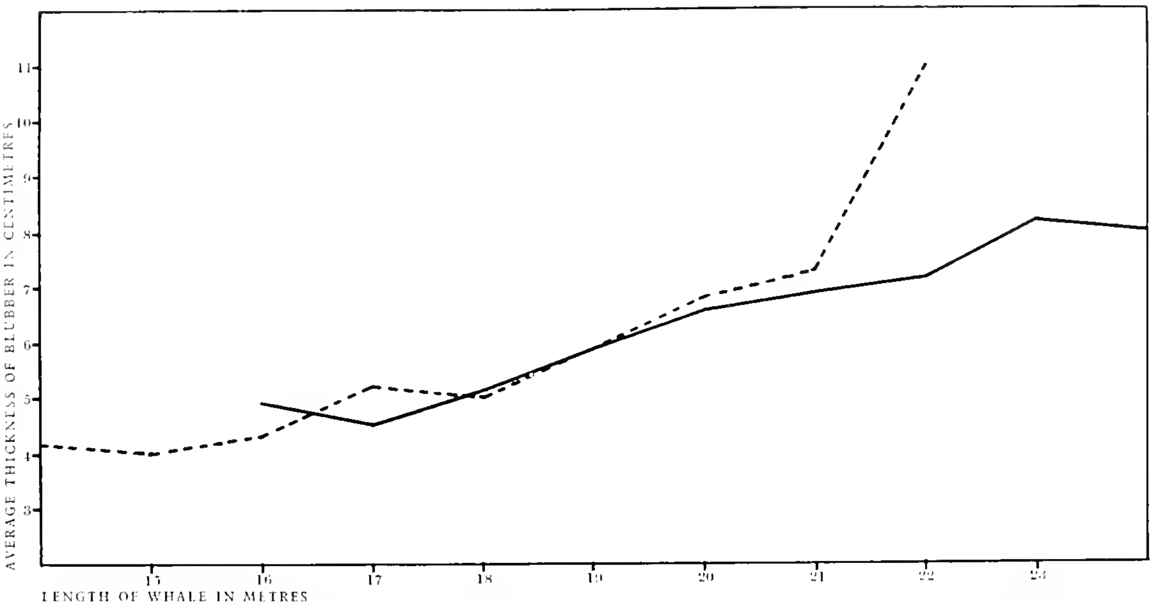


Fig. 103. Female Fin whales. Variations of thickness of blubber with length of whale.

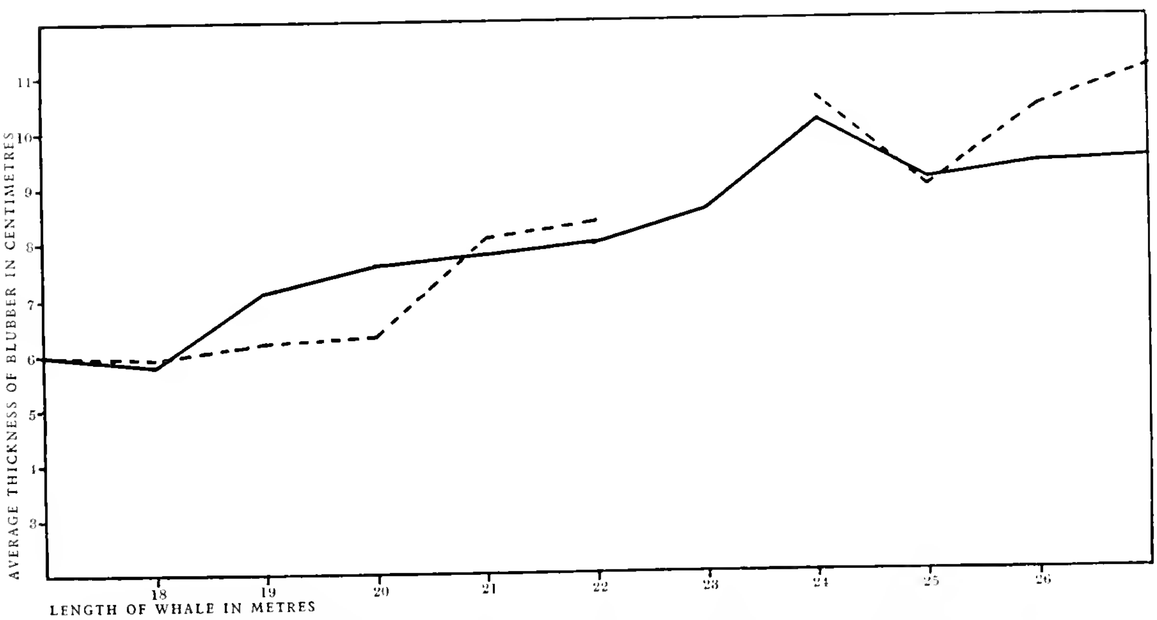


Fig. 104. Female Blue whales. Variations of thickness of blubber with length of whale.

——— South Georgia whales. - - - - - South African whales.

whales which did not occur among the large adults. It was felt that although the number of percentage measurements on which averages were based would be lessened by doing this, the large and small whales had evidently very different histories and must on that account be separated from one another.

The averages for each month of the thickness measurements (each measurement having been expressed as a percentage of the whale length) are shown in Figs. 105 to 110. Small whales certainly immature have been separated from the large adult whales. Thus Fin whales shorter than 18 m. and Blue whales shorter than 19 m. represent the immature group, while Fin whales longer than 20·0 m. and Blue whales longer than 23·0 m. are considered mature.

The average blubber thickness for all Fin whales is about 0·3 per cent of the total length. This represents a whale of normal fatness. For example, a 20 m. Fin whale should have blubber 6 cm. thick. The corresponding average for Blue whales is 0·35 per cent, which means that a Blue whale of 20 m. is fat or lean according as to whether its blubber is thicker or thinner than 7·0 cm. We will now consider each sex of the two species in turn.

Male Fin Whales (Fig. 105). In this graph the 1925–6 season is separated from that of 1926–7, but the results are very similar. An evident increase in thickness takes place among mature whales during the season at South Georgia.

It will be noticed that the immature whales appeared at the island in February and March, i.e. towards the end of the season, and that they were far less fat than the adults.

At Saldanha Bay the lean immature whales contrast well with the few fat mature whales of August and September. There is a hint of a decrease in blubber thickness here which is more evident in the other groups.

Male Blue Whales (Fig. 106). In the case of male Blue whales the increase in the thickness of the blubber in adults from below normal in November to above normal in March is seen. A rapid fattening of immature whales in the second half of the season is also evident.

At Saldanha Bay the fatness of the large whales and leanness of the small ones is apparent, as it was among male Fin whales. Here again is a suggestion of a decrease in thickness as the season advances.

Female Fin and Blue Whales. Among the female whales complications arise due to pregnancy and lactation. Pregnancy is known to have a profound effect on the blubber, the fatness of pregnant whales being noticeable at the whaling stations as soon as the blubber is cut.

Lactating whales, characterized by leanness at South Georgia, have been found at Saldanha Bay to be extraordinarily fat. To deal with these differences pregnant, lactating and resting females have been separated.

The resting females of both species (i.e. those neither pregnant nor lactating) may be taken first (Figs. 107 and 108). The mature whales at South Georgia, of normal fatness from November to February, show a rather sudden increase in blubber thickness at the end of the season. The immature females, like the immature males, arrived for the second half of the season, and on arrival were normal or rather lean.

At Saldanha Bay a decrease in blubber thickness among the mature whales balances the increase shown at South Georgia in both species. The immature whales are again thinner than the normal.

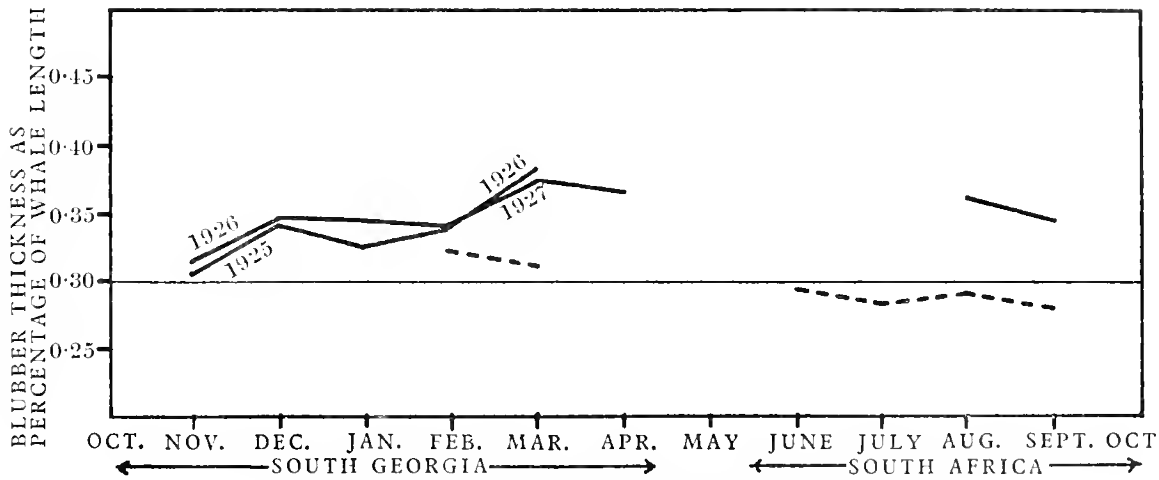


Fig. 105. Male Fin whales. Monthly average thickness of blubber.
(Separate curves for 1925–6 and 1926–7 seasons.)

—— Whales more than 20·0 m. long. - - - - - Whales less than 18·0 m. long.

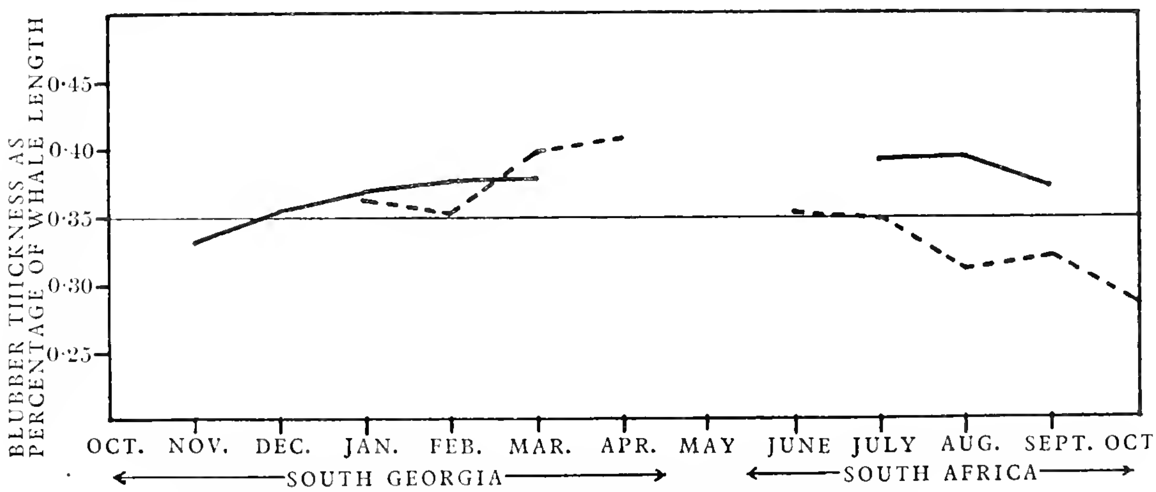


Fig. 106. Male Blue whales. Monthly average thickness of blubber.

—— Whales more than 23·0 m. long. - - - - - Whales less than 19·0 m. long.

The similarity of the results obtained for the males and resting females indicates the general conclusion that whales are fatter at the end of the season at South Georgia than they are at the beginning and that a decrease in blubber thickness takes place in South African waters. The increase in average blubber thickness of adult whales at South Georgia should be due to good feeding and fattening in that neighbourhood, where the food, as already explained, is available in abundance. The possibility might be suggested that the increase in fatness may be due to increasing numbers of fat whales arriving in South Georgian waters from other, apparently richer, feeding grounds as the season advances. If the small whales that appear about January have come from northern waters, as their leanness, size, and frequently parasitized condition very strongly suggest, the upward trend of their average blubber thickness shown in Figs. 106 and 107 favours the theory that fattening actually takes place on the local feeding ground.

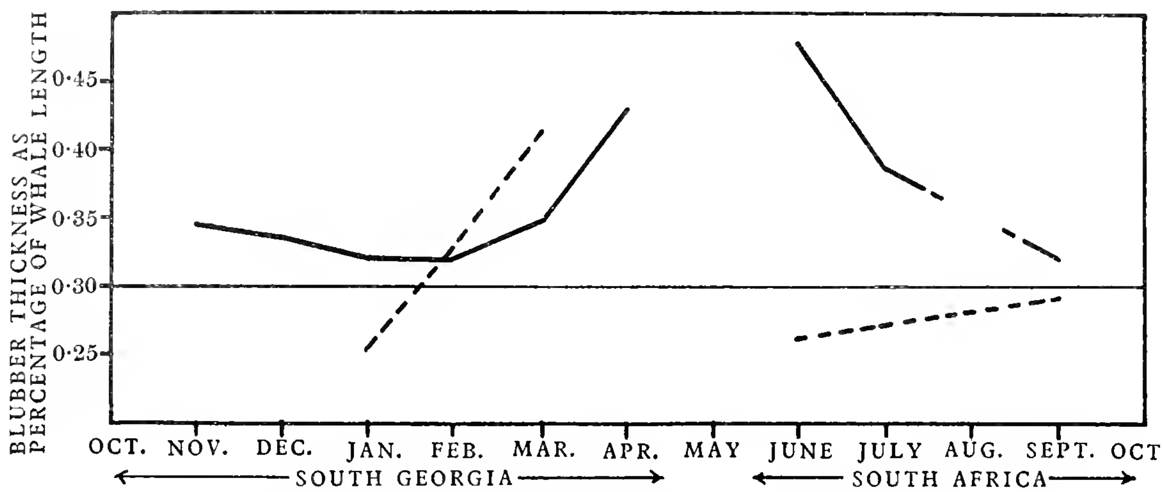


Fig. 107. Female Fin whales. Monthly average thickness of blubber.

—— Whales more than 20·0 m. long (excluding pregnant and lactating whales).
- - - - - Whales less than 18·0 m. long.

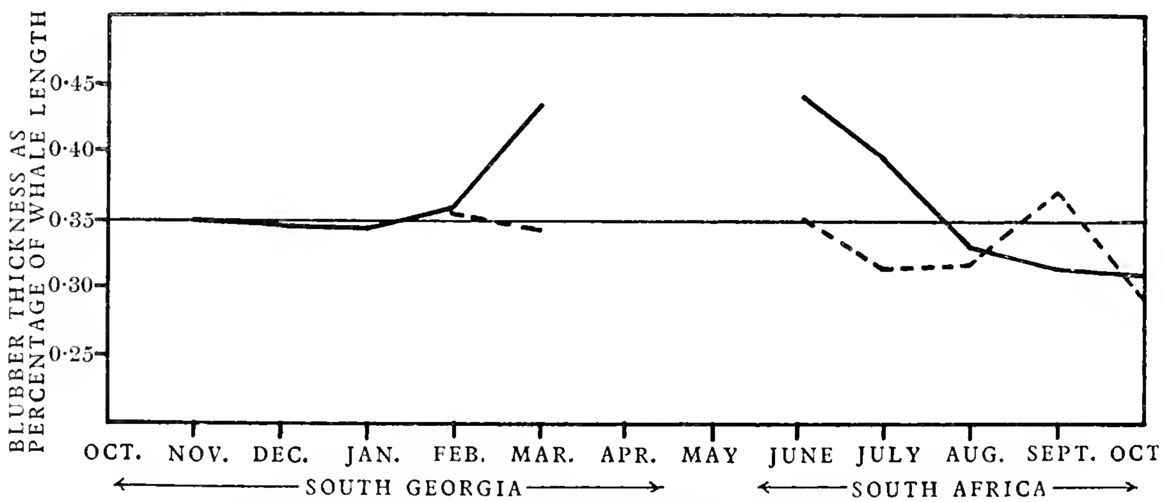


Fig. 108. Female Blue whales. Monthly average thickness of blubber.

—— Whales more than 23·0 m. long (excluding pregnant and lactating whales).
- - - - - Whales less than 19·0 m. long.

Turning now to the South African whales we see that the adult Fin whales make a late appearance in the catch at Saldanha Bay. Both Fin and Blue whales are very fat at the beginning of the season, as fat indeed as the end-of-season whales at South Georgia. This points to a migration to the African coast from rich feeding grounds, though not necessarily from the Dependencies of the Falkland Islands. Certainly they have not been staying for long off the coast of South Africa, for the majority of their stomachs were empty in spite of their fatness. Further, the average thickness of blubber shows

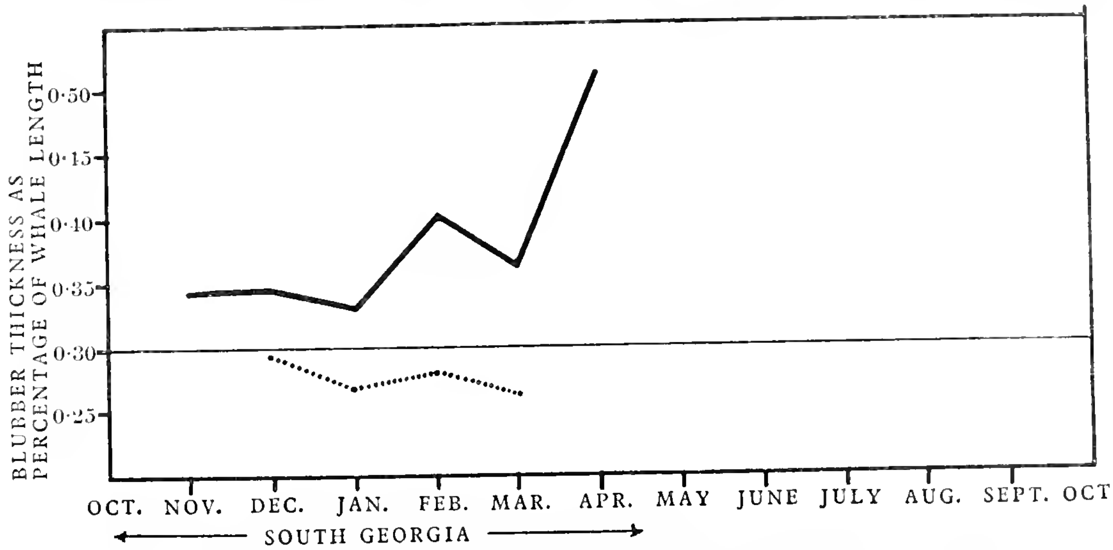


Fig. 109. Pregnant and lactating Fin whales. Monthly average thickness of blubber.

——— Pregnant. - - - - - Lactating.

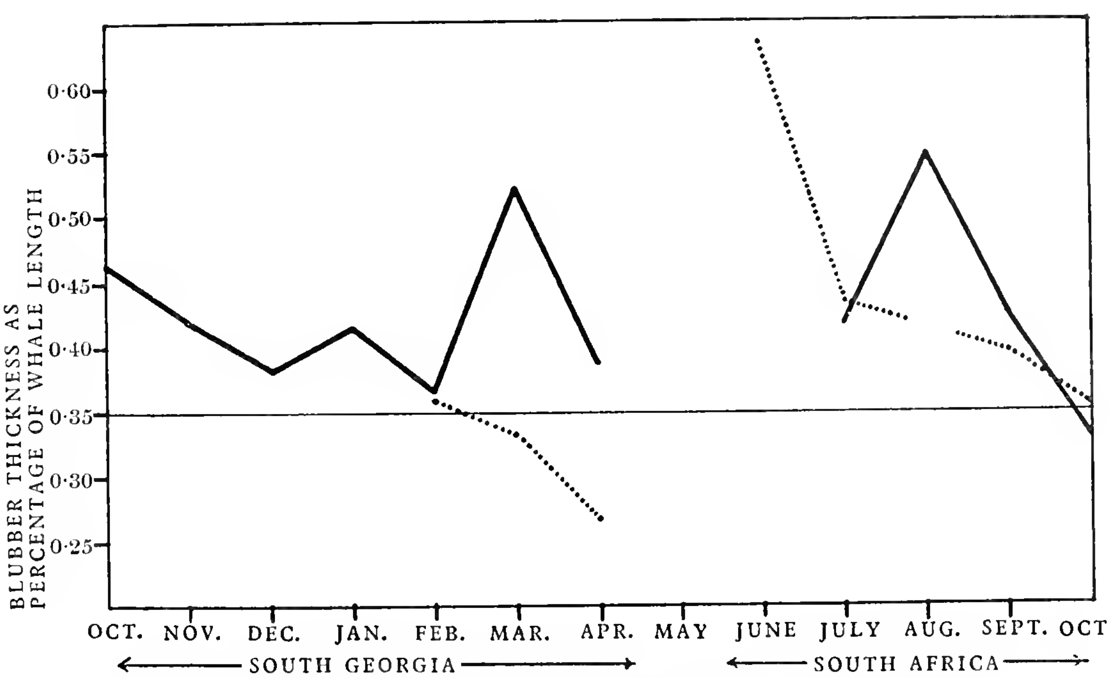


Fig. 110. Pregnant and lactating Blue whales. Monthly average thickness of blubber.

——— Pregnant. - - - - - Lactating.

a decided tendency to fall as the season advances. In other words the longer the whales stay the leaner they become.

The reason now appears why the large whales at South Africa have a higher average thickness than those of the same length at South Georgia as shown in Figs. 101 to 104.

In these figures the actual thickness of the blubber is shown. The large whales of South Georgia are a mixture of thin and fat individuals occurring during the season, while at South Africa the large whales are all fat.

The outstanding feature of the catches at Saldanha Bay is the high proportion of immature whales taken, and it is to be noted that they had a very low average thickness of blubber all through the season.

The west coast of Africa seems to be a sort of nursery area for young whales and it does not seem unreasonable to connect them in some way with the thin immature whales which arrive in southern waters usually late in the season.

Pregnancy and Lactation. The blubber is always thick during pregnancy. A glance at Figs. 109 and 110 will show that the average thickness is always above the normal. They appear to follow the general rule that the whales of South Georgia become fatter towards the end of the season.

Many more measurements of blubber thickness are needed for both pregnant and lactating whales, but the few records available for the latter are very interesting. The thinness of the blubber of these whales at South Georgia, and its thickness at South Africa have already been mentioned. In Fig. 110 the results are shown for Blue whales. There is a decrease in thickness from June to October (South Africa). At South Georgia lactating whales were lean and those taken in February, March and April were apparently rapidly becoming leaner. Of the Fin whales there were no records for lactating females at Saldanha Bay. Those captured at South Georgia from December to March were, like the Blue whales, very lean.

There seems to be no doubt of the significance of the great difference in the measurements at the two places. The blubber is very thick at Saldanha Bay because the whales have not long given birth. From the fact that the blubber during pregnancy is at all times above the normal thickness one would expect that at the onset of lactation the whales would be fat. This explanation covers also the fact of the leanness of the whales at South Georgia which are thus very near the end of the lactation period.

Diatom film. Little can be said with regard to the correlation of the diatom films with fatness in whales. Small patches of film occur on some whales at South Georgia throughout the season. From February onwards thick films covering a large part of the body were sometimes recorded. The immature whales were usually free but patches were found occasionally in the later months. Two immature Blue whales in March and April 1927 had thick and extensive films.

Small spots of diatoms were seen on a few immature whales at Saldanha Bay in August and September, but all the mature whales at this station appeared to be free. Conditions favouring the rapid growth of diatoms occur in southern waters in February, March and April, and as has been shown, at this time the whales are rapidly becoming fatter.

EXTERNAL PARASITES

The species of external and internal parasites of whales will be dealt with in separate papers. They have not been thoroughly examined at the time of writing and are therefore dealt with only very briefly here. The greater part of this section is devoted to an account of certain scars, of which the origin is rather obscure, but which are probably to be attributed to a parasite or parasites of some kind.

The external parasites of whales are mostly crustaceans, and the commonest internal parasites are tapeworms and Acanthocephala.

The following external parasites have been collected from Blue and Fin whales (apart from certain more or less minute forms found on the baleen):

Cirripedia.	Copepoda.
Coronula regina.	*Pennella* sp.
Conchoderma auritum.	Amphipoda.
C. virgatum.	*Cyamus* sp.
Xenobalanus globicipitis.	Diatoms.

Ectoparasites in general are rarely found on Blue and Fin whales at South Georgia. Infection seems to take place more easily in the warmer waters of the South African coast, where *Pennella* is particularly common. At South Georgia such external parasites as do occur are generally fully grown, while those observed at South Africa included, at any rate in the case of *Coronula* and *Pennella*, young ones in all stages besides the fully grown individuals. It appears that whales become infected with these external parasites during their stay in the warmer waters, but lose them on migrating to the colder waters of the south. The film of diatoms is the only exception to this, for it is undoubtedly contracted in the summer in the Antarctic or sub-Antarctic waters. Early in the season it may be seen in its initial stages in the form of little round green patches on the skin, an inch or so in diameter. These patches appear to be growing colonies, which gradually expand from numerous centres and eventually cover perhaps the whole body within a few months. These diatoms were described by Bennett (1920) and identified by Nelson (1920) as a species of *Cocconeis*.

The ability of a whale to throw off the *Pennella* which most commonly attack Blue and Fin whales, seems to have some physiological significance, for it is often found that a whale taken at South Georgia with a number of these parasites in its blubber is suffering from some internal growth or disease.

Internal parasites are to be found more commonly than the external Crustacea, and they are often present in great numbers in whales from both South Georgia and South Africa. Blue whales are more often parasitized than Fin whales, in fact more than half the individuals of the former species from both localities contain tapeworms or Acanthocephala or both in their intestines. In both species the younger whales are normally more heavily infected than the older ones.

We may now turn to an account of a kind of disease to which all southern Blue and Fin whales seem to be subject. All the whales of these species caught at South Georgia are marked by numbers of whitish scars which are very different in appearance from the irregular white or grey flecks scattered over the skin in Blue whales which are due, apparently, simply to incomplete pigmentation of the epidermis. The scars are obviously the result of wounds or sores. They occur mainly on the posterior end of the body, sometimes in such numbers that the colour of the animal is distinctly paler on the sides above the anus than at the head or in the flipper region. The scars are normally more numerous on the larger whales than on the smaller ones. They are usually of an oval shape with the long axis of the oval parallel with the long axis of the animal's body (Plate XXXVI, fig. 10). Sometimes they are quite white and sometimes composed of radiating white streaks. The centre line is an elongated cicatrix generally somewhat sunk below the level of the epidermis. Occasionally the scars take the form of a white crescent (Plate XXXVI, fig. 5).

At Saldanha Bay nearly all the whales captured had open wounds or pits on the flanks and tail, as well as various healing stages of these pits and white scars like those found on the whales at South Georgia. The open, unhealed pits of the South African whales were not seen at South Georgia and only rarely were the partly healed pits to be found there.

The open pits of the South African whales are very remarkable (Plate XXXVI, fig. 6). They are oval, scooped-out wounds in the skin and blubber about 7 cm. long, 4–5 cm. broad and 3 cm. deep. The long axis is usually parallel to the long axis of the whale's body.

From the appearance of the wounds one might think that a lump of blubber had been scooped out at a single stroke by some sharp spoon-shaped instrument, but a close examination shows that a fringe of minute processes arise at the edge of the pit just beneath the border of the epithelium (Plate XXXVI, fig. 6). No marks suggestive of teeth outside the lip or inside the pit can be seen, and the fringed edge does not give the impression that it has been caused by say a sucking mouth. The surface of these pits is naked, unaltered blubber.

Of almost equal frequency are pits of similar shape with a flabby disc of greyish tissue attached by its centre to the middle of the base of the pit (Plate XXX, fig. 8). This disc, apparently, is thrown off during the process of healing of the pit.

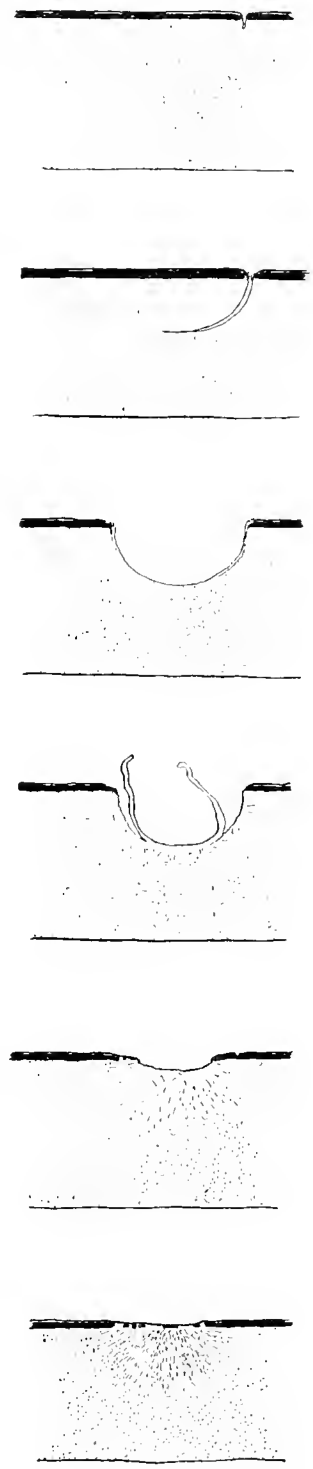


Fig. 111. Successive stages in the formation and healing of a pit in the blubber.

Sometimes crescent-shaped wounds were found. The appearance of this kind of pit suggests that the scooping action which might have gouged out the open pits had been arrested so that a free flap of tissue remained attached to one side of the pit (Plate XXXVI, figs. 2 and 4). Sometimes the crescent is short, as though only slight penetration had occurred, at other times the scooping action seems almost to have been completed so that the free flap of blubber and skin remains attached by a thread as it were to the edge of the pit. A kind of scar tissue covers the blubber surfaces within the crescent pit, and this peels at the edges during healing.

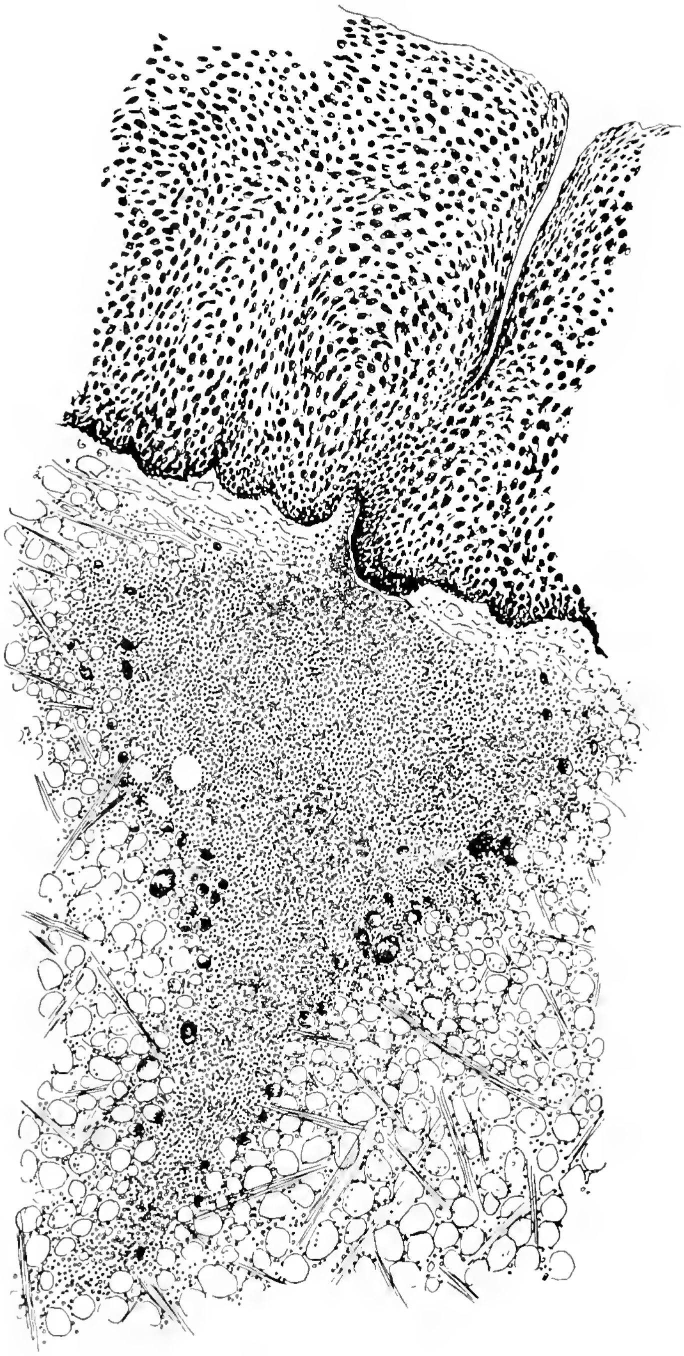
In the healing stages the epidermal layer loses its sharp edges and grows gradually inwards, while the blubber fibres grow up and draw together (Plate XXXVI, fig. 9). Pigment is not present in the later stages so that when the wound is completely healed the scar is white. In sections the scar tissue shows up as a mass of converging fibres (Plate XXXVII, fig. 3). White crescent scars, formed probably by prompt healing of a wound which never got beyond the initial stages, are found sometimes, but they are not numerous.

Careful examination of the whales at Saldanha Bay led to the discovery of occasional crescentic grooves with a few minute slots in the course of the groove (Plate XXXVI, fig. 1). The slots led into a subcutaneous crescentic canal following the arc of the surface depression. Microscopic examination of the contents showed nothing in the canal but numerous bacteria.

Specimens of all the stages observed have been collected from whales at Saldanha Bay and South Georgia, and examined from the histological point of view. Sections show a number of interesting points connected with the earlier stages and a possible causative agent. As the primary cause of the pits remains in some doubt it is of course not certain that the stage of the curved groove with its minute punctures is connected with the pits. It seems logical, however, to connect this stage with the crescent-shaped incisions. If one imagines a continuation of the process forming the crescent flap and the final throwing off of the latter, an open pit will be formed. Thus the stages fall into a natural order, beginning with the arc-shaped groove and the epidermal canal followed by the crescent pit. Occasionally this heals, to form the crescentic scar, but more frequently the whole centre is thrown off leaving scar tissue over the surface of the exposed blubber. This is sloughed off as the flabby disc referred to above, and leaves the clean open pit (Fig. 111).

It is quite probable that the initial stages are more frequent in regions further north than Saldanha Bay. This is suggested by the difficulty of obtaining evidence as to the primary cause of the pits and by the fact that whales in the colder waters of the south show only scars and a few late healing stages. It is reported by Olsen (1913) that wounds "filled with mortifying fat" were very numerous in the few old and apparently diseased specimens (of Bryde's whale, *B. brydei*) taken at Port Alexander, which is over 1000 miles north of Saldanha Bay. Similarly, the blubber of whales off the coast of Ecuador is, according to Risting, often more or less covered with deep holes filled with matter.

Sections of the arc-shaped groove show a deep cleft in the pigmented epidermal layer. In the blubber beneath is a wedge-shaped mass of tissue with deeply staining nuclei (Fig. 112). In this area the blubber has been completely replaced by this nucleated tissue. At the edge of the wedge of blubber cells are to be seen in process of destruction and some are filled with small brownish needle-shaped crystals. These are probably blood-crystals (Fig. 113).



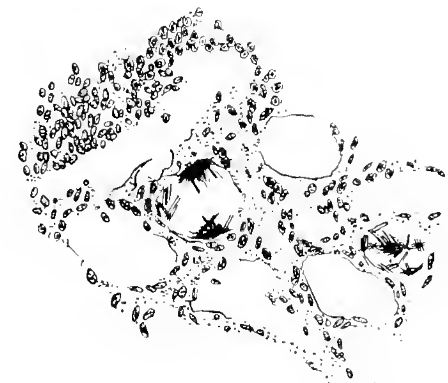


Fig. 113. Blubber cells with blood crystals at the edge of the inflammatory tissue of a wound. (Part of section shown in Fig. 112 enlarged.)

Fig. 112. Transverse section of an arc-shaped wound in the epidermis and the blubber beneath.

Dr John Taylor, pathologist at St Thomas's Hospital, kindly undertook to examine some of the specimens. He found that at all the exposed surfaces inflammatory tissue was present. The wedge-shaped mass of nucleated tissue was inflammatory in character and might result from a wound or abrasion of some kind. In sections of the flabby disc (Fig. 114) he found a number of ciliated protozoa (Fig. 115) embedded in the tissue by which the base of the disc was attached to the bottom of the pit. He considered that these might quite likely be the cause of wounds if the epidermis had been damaged slightly to allow their entry.

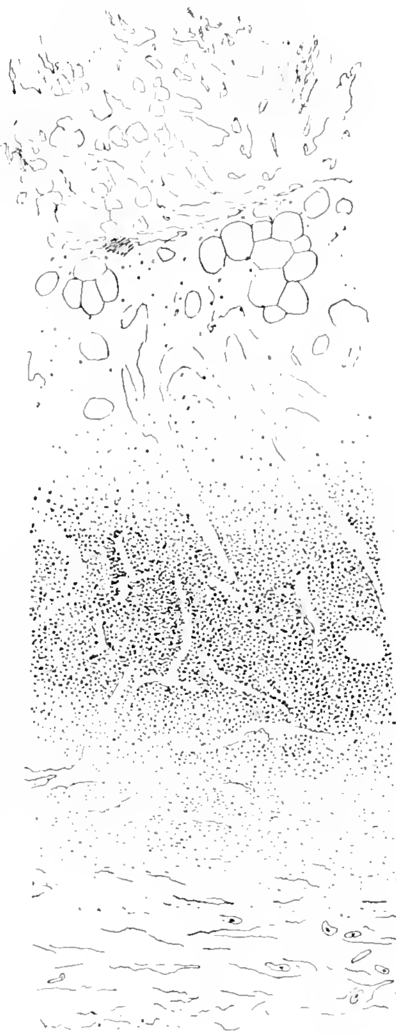


Fig. 114. Section of the "flabby disc." *a*, dead cells of surface disc; *b*, heavily nucleated tissue; *c*, protozoa; *d*, base of attachment to centre of pit.

On the under surface of the free edge of the flabby disc there are matted ribbons of what look like rod-shaped bacteria (Fig. 116). From their position one would suppose that these are a secondary infection. The flabby disc itself consists of an outer zone of disintegrated cells. Farther in are dead blubber cells. Beneath these is a zone of inflammatory tissue and then come the fibres already mentioned in which the protozoa were found.

In seeking the cause of these pits we must consider a number of possible agents. The balance of probability indicates that they are primarily the work of micro-organisms, but this cannot be regarded as proved. On the other hand, it does not seem possible to explain the various stages by any of the theories previously advanced. *Coronula* (Goodall, 1913), *Pennella* (Olsen, 1913), and sucking fishes (Olsen, 1913) have all been blamed, and biting fishes have been suggested. Lillie (1915) supposed that open wounds of evidently the same nature in Humpbacks at New Zealand had been caused by damage from sharp rocks.

Taking these in turn it can be shown first that *Coronula* can hardly be responsible. This parasite leaves a surface impression, but even when somewhat embedded in the skin it does not penetrate below the pigmented epidermis (Plate XXXVII, fig. 1). When the furrows and ridges of the impression have flattened out

Fig. 115. Ciliated protozoa in scar tissue.

after the disappearance, from one or other cause, of the barnacle, there is left a greyish symmetrical pattern on the epidermis that cannot be mistaken for the scars caused by healed pits (Plate XXXVII, fig. 2).

Pennella grows very deeply into the blubber—much further than the depth of the pits—and affects the skin and blubber only immediately around its narrow "stalk." Secondary infection of the open pits with *Pennella* often takes place, but there seems no possibility that this parasite is responsible for the formation of the pits either by its own activities or as a reaction on the part of the whale to these activities. It is true that *Pennella* may leave a scar of its own, but this is smaller and quite distinct from the scars left by the pits.

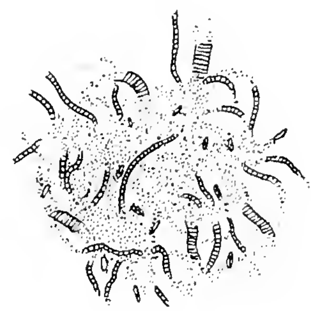


Fig. 116. Rod-shaped bacteria in scar tissue.

There have been reports from the whalers at Saldanha Bay of fishes (apparently Myxinoids) occasionally attached to the whales at sea. Soon after the capture of the whales the fishes were said to loosen their hold so that specimens were never taken. Myxinoid fishes can in fact be caught by hook and line in Saldanha Bay, though these are far too small to have caused the pits. In this connection Olsen (1913) remarks as follows: "A species of Myxinoid makes similar wounds in Bryde's whale, but I did not obtain specimens because they always leave the whale when it is dragged out of the water. I do not know whether they are to be found on the whale when alive or only after its death". There is no doubt that the wounds noted by Olsen at Durban are the "pits" under discussion. A very good illustration of them is given in his paper. He describes them as "fresh wounds with a length of as much as 10 cms. and 3–4 cms. deep, caused by parasites, generally *Pennella*". It is probable that wounds caused by a sucking fish would show signs of the method by which they had been made, and such fishes cannot be imagined to make the crescentic pits. The same objection applies to biting fishes, although certain species might possibly manage to make the open pit in one bite. It is in fact the partially cut pit shown in Plate XXXVI, fig. 4, with its free flap of practically unaffected blubber which constitutes the great objection to any kind of bite, gash or macro-parasite, as a possible cause of the open pits and the scars, for there seems to be no conceivable process by which such agents could cause this particular stage. One can only suppose that there is some micro-organism which, having penetrated the skin, propagates itself through a peculiar kind of curving plane, undermining a piece of blubber which finally drops out and leaves an open pit.

It should be mentioned that instances of fishes biting into the blubber of whales have been known. Scoresby (1820) describes how the Greenland Shark (*Laemargus borealis*) bites "hemispherical pieces", "nearly as big as a person's head", out of the blubber of the living Greenland whale. *Laemargus* does not occur, however, in the south, and if it did it could hardly be the cause of the pits in question. It is conceivable that the whale's epidermis might be pierced by a bite of some kind and that infection by some micro-organism then sets in, resulting eventually in the formation of the pit. *Callorhynchus*, for instance, is a fish with remarkable projecting teeth, but there is still the difficulty that the walls of the pit are normally absolutely vertical at the edge (i.e. at right angles to the surface of the blubber), and it is difficult to imagine any kind of teeth even starting such a wound.

The presence of pits and scars on whales from widely separated localities such as New Zealand, Ecuador, South Georgia and South Africa, gives a kind of unity to the southern whales. It shows a common experience confined to whales in the warmer water of the ocean, leaving its mark on the whales that migrate. It strengthens the theory of a north and south migration between the temperate or sub-tropical waters and the Antarctic and sub-Antarctic regions.

The open pits seem never to have been described in whales of the northern hemisphere. They are mentioned neither by True (1904) nor by Sars (1878, 1880) and they do not appear to be present on the whales of which True shows photographs. Irregular grey patches on the flanks and white patches on the ventral grooves are mentioned by these authors, but this is probably concerned with the normal colouring of the whales. White scars are mentioned by Collett (1912) on Sei whales from West Finmark and by Burfield and Hamilton on Fin whales from Bellmullet, Ireland. From Burfield's description of "large oval grey spots with radiating dark lines $2\frac{1}{2}$ in. $\times$ $1\frac{1}{2}$ in.", one would perhaps suppose that these whales had at some time suffered from open pits. More than one kind of scar, however, is liable to appear on the skin of whales, and further observations are needed from northern stations before the point can be settled.

IV. THE REPRODUCTIVE ORGANS

The systematic examination of the genitalia includes some of the most important observations in the work at whaling stations, and certain aspects of the physiology of the reproductive organs must be examined in considerable detail.

Previous descriptions of the genitalia of Cetacea have been few, and for the most part, not very helpful. Turner (1871) describes the uterus and foetal membranes of *Orcinus*, but the paper by Meek (1918) on the reproductive organs of the porpoise and some other species is probably the most useful general description though this does not include any account of Blue and Fin whales.

Since there is no difference of any importance between the genitalia of Blue and Fin whales the following account may be considered to have a general application except where otherwise indicated.

THE EXTERNAL GENITALIA

There is not very much to be said with regard to the external genitalia, but systematic notes have been made on them and their appearance sometimes gives a little information on the sexual condition of the whale. In the female the vulva is situated in a deep groove immediately in front of the anus (Plate XXIX, fig. 2, and Plate XXXIII, fig. 3). In immature whales this groove is usually tightly closed, but in mature whales it is generally slightly open so that the clitoris is just visible. On each side of the genital groove are the slits which contain the nipples of the mammary glands. As stated on p. 276, the average distance between the anus and reproductive aperture in, for instance, female Blue whales is 2·6 per cent of the total length, or 0·65 m. in a 25·0 m. whale. The most important observations to be made are probably those concerned with indications of "heat" in females, but we have met with only one case in which a whale appeared to be in this condition. In No. 775 the genital groove was rather more open than usual and the clitoris was pushed outwards by a slight eversion of the vagina. The latter was noticeably congested and contained some clear mucus. The actual presence of mucus appears to mean little, for it is present in most whales and is often found to be issuing in considerable quantities from the vagina, but instead of being clear it is normally cloudy and viscous.

The condition of the external genitalia may also occasionally be useful in indicating the approach of parturition in pregnant whales. In Nos. 154 and 175 the vulva was greatly swollen and the genital groove stretched open to a remarkable extent as though from considerable internal pressure. These two whales were found to contain foetuses measuring 6·3 and 6·05 m. respectively, and it is to be supposed that parturition was to take place very shortly.

In the male, the penis is retractile and is normally completely withdrawn into the cavity within the genital groove. The exterior then presents a long groove which differs from that of the female in its shape and in its more forward position (Plate XXX, fig. 2). Whereas in the female the anus lies immediately at the posterior end of the genital groove, in the male there is a considerable distance between the two. The average distance between the anus and genital aperture in this sex is 6 to 7 per cent of the total length, and this measurement gives in fact the most obvious distinction between the sexes. The shape and proportions of the penis are illustrated in Plate XXXIII, fig. 1. In the carcasses of males brought to the whaling station the penis is frequently fully extruded, but this takes place gradually, after the whale has been killed, during the period when it is being towed back to the whaling station. In fully grown Blue and Fin whales the penis measures usually from 2 m. to 2·5 m., but adult specimens (e.g. No. 1229) have been recorded in which the penis measured considerably less than 2 m.

Observations on the size of the penis may be useful as a means of deciding at a glance whether a whale is sexually mature or not, for this organ undergoes considerable growth at maturity. This method, however, is unreliable in the case of whales which have recently been or are about to become mature.

THE VAGINAL BAND

The vaginal band is a unique structure which is of sufficient interest to be considered separately from the other external genitalia. It was first noticed in a specimen of the external genitalia of a Fin whale sent to England from the South Shetlands by Mr J. E. Hamilton. It was then thought to be an abnormality of an interesting type, but the examination of whales at South Georgia and Saldanha Bay shows that it is by no means a rare occurrence among Fin whales and so should be included in any description of their structure.

In most immature female Fin whales, as already mentioned, the genital groove is closed so that little or nothing can be seen of the genitalia; and when the blubber is removed the vulva is frequently removed with it. This probably accounts for the fact that no mention of a vaginal band appears previously to have been made.

The clitoris is an incurved, keeled structure about 8·0 cm. long, with a trilobed apex directed backwards. Under the clitoris are the openings of a pair of small glands; and immediately behind these, between a pair of fleshy lobes, opens a larger unpaired duct which is the urethra. Behind the urethra and nearly covered by the apex of the clitoris is a small projecting mass of tissue with papilliform appendages. From the posterior side of this mass stretches a thick strand 7 or 8 cm. long and not less than 1 cm. in diameter, across the large, somewhat star-shaped entrance to the vagina, to the posterior border of which it is attached (Plate XXXIX, figs. 1, 2 and 3).

In mature Fin whales one end of this band was sometimes found as a tag 5 or 6 cm. long usually attached anteriorly, but signs of recent rupture of a complete band were not found.

The band is composed mainly of fibrous connective tissue with a few small blood-vessels. Many minute convoluted ducts course through the tissue, which also contains a few droplets of oil. Transverse sections show that the character of the band is not similar throughout. That part—about one-third—which faces the opening of the vagina is covered with papillae. At each side the papillae give place to a typical epidermis which covers the remaining two-thirds of surface and resembles the epidermis covering the blubber (Fig. 117). Sections give the impression that the outer surface epidermis has grown in round a solid strand of the underlying tissue but has not completely covered the inner surface.

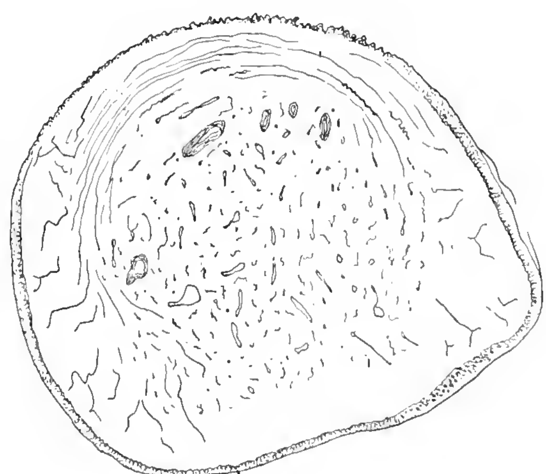


Fig. 117. Section of the vaginal band. v, ventral, or outer surface.

Of the total of 145 immature female Fin whales, the band was present in 31 (21·4 per cent) and in the total of 206 mature Fin whales the tag was observed in 14 (6·8 per cent). Not all these whales were examined for this structure, but it was definitely not present in 40 immature Fin whales.

Of 36 female Fin whale foetuses 5 (14 per cent) possessed the band while 2 definitely did not. Again in some cases observations could not be made.

There is some evidence that this peculiarity is not hereditary. In Fin whales Nos. 173 and 289 vaginal bands occurred in the foetuses but there was no sign of a tag in the adults. The broken ends, however, may possibly have been reabsorbed so far as to be inconspicuous. In Nos. 286 and 332 there was a tag in each of the parent whales and no band in either of the foetuses. One foetus, however, was very rotten and it is just possible that a band may have been missed.

Whale No. 1494, a Blue female, possessed a tag attached anteriorly. This was the only case where evidence of the vaginal band was found in any species other than Fin whales.

The presence of an unbroken vaginal band usually denotes sexual immaturity, for it is difficult to see how coition could occur without rupture of the band, and coition probably occurs quite shortly after the female becomes adult. In this way it appears to be somewhat analogous to the hymen in the human subject.

There are two cases, however, of vaginal bands occurring in whales, one of which appeared to be on the threshold of maturity, and the other just passed maturity. In the former, whale No. 139, one of the ovaries showed a large vesicle 6·5 cm. in diameter which was apparently an enlarged Graafian follicle. The ovaries appeared otherwise to be immature. They were small, weighed comparatively little (8 and 13 oz.) and the other follicles present were minute. The whale was smaller than the smallest certainly mature female Fin whale, and it was captured at the end of March. Whale No. 76 appeared to have just reached maturity, for it measured 20·2 m. (the mean size at which maturity is reached is 20·0 m. in female Fin whales) and although a vaginal band was present a body was found in the ovaries which appeared to be an old corpus luteum. In this whale, which is referred to again on a later page, either an ovulation had taken place or an ovum had ripened and become atretic. The second possibility is the more likely as no path could be traced from the capsule to the exterior of the corpus luteum.

The vaginal band appears not to have been previously described, and it is difficult at present to put forward any explanation of its occurrence. It has been found in too large a percentage of Fin whales to be dismissed as an abnormality, yet no correlation has been noticed with the measurements or other features of these whales to distinguish them from whales in which the band is absent.

THE OVARIES

The ovaries are, from our point of view, the most important of the reproductive organs, for they are an unfailing index of the sexual condition, and to some extent of the sexual history of the whale. They are elongated bodies measuring usually between 20 and 40 cm., and differ from the ovaries of most other mammals in their highly convoluted condition and the prominence of the frequently numerous corpora lutea and follicles, which give the surface a very irregular appearance.

(*a*) *Growth of the Ovaries*

In discussing the physiology of the ovaries it will be convenient to start with an account of their growth in the foetus and the young whale. In Blue and Fin whale foetuses measuring about 1 m. they are small elongated bodies whose flattened surfaces are marked by a number of furrows (Fig. 118). The whole genital tract of the young foetus at this stage is engorged with blood so that the ovaries are of a deep red colour. In larger foetuses the furrows are more pronounced and more numerous (Plate XXXIX, figs. 3 and 4). After the calf is born the majority of the furrows are smoothed out by the growth of the ovaries, but some remain to mark the convolutions of the adult ovary which are referred to above, and some of the minor furrows occasionally persist to give the surface of the ovaries a curious appearance which has been described in notes on the internal genitalia as "bramble-marking." This is illustrated in Fig 119 and Plate XXXIX, fig. 4.

Fig. 118. Ovary of foetus measuring 1·13 m. (Natural size.)

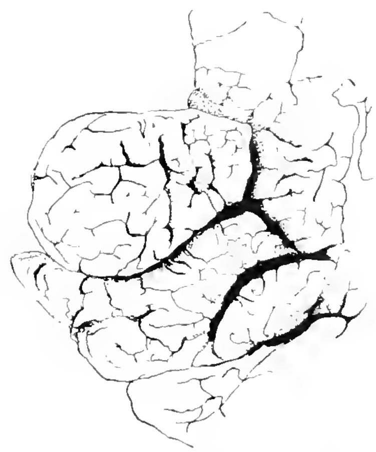


Fig. 119. Small portion of ovary of immature whale, showing "bramble markings." × 1·5.

Although the ovaries do not grow very much from birth to sexual maturity, considerable changes take place. From rather rounded, soft structures they become pale, flat, compact organs (Plate XL, fig. 1). They remain, however, small up to this stage, for in Fin whales measuring less than 18 m. and in Blue whales under 20 m. the two ovaries together weigh less than 1 lb. The ovaries of immature Fin whales practically never weigh more than 2 lb., nor those of Blue whales more than 3 lb. After sexual maturity is reached the weight of the ovaries, as shown in Figs. 120 and 121, appears to increase up to a point with the increasing length of the whale. Although the ovaries of large whales are as a rule bigger than those of smaller whales, the increases illustrated in these graphs are in reality due more to the presence of a larger number of old corpora lutea than to an increase in the actual size of the ovary. When a corpus luteum of pregnancy is present the weight of the ovary may be nearly doubled, so that in connection with the growth of the ovary, only those of non-pregnant females can be taken into consideration.

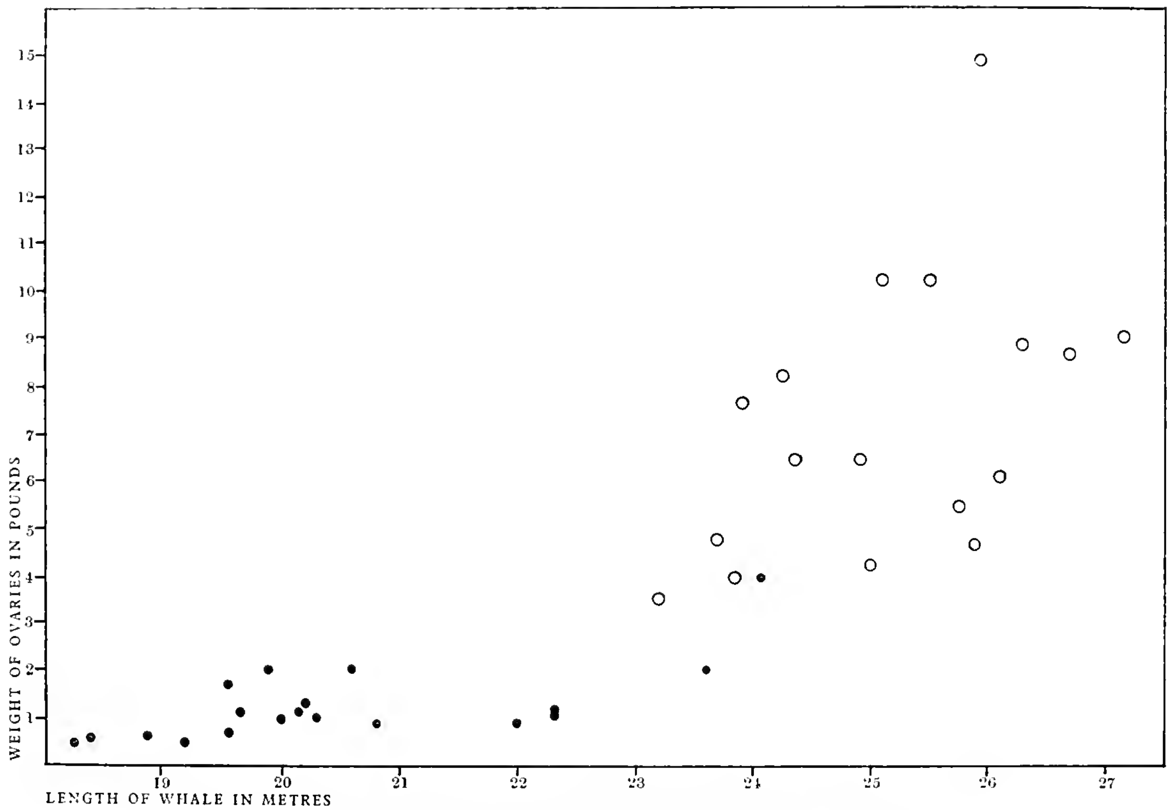


Fig. 120. Blue whales. Weight of ovaries in whales of different lengths.
● Immature whales. ○ Mature whales (not pregnant).

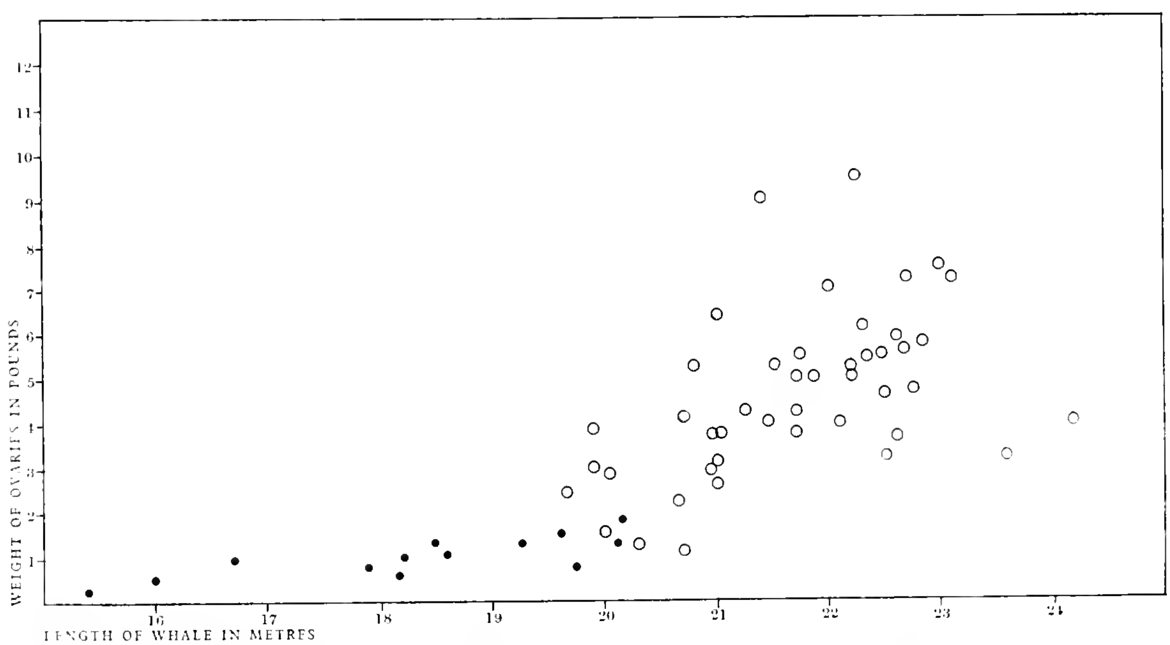


Fig. 121. Fin whales. Weight of ovaries in whales of different lengths.
● Immature whales. ○ Mature whales (not pregnant).

The positions of the plotted points in Figs. 120 and 121 suggest that at least in the case of Fin whales there is a general increase in the weight of the ovary from 20 m. (at about which length sexual maturity is reached) up to 22 m., that a maximum is reached here, and that there is subsequently some regression. This apparent regression may be a coincidence or it may be an indication of actually different conditions in the very large whales. The two whales of 23·6 and 24·15 m., plotted in Fig. 121, had thirteen and twenty corpora lutea respectively, and the fact that in spite of this their ovaries weighed so little, supports the suggestion that the ovaries do become lighter in the largest whales.

(*b*) *Growth of the Ova*

It will be convenient next to trace the growth of the ovum and development of the Graafian follicles. Sections of the ovary in young foetuses show large numbers of deeply-staining nuclei towards the surface. In a 2·76 m. foetus the germinal nuclei

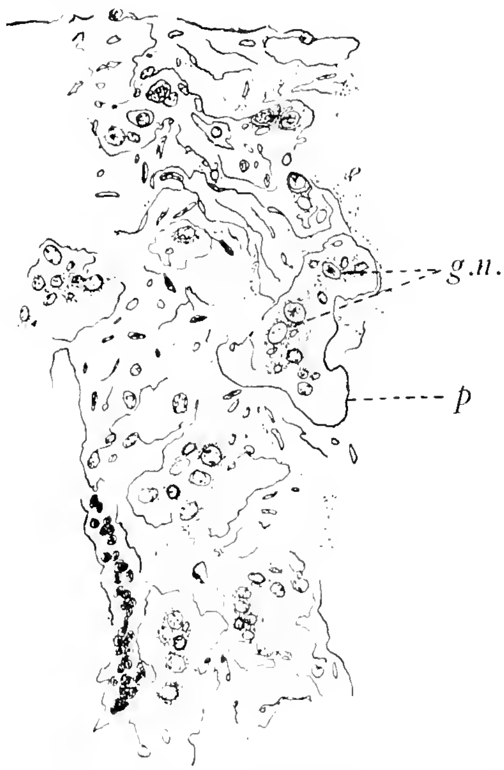


Fig. 122. Section through ovary of a 2·76 m. foetus of a Fin whale. *g.n.*, germinal nuclei; *p.*, Pflüger's tubes.

Fig. 123. Early Graafian follicles in 6·05 m. foetus of a Fin whale.

were collected in cavities (Pflüger's tubes), the intervening tissue being connective tissue and large blood spaces (Fig. 122). In a 6·05 m. foetus definite Graafian follicles are present some distance in from the surface (Fig. 123), while near the surface the conditions remain as they were in the smaller foetuses. In the follicles shown in the figure, the ovum is seen as a large cell round which several nuclei (often showing signs of division) are grouped.

In small immature whales the follicles are less than 1 mm. in diameter, and it is necessary to section the ovaries before they can be seen. In larger whales they become evident as dark round blurrs beneath the surface; and when ripening they project from the surface as thin-walled vesicles 30–50 mm. in diameter (Plate XL, fig. 2).

The ovum can be obtained from a large follicle by examination of the squeezed-out follicular liquor. It is usually surrounded by follicular nuclei and can just be picked out against a dark background without magnification. An ovum from one of the largest follicles (of a Fin whale) was 0·0165 mm. (0·00065 in.) in diameter. The follicle was about 40 mm. in diameter and probably was not fully ripe.

Among Blue whales follicles measuring as much as 10 cm. in diameter have been found. In one of this size no ovum could be found, but the cloudiness and bad smell of the *liquor folliculi* suggested that this large size might be a pathological condition.

In ripening ovaries there are many follicles visible, but usually there is only one of large size. This implies that one ovum is shed at a time, and further that if fertilization does not take place, another follicle ripens and is shed, or in other words that the whale is polyoestrous.

If more than one ovum were shed at one ovulation, records of two or more foetuses should be more frequent than they are. Only two instances of twins were recorded among the whales examined, and it is possible that these were identical twins, i.e. two foetuses from the same ovum, or from two ova from the same follicle. In one case there was only one corpus luteum of pregnancy, and the six old corpora lutea which were also present were shrunken, hard and small and did not appear to have been concerned in the twin pregnancy. In the other case the internal organs were too decomposed for examination. There are, however, the following records, among the statistics from South Georgia stations, which seem to show that occasionally several ova are shed at once, viz. seven foetuses in one Blue whale, six in one Fin whale and three in a Sei whale (see *Norsk Hvalfangst Tidende*, Sept. 1925, p. 99). Unfortunately, of course, no notes were taken of the condition of the ovaries of these whales, but it seems hardly likely that six or seven twins could develop other than from the discharge of several ova.

Enlarged follicles are found in a few ovaries during most of the year. Enlargement is sometimes general, both ovaries containing bulging follicles which give a decided impression of coming ripeness. Sometimes one or two follicles of about 20 mm. diameter are visible, while the remainder are very small and hidden beneath the ovarian epithelium.

In Fig. 124 the diameters of the largest follicles in Fin whale ovaries throughout the year are shown, all records for the seasons 1925, 1926 and 1927 are included. Although the numbers of ovaries examined in different months vary considerably, it will be seen that the "resting" ovaries, in which only small follicles are present, are commonest in the early months of the year, i.e. the latter part of the southern summer. The very few mature whales taken at Saldanha Bay had large follicles, and three whales which, though exceeding 19·0 m. in length, were still immature (female Fin whales become adult at about 20·0 m.) also had large follicles. This predominance of ripening follicles during the southern winter argues in itself a period of sexual activity, and the increase in size of the follicles of the three whales exceeding 19·0 m. suggests the approach of sexual maturity.

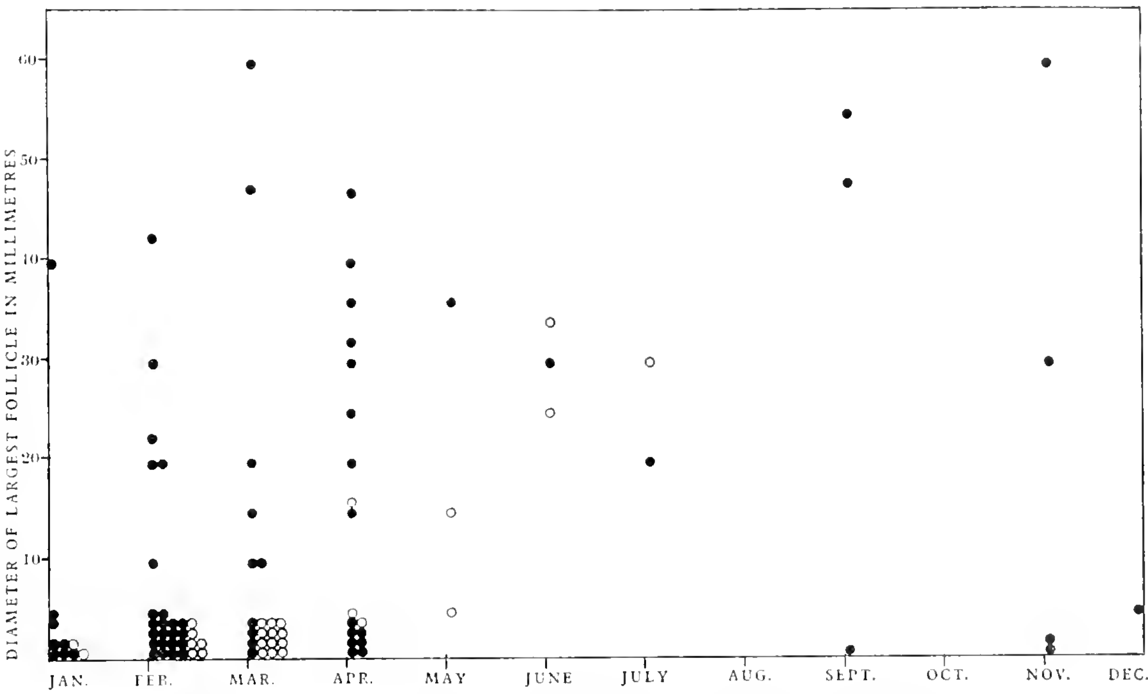


Fig. 124. Fin whales. Size of the largest ovarian follicles during the year.
● Mature females neither pregnant nor lactating. ○ Immature females longer than 19·0 m.

(c) *The Corpus Luteum of Pregnancy*

It is from the condition of the corpora lutea that the most important conclusions can be drawn as to the sexual condition and history of the whale. It will be convenient to start with an account of the corpus luteum of pregnancy.

When an ovum is shed the follicle from which it was liberated becomes a corpus luteum by inward growth and hypertrophy of the follicular epithelium, carrying with it blood-vessels from the surrounding tissue (see Marshall, 1922, who discusses in detail the physiology of the ovaries and gives references to original work on the subject). If fertilization occurs, the corpus luteum persists to all intents and purposes in its original condition throughout the period of gestation, but if pregnancy does not supervene it persists for a comparatively short time and then begins to undergo involution. In whales of all the species examined the corpus luteum of pregnancy is a very large and conspicuous body (Plate XL, figs. 3 and 4) with a scar marking the point of rupture of the follicle. The scar, which is sometimes of considerable size, consists of a dimple about 5 mm. in diameter surrounded by a raised area which may be called the "corona" and which may measure as much as 6·0 cm. in diameter. Internally the corpus luteum shows fine connective tissue strands radiating from the centre and dividing up the soft pale buff luteal tissue. In young luteal tissue the cells are vacuolated. This is illustrated in Fig. 125 from a section of the corpus luteum of a whale containing a 30 mm. foetus, and may be compared with the older tissue shown in Fig. 126. The mean diameter of the young corpus luteum is 10·5 cm. in Fin whales and 12·7 cm. in Blue whales. There is some indication that in both species it increases slightly in size up to the stage when the foetus measures about 1 m., and then gradually becomes slightly smaller. This is shown in Fig. 128 in which the sizes of the corpora lutea are plotted according to the length of the foetus. It will be seen that in general the smallest corpora lutea

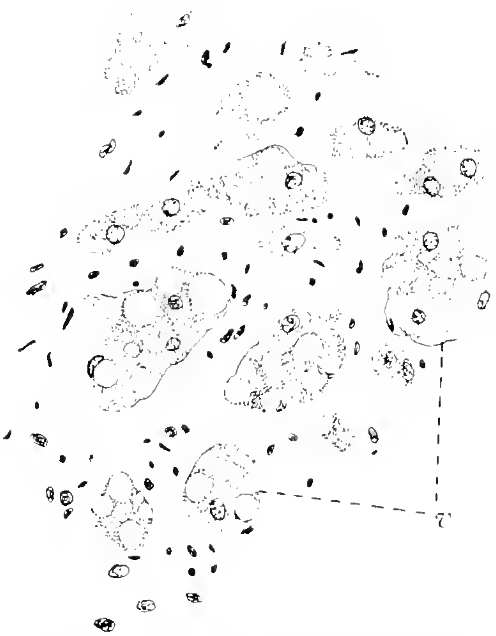


Fig. 125. Young luteal tissue from ovary of Blue whale with 30 mm. foetus. *v*., vacuolated cells.

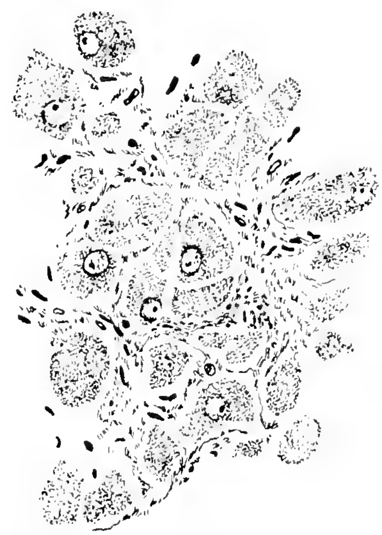


Fig. 126. Older luteal tissue from ovary of Blue whale with 6·3 m. foetus.

of this kind were those with which no foetus was found and which were therefore either corpora lutea of ovulation or corpora lutea of pregnancy which accompanied foetuses so minute that they were missed. It appears that the regression in size of the corpus luteum is accompanied by the disappearance of the vacuoles in the luteal cells. The luteal tissue now stains intensely with Nile Blue, indicating the presence of plenty of fat.

It is difficult to say whether the size of the corpus luteum continues to decrease up to the end of gestation owing to the small number of large foetuses which have been recorded, but in Fin whales there seems to be a slight decrease.

It may be mentioned here that there are invariably many enlarged follicles in the ovaries of pregnant whales, and these range in magnitude from 40 mm. to 50 mm. in diameter to 10 mm. and less. During lactation one or two large follicles are found but the smaller ones are no longer visible. It is known that a functional corpus luteum inhibits the growth of ova and the incidence of ovulation, so that the follicles seen in pregnant ovaries are those that would later have discharged their ova had not fertilization occurred. During lactation the larger follicles, having apparently attained a size that is beyond retrogression, remain large but lose the turgidity they had before and during pregnancy, while the smaller follicles retrogress to become again hidden beneath the surface of the ovary.

(*d*) *The Corpus Luteum of Ovulation*

In certain whales no foetus was found in the uterus yet a corpus luteum similar to the corpus luteum of pregnancy was present in the ovaries. Assuming that no foetus was missed in these cases, it may be said that these were corpora lutea of ovulation, i.e. representing an ovum which had been shed quite recently. There are, in such circumstances, two occasions on which a foetus may be missed. It may be lost at sea through premature birth when the whale is killed, or it may be so minute that it cannot be found. The former could hardly occur except when the foetus is fully large enough to leave unmistakable evidence of its presence in the uterus. There have in fact been two clear cases in which it has occurred, for in No. 373 (Fin) and No. 1602 (Sei), although no foetus was present, some of the membranes were still in the uterus, and even had these been lost the swelling and congestion of one cornu of the uterus could not have been missed. With regard to the second possibility it may be said that the smallest foetus can hardly be missed if searched for in the proper manner. When a functional corpus luteum is present in the ovaries the uterus is at once spread out and slit open from end to end. The foetal membranes of even a 2 mm. embryo form an object about the size of a thrush's egg and can readily be seen. It may be said then that those functional corpora lutea which were not found to be accompanied by a foetus, were corpora lutea of ovulation or were accompanied by a foetus not exceeding 1 or 2 mm. in length. It is in any case certain that in all the whales in question ovulation had occurred relatively very recently. Of these whales there were nine Blue and four Fin whales. None had any sign of a foetus and the copora lutea were on the average smaller than the corpus luteum of pregnancy except in No. 250 (Blue) in which the corpus luteum had a mean diameter of 14·7 cm. This contained an enormous cavity and was obviously a very young structure.

Corpora lutea of ovulation in Fin whales occurred at South Georgia once in February among fifty-two mature females, and at Saldanha Bay once in June (the only adult female), once in July (also the only adult female) and once in September (among three mature females). Very small embryos were found twice at South Georgia in January (one in 1926 and one in 1927) and once at Saldanha Bay in the only mature female taken in August. Now only 8 per cent of the female Fin whales taken at Saldanha Bay were adult, whereas at South Georgia over 60 per cent were adult. Thus the ratio of ovulating females to other mature females is overwhelmingly greater at Saldanha Bay than at South Georgia. That is to say, a far greater percentage of Fin whales are ovulating during the southern winter than during the southern summer.

Among Blue whales again at South Georgia one corpus luteum of ovulation was recorded in February among twenty mature whales taken in this month, two in March among thirty-six mature whales, one in May from among four adults, and one in October among seven adults. At Saldanha Bay there were three such corpora lutea in June among six mature females, and one in July among five adults. Early foetuses were found in July and August. Thus in the case of Blue whales also ovulation takes place to the greatest extent during the southern winter.

It is not known for certain whether ovulation takes place spontaneously, but there is evidence besides that furnished by the corpora lutea of ovulation to show that the ovum is shed at oestrus whether coition occurs or not. The corpora lutea simply show that fertilization of the ovum probably does not always occur, but this does not necessarily mean that copulation had not taken place. In a Fin whale (No. 76) of 20·2 m., the "vaginal band" was found intact, showing that coition almost certainly had not taken place. A small body like an old corpus luteum was however found in one of the ovaries which otherwise appeared to be immature. Luteal tissue was present in this structure surrounding a tough capsule with viscid contents. It is to be supposed that the follicle had matured early (the whale was captured at South Georgia in March) and formed a corpus luteum of ovulation following spontaneous rupture. The condition of the corpus luteum appears to have been abnormal, and it is not entirely certain that an ovum was actually shed, but the formation of luteal tissue shows that the follicle had at least attained a size ripe for shedding.

(*e*) *The Corpus Luteum subsequent to Parturition*

It is reasonably certain that ovulation does not normally take place after pregnancy until the end of lactation. Among all the whales examined no lactating whale was pregnant or showed any indication of ovulation. There have been reports of lactating whales which were pregnant (see Hinton, pp. 97 and 98), and one may suppose that though ovulation and fertilization may possibly occur during lactation, such an occurrence is extremely rare.

In the ovaries of whales captured during lactation there are normally several old corpora lutea, one of which is still conspicuously bigger than the others (Plate XLI, fig. 1). This is the former corpus luteum of pregnancy persisting after the birth of the foetus. It is much smaller and tougher than it was during gestation and the change appears to have taken place comparatively abruptly. In Fin whales the size varies from 4 cm. to 8 cm. diameter, with an average of 5·3 cm. In Blue whales the average is 7·0 cm. diameter. The changes in size and consistency are due to shrinkage of the luteal cells and growth of the connective tissue which take place rapidly after parturition. Sections of these corpora lutea stain faintly and generally with Nile Blue.

It remains now to consider the old corpora lutea which are often present in considerable numbers in the ovaries, and in various stages of degeneration (Plate XLI, figs. 2 and 3). More than one functional corpus luteum (i.e. corpus luteum of ovulation or of pregnancy) has never been known to occur at one time in the ovaries, but over thirty old corpora lutea have sometimes been counted in the two ovaries together.

The structure of these corpora lutea is similar to that which the corpus luteum of pregnancy assumes after parturition and the beginning of lactation, but they are smaller and still more compact and tough. Sometimes little more is seen than a scar at the apex of a hard and inconspicuous knob on the surface of the ovary. This, when cut open, shows radial white connective tissue strands with a small amount of whitish yellow tissue between them. Careful slicing of the ovaries reveals no traces of older corpora lutea which are not to be distinguished on the surface. The staining with Nile Blue is again faint and general.

It will be seen that two quite different types of corpus luteum are to be found in the ovaries of these whales. In the first place there is the functional corpus luteum of ovulation or pregnancy which is a large and conspicuous structure composed mainly of soft luteal cells. One cannot say how long the corpus luteum of ovulation (i.e. where pregnancy does not supervene) remains unchanged, though this is presumably for a comparatively short period. The corpus luteum of pregnancy persists as such only until the end of gestation. In the second place there is the old functionless corpus luteum formed by a kind of metamorphosis of the functional corpus luteum of ovulation or pregnancy. This body remains essentially the same during its earlier stages in the period of lactation and in its later stages of gradual absorption. The two types may for purposes of convenience be referred to as corpus luteum *a* and corpus luteum *b*.

There are several reasons for inferring that the retrogression of the corpus luteum after gestation and lactation is extremely slow, so much so in fact that it is probably never completely absorbed. The co-existence of a corpus luteum of pregnancy with several of these corpora lutea *b*, some at least of which must have persisted since a previous breeding season, is in itself evidence that this is the case. It is at least quite certain that the corpus luteum persists for more than a year since, although there is an annual breeding season among whales which falls only in a certain season, no mature female is ever found, except those which have evidently only just become mature, which has not several corpora lutea *b* in the ovaries no matter at what time of year it is captured. A slight indication of the rate of absorption of the corpus luteum *b* is shown in Figs. 127 and 128 in which are plotted the mean diameters of the largest (and therefore presumably the most recent) corpus luteum *b* in either of the ovaries where a corpus luteum of pregnancy was present. The plotted points show in general in the case of Fin whales a gradual reduction in size of the corpus luteum *b* during gestation, but there are insufficient data referring to the latter part of the period of gestation to allow of any quantitative estimation of the average rate of regression. The data in the case of Blue whales are insufficient to show any very definite results.

In any pair of ovaries containing fairly numerous corpora lutea *b*, it is found that the smaller corpora lutea are more numerous than the larger, and since the size is a rough indication of the age, it follows that the older the corpus luteum the slower becomes its rate of decrease in size. Fig. 128 suggests that in the case of Fin whales the youngest corpus luteum *b* shrinks from about 5 cm. diameter to 3 or 4 cm. during a period of about 10 months (i.e. the period of gestation). Thus one might say on a

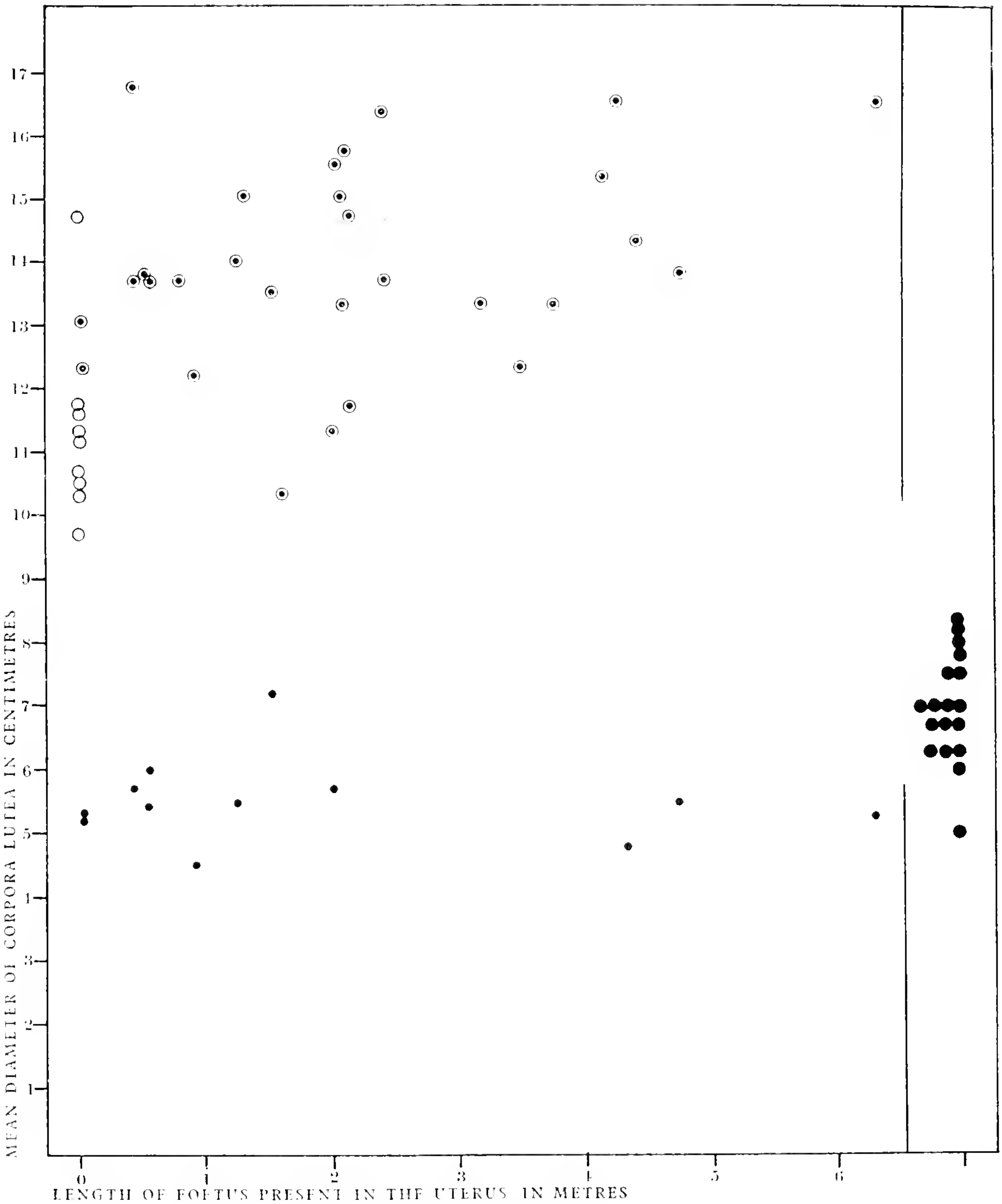


Fig. 127. Blue whales. Mean diameter of corpora lutea in ovaries of pregnant females, and length of foetus.

○ Corpus luteum of ovulation. ⊙ Corpus luteum of pregnancy. ● Former corpus luteum of pregnancy persisting during lactation. • Largest old corpus luteum co-existent in the ovaries with a corpus luteum of ovulation or pregnancy

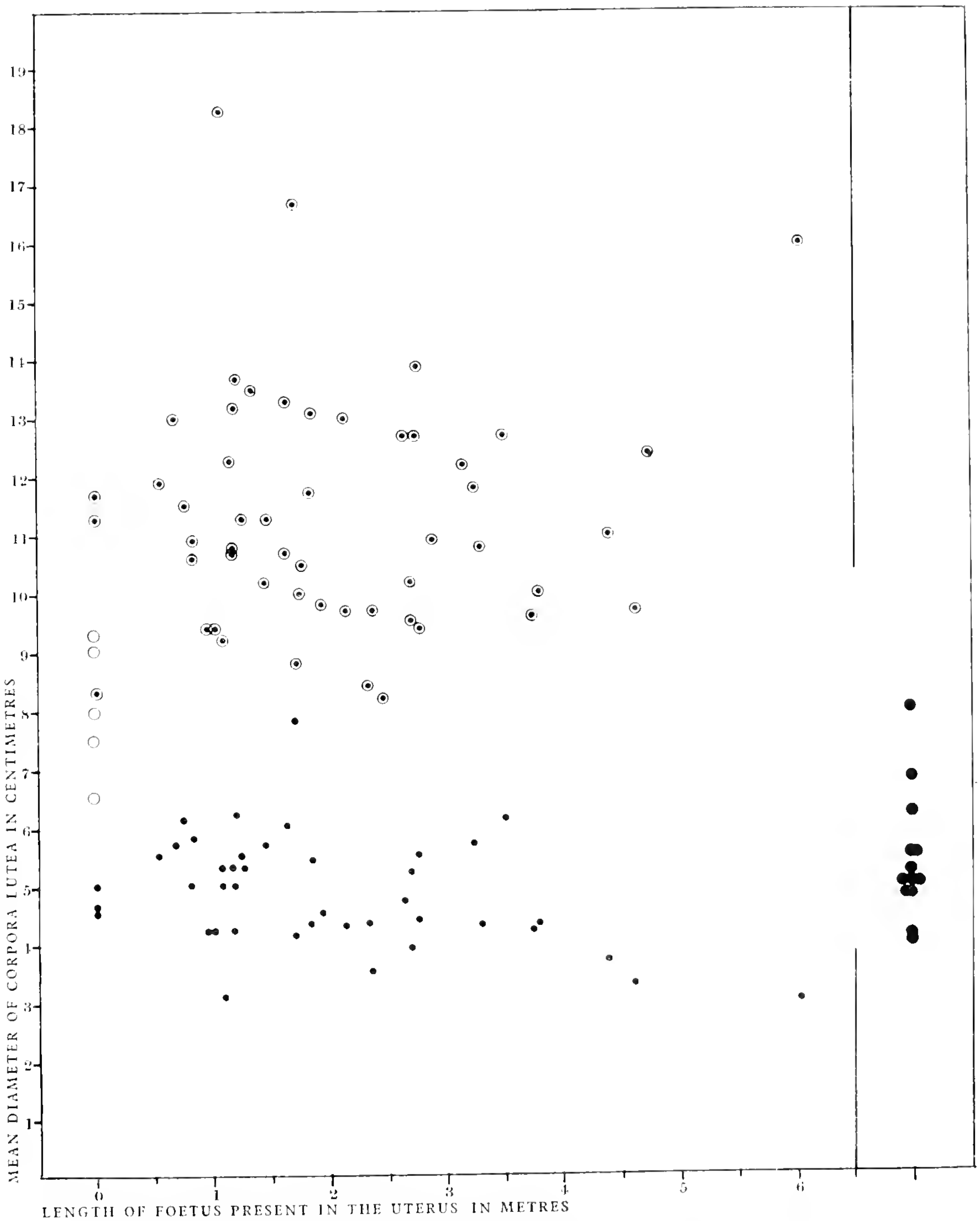


Fig. 128. Fin whales. Mean diameter of corpora lutea in ovaries of pregnant females, and length of foetus.

(For meaning of symbols see Fig. 127.)

rough estimation that in its first year the diameter of the corpus luteum *b* probably becomes reduced by about 40 per cent, and since this is the period during which reduction is most rapid it is to be supposed that many years must pass before it could completely vanish if indeed the last traces of it ever do disappear. It seems that this much may be inferred, even though a quantitative estimation of the average rate of regression is inadmissible.

Further evidence of the longevity of the corpora lutea *b* may be obtained by comparing their numbers in the ovaries with the lengths of the whales from which they were taken. This comparison is shown in Figs. 129 and 130. It will be seen that there is a great diversity in the numbers of corpora lutea at any given whale length, but the important fact emerges that in general the smaller whales have fewer corpora lutea than the larger whales, the correlation being better defined in the smaller than in the larger whales. Now up to a point the length of a whale is obviously some indication of its age, and it must be supposed that the correlation existing between the number of corpora lutea and the length of the whale is in fact a correlation of some kind between the number of corpora lutea and the age of the whale. Female Fin whales become adult when they reach a length between 19·5 and 20·5 m. (see p. 417) and one would expect that they would normally continue subsequently to grow a metre or two beyond this length, some ceasing to grow at about 22·0 m. others going on to 23·0 or 24·0 m. On the supposition that the number of corpora lutea are an indication of the age of the whale this fits in well with the fact that in Fig. 130 there is a more obvious correlation in the case of whales measuring 19·5 to 21·5 m. than in the case of the larger whales, many of which will have ceased to grow and whose length is thus little indication of their age.

If all the corpora lutea in the ovaries were those of the previous season (as was suggested by Barrett-Hamilton) this correlation with the length of the whale should not exist as there is no reason why large whales should ovulate without the occurrence of fertilization more times than small whales. Persistence and accumulation of the corpora lutea, however, explains the correlation at once.

It has already been pointed out that although the number of corpora lutea varies to some extent with the length of the whale, there is still a great diversity in the number occurring at any particular whale length. This can be set down to one of two causes. The first of these is the differences in length attained by the whales at and after sexual maturity, and has already been discussed in certain particulars. Although female Fin whales become mature mostly at about 20·0 m. and Blue whales at about 23·7 m. the difference actually between the smallest mature and the largest immature whale is relatively large. Then where for instance two whales differ slightly in length, the difference may be due to age, the rates of growth having been equal, or it may be due to differences in the rate of growth, the ages being equal.

The second cause for the variation in the numbers of corpora lutea is due to the difference between the number of pregnancies and the number of ovulations which may have occurred. From evidence already given it may be taken that ovulation

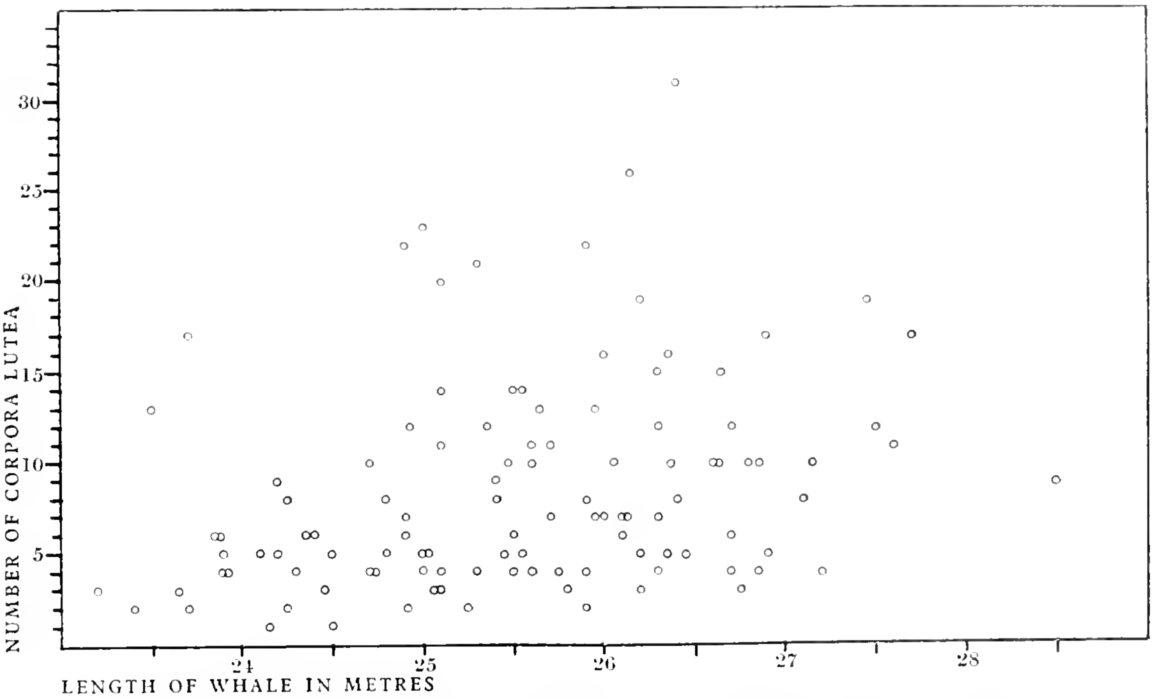


Fig. 129. Blue whales. Length of female and number of corpora lutea in the ovaries.

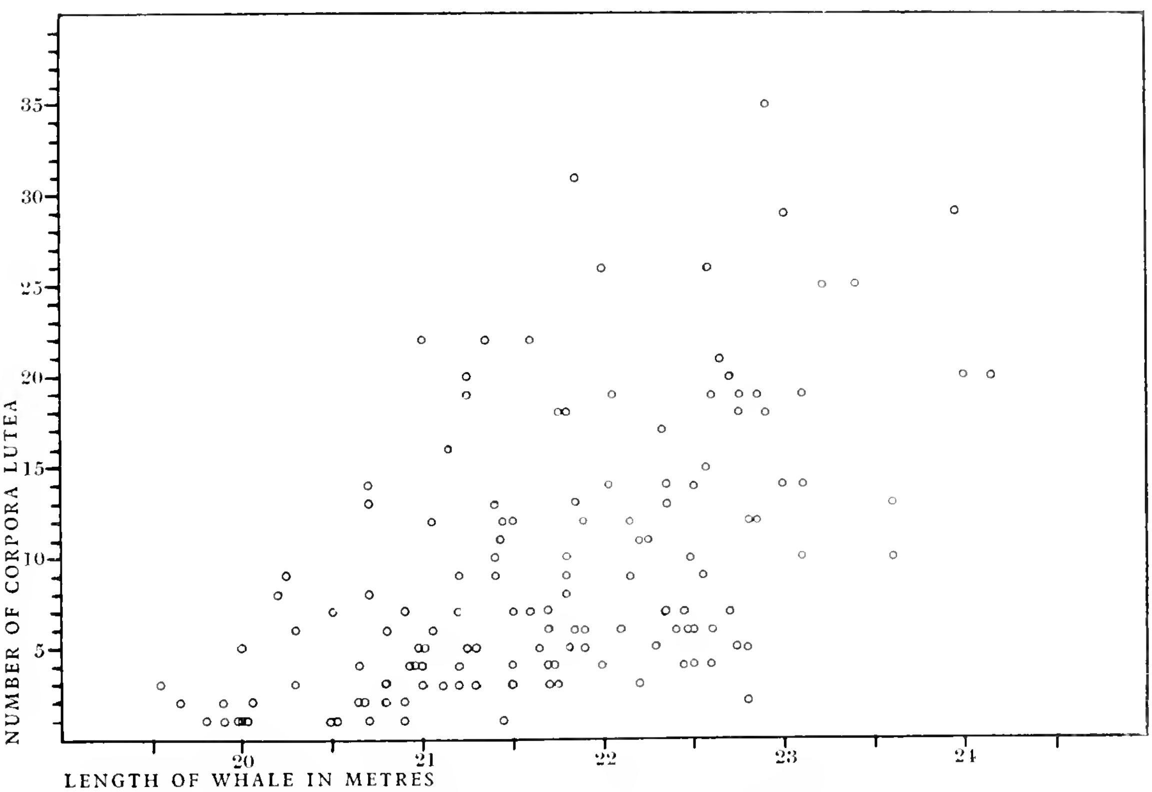


Fig. 130. Fin whales. Length of female and number of corpora lutea in the ovaries.

can take place without fertilization, and that many follicles are ready for subsequent ovulation should fertilization not occur. Now if fertilization occurs at the first ovulation every season the number of corpora lutea represents the number of pregnancies which have taken place and the number of years since sexual maturity was reached (except possibly in the case of the oldest whales in which the oldest corpora lutea might have finally vanished). With ovulation, however, taking place spontaneously and no method of distinguishing the corpora lutea formed from those of pregnancy it is evident that there will be great differences in the numbers of corpora lutea present among whales of similar length, differences depending on the number of dioestrous cycles which may have taken place each season before pregnancy supervened.

Finally, a few words may be said in recapitulation of the more important facts which emerge from the study of the ovaries. There are two specially characteristic features of the ovaries of the Balaenopteridae. These are the abundance of ripening follicles which are so often present and the curious longevity of the old corpora lutea. The number of follicles implies a capacity for producing numerous ova in quick succession, and this favours the supposition that these whales are polyoestrous. The suggestion is further supported by other evidence. There are several cases for instance in which over thirty old corpora lutea have been counted in a single pair of ovaries, and if whales are monoestrous it follows that some of these have persisted for not less than thirty years. It seems much more reasonable to suppose that the large number is the result of several unsuccessful ovulations in a comparatively few seasons. Again, it will be shown later that the breeding season is a protracted period covering several months. This in itself suggests that a succession of dioestrous cycles may occur and that in some cases conception occurs after the first ovulation and in other cases not until several ovulations have occurred and the season is well advanced.

The longevity of the corpora lutea provides a useful indication of the history of the whale in which they occur. The weak point here, however, lies in the fact that the number of corpora lutea depends partly on the number of years which have elapsed since sexual maturity and partly on the number of ovulations which have occurred in each sexual season, and there is no means of knowing how much each factor has contributed to the number of corpora lutea which are found. However, one would not suppose that more than a very few ovulations would occur before pregnancy supervened among animals living in a state of nature, even though it is likely that ovulation may occasionally take place at times of year outside the season at which breeding activities become general. It follows from this that a whale having twenty or thirty corpora lutea *b* in the ovaries can hardly have been adult for less than five or six years, and has more probably been adult for say twelve or fifteen years. On the other hand, a whale having only three or four corpora lutea will probably be not more than two or three years old.

THE UTERUS

The uterus consists of a relatively short corpus and two long cornua which are generally to be found close to the ventral wall of the abdominal cavity. There is no particular feature of its gross anatomy which needs any special consideration but an account of its growth in the young whales and the alterations in size which it undergoes at different stages may be given. The routine observations which have been made on the uterus consist in the measurement of the width of one cornu

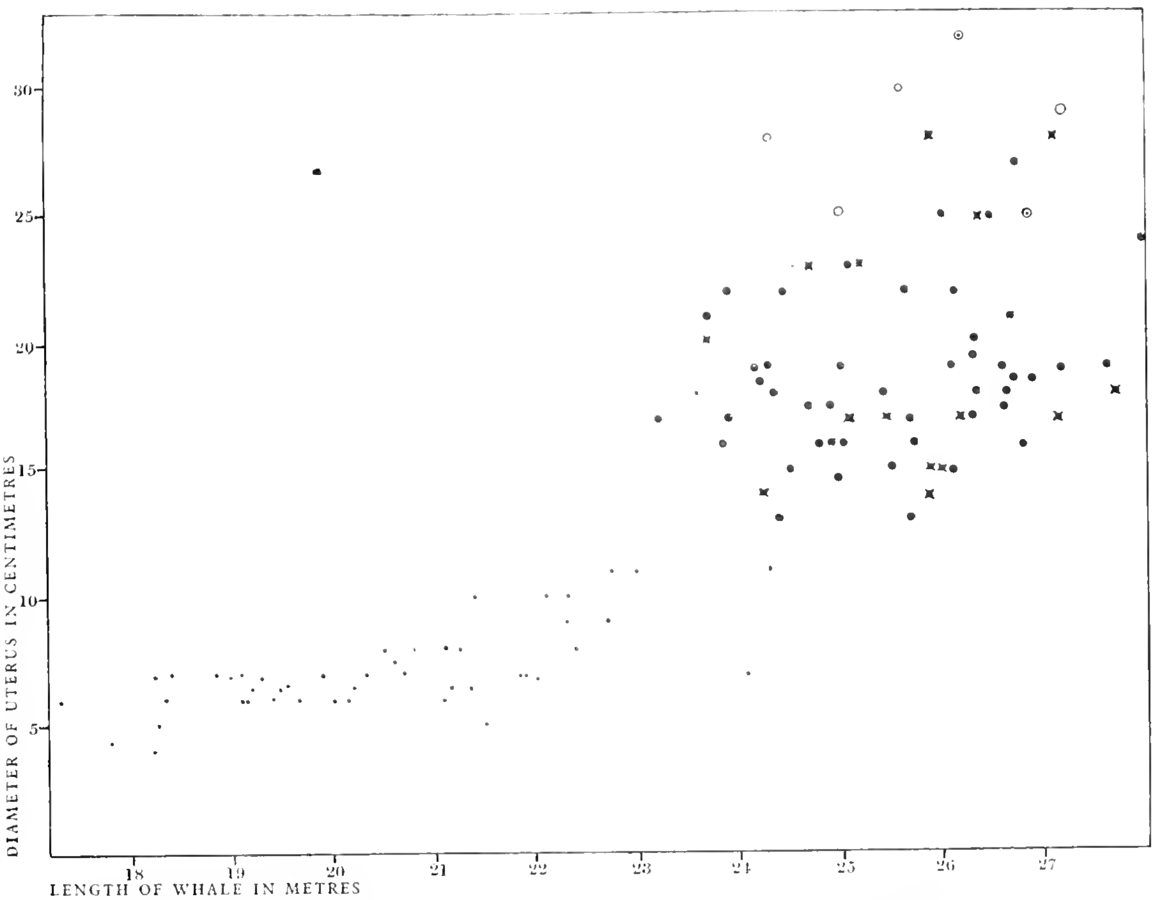


Fig. 131. Blue whales. Size of uterus in whales of different classes and different sizes.

• Immature. ● Resting. ○ Recently ovulated. ⊙ With very small foetus. Lactating.

as it lies in the collapsed condition on the flensing platform, and records of any congestion observed when it has been slit open. Histological examination has also been undertaken in many cases.

During the period between birth and sexual maturity the uterus undergoes no important change other than a gradual increase in size to keep pace with the growth of the body. The sizes of the uterus in immature whales of various lengths is shown in Figs. 131 and 132 and it is seen that it does not much exceed 8 cm. in Blue whales measuring less than 22·0 m., or 7 cm. in Fin whales measuring less than 19·0 m.

Maturity is reached in Blue females at about 23·7 m. and in Fin females at about 20·0 m. and it will be noticed that just before these lengths are reached the still immature uterus undergoes an acceleration in its growth, and by the time maturity is reached it has become conspicuously bigger, measuring not less than 13 cm. in Blue whales, or (with one exception) less than 11 cm. in Fin whales. Fluctuations of course take place subsequently in the size of the uterus, but once the functional enlargement has taken place it never returns to its original size.

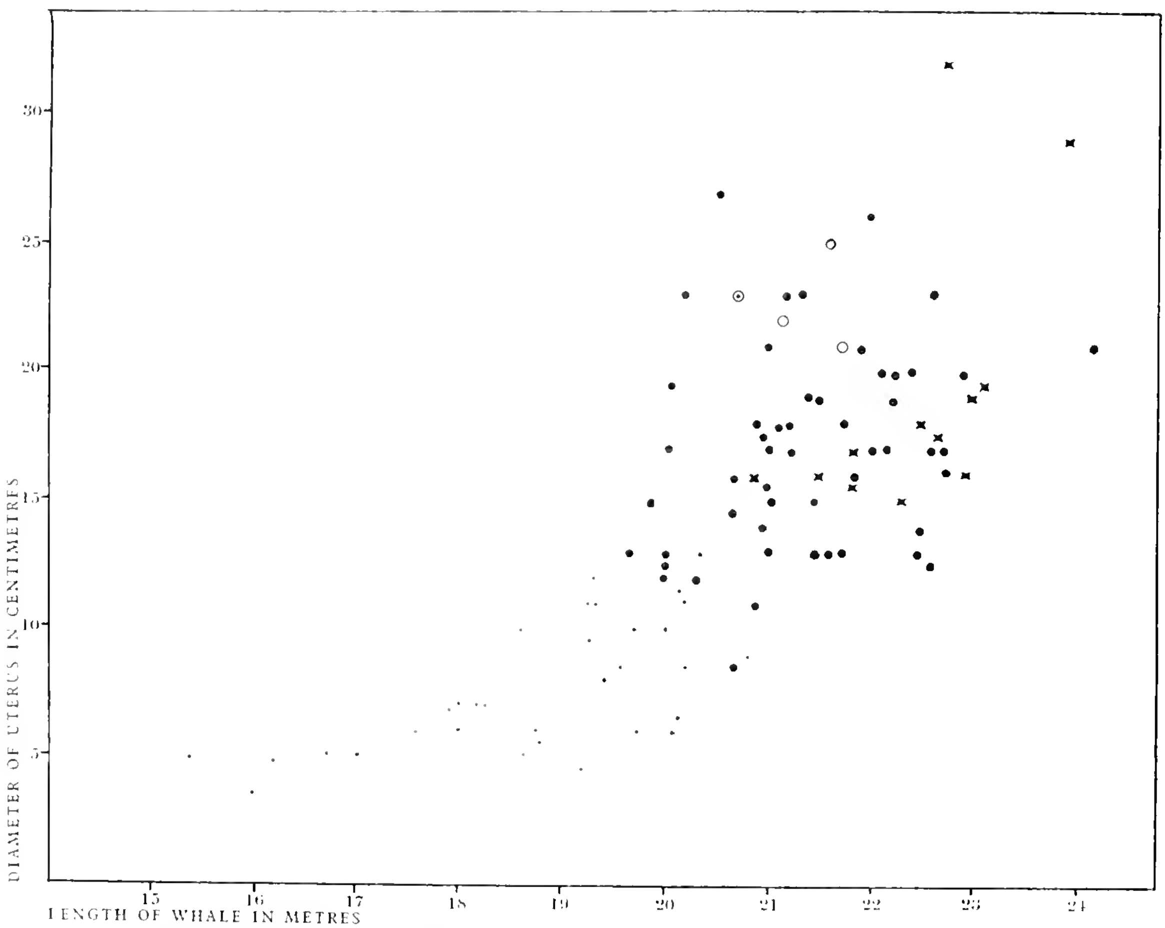


Fig. 132. Fin whales. Size of uterus in whales of different classes and different sizes.

• Immature. ● Resting. ○ Recently ovulated. ⊙ With very small foetus. · Lactating.

In "resting" whales (i.e. those mature females which are neither ovulating, pregnant nor lactating) the average size of the uterus is about 17 cm., but, as will be seen in Figs. 131 and 132, it may range from less than 10 cm. to over 25 cm. A new increase in size, however, takes place at ovulation for it will be seen that the size of the uterus is clearly above the average in those whales in which a corpus luteum of ovulation or an early foetus not yet big enough to necessitate an increased size, has been found.

In pregnancy the uterus grows to an enormous size, for the foetus reaches a length of 6 or 7 m. before it is born, but after parturition involution takes place with surprising rapidity. In almost all the lactating whales examined involution has been complete.

In a few cases the size of the uterus has been still above the average for resting females, but in the majority of cases it has been as low as, if not lower than, the average. This may be seen in Figs. 131 and 132. In the latter figure attention may be drawn to two Fin whales having remarkably large uteri in which involution was evidently not complete. In only one case (not included in the above figures) did the uterus appear to have actually been in an early stage of involution. This was in a Blue whale, No. 770, caught at Saldanha Bay on June 21. One cornu of the uterus measured 48 cm. and was thin walled. The other measured only 21 cm. The congestion of the large cornu was evident before it was opened, and the corpus of the uterus, which measured 30·0 cm., was also congested. This whale had evidently given birth to a calf quite recently, and it is interesting to note that though involution of the uterus had hardly begun, the corpus luteum had completely changed from the *a* to the *b* type.

Although only this one whale has been met with in which the uterus had not recovered from pregnancy, it must be remembered, in discussing the rate of involution, that the majority of lactating whales killed are those accompanied by large rather than small calves. This is partly because the waters which come within the sphere of the whaling operations appear to be frequented less by the whales which have recently given birth than by those accompanied by large calves, and partly because the whaling regulation in force in the Falkland Island Dependencies, against the killing of mothers with calves, is probably applied more to the small calves than to the large ones which may be very difficult to recognize as such at sea.

Since it conveys some idea as to whether parturition has occurred recently or not, the involution of the uterus is the most important point for observation so far as this organ is concerned.

The changes in the size of the uterus are mainly caused by alterations in the blood content of the uterine mucous membrane, and accompanying them are changes in the mucous exudation from the vagina.

For the histological study of the uterine mucosa small pieces of the uterus were occasionally taken from the cornu about half-way between the uterine end of the Fallopian tube and the junction of the cornua. They were fixed in Bouin or formol-saline, and after sectioning were stained in haematoxylin and eosin.

The mucous membrane of the uterus is typical, but the ciliated epithelium is rarely intact over the surface. Even in immature whales (Plate XLII, fig. 1) it is usually lost except in the openings of the glands.

In sections of the mucosa no very striking difference is apparent between immature and mature "resting" whales, though the latter may or may not show some congestion. In two Fin whales, Nos. 111 and 193, for instance, there was a considerable amount of blood in the capillaries, and in some other whales taken in the same months as these (March and April) some congestion at the edge of the mucosa was found.

During early pregnancy blood is present in large quantities throughout the mucosa and is especially evident at its edge (Plate XLII, fig. 3). Extravasation of blood takes place, but it is possible that the extra blood supply is kept up until after parturition, since during early lactation more blood appears to break away (Plate XLII, fig. 4). The material collected did not cover the later stages of gestation. Sections were cut of the uteri of six pregnant whales, and the foetuses present were all in comparatively young stages, viz. Blue whales 0·55, 0·91 and 1·52 m.; Fin whales 0·81, 1·09 and 1·63 m. Later in lactation the uterus returns to the resting stage shown in Plate XLII, fig. 5.

Fig. 137 shows the uterus of a whale (Fin, No. 877, 13. vii. 26) in which ovulation had taken place, i.e. there was a corpus luteum *a* in the ovary but no sign of a foetus in the uterus. The capillaries at the edge of the mucous membrane appeared to be dilated—they were more evident in this section than in any of the others—but they contained no blood corpuscles, while vessels in the deep mucosa were full of blood.

The change in size of the uterus at ovulation is due to the increasing supply of blood and the congestion of the uterine tissue. If ovulation passes without fertilization the uterus tends to return to the normal. If, however, pregnancy supervenes the congestion remains, at least for a time. At parturition also it is congested and presumably it has remained so throughout gestation. During lactation the uterus returns again to normal, both in size and in condition of the mucosa.

A number of smears of vaginal mucus from different whales were collected and stained in an endeavour to trace the course of the generative processes. This method was used with some success by Long and Evans (1922) in their work on the oestrous cycle in the rat. Care was taken that no apparent injury had been done to the internal organs in the whales from which the smears were taken, for blood for instance may sometimes be present in the vagina as a result of injury by the harpoon.

The whales examined were as follows: four immature (Nos. 191, 203, 187 and 192), five mature "resting" (Nos. 184, 185, 208, 260 and 264), one recently ovulated (No. 250), two pregnant (No. 253, foetus 1·52 m., and No. 186, foetus 2·65 m.), and two lactating (No. 244, uterus 22·0 cm., and No. 271, uterus 17·0 cm.).

The results were constant although in this small number of cases only the obvious differences in the cells occurring in the mucus can be pointed out.

In immature (Fig. 133) and resting mature whales the mucus contains small clumps of epithelial cells (portions of epithelium) and many isolated cells, some from the surface of the mucosa, others from the epithelium of the glands. In immature whales a few red blood corpuscles occur. The presence of epithelial cells may account in part for the absence of much of the uterine epithelium in sections of the mucosa.

Fig. 133. Cells from vaginal mucus of immature whale. *ep.c.*, epithelial cells; *c.gl.*, cells from glands; *r.b.c.*, red blood corpuscles.

In regard to pregnancy a smear from a whale containing a foetus of 1·52 m. showed that the dominant cells were red blood corpuscles with a few polymorphonuclear leucocytes. In a whale with a larger foetus (2·65 m.) the mucus was very thick and few cells could be seen. Epithelial cells together with blood corpuscles were, however, present. If this second case is typical it suggests that extravasation of blood may not continue throughout pregnancy.

The smear from the ovulating whale differed entirely from those from the pregnant whales. There were many isolated epithelial cells present, with many other cells with smaller nuclei of doubtful origin. As one would expect from observations on sections of the uterine mucosa, no blood corpuscles could be seen.

In lactating whales the epithelial cells and red blood corpuscles were few. In No. 271, which had a uterus of 17·0 cm., more epithelial cells were present than in No. 244. In these whales apparently the extravasation of blood had almost ceased.

THE MAMMARY GLANDS

The mammary slits are situated on either side of the genital groove, and lie parallel to it. The teats are normally completely withdrawn and invisible, but in lactating whales drawn on to the flensing platform they are more or less everted, though not always

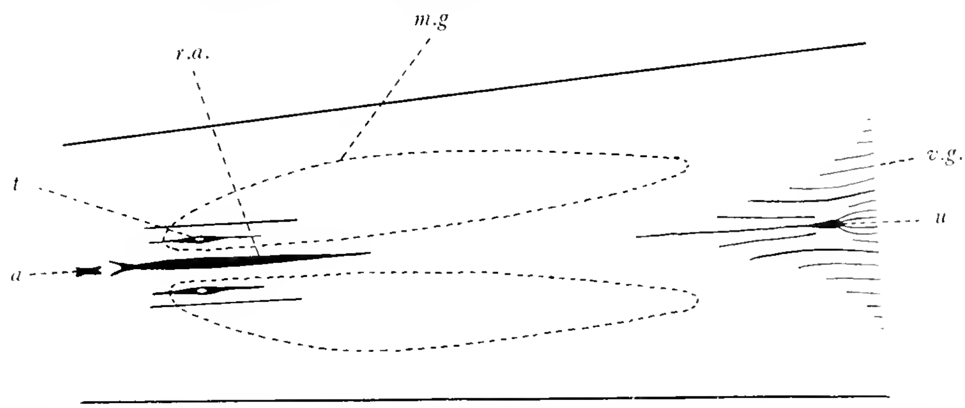


Fig. 134. Diagram of ventral view of whale to show position of mammary glands. *m.g.*, outline of mammary glands; *r.a.*, reproductive aperture; *t.*, teat in mammary groove; *a.*, anus; *u.*, umbilicus; *v.g.*, endings of ventral grooves.

completely. Sometimes when plenty of milk is present the pressure of the carcass on the edge of the platform causes it to spout from the teat in such a way that a sample can be collected sufficiently pure for chemical analysis. An account of the composition of whale's milk appears in Appendix I.

A good description of the mammary glands of the Humpback is given by Lillie (1915, p. 101). This however deals mainly with the gross anatomy of the gland and the process of suckling, while we are concerned more with the changes which take place in the gland in the different phases of the sexual cycle.

In Blue and Fin whales the mammary glands lie between the blubber and flesh and are situated almost entirely anterior to the teats. They are of an elongated pear-shape, the apex of the pear being anterior to and remote from the teats (Fig. 134). The length of the gland is about 2 m. and its depth varies according as to whether the whale is sexually mature or immature and whether milk is being secreted or not. In an immature whale the gland is usually not more than 2 cm. deep at the widest part. In a mature whale it is usually 5 to 6 cm. deep, and in a lactating whale 15 to 30 cm. deep. When the gland is in full activity the swelling is usually distinguishable externally (Plate XXX, fig. 1), and is very evident after the blubber has been removed from it (Plate XXXV, fig. 3). When milk is not being secreted the outline may be almost indistinguishable even after flensing.

Several large ducts run longitudinally through the gland. These are fed by numerous smaller ducts and become enlarged posteriorly to form sinuses or reservoirs for the milk. They join finally in one large sinus which communicates with the teat.

If the gland of a sexually mature whale which is not lactating is cut across, it is seen to consist of numerous lobes subdivided into small pinkish lobules, with ducts of all sizes and blood-vessels. There may be some variation in the amount of blood which is present. These pink lobules are not seen in immature whales, but the connective tissue in which they subsequently develop can be distinguished quite easily.

When examined histologically the gland in whales does not appear to differ in any essential from that of other mammals. The greater size of the gland appears to be allowed for by increased numbers of the alveoli in a lobule, and multiple subdivision of the lobes of the gland, rather than by any different structure.

It will be convenient to describe first the immature gland. This shows the same structure both in the foetus and in large though still sexually immature whales. When examined histologically it is found to consist mainly of connective tissue in which a few ducts and blood-vessels are seen, of which the former are surrounded by clusters of cells forming imperfect alveoli grouped together in small lobules (Fig. 135). In some cases (such as adult whales which have not yet been pregnant) the distinction between the immature and mature condition is not very sharp, but as a rule there is no difficulty in recognizing the immature type.

Among sexually mature whales the gland may be found in no less than four different conditions. These are as follows:

1. *Lactating*, in which milk is being actively secreted.
2. *Intermediate*, in which the lobules of the gland are better developed than in the resting condition, but less than in the lactating condition. This condition appears to occur immediately before lactation and again in the apparently prolonged involution of the gland afterwards.
3. *Resting*, in which complete involution appears to have taken place.
4. *Virgin*, which occurs in a few young adults which have probably never been pregnant.

In the lactating gland (Fig. 136) the lobules are greatly swollen, and the space between them which is occupied by connective tissue is considerably restricted. The alveoli are distended and their outline is rounded and relatively distinct. Droplets of secretion are clearly seen in the lumen of the alveolar cells which are noticeably swollen and have small, densely staining nuclei. The lumen of the alveoli is filled with larger droplets, the size of which, however, may vary. This variation might possibly depend on the freshness of the whale when the tissue was fixed, or it might be correlated with the rate at which the secretion is being drawn off, or with variations in the constitution of the milk. Sometimes the outlines of these droplets is in the form of a complete circle; at other times (possibly when the gland has been emptied by suckling) the outlines are broken up or fragmentary. Where an osmic acid fixative is used the droplets are densely blackened, no doubt owing to the very high percentage of fat which is present in whale's milk. In such cases the droplets within the lumen of the cells are similarly blackened.

The depth of the mammary gland during the secretion of milk varies in Blue and Fin whales between about 15 and 30 cm.

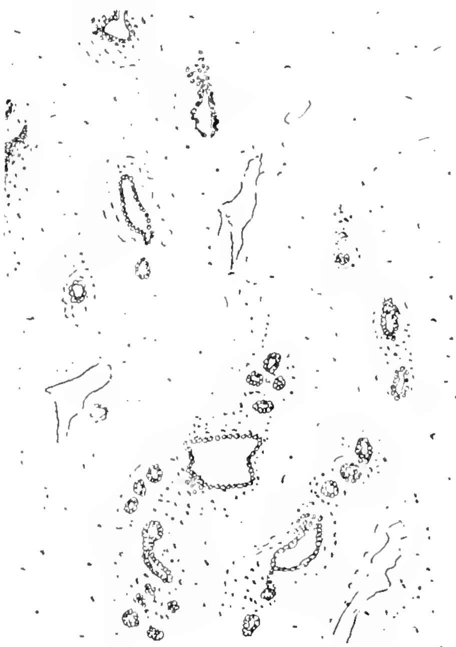


Fig. 135. Section of the immature mammary gland.

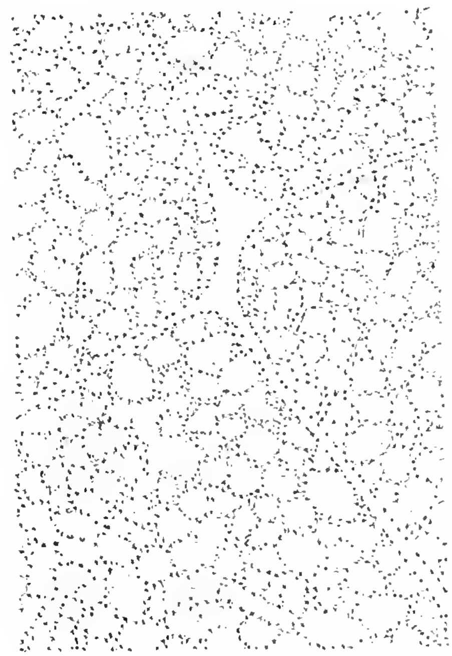


Fig. 136. Section of mammary gland in functional activity.

The intermediate stage occurs in certain sexually mature whales in which the mammary glands are not functionally enlarged. It has been seen that during lactation the lobules become greatly swollen and compress the intervening connective tissue into the smallest possible space. In the intermediate stage the lobules appear either to have started swelling in preparation for lactation, or, more often, are in the process of contracting after the end of lactation. This condition is never found in pregnant whales except at the very end of gestation, but it is curious that it occurs more often in "resting" whales than the normal resting condition which is almost always present in pregnant whales. The lobules are still large (Fig. 137), and, though noticeably smaller than in lactating whales, they are considerably better developed than in the resting stage. The connective tissue space is still restricted, but the alveoli are shrivelled and smaller than in the lactating gland, their outline is less easily traced, and their lumen, at least in haematoxylin-eosin preparations, is not easy to distinguish. Droplets are practically absent from the alveoli, though one or two may sometimes be visible here and there. The nuclei of the cells lining the alveoli are larger than in the lactating gland, and stain less densely.

The thickness of the gland during this stage rarely exceeds 10 cm.

The resting stage occurs in a certain number of whales which are neither pregnant nor lactating and has been found with one exception in the case of all pregnant whales in which the gland has been histologically examined in this respect. It differs from the intermediate stage principally in the size of the lobules (Fig. 138) which are definitely

Fig. 137. Section of mammary gland not completely returned to the normal condition.

Fig. 138. Section of mammary gland after complete involution.

smaller and more numerous in a given area of section. The nuclei are usually more numerous in a given space but are similar in individual appearance. The alveoli have shrivelled to such an extent that they cannot now be distinguished. Usually the lobules are flattened or elongated in cross-section, perhaps owing to collapse of the gland as a whole. This is not an invariable rule, however, and the appearance of the lobules no doubt depends to some extent on the plane in which the section was cut.

The thickness of the resting gland is usually between about 4 and 8 cm. and is only a little less than that of the intermediate gland.

The fourth condition of the mammary glands, which is found in young whales which in all probability have never been pregnant, or are pregnant for the first time, differs from the state of the gland in immature whales only in a slightly better development of the lobules which are still less developed than in the resting gland. This condition has been found in several whales with only one or two corpora lutea.

The thickness of the gland here is of course intermediate between that of the resting and that of the immature gland. The latter is usually about 2 cm. deep.

Excluding lactating and immature whales the number of Fin whales of which the mammary glands have been sectioned is thirty-three and of Blue whales eight. The numbers of these occurring in each condition are as follows:

	Fin	Blue
"Resting" whales:		
Intermediate	7	3
Resting	3	1
Virgin	3	—
Doubtful	4	
Pregnant whales:		
Intermediate	1	
Resting	14	4
First pregnancy	1	—
Total	33	8

Taking pregnant whales first it is found that only in one case was there a mammary gland in the intermediate condition. This whale, No. 175, had a foetus measuring over 6·0 m. which was evidently about to be born, and there is no doubt that the lobules of the glands were beginning to develop in preparation for active secretion. Now, where the gland is found in this condition in whales which are not pregnant it must be supposed that, lactation having ceased, the gland is now reverting to the normal resting condition, and since the ratio of the intermediate to the resting conditions is 7 to 3 among Fin whales and 3 to 1 among Blue whales it can only be supposed that though the development of the gland is rapid at the end of pregnancy, its involution after the period of secretion is very slow. It seems improbable that the majority of "intermediate" non-pregnant whales had only just finished lactation, since the resting whales are caught in far greater numbers than the lactating whales—a fact which argues that the resting period is correspondingly longer than the lactating period or at least as long, even if the nursing mothers lead a more secluded life less open to the attacks of whale boats.

Since the intermediate stage is never found in pregnant whales except at the approach of parturition it follows that the involution of the gland is always completed before pregnancy again takes place, but since in some young but clearly adult whales the gland is sometimes found in a state far less developed than the normal resting condition, it is to be supposed that it becomes permanently altered after the first pregnancy.

THE TESTES

It is well known that in Cetacea the testes remain permanently in the abdominal cavity. In the whalebone whales, as explained on p. 267, they can be found without difficulty near the abdominal wall at the posterior end of the cavity. The testis is a rounded cylindrical organ, the size of which is subject to considerable variations which are very difficult to correlate with any particular factor. However, it is worth while to examine the matter as closely as possible. It should be explained first that for convenience the size of the testis may be represented by a number obtained by multiplying together the length, breadth and depth measured in centimetres. This gives a rough approximation to (actually rather more than) the volume of the testis in cubic centimetres. The size of the smallest testis of a Blue whale recorded in this way was 330 (No. 594) and of a Fin whale 300 (No. 705). The largest testes were of a Blue whale 58,000 (No. 1331) and of a Fin whale 56,000 (No. 51). As an accurate representation of the size of the testis is unnecessary a figure may be used giving the number of thousands of cubic centimetres in the approximate volume. Thus the largest Blue whale testis may be considered to measure 58, and the smallest 0·3.

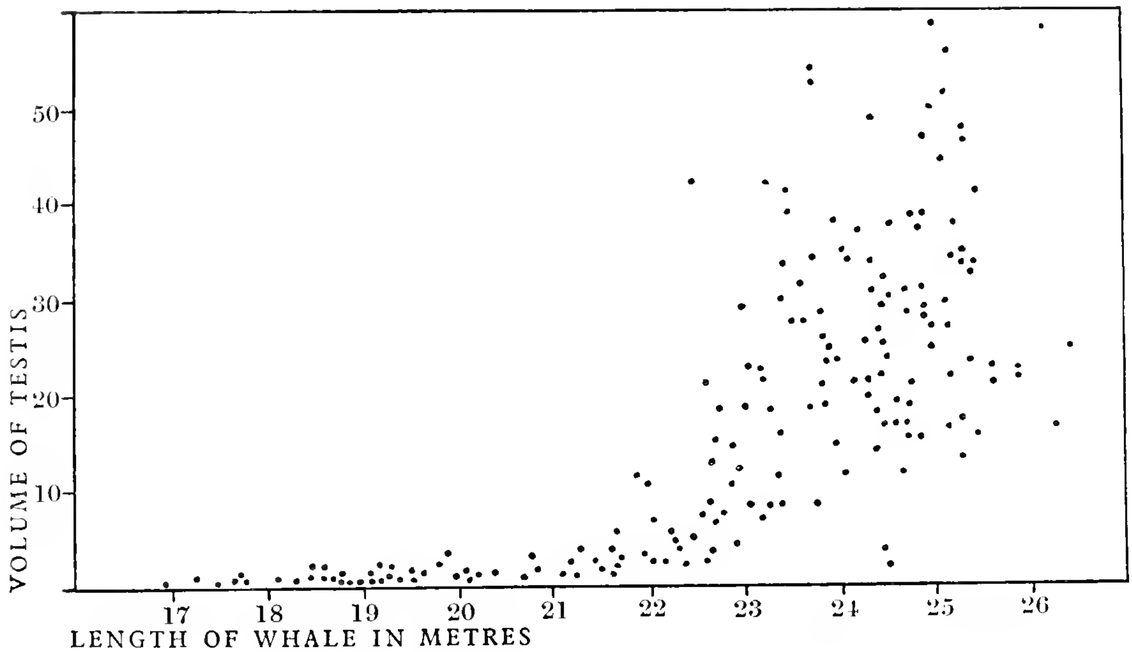


Fig. 139. Size of the testis in Blue whales of different lengths.

As was to be expected, the size of the testis up to a point varies with the size of the whale, this being in part due to the fact that the former becomes much larger at the advent of sexual maturity. Fig. 139 shows the testes of 180 Blue whales plotted according to the size of the testis and the length of the whale. It will be seen that up to a length of about 23·5 m. there is a general tendency for the size of the testis to increase, but from 23·5 m. onwards it cannot be said that there is any correlation between its size and the length of the whale. The plotted points represent all the Blue whale testis measurements which have been taken (in large numbers of immature whales of course the testes were not examined) and are plotted therefore quite irrespectively of the time of year. It is to be supposed from Fig. 139 that during immaturity the testis increases its size very slowly, but that when sexual maturity is reached (around 22·5 m.) it rapidly increases in size, and continues to increase over the period during which the whale increases its length by one or more metres. Among whales over 23·5 m.

in length, the age or size of the whale evidently ceases to be the factor which dominates the size of the testis, and other factors must be sought in order to explain the great variations in its size in large whales. In the porpoise the testis is described by Meek (1918) as undergoing an enormous development in the summer (northern hemisphere), the breeding season being in July and August, and it is natural to suppose that something similar might occur in the Balaenopteridae. If this were so the size of the testis might provide a valuable clue to the period and duration of the breeding season. Unfortunately, however, there is no evidence that this is the case. If the testes of all the sexually mature whales are plotted, according to the time of year and volume of the testis, there is no indication of any correspondence between the two. The great diversity in the size of the testis in different whales might be accounted for if there is considerable individual variation and at the same time a slight increase in size in answer to a stimulus associated with breeding.

The most instructive observations on the testis are those made from the histological point of view. One of the most striking features of the testis is the extraordinarily small number of spermatozoa which are normally to be seen in sections, and it may be said at once that the examination of sections gives no support to the supposition that the testis might undergo any important increase in size when breeding takes place, for the largest testes appear to contain no more spermatozoa than the smaller.

Sections of the immature testis (Fig. 140) show small tubules, of which the wall consists of a layer of small cells with small, strongly staining nuclei. The lumen of each tubule is completely filled by a comparatively small number of large cells with large nuclei which do not stain very strongly and of which only about half a dozen appear in transverse sections of tubules. There is often plenty of interstitial tissue, but the spacing of the tubules varies considerably. In immature Blue whales the tubules appear often to be rather more tightly packed and slightly larger than in Fin whales. The histological appearances of the testis in the foetus do not appear to differ in any way from those of the large immature whale.

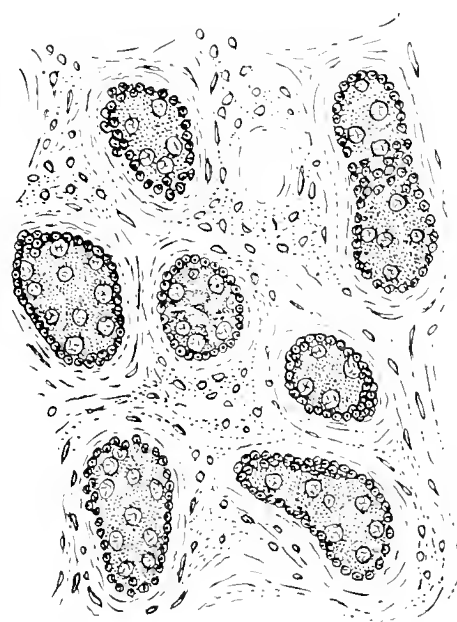


Fig. 140. Section of testis tubules of an immature Fin whale.

At the approach of maturity the first indication of a change is the appearance here and there of division stages in the nuclei of the large cells in the lumen of the tubules. After this the tubules become greatly enlarged and various other changes take place. The general appearance of sections of the mature testis is subject to considerable variation in any particular species, and this is only in part due to the different degrees of freshness in which the material is fixed. For good fixation of mammalian testis the material should be fixed within a very few minutes of death. In the case of whales, one is fortunate if the tissue has been dead less than three or four hours. However, surprisingly good fixation can sometimes be achieved and, the nuclei being very large, even some cytological observations can be made.

The mature testis can of course be distinguished at a glance from the immature. The tubules are much larger and may be filled with nuclei in various degrees of abundance. In some cases the lumen is packed with a dense mass of cells, and in others the latter may be loosely scattered, or clustered only round the rim of the tubule, leaving an empty space in the middle. In extreme cases the tubule appears to be practically empty. It is difficult to say whether these spaces are in part due to bad preservation, but in the testis of No. 114 (Fin), in which the fixation was probably better than in any other, the tubules showed large spaces (Fig. 141).

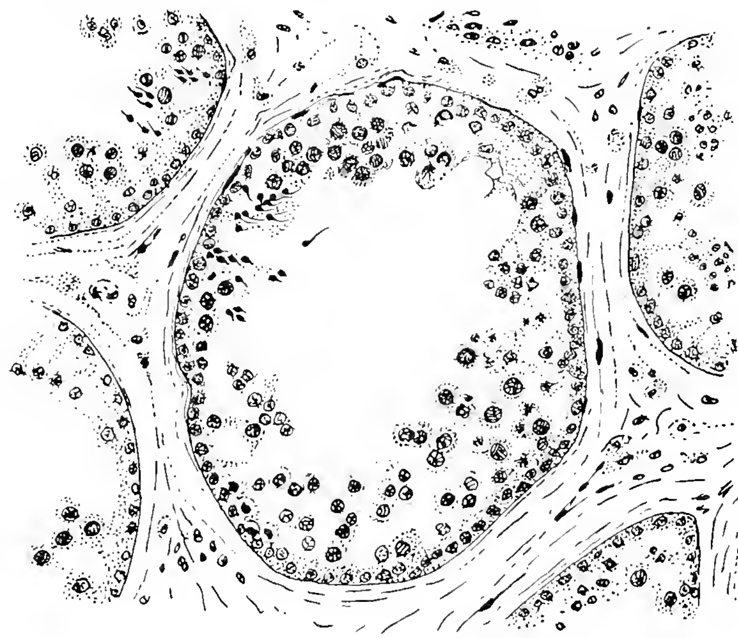


Fig. 141. Section of normal testis of an adult Fin whale.

Germ cells may be seen in various stages of development, but it is difficult to follow out much of the process of spermatogenesis. Figs. 142 and 143 illustrate some of the stages most commonly seen. (Both are from the same specimen as Fig. 141.) Among all the testes, of which sections have been cut, the conditions are found to vary at different times of year. In the majority of cases spermatozoa are present in very small numbers. They appear to be produced all the year round, but only in very small quantities, except at one particular season. Sections have been prepared from whales killed in every month except June, and it is found that in April and May, and in the case of one whale in July, the testis assumes a different histological appearance from that of whales killed in other months. The difference is noticeable partly in the relative abundance of spermatozoa throughout the tubules, but mostly in the enormous quantity of nuclei which appear in the tubules. In other months the tubules show considerable empty spaces or may be loosely filled with cells. In some cases large quantities of cells may be present, but the densely packed tubules which are found in the testis in May for example are practically never seen. In April and May spermatozoa are also present in much increased quantities, and the appearance of the sections

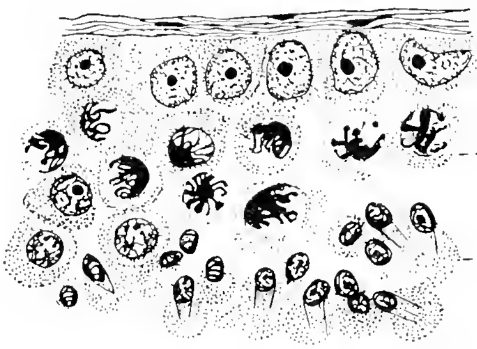


Fig. 142. Germ cells in normal testis. *a.*, spermatogonia; *b.*, spermatocytes; *c.*, spermatids.

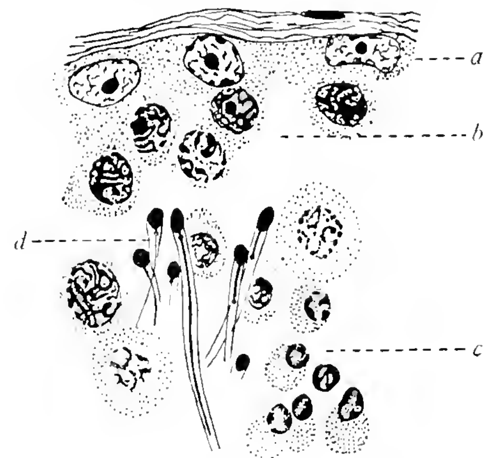


Fig. 143. Germ cells in normal testis. *a.*, spermatogonia; *b.*, spermatocytes; *c.*, spermatids; *d.*, spermatozoa.

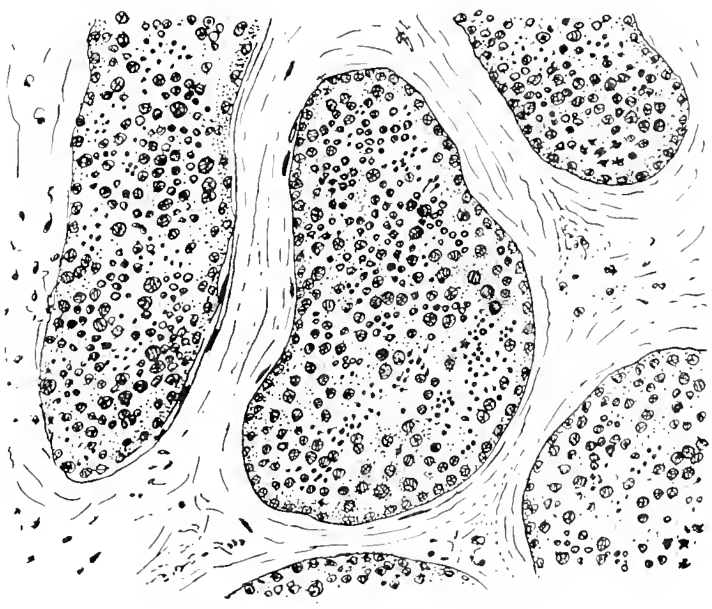


Fig. 144. Section of active testis of Fin whale during the male sexual season.

indicates unmistakably an active proliferation of germ cells, and a speeding-up in the production of spermatozoa. In Figs. 144 and 141 this active condition of the testis can be compared with the relatively passive condition. It happens rather often in a testis in the latter condition that the section of a tubule shows numerous spermatozoa which may be as abundant as in the active testis, but the distinction lies in the fact that the numerous spermatozoa are to be seen only in one tubule out of half a dozen or more, whereas in the active testis they are uniformly distributed as a result of active proliferation throughout the tubules.

Since this indication of a male sexual season is of considerable importance in its relation to the problem of the breeding season of whales, it will be worth while to make a systematic examination of the data. The following is an account of the testes of whales taken in different months, which have been examined histologically.

(*a*) *Blue Whales*

January. Two specimens. Both with tubules lightly filled with cells, but with rather few spermatozoa.

February. Four specimens. In three of these the tubules were mostly still in a practically immature condition. In the fourth there were few spermatozoa and there were empty spaces in some of the tubules.

March. One specimen. Empty spaces in the tubules and few spermatozoa.

April. Six specimens. In two of these the spermatozoa were not many and in one there were empty spaces in the tubules. In the other four the tubules were packed with nuclei and spermatozoa were numerous—not appearing in small groups here and there in an odd section of a tubule, but everywhere. The appearance of the sections suggested a general and uniform proliferation of germ cells, and a production of spermatozoa all along the tubules.

May. Two specimens. In one of these the spermatozoa were numerous, and the tubules, though small and distorted, seemed well filled with cells. In the other, part of the section was similar to the most active specimens, but the rest of the tubules were emptier.

June. No specimens.

July. Four specimens. One of these had a moderate number of spermatozoa, but there were few in the others, and none of the tubules contained a noticeably large quantity of cells. These testes seemed to have reverted to the more passive condition.

August. Two specimens. Both with few spermatozoa and with rather empty tubules.

September. Four specimens. One with a moderate number of spermatozoa and the rest with few. All had rather empty tubules.

October. Three specimens. Few spermatozoa in any. In one most of the tubules were immature, in another they were small and distorted, and in the third they were loosely filled with cells.

November. Five specimens. A moderate number of spermatozoa in one but very few in the rest. In the former the tubules were lightly filled with cells. One of the others was similar in this respect, but in the remaining three there were empty spaces in the tubules.

December. Three specimens. All with very few spermatozoa and with empty spaces in the tubules.

(*b*) *Fin Whales*

January. Twenty-two specimens. One of these was too rotten to be studied. Of the remaining twenty-one, all except five had few spermatozoa. In two of these five the spermatozoa could be described as numerous, and the tubules were well filled, though not thickly packed with cells. In the third the spermatozoa were not numerous, but seemed uniformly distributed along the tubules. In the fourth and fifth a number of spermatozoa were present, but the tubules showed empty spaces or were loosely filled with cells. In the remaining sixteen the testes all had few spermatozoa and the tubules showed empty spaces or were loosely filled with cells. In spite of the one or two exceptions the testes for January do not suggest much activity in this month.

February. Thirty-five specimens. In two of these spermatozoa were comparatively numerous, but the tubules, though well filled, were not thickly packed. There were one or two cases where a moderate number of spermatozoa were present, but in the great majority they were few and the tubules had empty spaces or were only loosely filled with cells.

March. Three specimens. One of these (early in March) had few spermatozoa. The tubules, however, were distorted and it was difficult to interpret their condition. The second (No. 114) at the end of March had fairly numerous spermatozoa. The tubules were large and rather empty. The third specimen was rotten.

April. Five specimens. One of these was hardly mature. Of the others spermatozoa were very numerous only in one, but in all four the tubules were becoming thickly packed with cells. In general, the sections for this month suggest that the activity of the testes was well started.

May. Three specimens. These three were all alike in the presence of very numerous spermatozoa and tubules thickly packed with nuclei.

June. No specimens.

July. One specimen. Here again the spermatozoa were numerous and the tubules thickly packed with nuclei.

August. Four specimens. In these a moderate number of spermatozoa were present, but the tubules were only loosely filled with cells.

September. Five specimens. One had numerous and the other four from rather few to moderate numbers with loosely packed tubules.

October. Three specimens. There were rather few spermatozoa in all these. In two cases the tubules were loosely filled with cells, and in the third they were practically empty.

November. Five specimens. In two of these (early in the month) there was a moderate number of spermatozoa and the tubules were loosely packed with cells. In the other three there were few spermatozoa and in two the tubules were rather empty.

December. Three specimens. In one there was a moderate quantity of spermatozoa but there were few in the other two. There was a tendency towards empty spaces in the tubules of all three.

From the foregoing material one may conclude that through the greater part of the year the testis is in a comparatively quiescent condition. As will be shown later pairing may take place exceptionally at almost any time of year, and this may account for the slow but steady production of spermatozoa during the other months.

It is true that there are one or two cases of whales in which the testis appeared to be producing spermatozoa comparatively rapidly at times when the majority are quiescent, e.g. Nos. 374 (January), 471 (January), and 552 (February), but the activity of the testis in April and May, in comparison with its condition in other months, is quite unmistakable. No material is available for June, but no doubt the conditions in this month are similar to those for May.

The bearing of these observations on the question of the season at which pairing takes place will be considered in a later section.

BREEDING AND GROWTH

SOURCES OF INFORMATION ON BREEDING

The study of the reproductive processes and breeding habits of whales constitutes probably the most important part of the work concerned with direct observations on whales. The sources from which information may be obtained on this subject are included mainly among (1) the examination of the reproductive organs themselves, (2) the study of the occurrence of foetuses, and (3) the correlation of the seasonal movements and other habits of whales, with the reproductive processes.

The difficulty of obtaining any direct evidence on the breeding of whales has already been pointed out, and it may be said that the investigation of evidence from one source alone, such as the lengths of foetuses at different times, does not provide quite adequate information. It is necessary to put together the evidence from all sources in an endeavour to build up, so to speak, as much as possible of the life history and reproductive cycle of the whales under consideration.

In the first place, it must be explained that nearly all the conclusions which are to be drawn on the breeding habits of whales ultimately rest on the assumption that there is an annual migration of these whales towards the equator in winter into warmer waters for purposes of breeding, and southwards in summer into colder waters where food is more plentiful. It is not necessary to assume that this rule is rigidly adhered to by all the whalebone whales, but it is sufficient if it can be shown that there is at least a general tendency in the south for a northward breeding movement in winter and a southward feeding movement in summer. This annual migration has been fairly well established by other investigators, but as it is of considerable importance here it will be best at this point to give some attention to the evidence supporting it.

To begin with, there is the evidence from the quantities of whales caught at whaling stations in different latitudes at different seasons. Briefly it may be said that at the southern stations, such as those in South Georgia, which is a relatively cold region, the numbers of whales are altogether greater in summer than in winter, whereas at the northerly stations the reverse is the case. This fluctuation is described in detail by Risting (1928) and is in itself strong evidence for a northern migration in winter and a southern migration in summer. Harmer has gone into this question in even greater detail, and his analysis of the returns from whaling stations in the Dependencies and on the west and east African coasts puts the fact of the north and south migration of Blue, Fin and Humpback whales practically beyond all question. Of these three species the most rigidly defined migration appears to be that of the Humpback.

Observations on whales of the North Atlantic have also led to the supposition of a north and south migration, and descriptions of the migrations of these species in that region have been given by Collett (1912), Risting (1928), Hinton (1925) and others. In fact it may be considered that this annual movement is a universal rule among the Balaenopteridae.

The existing knowledge of the reproductive processes and breeding habits is rather meagre, but a brief account must be given here of the more important previous work which has been done on the subject.

Work on the breeding of whales which had been published up to 1915 is mostly summarized by Hinton (1925). It may be mentioned that probably the most important early work on the subject is that of Guldberg (1886), to whom reference has already been made on p. 265. Hinton's paper is based on the records of 294 whales examined by Barrett-Hamilton at South Georgia over a period of two months. The value of the material is, of course, restricted by the shortness of the period, for the composition of the local whale population is liable to vary so much from month to month and year to year that conclusions cannot be drawn from a quantitative analysis of the data. In the "Preliminary Memorandum" a scheme of the rate of propagation is given, which summarizes some of the more important conclusions. In this, gestation (in Fin whales) is taken as lasting for 10 to 12 months and the length of the calf at birth as 20 to 25 ft. (i.e. approximately 6 or 7 metres); during the next year it is suckling and grows to 45 or 50 ft. (15 metres) and, after weaning, it grows in its second year to 61 ft. and is then ready to breed in the next sexual season. The estimation of the period of gestation and length of the calf at birth appear to be well founded, for there was a considerable number of foetal records and previous work (mostly from the North Atlantic) on which to base the former, and the latter can easily be fixed with sufficient precision from the lengths of the largest foetuses and smallest calves recorded. We have, however, been unable to find any mention of the evidence on which the supposed subsequent rate of growth is based, except a remark on p. 126 that the whalers believe that the calf grows very rapidly and accompanies the mother for a full year.

According to Haldane (1905) also, the whalers consider that the young Fin whale cow is mature at two to three years.

Of the Fin whale foetuses noted by Barrett-Hamilton, Hinton estimates the majority to have been conceived in July and August. The majority of pairings for the North Atlantic are estimated to fall between January and April. The Blue whale records for

South Georgia are not very useful as there are only seven, but for the North Atlantic the majority of pairings is estimated to fall in December, February and March, but they are spread over a longer period and are much less conclusive than in the case of Fin whales.

The next paper to be mentioned is that of Andrews (1916) on the Pacific Grey whale, *Rhachianectes glaucus*. It has been possible to make some direct observations on the migrations and breeding of this whale, and these observations provide by analogy some useful evidence on the breeding of the other whalebone whales. The period of gestation in this species is clearly about one year, and it has been shown that subsequent growth is remarkably rapid.

It has already been mentioned that a detailed examination of some of the whalers' statistics has been made by Harmer, special attention having been paid to an analysis of the records of foetuses with a view to calculating the pairing dates and ascertaining the limits of the breeding season and the months in which the breeding activities reach a maximum. The more important results are incorporated in an account of the southern whaling industry in the *Report of the Interdepartmental Committee on Research and Development in the Dependencies of the Falkland Islands*. The analyses of the foetal records suggest that the maximum time of pairing for Fin whales falls in about July, for Blue whales between June and October, and for Humpbacks about September. It is shown that though the existence of a definite pairing season is a clearly established fact, it is prolonged over several months at least. It is inferred that parturition takes place normally not later than July.

These inferences, which are concerned with the breeding season of whales and drawn from the whalers' records of foetuses, are subject to two weaknesses. In the first place, the accuracy of the material is not wholly to be relied on. However, such inaccuracy as exists does not seem to be sufficiently serious to affect the main conclusion that pairing mostly occurs between about June and September, for this agrees well with similar estimations from other sources, such as those of Hinton from the North Atlantic. The more serious difficulty in fixing the maximum pairing season is due to the uncertainty as to the rate of growth in the earlier stages of gestation, the uncertainty being due to the fact that the information is derived only from records of foetuses measuring from about 1 ft. upwards and is unchecked by observations on the ovaries and testes and the evidence of minute foetuses.

An exhaustive paper has recently been published by Risting (1928) in which an analysis has been made of the statistics supplied by various whaling companies over a number of years and assembled by the Norwegian Whalers' Association. This is carried out on very much the same lines as Harmer's work described above. The paper serves in general to confirm the supposition that the period of gestation in Blue and Fin whales is in the neighbourhood of a year, that pairing takes place during the southern winter and that the pairing season is itself somewhat indefinite and prolonged. It is estimated that among Blue whales pairing takes place mostly in June, July and August, and among Fin whales in June, July, August and September. Risting's results are, of course, liable to the same two weaknesses which are mentioned in connection with Harmer's work. Risting (1929) has further published a brief paper on the same subject in *Den Norske Hvalfangst Tidende*.

Among the sources of information on breeding mentioned above are the reproductive organs and the occurrence of foetuses. The latter, which are perhaps the most important of all, are comparatively simple to deal with, for, by plotting out the foetuses found according to their length and the date on which they occurred, we have important evidence at once as to the rate of growth and the probable seasons of pairing and parturition.

Owing to the fact that the pairing season is prolonged over a considerable period, the points so plotted are very much scattered, so that the best one can do is to construct a curve which seems to represent as accurately as possible the mean rate of growth throughout gestation. This, however, is not a serious difficulty. The main weakness of this method (at least of fixing the pairing season) lies, as already mentioned, in the uncertainty of the rate of growth in the early stages of development. It is here that observations on the genitalia of whales are needed, to fix, for example, the exact season at which pairing takes place, and to investigate the details of the oestrous cycle, the sexual season of the male, etc. In this connection the most important whales to examine are the adult females, and naturally the most important observations are to be made at the period when pairing and parturition mostly take place. One of the most serious obstacles to the work on whales at whaling stations has been the difficulty of finding adult females at this particular time of year. As will be explained later, the seasons of pairing and parturition fall in the southern winter or autumn, when whaling closes in the Dependencies and opens at South African stations. It is at the latter, therefore, that the most important observations on the breeding processes are to be sought. It has already been mentioned that at Saldanha Bay the number of adult whales caught is unfortunately small and the conditions appear to be much the same at other African stations, though the percentage of mature whales appears to be somewhat higher at the Durban stations. At present it is impossible to say what becomes in winter of the numerous adult whales which frequent the neighbourhood of South Georgia in summer. This question, however, will be considered again later on.

SEXUAL MATURITY

In an investigation of the breeding of whales, the first fact to be sought, if possible, for every whale is whether or not it is sexually mature. Sexual maturity is to be distinguished from full (physical) maturity. The latter may take place long after the former is attained, and it can sometimes, though with difficulty, be distinguished by the degree of ossification of the vertebral epiphyses.

An accurate diagnosis of sexual maturity is of special importance for several reasons. In the first place, the proportion of immature whales among those which are killed is of fundamental importance in any consideration of the effect of whaling on the stock of whales; and, in the second place, the determination of the proportion of mature and immature whales is a necessary preliminary to the estimation of various other ratios, such as the percentage of adult females pregnant or lactating.

The amount of data collected during the work makes it possible to fix with considerable accuracy the mean length at which Blue and Fin whales become mature, and, among all the whales examined, there have been very few cases in which maturity or immaturity cannot be determined with confidence. The only doubtful cases are those of whales whose length, being near to that at which maturity takes place, gives no clue, and in which there are not sufficiently definite records of the condition of the genitalia.

It is easy to determine whether a female is mature or not, but there is much more difficulty in the case of males.

Among females, information can be obtained from the following points:

1. *Presence of a foetus.* This, of course, determines maturity, but it is of little value in itself for estimating the mean length at which members of a species become mature.

2. *Presence of corpora lutea in the ovary.* This is the most valuable means of ascertaining whether a female is mature or not. If corpora lutea (including the scars of very old ones) are present in the ovary, the whale must, of course, be mature, and it can be said that, with negligible exceptions, a whale without any sign of corpora lutea in the ovaries is immature. As was explained in the section on the reproductive organs, it appears that the old corpora lutea persist for several years, so that once ovulation has taken place there will always be corpora lutea, or traces of them, in the ovaries. Instances of whales which have just become mature without having yet ovulated are extremely rare, and it might indeed be argued that a female need not be regarded as mature until it has actually ovulated. In no case has a whale been examined which for other reasons was obviously mature, but which had no traces of corpora lutea in the ovaries.

3. *Size of the uterus.* There is, of course, an increase in the size of the uterus when maturity is reached but it is not sufficiently sudden to constitute an infallible distinction between the mature and immature. Among Fin whales an immature individual would very rarely have a uterus measuring more than 11·0 cm. across the cornu (i.e. the transverse diameter of the collapsed cornu), and the uterus of mature whales would rarely measure less. Among Blue whales the corresponding figure would be about 12·0 cm. (see Figs. 131 and 132).

4. *Size of the ovaries.* In a number of cases a figure has been used representing roughly the volume of the ovaries and obtained by multiplying together the length, breadth and depth expressed in centimetres. Among Fin whales a figure exceeding about 800 generally indicates a mature whale. Among Blue whales a corresponding figure would be about 900, but this is less certain.

5. *Weight of the ovaries.* This is more convenient than measuring the size of the ovaries. As stated in the section dealing with the reproductive organs, among Fin

whales a pair of ovaries weighing less than 2 lb. generally indicates immaturity, the corresponding figure for Blue whales being slightly higher (see Figs. 120 and 121).

6. *Condition of the mammary glands.* The appearance of the mammary gland after flensing, and to some extent its thickness, form a useful quick method of determining whether or not a whale is mature. There are only occasionally intermediate cases where the method cannot be applied and most of these can be settled by a histological examination of the gland.

7. *Condition of the ovarian follicles.* These are not of great importance except where they serve as an indication in immature whales of the approach of maturity.

Among males there is very much less to go on, but information can be obtained from the following points:

1. *Size of the penis.* This is perhaps the readiest method of distinguishing mature from immature males, but it can be used only to distinguish definitely mature from definitely immature whales, for the growth of the penis at maturity is not conspicuously sudden. Among Fin whales a penis exceeding about 1·5 m. would usually indicate maturity, and about the same figure would apply to Blue whales.

2. *Size of the testis.* This is more convenient than taking the weight, as there is a great range in size. If the size, measured in the manner explained on p. 406, exceeds about 4 in the case of Fin whales, and say 5 in the case of Blue whales, the whale is generally mature (see Fig. 139).

3. *Histology of the testis.* This is the most reliable method of distinguishing maturity, but it is naturally laborious. The distinction between the mature and immature testis, as seen in sections, is fully explained in the section on the reproductive organs.

According to calculations based on a large number of individuals distinguished as mature or immature by the above methods, the following figures may be taken as accurate estimations of the mean lengths at which Blue and Fin whales become sexually mature:

Blue females	...	...	23·7 m. or 77 ft. 9 in.
Blue males	...	...	22·6 m. or 74 ft. 2 in.
Fin females	...	...	20·0 m. or 65 ft. 7 in.
Fin males	...	...	19·5 m. or 63 ft. 8 in.

The corresponding figures calculated by Hinton and based on the records left by Barrett-Hamilton are according to these results mostly a little too low. He gives 75–80 ft., 70 ft., 61 ft. and 60 ft. respectively.

The value of establishing the mean length at which maturity is reached lies in the fact that it enables one to calculate the percentage of mature whales in lists of catches in which only the sex and length are given. The following notes will give some idea of the degree of accuracy with which maturity can be gauged by the length alone:

Blue females. Of 402 female Blue whales there were three clearly mature measuring less than 23·7 m. and three clearly immature measuring more than 23·7 m. The smallest mature whale measured 23·2 m. and the largest immature whale measured 24·3 m. Five other whales measuring 23·0 m. to 23·4 m. were doubtful but probably immature (Nos. 209, 1267, 1408, 1436 and 1482) and three measuring 23·7 m. to 24·2 m. were doubtful but probably mature.

Blue males. Of 383 male Blue whales two certainly mature and one probably mature measured less than 22·6 m., three certainly mature whales measured 22·6 m., and two certainly and one probably immature whale measured more than 22·6 m. The smallest certainly mature whale was 22·4 m. and the largest certainly immature whale measured 22·74 m. There were, however, nine whales between 22·0 m. and 22·95 m. of which the records did not provide evidence as to maturity.

Fin females. Of 351 female Fin whales, five clearly mature whales measured less than 20·0 m., four mature and one immature whale measured exactly 20·0 m. and nine clearly immature whales measured more than 20·0 m. The smallest certainly mature whale measured 19·55 m. and the largest certainly immature whale measured 20·85 m. There were also five doubtful whales and two just verging on maturity between 19·5 m. and 21·2 m.

Fin males. Of 441 male Fin whales, fourteen mature whales measured less than 19·4 m., two mature whales measured exactly 19·4 m. and eleven immature whales measured more than 19·4 m. The smallest certainly mature whale measured 19·1 m. and the largest certainly immature whale measured 20·0 m. There were also twenty-nine doubtful cases between 19·0 m. and 20·1 m.

The ratios of mature and immature whales which have been examined at different times and places may now be considered. In the following table the percentages of immature whales are shown separately for the whales examined at South Georgia and Saldanha Bay, and for the separate seasons and half-seasons at South Georgia. (The end of January is taken as the middle of the South Georgia season, which lasts from October to May.)

	Blue whales						Fin whales					
	Females			Males			Females			Males		
	Total number	Number immature	% immature	Total number	Number immature	% immature	Total number	Number immature	% immature	Total number	Number immature	% immature
South Georgia												
Feb. to May 1925 ...	58	34	58·6	50	34	68·0	75	26	34·7	56	23	41·0
Oct. 1925 to Jan. 1926	20	5	25·0	17	6	35·3	72	7	9·7	115	7	6·1
Feb. to Mar. 1926 ...	51	37	72·5	41	32	78·0	67	23	34·3	95	21	22·1
Total for season 1925–6	71	42	59·2	58	38	65·5	139	30	21·6	210	28	13·3
Nov. 1926 to Jan. 1927	102	23	22·6	114	17	14·9	25	2	8·0	18	4	22·2
Feb. to Apr. 1927 ...	44	17	38·6	41	22	53·7	37	18	48·6	43	20	46·5
Total for season 1926–7	146	40	27·4	155	39	25·2	62	20	32·3	61	24	39·4
Total for South Georgia	275	116	42·2	263	111	42·2	276	76	27·5	327	75	22·3
South Africa												
Saldanha Bay 1926 ...	127	102	80·3	120	99	82·5	75	69	92·0	114	90	79·0

The most striking result shown by this table is the generally high percentage of immature whales. The figures for males and females correspond fairly closely in both species, but the percentage of immature Blue whales is usually higher than in the case of Fin whales.

At South Georgia, perhaps the most important fact is that there is always a higher percentage of immature whales in the second half of the season than in the first. Included above are three second-half seasons and two first-half seasons. Among Blue whales the percentage of immature whales in the first half of the season is about 20 per cent or 30 per cent, but in the second half of the season usually more than half, and in one case 78 per cent, of the whales are immature.

The same phenomenon is to be seen in the case of Fin whales. Here the immature whales are mostly under 10 per cent of the total in the earlier part of the season, but rise to 30 per cent or 40 per cent in the second half of the season.

These figures are, of course, a reflection of certain features of the migrations and movements of the whales, and it appears that there is a general tendency for the large whales to visit the coasts of South Georgia first, and for the smaller whales to come on later. The significance of this will be discussed in a later section.

One other feature may be pointed out in the figures for South Georgia and that is that there is a definitely lower percentage of immature Blue whales in the 1926–7 season than in the two preceding seasons. This is due to the exceptional nature of the catches of Blue whales, which were present in very large numbers throughout most of the season, and which were of a large average size. This again is dealt with more fully later on.

Of the figures for Saldanha Bay there is little to be said beyond the fact that almost the entire catch (from 80 per cent to 90 per cent) consists of immature whales. The catches at Saldanha Bay are fairly uniform throughout the season and there seems little to be gained by a comparison here between the first and second halves of the season.

The proportion of immature whales in the catches needs careful scrutiny from the economic point of view. As has been pointed out on various occasions, the killing of immature whales is economically undesirable, as it means that these whales have no chance of reproducing. To express in a different way what is perhaps the same thing, one may say that a high percentage of immature whales in the catches is a reflection of a general decrease in the average length of the whales. Now it is known that one of the first effects of the depletion of a community of animals is a general decrease in size, which results from the likelihood that an individual is killed before it has time to grow to its full size. Thus, where an unnaturally high percentage of immature whales is found, excessive hunting may be suspected. At Saldanha Bay, however, the high proportion of immature whales is not due to this cause but to the segregation of young whales in that particular region. The whole question will be examined, however, when the movements and distribution of the whales come to be considered.

THE BREEDING SEASON

The term "breeding season" is not very explicit and needs to be used with a certain amount of caution, for it does not clearly differentiate between the pairing season and the season at which the young are born. The term "breeding season" will probably convey to most people the season at which pairing takes place, but in any case it so happens that the two fall very close together and certainly overlap to some extent. In many cases, however, it will be better to speak separately of the "pairing season" and the "season of parturition".

The fact that whales actually have a breeding season has been clearly established by various previous authors. It is pointed out by Hinton that the first attempt to deduce the time of the breeding season from a study of the lengths of foetuses at different times was made by Guldberg (1886), who found from an examination of foetuses from the North Atlantic that there was at least such a thing as a definite pairing season. More data were subsequently collected by Cocks (1886–90) and Collett (1912) and the question was re-examined by Hinton in 1925. Similar work has been done, as already explained, by Harmer (unpublished) and Risting (1928), and the results of these investigators' work are mainly in agreement.

The position from which we now have to start is as follows. From a study of the recorded lengths of a considerable number of foetuses of Blue and Fin whales, several authors have arrived at the conclusion that (1) the pairing season is very protracted and lasts as such over two or three months, while pairing may exceptionally take place at almost any time of year, (2) the maximum amount of pairing takes place about July in the case of Blue and Fin whales.

That pairing is spread over a considerable period is obvious from the diversity in the lengths of the foetuses which may be taken at any one time, but these authors do not claim to have proved that, say, July is the month in which the maximum numbers of Blue and Fin foetuses were conceived. It is merely stated that, as far as the available data goes, July appears to be the most likely month, the doubt lying mainly in the rate of linear growth during the earliest stages of development. Perhaps the only way in which it is possible to ascertain the length of this preliminary period, apart from guess-work, is to compare the mean curve of foetal growth with the dates at which the greatest numbers of whales show signs of active breeding, such as the occurrence of minute foetuses, heat and ovulation among females, and the increased activity of the testis among males.

It will be convenient to start with the more direct evidence concerning the time of the breeding season and to go on later to the foetal growth curve.

In the first place, some information on the female sexual season is to be had from the ovarian follicles. The fact that many follicles are to be seen in ripening ovaries is a sign that many ova may be shed, but the rule is that one ovum is shed at a time, for, in the first place, one follicle appears always to be definitely larger than any others in the ovaries, and, in the second place, twins and multiple births are not common occurrences.

It has already been shown that large follicles *may* be present at any season of the year in whales which are neither pregnant nor lactating, but there is definite evidence that in the majority of such whales the follicles are small during January, February and March, but increase in size in April and May, i.e. the growth of the follicles eases up in the summer but becomes active at the commencement of the southern winter (see Fig. 124, p. 387).

Perhaps the most important sign of breeding activity is the occurrence of functional corpora lutea in the ovaries without the presence of a foetus. This, of course, indicates recent ovulation. It is observed so seldom at South Georgia that the occurrence of a recent corpus luteum in the ovaries almost invariably means a foetus in the uterus. At Saldanha Bay, however, such corpora lutea occurred comparatively frequently in proportion to the number of adult whales.

Although these corpora lutea of ovulation have been discussed in the section on the reproductive organs it will be convenient to recapitulate here some of the details of their occurrence. Among Blue whales they were found on March 14 and 18 (1926 and 1927), May 4 (1925), and October 24 (1925) at South Georgia; while among the few mature whales at Saldanha Bay they occurred on June 17, 22 and 29 and on July 19. Among Fin whales they were found on February 16 and 28 (1925) at South Georgia, and June 22, July 13 and September 15 at South Africa. It must be emphasized again that the numbers of adult females taken at South African stations is very small and that the percentage of ovulations is therefore very high.

Further light is thrown on the breeding season by the occurrence of several minute foetuses in an early stage of development. Two of these were of Blue whales and occurred in July and August. They measured 21 mm. and 30 mm. respectively. It is difficult to say how old such foetuses are but probably conception took place not less than several weeks previously. Among Fin whales there were three small embryos. One of these was found in August and the other two both occurred in January. Judging from the appearance of one of the latter when it was found (in whale No. 331) it seems possible that it was abortive, but the occurrence of the other one so late as January is surprising, though not very exceptional when compared with the irregular occurrence of many of the larger Fin whale foetuses (see Fig. 146, p. 425). Photographs of some of these foetuses appear on Plate XXXVIII, together with that of a Sei whale (No. 1074) which measured only 2 mm. and is probably the smallest foetus of a whalebone whale which has ever been found. These small foetuses are not described in detail in the present report but will doubtless form the subject of a separate paper in due course.

It has already been explained that through the greater part of the year the testis is in a comparatively quiescent condition but that from about April to July it shows signs of increasing activity in the production of spermatozoa (see p. 408). Seen as it is in sections of the testis, this activity takes place perhaps rather earlier than one would expect, comparing it with, say, the time at which corpora lutea of ovulation occur most plentifully, but a proliferation of germ cells in the testis does not, after all, necessarily mean that the spermatozoa will be put to immediate use.

It is now seen that the time of ripening of the ovarian follicles, the occurrence of corpora lutea resulting from recent ovulations, the occurrence of minute foetuses, and the season at which the testis shows an increased activity, all point to the earlier part of the southern winter as the season at which the breeding processes become general. The next step will be to examine the records of the lengths of the foetuses at different times of year and to construct curves to represent the growth of the foetus. The pairing season, as indicated by these curves, may then be compared with information provided by the reproductive organs.

The total number of foetuses examined at South Georgia and Saldanha Bay is as follows:

	Males	Females	Sex not determined	Total
Blue ...	19	28	3	50
Fin ...	41	35	5	81
Sei ...	7	5	1	13
Humpback	3	1	2	6
Sperm ...	—	1	—	1
	Total for all species ...			151

In the above list twins (which have occurred twice) are counted as two foetuses. Cases in which foetuses were known to have been present (e.g. by traces of foetal membranes), but were not found, are not included. Those recorded under "Sex not determined" were either too small or too much decomposed for their sex to be distinguished.

In Fig. 145 all the Blue whale foetuses which have been examined in the course of the work are plotted according to their lengths and the dates on which they were found. The average monthly lengths are also shown.

The curve is an attempt to show what is the probable rate of growth of the foetus. So far as its actual shape is concerned, it should represent the growth of any Blue whale foetus, while its position in respect to the time of year should enable one to find the *probable* mean size of all the foetuses at a given time. The curve in this case is drawn "freehand" to represent as well as possible the general trend of the mass of plotted points, regard being paid also to the monthly average lengths. It is not, of course, intended as a final representation of the rate of growth, but simply what seems most probable from the given material. A similar curve for Fin whales is shown in Fig. 146. Here the plotted points have turned out to be considerably more scattered than in the case of Blue whales, though the monthly average lengths arrange themselves in a fairly good line. One foetus, measuring 5 m. in November, lay far outside all the others and is not shown in the figure. This one, however, was an abortive foetus found in whale No. 262. It was a case of abdominal pregnancy and when found the foetus was in a degenerate condition and appeared to be in the process of reabsorption by the parent. It may therefore be left out of any calculations concerned with the growth of the foetus.

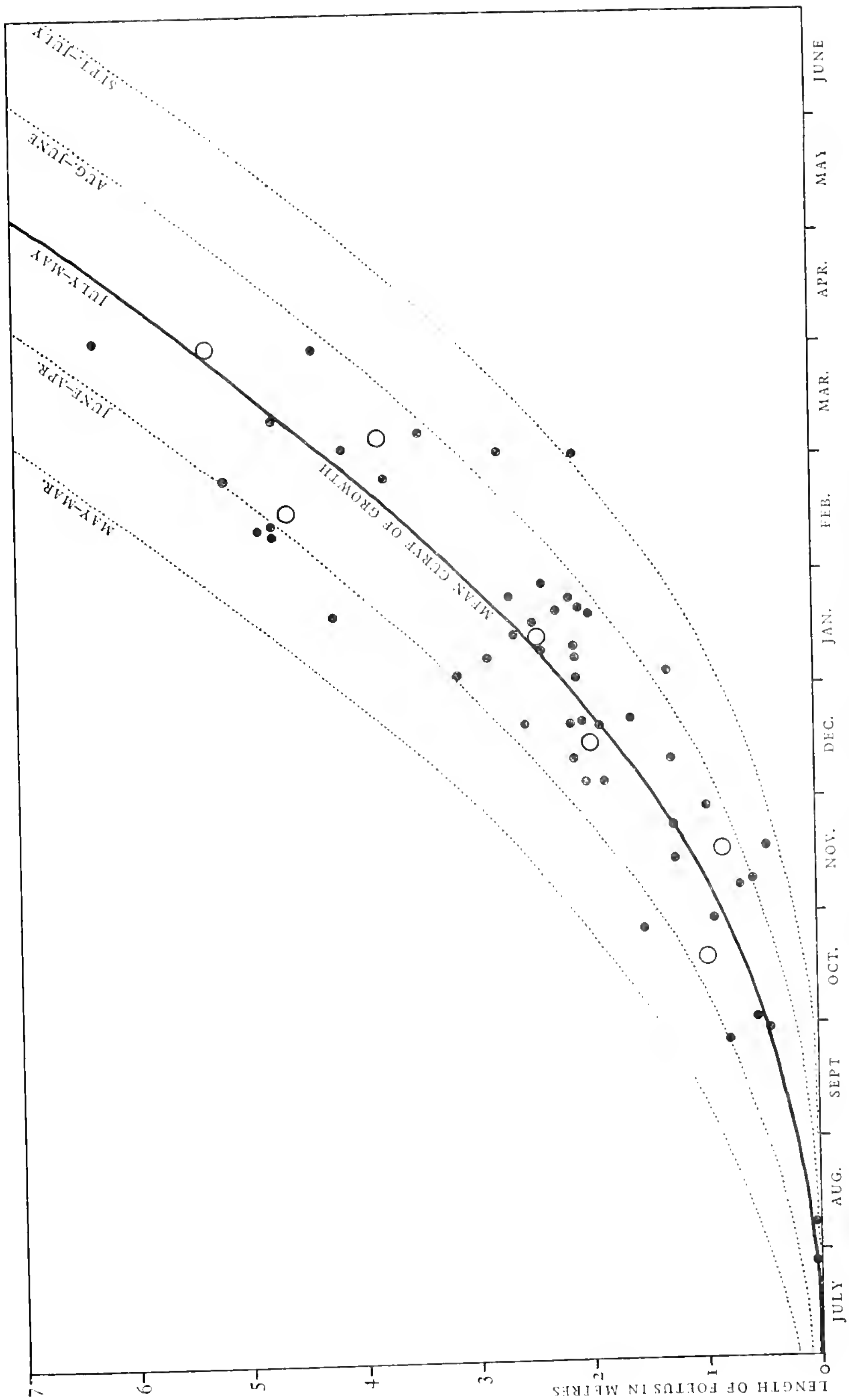


Fig. 145. Mean curve of growth of Blue whale foetuses.
● Individual foetuses. ○ Monthly average sizes.

It will be seen that the mean curve of growth rises only very gently during the earliest part of gestation and is drawn, in the case of Blue whales, to begin in June. Although the greater part of the curve is derived from the plotted foetal lengths, this earlier part depends on the time fixed as the height of the pairing season and in order to determine this time, the evidence provided by the reproductive organs may be used.

In order to get a clear idea as to what months are most likely to be occupied by the pairing season, it will be convenient to draw up a table as follows, in which the evidence from the testis, the ovaries, the minute foetuses, and the growth of the larger foetuses may be seen as a whole:

	Blue				Fin			
	1	2	3	4	1	2	3	4
	% of mature testes proliferating spermatozoa	% of mature females with functional corpus luteum but no foetus	Number of minute foetuses found	Height of mean curve of foetal growth	% of mature testes proliferating spermatozoa	% of mature females with functional corpus luteum but no foetus	Number of minute foetuses found	Height of mean curve of foetal growth
Jan.	—	—	—	2·5	5	—	2	2·0
Feb.	—	6	—	3·6	6	5	—	2·75
Mar.	—	4	—	4·8	—	—	—	3·5
April	66	—	—	6·1	75	—	—	4·4
May	100	33	—	Over 7	100	(100)	—	5·5
June	?	33	—	0	?	(100)	—	0
July	—	25	1	0·05	(100)	—	—	0·05
Aug.	—	—	1	0·12	—	—	1	0·13
Sept.	—	—	—	0·3		33	—	0·3
Oct.	—	12	—	0·6	—	—	—	0·57
Nov.	—	—		1·1	—	—	—	0·95
Dec.	—	—		1·8	—	—	—	1·45

NOTE. Owing to the relatively small number of mature whales for each month, the percentages are not as reliable as one could wish. Percentages in brackets mean that there was only one mature whale in that month. Column 1 refers to testes showing definite signs of increased activity, and column 2 refers to whales in which the corpus luteum showed that ovulation must have taken place recently. In column 4 the height of the curve is measured for the middle of each month, as will be seen by reference to Figs. 145 and 146.

No column has been kept to show the monthly sizes of the ovarian follicles as the data do not lend themselves so well to treatment of this kind, but reference may be made to Fig. 124 on p. 387.

It will be seen from the table that the testes in both species begin to show signs of activity in April and continue to proliferate spermatozoa during May and probably June, and that during most of the other months they are in a comparatively inactive condition. In regard to ovulations the results are inconclusive in the case of Fin whales owing to very limited material, but among Blue whales the majority fall in May, June and July, i.e. somewhat later than the activity of the testis. The two small Blue whale embryos occur, as might be expected, still later (in July and August). Of the small Fin whale embryos, one appears in August and the other two are aberrant. Finally, the

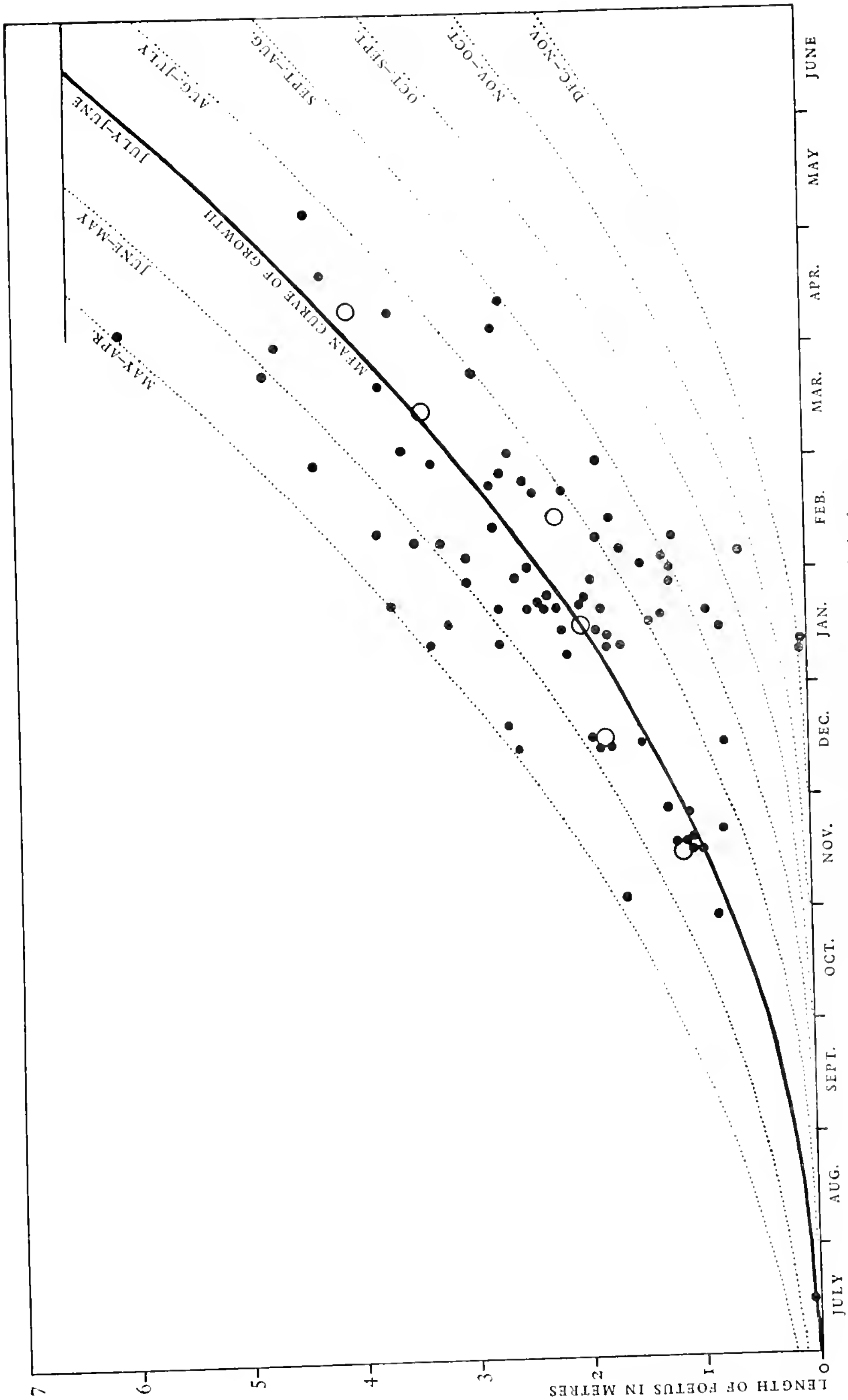


Fig. 146. Mean curve of growth of Fin whale foetuses.
● Individual foetuses. ○ Monthly average sizes.

height of the mean curve of foetal growth shows that the period of gestation is, on the average, well started by the end of August.

Taking the data as a whole, it may be inferred that the height of the pairing season falls in both species towards the end of June. As already mentioned, the early activity of the testes does not necessarily mean that pairing takes place equally early, and the instances of ovulation point to the end rather than the beginning of June, for it must be remembered that, as whales appear to be polyoestrous, several ovulations may occur before impregnation, but none will occur afterwards.

It will be seen that the curve for both species starts slowly but gradually increases throughout pregnancy. It cannot perhaps be regarded as certain that the rate of growth increases steadily during the latter part of gestation, but it is quite certain that growth

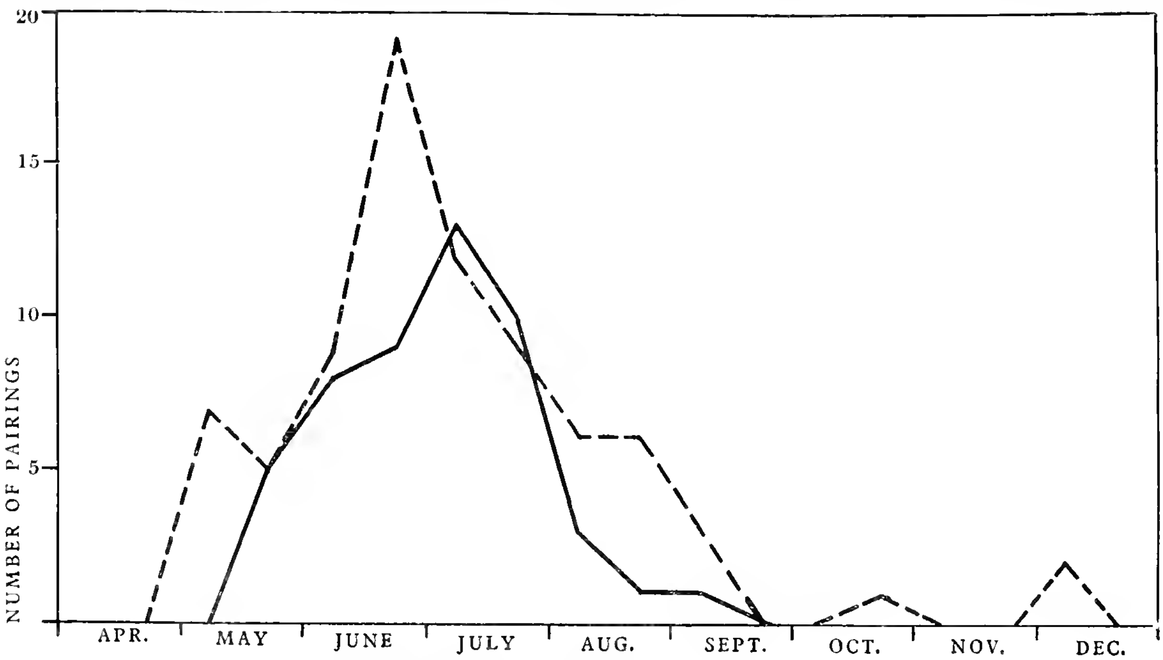


Fig. 147. Curve of frequency of pairing.
——— Blue whales. - - - - - Fin whales.

is relatively slow in the earlier stages. It is a characteristic feature of the development of these whales that the form of the body is practically perfected at a stage when the foetus is still very small. A 0·5 m. foetus, for instance, differs very little in appearance and bodily proportions from the adult and so far as the internal structures are concerned the organs are probably all laid down by the time the foetus has reached 0·1 m. It is therefore natural to suppose that the actual linear rate of growth is extremely slow while the foetus grows from zero to about 0·1 m. compared with its subsequent growth up to the end of gestation, for from between 0·1 m. and 0·5 m. up to birth at 6–7 m. development consists mainly in increase in size.

It appears that the rate of growth in Fin whales is somewhat less than in Blue whales and it is probable that in Sei whales it is slower than in Fin whales.

The dotted curves in Figs. 145 and 146 are reproductions of the mean curve of growth shifted to lateral intervals of one month so as to include all the plotted points. It will be seen from these that, given that all foetuses of one species grow at an equal speed, all the foetuses measured were conceived within a period of less than five months in the case of Blue whales and less than seven months in the case of Fin whales.

We are now in a position to draw curves showing the probable intensity of pairing during the season, indicated by the material in question. For this it is only necessary to count the numbers of plotted points between two parallel curves and one may plot the number obtained against the month in which they were conceived as indicated by the parallel curves, or better, one may divide the points between two curves into those lying nearer the one curve and those lying nearer the other, and count the number for each half-month. The results are shown for both species in the following table, and are plotted in Fig. 147.

Date of pairing	Blue	Fin	Date of pairing	Blue	Fin
May, 1st half	—	7	September, 1st half	1	3
May, 2nd half	5	5	September, 2nd half	—	—
June, 1st half	8	9	October, 1st half	—	—
June, 2nd half	9	19	October, 2nd half	—	1
July, 1st half	13	12	November, 1st half	—	—
July, 2nd half	10	9	November, 2nd half	—	—
August, 1st half	3	6	December, 1st half	—	2
August, 2nd half	1	6	December, 2nd half	—	—

Thus in both species it appears that May, June, July and August are the months in which the majority of pairings take place, the maximum falling at about the end of June or beginning of July. In the case of Fin whales, the results indicate that pairing may take place over seven or eight months and the fact that the Blue whale season appears more restricted is probably merely because we have not so many foetal records for this species. There would be no justification, however, for arguing from this that, if the records were sufficiently increased, instances of pairing in every month of the year would appear.

The results of this investigation of the breeding season differ slightly from those of Hinton and Harmer in that the period of maximum pairing is now set rather earlier in the winter. This difference is mainly the outcome of correlating the evidence of the reproductive organs with the curve of foetal growth.

The question of the female sexual season, although intimately connected with the breeding season in general, need not be considered here, as it has already been dealt with in the section on the ovaries. It has been shown that whales are almost certainly polyoestrous, and in view of the protracted nature of the breeding season one may suppose that in many cases several dioestrous cycles may occur before pregnancy supervenes. It is difficult, however, to express any opinion as to the length of the interval between the successive dioestrous cycles.

THE SEXUAL CYCLE AND GROWTH OF THE CALF

The length of the period of gestation can be found from the curve of growth of the foetus, provided the length of the calf at birth is known, a point which can be ascertained with a fair degree of accuracy. One way of finding the average length at which the calf is born is to compare the largest foetuses with the smallest calves which have been recorded. In the course of our work two very large foetuses were found. One was that of a Blue whale (No. 154) and measured 6·3 m. (20·6 ft.), the other was of a Fin whale (No. 173) and measured 6·05 m. (19·85 ft.). In both cases, but especially in the latter, the condition of the mother suggested that parturition would have shortly taken place. Before No. 173 was flensed, it was noticed that the genital region was greatly swollen and that the genital groove was stretched open to a remarkable extent. A sample of the mammary gland was preserved and sectioned and it was found that the condition of the gland suggested that secretion would shortly commence. The external genitalia of No. 154 were in a similar condition but sections were not made of the mammary glands.

These cases, so far as they go, suggest that in Blue whales the calf is born when rather more than 6·3 m. long and in Fin whales when a little over 6·0 m. Haldane (1905) records Blue whale calves of 6·7 m. (22 ft.) and 6·1 m. (20 ft.). Harmer mentions a Fin whale foetus of 6·4 m. (21 ft.) and a Blue whale foetus of 8·8 m. (29 ft.), but these are quoted from statistics supplied by the whalers and their precise accuracy cannot be regarded as very reliable. Records of the smallest calves are of course very hard to come by, for very small ones are rarely seen and hardly worth shooting. There is also a regulation in the Dependencies of the Falkland Islands prohibiting the whalers from attacking females accompanied by calves. However, Hinton (1925) mentions records of three Blue whale foetuses from 5·3 m. to 7·0 m., and the statistics supplied by Messrs Irvin and Johnson, whose whaling station is at Saldanha Bay, include a record of a Blue whale calf of 7·7 m. (25·3 ft.).

On the whole it seems probable that Blue whales are born on the average at about 7·0 m. (23·0 ft.) and Fin whales at about 6·5 m. (21·3 ft.). It is at least certain that the length at birth is not far from this. No doubt some variation occurs. It has been suggested, for instance, that the length of the calf at birth bears a definite ratio to the size of the mother, but this is a statement which it would be extremely difficult if not impossible to test. In any case if birth may take place at lengths other than 7·0 m. and 6·5 m. in the two species the difference would not materially affect the estimation of the length of the period of gestation especially as the rate of growth is fastest at the end of gestation.

By reference to Figs. 145 and 146 it is seen that the curve for Blue whales ends at 7·0 m., representing the close of the period of gestation. The point reached at the 7·0 m. level is opposite the beginning of May. In Fin whales the curve reaches 6·5 m. opposite the middle of June. This gives a period of gestation of slightly over ten months in the case of Blue whales, and of eleven and a half months in the case of Fin whales.

The time of the season of parturition may be worked out in the same way as the pairing season. If we continue on the assumption that all the foetuses of a species grow at the same rate the season of parturition will of course be identical in duration and intensity with the pairing season. All that needs to be done is to reproduce the pairing curves (Fig. 147) ten months later in the case of Blue whales and eleven and a half months later in the case of Fin whales. The result is shown in Fig. 148. The details of the shapes of these curves of course mean nothing, but they suggest in general that Blue whales are mostly born in April and May and Fin whales in June and July.

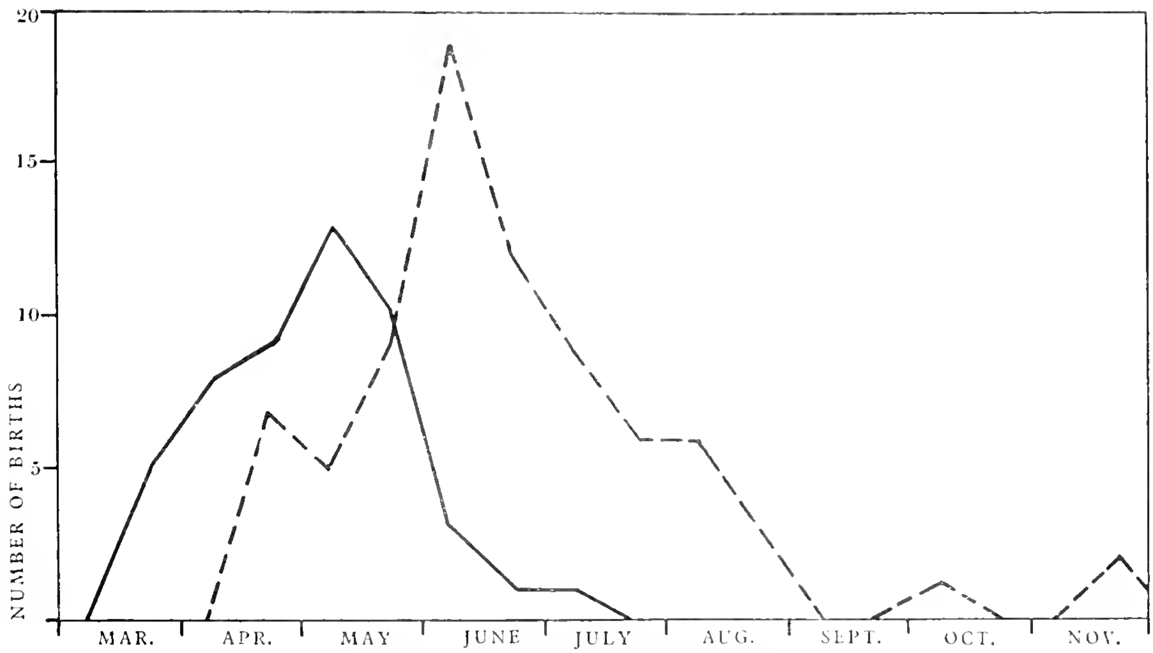


Fig. 148. Curve of frequency of births.
——— Blue whales. - - - - - Fin whales.

As explained above it is being assumed that the foetuses grow at the same speed during gestation. If, however, some foetuses grow faster than others the result would be that the season of parturition might be more protracted than the pairing season. On the other hand it is possible that a whale which was impregnated early might retain the foetus slightly longer than one which was impregnated later, since birth apparently takes place mostly when the parent migrates northwards to warmer waters, and the attainment of the proper environment might have the effect of stimulating slightly premature parturition in a whale in which the foetus was later than the average. There is still another assumption involved in the construction of the foetal growth curves, and that is that the earliness or lateness of a pregnant whale's visit to the neighbourhood of South Georgia is not affected by the age of the foetus, i.e. the time at which impregnation took place. But it seems quite possible that a female which had not been impregnated before the later part of the pairing season might delay her southern migration until impregnation took place, while those which had been impregnated earlier might also travel southwards earlier. Now as will be shown in a later section the whale population at South Georgia undergoes considerable changes during the season and it may be that the foetuses measured in the earlier part of the South Georgia season were conceived earlier than those measured in the later part of the season. The effect of this would be that the curve of mean foetal growth, constructed as it is from the progressive increase in the lengths of foetuses during the season, shows a slower rate of growth than that which actually takes place. In other words, if the time of the southern migration is influenced by the time of impregnation and if individual pregnant females stay in the vicinity of South Georgia only for a comparatively short time, then the length of the period of gestation is somewhat shorter than the period which has been estimated. However, there is no definite evidence to show that this actually happens and in any case the difference may not be very great.

An important point to be considered at this stage is the length of the interval which elapses between successive pregnancies in an individual. For this also the percentage of pregnant females must be examined. If, for instance, pregnancy normally took place every year we should expect to find nearly every adult female pregnant at almost any time of year since the period of gestation lasts only a little less than a year, and it would follow that a female would normally be impregnated long before she weaned her calf. On the other hand, if pregnancy recurs every two years one would expect to find slightly less than 50 per cent of the adult females to be pregnant at a given time or if every three years something less than 33 per cent and so on. Calculations of this kind, however, involve a dangerous assumption, namely, that the whales actually brought to the whaling station at South Georgia, or any other localities, constitute a representative sample of the general stock of whales. This is a subject to be dealt with in a later section, but it may be said at once that such an assumption is definitely not justified except so far as certain approximate estimations are concerned. It is quite certain that the whales caught off the south-west African coast are not representative of the whole stock, and at South Georgia the whale population is perpetually fluctuating both as regards constitution and numbers. However, as far as the latter locality is concerned some reasonably certain inferences may be drawn if they are based on observations covering several seasons. The percentages of adult females pregnant vary mostly between 20 per cent and 50 per cent in the case of Blue whales and 20 per cent and 70 per cent in the case of Fin whales. Of all the adult females examined at South Georgia and Saldanha Bay 31 per cent of the Blue whales and 46 per cent of the Fin whales were pregnant. From this alone it can be regarded as fairly certain that pregnancy does not normally recur every year and the fact that out of the large number of lactating whales examined not one was pregnant, clearly rules out the possibility of annual pregnancy so far as the great majority of whales are concerned. The uterus in lactating whales has not always been opened, but it has invariably been found in these whales that the ovaries have no functional corpus luteum, i.e. of the type referred to in the section on ovaries as corpus luteum *a*. There exist, however, one or two records of lactating females which were pregnant. It appears that Barrett-Hamilton found one or two pregnant Humpbacks with milk in the glands and Hinton mentions one or two cases recorded in the north among Blue whales. Risting also refers to such cases among Humpbacks. We have not examined a sufficient number of Humpbacks to express an opinion on that species, but so far as Blue and Fin whales are concerned it must be supposed that such cases are extremely rare, but might arise if a female were impregnated near the end of a long period of lactation.

The percentage of Fin whales pregnant (46 per cent) strongly suggests that pregnancy recurs every two years. The percentage of Blue whales pregnant is lower (31 per cent) but is still rather high for pregnancy every three years and one would not expect Blue and Fin whales to differ in this respect. Taking everything into consideration, including the uncertainty as to whether one is dealing with a representative sample of the general stock of whales, it may be said that although the possibility of pregnancy every three years is not finally ruled out, it may be regarded as almost certain that it recurs in the majority of cases every two years. It is probable that an interval of three years may occasionally elapse between pregnancies, but apart from considerations of the ratio of pregnant whales we have firstly the fact that gestation lasts for nearly a year, and secondly, as will be shown below, the nursing period lasts until after the next pairing is over. Thus it is naturally at the second pairing season after gestation that the next impregnation may be expected to take place.

We now come to the nursing period. This does not necessarily correspond to the whole period during which the mother is accompanied by the calf or to the whole period during which the mammary glands of the parent are in functional activity, but for our immediate purpose it is required to find the length of the period from birth until weaning. To find the length of the period of gestation it was necessary to ascertain the size of the calf at birth and the rate of growth from conception until parturition. In the same way it is now required to find the length of the young whale at weaning and the rate of growth of the calf during the nursing period.

The period of lactation is more difficult to determine than the period of gestation, but a few records are available which may be plotted out in much the same way as the foetuses. In the first place, the average length at which weaning takes place may be found (in the same way as the length at birth) from records of the largest sucking calves and the smallest young whales which are feeding independently.

Among Blue whales examined by us there appear to be only two which were being fed by the mother. These were both caught at Saldanha Bay in September. The first, No. 1064, measured 13·35 m., and had very poorly developed baleen plates, of which the longest were only 18 cm. A curve showing the rate of growth of the baleen is given in Fig. 49 on p. 314. This curve shows a sudden increase in the rate of growth after the calf has reached a length of 16·0 m., and it has already been suggested that this increase is connected with a change from a diet of milk to one of krill, and comes considerably after the longest plate has reached a length of 18 cm. Whale No. 1064 was taken two days after a lactating whale (No. 1057) by the same boat and at the same spot, and was considered by the whalers to be the calf of that whale. The stomach contained no krill but a turbid, watery fluid was present, and this seems compatible with the suggestion that this was a calf which was being fed by the mother but had been starved for two days. In any case it is fairly certain that this 13·35 m. whale can be safely put down as an unweaned calf.

Ten days after the capture of No. 1064 another Blue whale (No. 1085) was taken, which measured 13·95 m. Here the baleen was still short (22 cm.) and the stomach is noted as containing "a yellow fluid". The baleen seems hardly long enough for independent feeding and has not yet reached the length at which the increased rate of growth takes place. This may have been the calf of No. 1079, a lactating Blue whale caught the day before.

These two (Nos. 1064 and 1085) are the two largest unweaned calves of which we have been able to find records. Messrs Hamilton and Matthews, on a visit to Durban in 1926, measured a young Blue whale of 11·85 m. of which the baleen measured 15 cm., but there was unfortunately no opportunity to examine the contents of its stomach.

Unfortunately we met with only one whale measuring between 13·95 m. and 16·0 m. and in this whale (No. 823, 15·83 m.) the baleen and stomach were not examined. At 16·25 m. No. 248 had baleen 27 cm. long and a substance "like congealed blood" (which may well have been partially digested milk mixed with some blood) in the stomach. The probability is on the whole that this whale had not yet taken to independent feeding.

Two other whales (No. 767, 16·8 m. and No. 1584, 16·95 m.) both had krill in the stomach. The baleen was not measured in these whales but in No. 1104 which measured 16·82 m. (and had only blood in the stomach) the baleen was 40 cm. long, suggesting that this whale had also been weaned.

It is thus reasonably certain that weaning takes place when the calf has reached some length between about 14·0 m. and 16·5 m. In view of the fact that No. 248 measuring 16·25 m. was probably not weaned, and that the growth of the baleen plates appears to become speeded up between 16·0 m. and 17·0 m. it is probable that the required length is much nearer 16·5 m. than 14·0 m. Now, although No. 248 appeared not to be weaned it will probably be safest to put the mean length at which Blue whales are weaned at 16·0 m. for there is likely to be plenty of variation in the length of the calf at this stage and we have three whales from 16·8 m. to 16·95 m. which were all weaned.

Fin whales are evidently weaned at a much shorter length than Blue whales. The smallest specimen we examined measured 12·3 m. (No. 891) and had krill in the stomach and baleen 41 cm. long. Krill was also present in No. 999 (13·35 m.) but the baleen was not measured. In No. 910 (13·38 m.) the stomach was empty, but in No. 84 (13·55 m.) a milk-like substance was present in the stomach and the baleen measured 30 cm. In No. 1187 (also 13·55 m.), on the other hand, the baleen measured 50 cm. and though the stomach contents were not examined the faeces were typical of whales feeding on krill.

It is a pity that no Fin whales of less than 12·0 m. were seen, but it may be gathered that weaning in this species takes place when the calf is in fact about 12·0 m. long. There are not quite adequate data for the construction of the curve of baleen growth (see p. 355) and the first half of it rather depends on analogy with the curve for Blue whales, but it is evident from the plotted points that no spurt in growth takes place after the calf has reached much more than 13·0 m. and one may expect that it occurs between 12·0 m. and 13·0 m. All the whales over 12·0 m. were weaned except perhaps one. This one (No. 84 mentioned above) was probably unweaned, and it merely serves to show that if a Fin whale *can* reach 13·55 m. before being weaned, the normal length at which Fin whales are weaned is not likely to be far below 12·0 m. It might in fact be above 12·0 m., for No. 891 (12·3 m.) might have been weaned earlier than usual. Hinton refers to two records of Fin whale calves of 40 ft. and 45 ft. (i.e. 12·2 m. and 13·7 m.) from the North Atlantic which were suspected of being fed on milk owing to a yellowish substance found in the stomach.

In any case, until further material has been collected, it may be assumed that Blue whales are weaned on the average at 16·0 m. and Fin whales at 12·0 m. The difference between these two lengths is very striking, especially as it actually exceeds the difference between the lengths at which the two species become sexually mature, but it seems impossible to avoid the conclusion that if the growth of the baleen of Fin whales resembles that of Blue whales, the increase in the rate of growth takes place when the Fin whale is 4·0 m. shorter than the Blue whale.

In an estimation of the rate of growth of the calf during lactation and the length of the nursing period, an examination of the ratio of mature females which are nursing is not of much assistance, for their appearance is very irregular and there is a probability that a part of the nursing period is spent in some seclusion or segregation from the main herds, so that the proportion represented by those which do appear on the whaling grounds is uncertain. Furthermore, it must be remembered that the killing of females accompanied by a calf is prohibited in the Dependencies. From the accounts of the whalers it seems that young calves are very rarely seen in the Dependencies but are commoner off the South African coasts. This is to be expected since the calves appear to be born early in the southern winter when the mothers have travelled north into the warmer waters. Small calves are of course seldom killed by the South African whalers as they are scarcely worth pursuing, but, as is pointed out in the section on blubber, the lactating whales examined at Saldanha Bay were very fat compared with those at South Georgia, indicating a comparatively early stage in the nursing period. It happens occasionally at South African stations that sucking calves are killed and when this occurs valuable evidence is provided as to the rate of growth during the nursing period. At South Georgia Blue whales of less than 16·0 m. or Fin whales of less than 13·0 m. are practically never captured.

As scarcely any small calves have appeared in the course of our work it is necessary to turn elsewhere to find material on which to extend the curve of growth. Records of calves are extremely scarce, but among the statistics furnished to the British Museum by the whaling companies the number of whales recorded is so great that it is possible to glean a moderate number of measurements of whales sufficiently small to be regarded as unweaned calves. These have been plotted according to their size and date in Figs. 149 and 150, and are taken from the statistics of the whaling stations at South Georgia and of Messrs Irvin and Johnson's station at Saldanha Bay, Cape Colony. Records from the South Shetlands and South Orkneys have been excluded as unreliable owing to the difficulty of measuring whales from a floating factory.

For the estimation of the rate of growth during lactation Blue whales may be taken first, since for this species the material gives rather more definite results. It will be seen in Fig. 149 that the plotted points representing calves are much more scattered than those representing foetuses, but that the young calves are inclined to occur early in the southern winter while the large ones are massed in the late winter and early summer (i.e. about October, November and December). There is in fact an unmistakable path of points sloping upwards through the southern winter, and the mean curve of growth is drawn to represent as closely as possible the line of this path.

Two dotted curves are drawn parallel to the mean curve of growth and set on either side of it at intervals of two months. Over the gestation period these curves are accurate reproductions of the mean curve and represent the growth of foetuses conceived two months before or two months after the height of the breeding season. They are similar during the nursing period, but are drawn to diverge slightly to allow for differential rates of growth. It will be seen that these two curves enclose not only practically every foetus but also the vast majority of the calves. In other words, although they appear rather scattered and irregular, it may be supposed that the majority of recorded calves were born within four months of one another. Various factors might explain the points which fall outside the dotted curves, among which are exceptional pairings outside the breeding season, exceptionally rapid or slow growth after birth, and faulty measurement or recording by those supplying the statistics from which the plotted calves are derived.

To return to the mean growth curve it is seen that this reaches the 16 m. level opposite the earlier part of December. It may be estimated therefore that the nursing period lasts on the average from May to December, i.e. about seven months. Growth during this period thus appears to be very rapid and equal (in linear increase in size) to the rate at the end of gestation.

One might expect that the occurrence of lactating females, especially at South Georgia, might help to throw some light on the normal time at which the nursing period closes, but little help is to be found in this direction owing to the irregularity of the appearance of these whales. In the 1925–6 season at South Georgia there was a comparatively large number early in the season and few in the second half, a state of affairs which appears to tally well with the foregoing conclusions as to the nursing period. On the other hand, in the 1926–7 season, the lactating Blue whales predominated towards the end. It must of course be remembered that December would be only the average of a large number of times at which weaning might take place and that the process of weaning

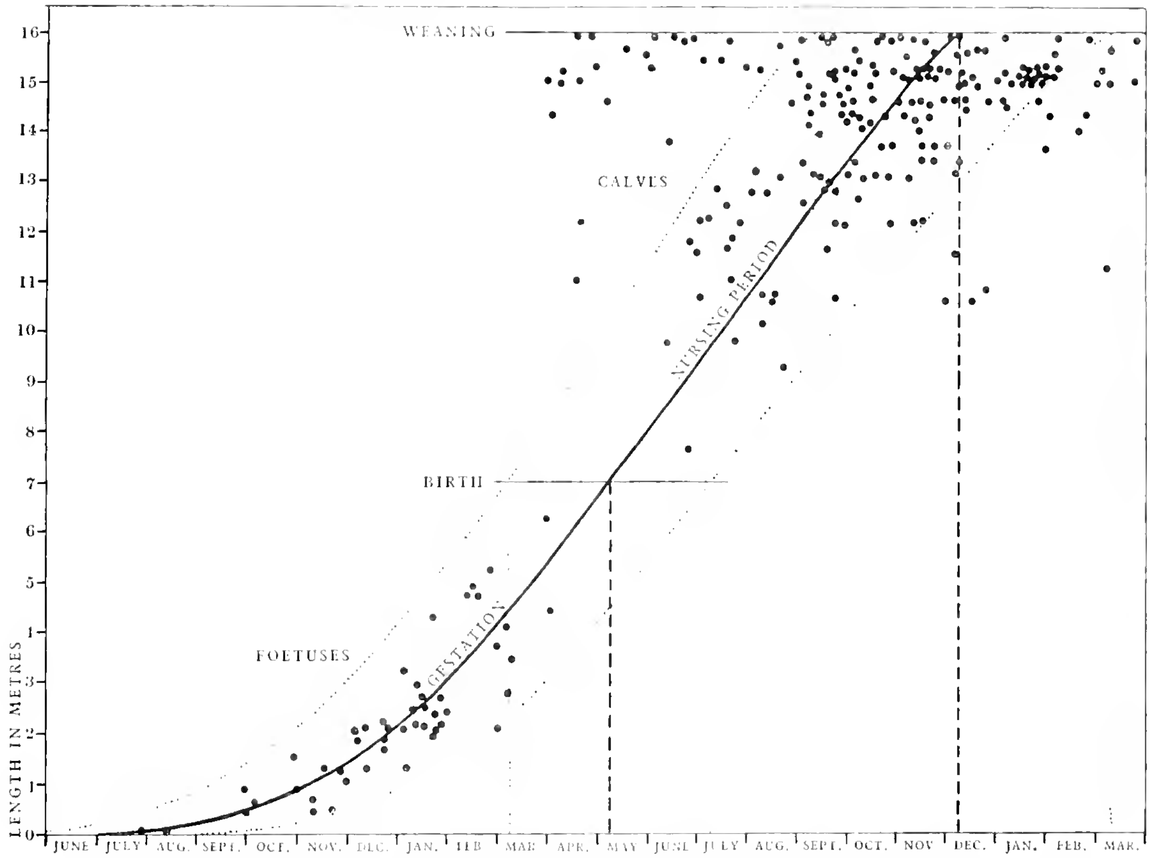


Fig. 149. Blue whales. Mean curve of growth during gestation and nursing.

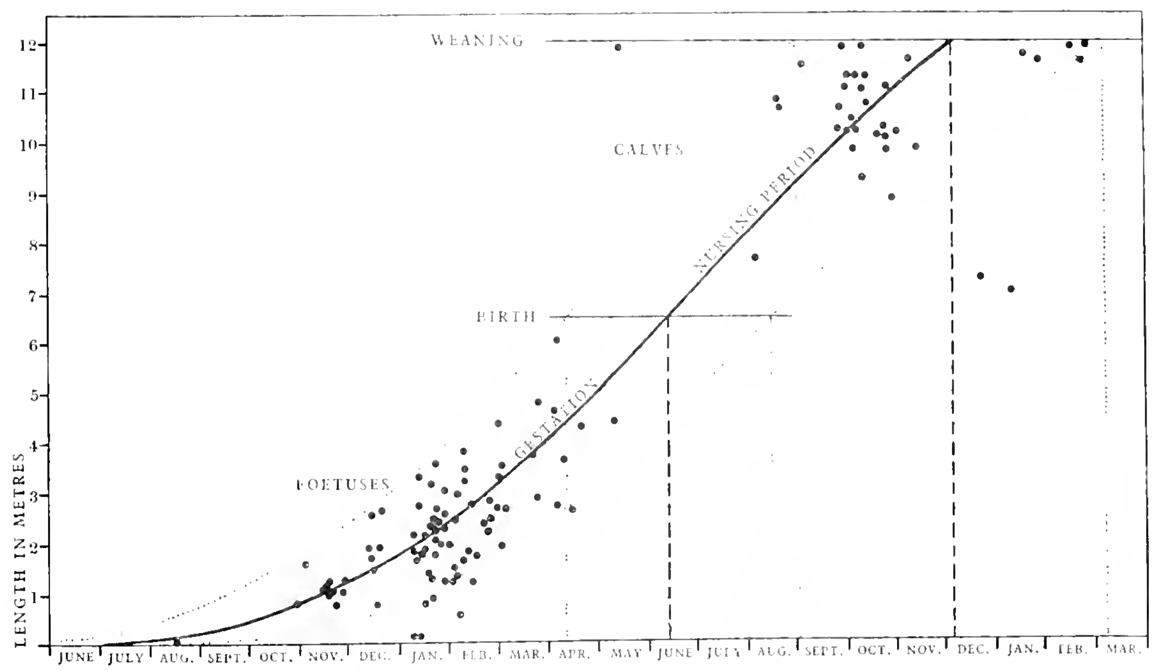


Fig. 150. Fin whales. Mean curve of growth during gestation and nursing.

may itself take some little time and an even longer period may elapse before the condition of the mammary glands has finally reverted to the normal. Thus in any case we may expect to find lactating whales long after December, but even so the most important cause of the irregularity in the appearance of lactating females is that their distribution and movements are probably different from other "classes" of Blue whales. It is not unlikely that they seek seclusion of some kind during a large part of the nursing period and it is probable that if the catches of the whaling stations constituted a representative sample of the whole stock, the lactating whales would regularly be found to be more numerous in the earlier part of the southern summer.

We have seen then that the nursing period in Blue whales appears to occupy about seven months, on the average from about May to December, and that during this period the length of the calf becomes more than doubled.

Fig. 150 has been constructed for Fin whales in just the same way as Fig. 149, but the records of calves are scarcer than in the case of Blue whales. This is no doubt due to the fact that the calves in this species, being weaned when much smaller than those of the Blue whale, are from the whaler's point of view not worth taking. All that can be said is that there is a group of large calves occurring mostly about October which were presumably born in the previous autumn (i.e. between about April and July). The mean growth curve is therefore continued upwards so as to pass through the middle of this group. It is then found to reach the 12 m. level opposite the month of December. Thus for Fin whales about six months is estimated for the nursing period which, on the average, should last from June to December. It will be noted that the rate of growth during this period is appreciably slower than that of Blue whale calves.

As to the occurrence of lactating whales much the same comments apply to Fin as to Blue whales, but lactating Fin whales appear to have been spread a little more evenly over the season than lactating Blue whales.

In considering now the subsequent growth of the young whale, Blue whales must again be taken first. Up till now the rate of growth of the calf has been extremely rapid, but there is some evidence that after weaning the rate of growth slows down considerably. This fact together with the almost certain intervention of different individual rates of growth would obscure any evidence from the plotting of larger whales according to length and date, and in order to find the rate of growth over the next period of development, that is from weaning to sexual maturity, different methods have to be employed.

By a kind of statistical analysis of the catches of whales it can be argued that in all probability the period which elapses between weaning and sexual maturity is rather less than two years, or rather more than two years from birth. The evidence from this cannot perhaps be regarded as conclusive, but receives support from evidence from certain other sources.

It is necessary first to consider some aspects of the migrations of Blue and Fin whales. It has been shown that the period of lactation mostly covers the winter and early part of the southern summer. During the winter the whales are to the north in warmer water, but in the spring the southward migration begins and from the fact that weaning appears to take place about December, it is to be supposed that the mother with her calf migrates southwards in the beginning of the summer in order to wean the calf on the feeding grounds of the Dependencies. Probably the migration of the mother is more leisurely than that of the main body of whales travelling to the south. This is in itself probable since the calf cannot be expected to swim as fast as the adult. The suggestion is also supported by other facts. For instance there is a phenomenon which appears to be quite regular from year to year at South Georgia. If reference is made to Plates XLIII and XLIV, it will be seen that in the second half of the South Georgia season there is a regular influx of smaller whales, and that many of these (unless growth has slowed down to an improbable extent) can hardly have been weaned more than a few months, and are thus the season's new batch of whales.

There is one point, however, which does not appear to agree very well with the theory that the mother and calf regularly migrate southwards towards the end of the nursing period and that is that there are numerous small whales off the South African coast in winter, many of which are obviously too small to have migrated south and back again to warmer waters since they were weaned. It is difficult to say what relation these small South African whales bear to the main stock. It is possible that in some cases the calf is weaned on the small and rather scarce krill in those waters and remains in the northerly regions for the first summer.

Up to the present the story of the whale's growth may be summarized as follows. Impregnation in both Blue and Fin whales may be expected to take place about June or July and the calf is born on the average about the beginning of the following May after the parent has made a southward migration to feed during gestation and returned to the warmer waters towards the north. The calf is born at 6·5 to 7 m. and during a nursing period of some six or seven months it grows to about 16 m. in the case of Blue whales and 12 m. in the case of Fin whales. At this stage the summer is reached and the calf is weaned when it has migrated with the parent to the southern feeding grounds.

It is now necessary to find the rate of growth from this point up to sexual maturity, and to throw light on this we must, as mentioned above, examine the catches from a statistical point of view.

The following table shows the length frequencies of all the whales examined in the course of our work. That is to say it shows, for various periods, the numbers of individuals which have occurred at different lengths, successive metres of length being taken as the most convenient length groups. Separate figures are given for separate seasons, but the second half of the 1924–5 season (when work was started) and the 1925–6 season are amalgamated in one column as the constitution of the whale population of South Georgia was somewhat similar in these two seasons, whereas it was quite different in the 1926–7 season.

The result of this analysis of the catches can be examined more satisfactorily in a graphic form. In Figs. 151, 152 and 153 the figures are plotted in charts which show the number of whales in each length group, the different seasons and sexes being kept separate as in the table.

Blue Whales

Length in m.	Number of females					Number of males				
	Feb. to May 1925	Oct. 1925 to Mar. 1926	Feb. 1925 to Mar. 1926	Nov. 1926 to Apr. 1927	Saldanha Bay 1926	Feb. to May 1925	Oct. 1925 to Mar. 1926	Feb. 1925 to Mar. 1926	Nov. 1926 to Apr. 1927	Saldanha Bay 1926
13	—	—	—	—	2	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—	—	1
16	—	4	4	—	7	1	—	1	1	2
17	2	3	5	2	16	1	7	8	7	21
18	4	12	16	5	28	6	9	15	6	33
19	6	7	13	9	24	7	8	15	8	23
20	9	7	16	4	12	2	7	9	6	14
21	5	4	9	4	8	11	8	19	3	1
22	4	5	9	7	4	6	3	9	15	7
23	6	2	8	14	2	4	5	9	33	7
24	5	7	12	15	6	8	9	17	45	6
25	7	7	14	42	7	4	2	6	28	3
26	8	11	19	36	9	—	—	—	3	2
27	2	1	3	6	1	—	—	—	—	—
28	—	1	1	2	—	—	—	—	—	—

Fin Whales

Length in m.	Number of females					Number of males				
	Feb. to May 1925	Oct. 1925 to Mar. 1926	Feb. 1925 to Mar. 1926	Nov. 1926 to Apr. 1927	Saldanha Bay 1926	Feb. to May 1925	Oct. 1925 to Mar. 1926	Feb. 1925 to Mar. 1926	Nov. 1926 to Apr. 1927	Saldanha Bay 1926
12	—	—	—	—	1	—	—	—	—	1
13	—	—	—	—	1	1	—	1	—	5
14	—	1	1	1	14	—	2	2	1	23
15	2	2	4	3	25	—	2	2	4	30
16	2	6	8	1	14	2	3	5	2	18
17	5	3	8	3	9	4	4	8	5	8
18	8	9	17	5	2	8	9	17	7	3
19	9	8	17	4	1	17	42	59	13	9
20	12	18	30	11	4	18	88	106	18	13
21	17	40	57	18	4	6	56	62	10	4
22	15	40	55	13	—	—	4	4	1	—
23	4	9	13	3	—	—	—	—	—	—
24	1	3	4	—	—	—	—	—	—	—

If one were dealing only with fully grown whales one would expect a curve constructed in this way to resolve itself into something like a normal frequency curve, the medium-sized whales being commonest and the larger and smaller whales progressively fewer. But as young whales in several stages of growth are included in the catches, the beginning or left-hand side of the curve (representing the smaller whales) may be expected to rise more gradually, and over a greater range of size, than the right-hand

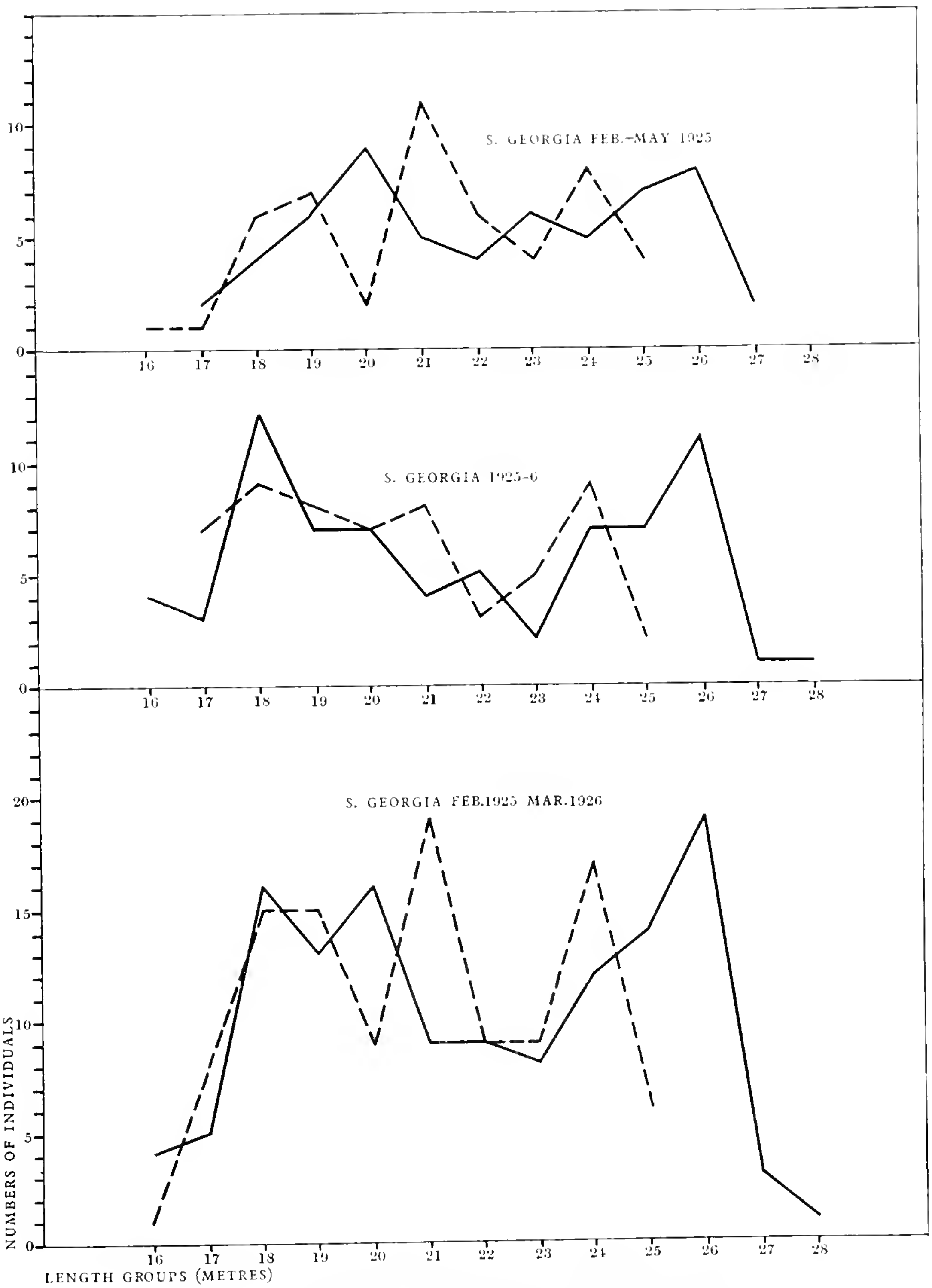


Fig. 151. Blue whales. Length frequencies for different periods.

——— Females. - - - - - Males.

part of the curve (representing the specially large whales). This, approximately, is the result obtained among Fin whales (Fig. 153). The difference between the two maxima represents roughly the normal difference in length between the sexes.

When we turn to the Blue whales we find that some of the curves are of quite an unexpected shape. In the 1926–7 season, when the majority were fully grown, the curves are of the normal type found in Fin whales with one marked apex for each sex, but in the preceding seasons the curves tend to resolve themselves into several apices

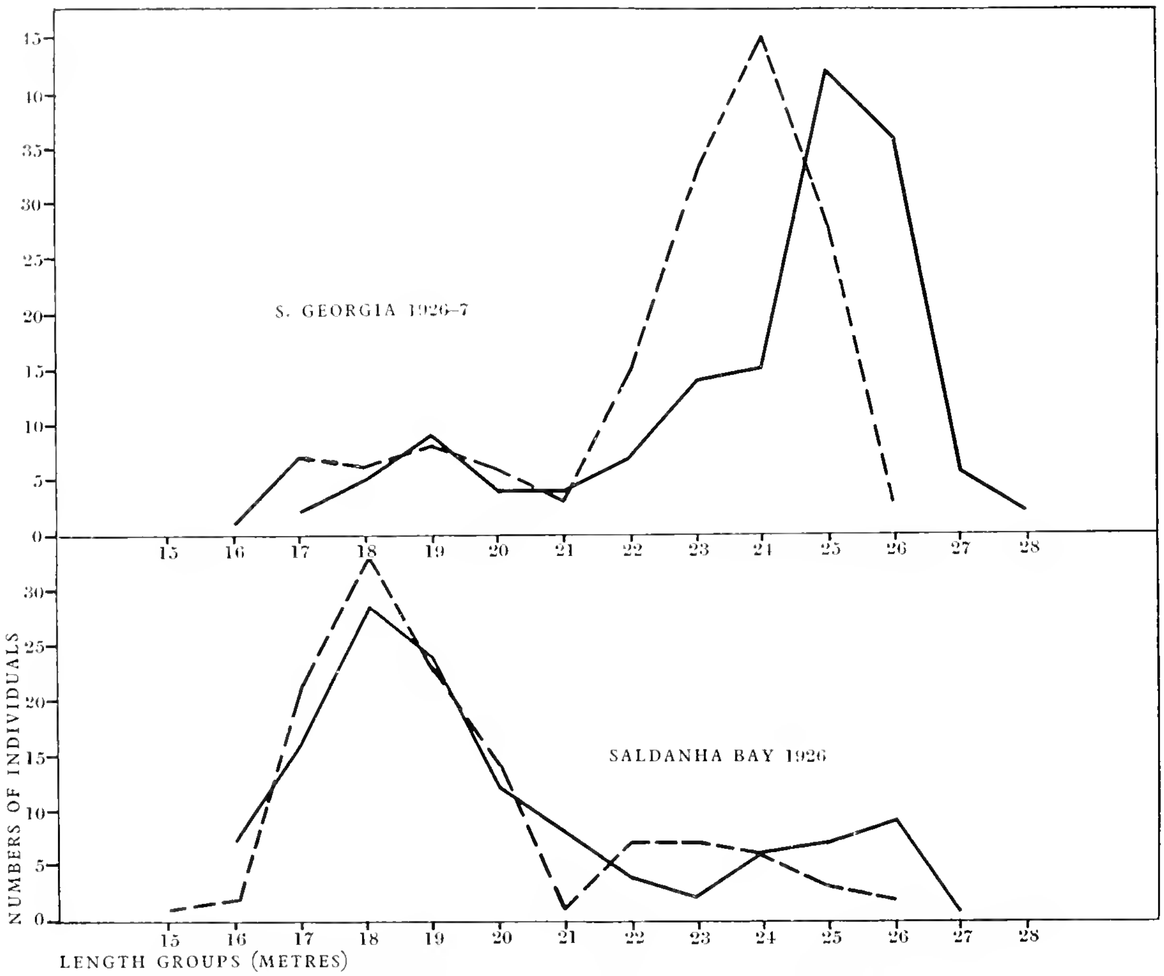


Fig. 152. Blue whales (*continued*). Length frequencies for different periods.

——— Females. - - - - - Males.

of comparatively uniform prominence. Perhaps the best example is furnished by the figures for males and females in the half-season February to May 1925. There are three maxima for each sex showing that males are commonest at 18–19 m., 21 m. and 24 m. and less numerous at 20 m. and 22–23 m., and that females are more numerous at 20 m., 23 m. and 26 m. and less numerous at 21–22 m. and 24 m. In other words these whales tend to approximate to one of three different sizes which may be regarded as (1) small immature (18–19 m. in males, 20 m. in females), (2) large immature (21 m.

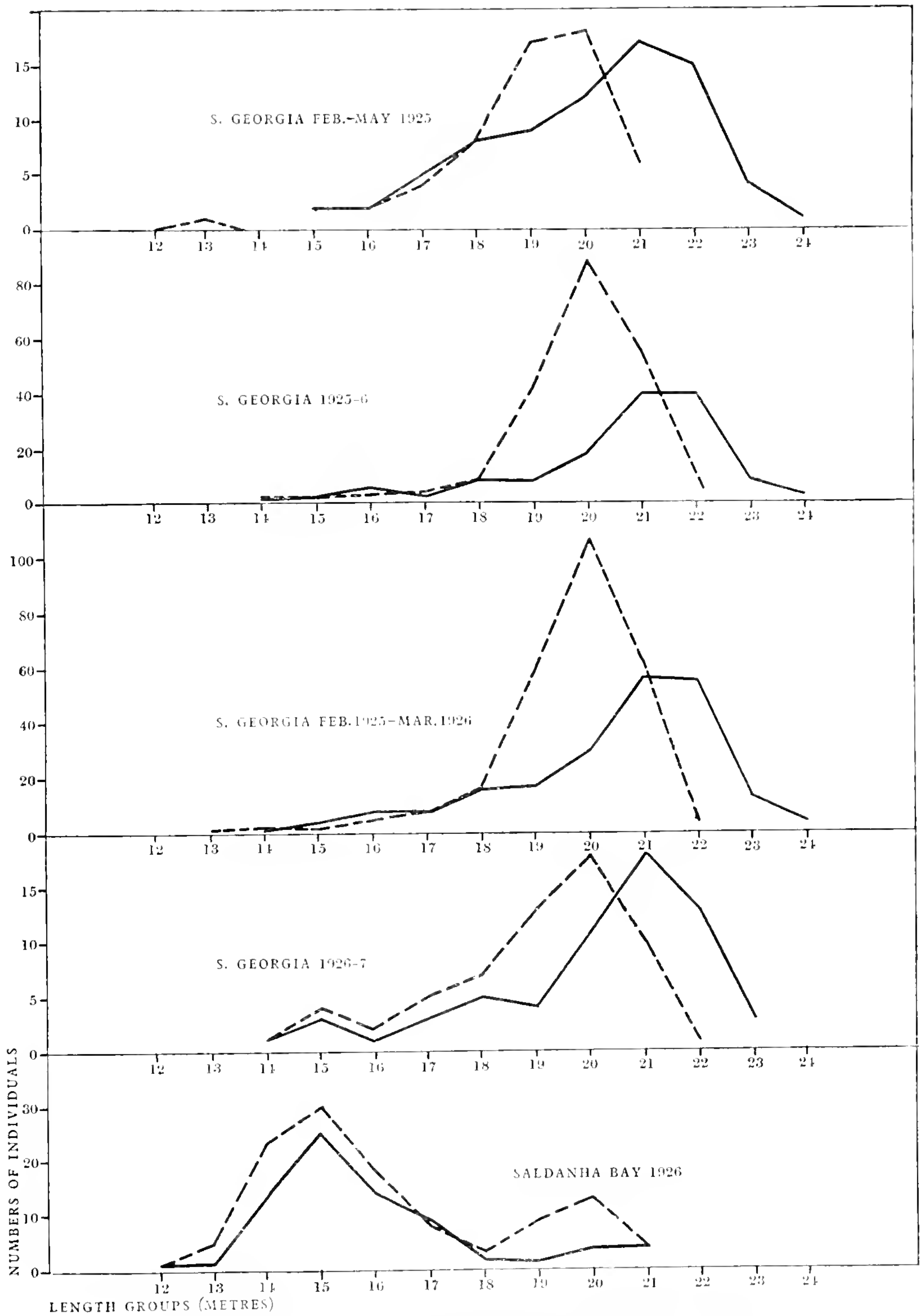


Fig. 153. Fin whales. Length frequencies for different periods.
——— Females. - - - - - Males.

in males, 23 m. in females), and (3) mature (24 m. in males, 26 m. in females). Again the differences between the maxima are about equal to the ordinary differences in length between the sexes.

The tendency towards three dominant length groups is also to be seen in the curves for the 1925–6 season, and in the graph showing the February–May 1925 figures combined with those of season 1925–6.

Although the numbers of whales on which these curves are based is small it is difficult to believe that the appearance of these length groups is due to chance, and the explanation seems to be as follows. If breeding took place regularly all the year round one would expect the young whales to appear equally at all sizes at any given time, but as breeding takes place mostly at a particular season there will be batches of

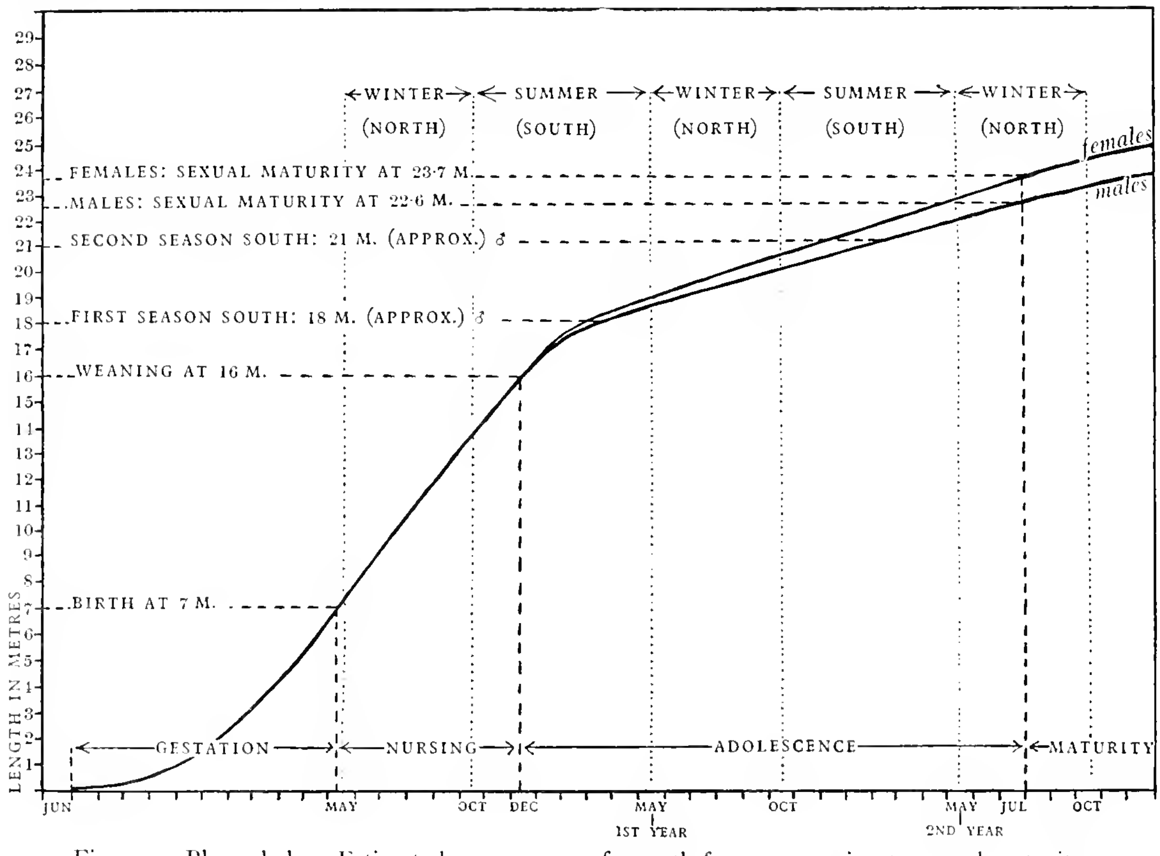


Fig. 154. Blue whales. Estimated mean curve of growth from conception to sexual maturity.

young whales differing in length from one another by an amount equal to a year's growth. It is therefore not unreasonable to suppose that the difference between our two immature groups represents a year's growth.

The most uniform results seem to be furnished by the male Blue whales. The facts may be stated as follows. In the summer season at South Georgia male Blue whales are most common at 18–19 m., 21 m. and 24 m. If the calf is weaned at 16 m. it might quite reasonably be expected, judging by its rapid growth during nursing, to grow to 18 m. before the end of its first summer (see Fig. 154). Then the inference from these length groups is that the young whale migrates northwards in the next winter, grows a little more and returns to the south in the second summer where it reaches a length of 21 m. At the end of this second summer it returns again to the north to grow up to 22 or 23 m. It is at this length (speaking still of male Blue whales) that sexual maturity is reached. Although there are very few whales among the winter catches at Saldanha Bay approximating to the length at which maturity is reached, it is still probable that this condition is attained before the commencement of the southward migration, for it appears that this locality is not the ordinary haunt of whales which leave the south in the winter.

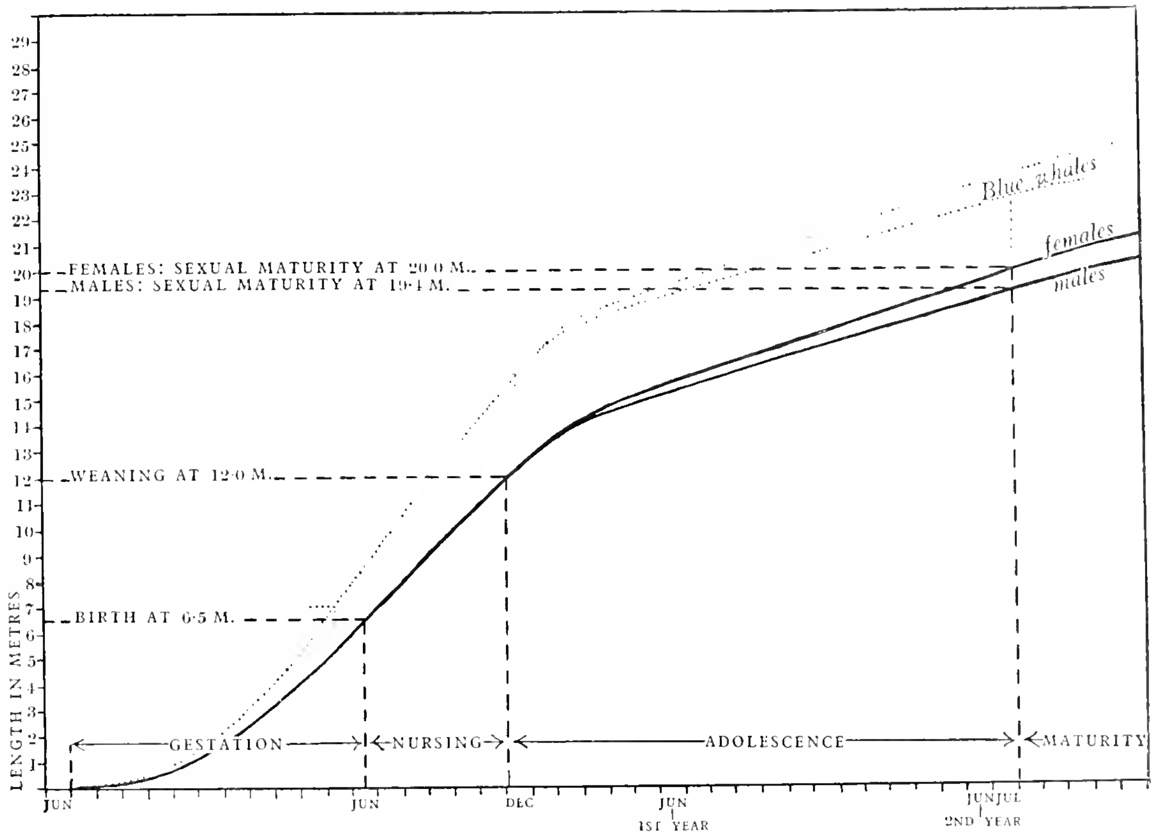


Fig. 155. Fin whales. Estimated mean curve of growth from conception to sexual maturity.

Thus if the whale is born at the beginning of May, then the indications are that sexual maturity is reached after a period of slightly more than two years. The general significance of this surprisingly rapid growth will be discussed later, and in the meantime we may complete the curve of growth for male Blue whales up to sexual maturity and slightly beyond that point, as it is to be supposed that the newly adult whale now grows up towards the third length group (24 m.) on its third visit to the south. This is shown in Fig. 154 in which the curve in Fig. 149 is continued and that of the female Blue whales added. It is suggested that the differences in length between males and females at sexual maturity and at maximum growth first appears some time after weaning. The smallest whales of both sexes caught at South Georgia are of about the same length.

In Fin whales it has already been seen that the rate of foetal growth is slower and that the foetus is born at a shorter length than that of Blue whales. The difference in length between the two species is thus marked from the start (by the slower growth rather than by the birth at a smaller size).

The breeding season among Fin whales appears to be less definite than that of Blue whales. As a consequence the length groups tend to coincide and this is presumably the explanation of the normal frequency curves shown in Fig. 153 instead of the trimodal curves of the Blue whales. As the growth rate of Fin whales is unlikely to be substantially different from that of Blue whales a provisional curve for the former can be constructed by analogy from weaning at 12 m. to sexual maturity at 20 m. for females and 19·4 m. for males (Fig. 155).

It may appear that a good deal has been taken for granted in the construction of this curve for Fin whales, but it must be remembered that the curves of growth subsequent to weaning are intended in both species only to represent the most probable rate of growth, as indicated by such evidence as is available. The important point is to find out whether two or three years or, say, five or six years are passed before maturity is reached, and the details of the curve are relatively insignificant.

At this point the steps by which the whole growth curve is built up from conception to the attainment of sexual maturity may be briefly recapitulated. The records of foetuses show that the greater part of foetal growth takes place during the southern summer, and this, coupled with the occurrence of very small embryos, evidence in the ovaries of ovulation and in the testis of a male sexual season, enables us to fix the middle of the breeding season about June or July. It is known that birth takes place in Blue whales at about 7 m. and in Fin whales at about 6·5 m., and by drawing a line to represent as nearly as possible the slope of the plotted foetuses we are able to complete the curve of growth during gestation, which gives us a period of about ten months. For the nursing period exactly the same method is used. The length of the calf at weaning is known to be in the neighbourhood of 16 m. in Blue whales and 12 m. in Fin whales. The gestation curve is extended over the nursing period, and, guided by points plotted to represent records of calves, reaches the length at which weaning takes place some six or seven months after birth. This brings us over the southern winter to the early part of the summer, the mother and calf having presumably migrated southwards during the spring. As to the rest of the curve of growth, the fact that adolescent Blue whales at South Georgia tend to approximate to one of two lengths is attributed to the production of annual batches of calves, and from this, the length at maturity being known, it is estimated that maturity is reached some two years after birth. Thus the whole curve is built up by ascertaining the lengths at which the important "landmarks", such as birth, weaning and sexual maturity, are reached, and by filling in the rate of growth between by whatever evidence is available.

The earlier part of the curve is based on the soundest evidence and it becomes more speculative towards the end. Perhaps the most important point which emerges is the very short period which elapses between birth and the attainment of sexual maturity.

The reliability of the statistical method of calculating this period might be questioned, but a glance at Figs. 154 and 155 will show that it is during the periods of gestation and nursing that the surprisingly rapid growth takes place and that the section of the curve based on the statistical evidence shows a marked reduction in the rate of growth.

Mention has already been made of a paper by Andrews (1914) on the Pacific Grey whale, *Rhachianectes glaucus*. Here there is more evidence of the rapid growth of whalebone whales, for, from some notes on the period of gestation and rate of growth, it appears that it more than doubles its length in its first year. An investigation of the rate of growth of this species is also made by Risting, who shows that by the end of this first year after birth this species is almost certainly adult.

Direct evidence of the rapid growth of a young whale, probably a Fin whale, is also mentioned in the *Report of the Interdepartmental Committee on Research and Development in the Dependencies of the Falkland Islands* (p. 77). Reference is here made to a case in which a recently born whale was observed early in May. It was presumably not more than about 8 m. long and had a wound by means of which it was recognizable. It was noticed by the whalers all through the summer, and by the autumn it had grown to some 14 or 15 m. This indicates a rate of growth which corresponds fairly well with that shown in Fig. 155.

The great size of Blue and Fin whales is apt to result, perhaps naturally, in the impression that they must require an exceptionally long time to grow to maturity and must live to a great age in comparison with other animals. It has been shown, however, that growth is surprisingly rapid during both gestation and adolescence, and that the whale becomes adult within an unexpectedly short time. It will therefore be interesting to make a comparison in this respect with some other mammals.

The period of adolescence in most mammals varies from about two to five times the length of the period of gestation, and up to a point it may be said that the larger the animal the longer the periods of gestation and adolescence. In the rat, for instance, the period of gestation is about three weeks, and it starts breeding about two months after birth, while in cats and dogs the corresponding periods are about two and ten months. The horse resembles the Blue and Fin whale in this respect, for gestation lasts for some eleven months and breeding may take place two years after birth. The longest period of gestation appears to be that of the elephant, in which twenty months elapse between conception and birth. The age at which puberty is reached is probably considerable, since full maturity is not reached before about twenty-five years.

Thus the periods of gestation and adolescence in whales are short in proportion to their size when compared with the land mammals. This is not only the case in Blue and Fin whales, but also, as we have seen, in *Rhachianectes*, in which both gestation and adolescence last only about one year. It is probable in fact that in marine mammals growth is in general relatively fast, for in the sea elephant also, which may be regarded as one of the definitely large mammals, the period of gestation is eleven months and breeding appears to begin about a year after birth.

A point of some interest arises when the development and growth of the whalebone whales is examined in connection with the enormous size attained by the adult. It has already been pointed out that during the early part of gestation growth is slow, but that the general form of the body is rapidly perfected, so that a foetus of 0·5 m. really differs very little from an adult whale.

Now although the difference in size between the sexes probably does not appear until about the time when the young whale is weaned, reference to Figs. 154 and 155 will show that the difference in size between Blue and Fin whales is apparent quite early in the development of the foetus. This specific difference in size is attained simply by more rapid growth on the part of the larger species and not by growth spread over a longer period. Blue whales are apparently ready for birth at a greater length in, if anything, an actually shorter time than Fin whales. It is probable that in the early stages of the development of the foetus, when the organs are being formed and the limbs completed, the actual increase in length would be approximately the same for both species, and it may be suggested that development up to this point does not differ in any special way from the development of other mammals, and that the foundations for the whale's great subsequent size have not yet been laid down. After this, however, instead of development being quietly finished off and birth taking place, the rest of gestation is devoted to a great burst of growth, the rapidity of which in the different species appears to be proportional to the size of the whale when fully adult. As it is practically certain that the great size of whales is, from the evolutionary point of view, a recently acquired character, it would naturally be expected to make its appearance in the later part of gestation. Thus the great size of a whale does not necessarily imply the need for a long period to attain that size. The capacity for rapid growth is to be regarded rather as one of a number of characters distinguishing certain whales from other mammals.

THE AGES OF WHALES

It is important that something should be known of the ages of whales, but the problem is a very difficult one to approach. At present no direct method of judging the age of any individual has been found, but it is often possible to say whether one whale is older or younger than another, and in the case of the younger whales there are sometimes grounds for making some kind of guess at the actual age. The main object, however, of this section will be to give an idea of the kind of results which may be hoped for in this direction in the future.

The size of a whale, the number of old scars, the condition of the vertebral epiphyses and the number of old corpora lutea may all throw some light on the age of a whale.

It is obvious that size is up to a point a rough criterion of age, and we already have grounds for supposing that when a whale reaches the size at which it should become adult it is about two years old. After a whale becomes adult it may reasonably be supposed that it will continue to grow at least a little and that in some cases it adds several metres to its length, so that one is justified in saying that, for instance, any female Fin whale measuring about 20 m. is unlikely to be more than two or three years old and that one measuring 23 or 24 m. is unlikely to be less than three or four years old. But one cannot go further than this.

The old scars left on the whale's skin by the wounds contracted in temperate or subtropical waters seem to be cumulative, for they are generally more numerous on large than on small whales, but they are of little value except that they may help to show whether a whale is comparatively old or comparatively young. It would be practically impossible to count the scars and such a figure would in any case convey very little information.

The condition of the vertebral epiphyses and the numbers of corpora lutea are worth considering in more detail. The former gives an indication of full maturity (and not merely of sexual maturity) and the latter, although it does not take us far, and applies only to females, is in some ways the most important clue to the age of a whale which has so far appeared.

The ankylosis of the epiphyses with the centra throughout the vertebral column can be taken as marking the attainment of full maturity in the animal and cessation of growth in length. Owen (1853), who found that the skeletons of such whales as were available for study possessed unfused epiphyses, suggested that no fusion ever took place and that the immature condition persisted to give greater flexibility to the body and tail, but Flower (1864) showed that when full maturity was reached fusion took place in whales as in other mammals. He further showed that the fusion first took place in the cervical and caudal regions and proceeded from each end to the middle of the column.

The examination of the vertebrae at whaling stations would be much more profitable than it is were it not for the practical difficulties involved. At South Georgia the cutting up of the carcasses is accomplished with considerable speed, and as the operation of exposing the epiphyses is a comparatively laborious process it is impossible to carry it out systematically. At Saldanha Bay some opportunities for this work occurred and a number of observations were made upon whales whose length suggested that they might be approaching or past full physical maturity. The method of examination consisted essentially in cutting away the periosteum between the vertebrae and exposing the edge of one of them. The state of fusion of the epiphysis with its centrum could then be noted. At the whaling station at Saldanha Bay the vertebral column was usually hauled on to the "bone platform" ventral side uppermost. This permitted the counting of the vertebrae from the first ventral chevron and facilitated the cutting away of the periosteum without assistance from station hands and machinery. As many vertebrae as time permitted were examined, but not more than three could be done at any time before the column was cut up.

The observations made were as follows:

Blue Males

Whale number	Length (m.)	Vertebrae examined	State of epiphyses	Notes
1045	23·3	3rd dorsal	Not ankylosed	Vertebra red, epiphysis white
		8th dorsal	Not ankylosed	Vertebra red, epiphysis white
		13th dorsal	Not ankylosed	Cartilaginous layer between epiphysis and centrum
1109	24·9	10th lumbar	Ankylosed	—
1100	25·9	10th dorsal	Ankylosed	Rounding off
		10th lumbar	Ankylosed	Rounding off
1029	26·3	10th dorsal	Ankylosed	No traces of join
		4th lumbar	Ankylosed	No traces of join
		9th lumbar	Ankylosed	No traces of join

Blue Females

Whale number	Length (m.)	Vertebrae examined	State of epiphyses	Notes
1095	19·85	5th dorsal	Not ankylosed	—
		10th dorsal	Not ankylosed	—
981	20·1	2nd or 3rd dorsal	Not ankylosed	—
1124	25·7	3rd dorsal	Not ankylosed	Vertebra red, epiphysis white. Greatest contrast in 3rd dorsal
		5th dorsal	Not ankylosed	
		10th dorsal	Not ankylosed	
1079	25·95	7th dorsal	Not ankylosed	Vertebra red, epiphysis white
900	26·3	10th dorsal	Not ankylosed	Vertebral column broken on platform. Epiphysis parted from centrum

Fin Males

Whale number	Length (m.)	Vertebrae examined	State of epiphyses	Notes
940	15·43	7th dorsal	Not ankylosed	—
1030	19·0	8th dorsal	Not ankylosed	Vertebra red, epiphysis white
		13th dorsal	Not ankylosed	—
1111	20·35	10th dorsal	Not ankylosed	Vertebra red, epiphysis white
		15th dorsal	Not ankylosed	Vertebra and epiphysis white
		10th lumbar	Not ankylosed	—
1094	21·2	10th dorsal	Ankylosed	Rounding off
		10th lumbar	Ankylosed	Rounding off
		15th lumbar	Ankylosed	Rounding off

Fin Females

Whale number	Length (m.)	Vertebrae examined	State of epiphyses	Notes
186	21·7	6th dorsal	Not ankylosed	—
963	16·78	1st dorsal	Not ankylosed	—

These observations, being made on the dorsal and lumbar vertebrae near the middle of the vertebral column, should, if Flower is correct, be sufficient in most cases to show whether or not fusion has spread through the whole column.

Complete maturity appears to have been attained in three of the Blue males but in none of the Blue females, although the largest measured over 26 m. Only one vertebra was examined in No. 1109, so that one cannot be certain about the whole column, but there is little doubt that Nos. 1100 and 1029 were fully mature. From this it appears that male Blue whales reach full physical maturity at somewhere about 25 m. and females at some length over 26 m., but the data are of course extremely meagre. The data for Fin whales suggest about 21 m. as the corresponding length in males and probably 22 or more metres in females.

As was to be expected these observations give further evidence that females are normally of greater size than males.

It has been pointed out in the section on the reproductive organs that a clue to the age of a female whale is to be found in the remains of the corpora lutea of the ovaries. At the end of its existence as a functional body (i.e. very soon after parturition; or, if the ovum is not fertilized, after presumably a much shorter period) the corpus luteum shrinks to a small fibrous body. Old corpora lutea formed in this way may accumulate, owing to their longevity, in considerable numbers in whales which have been adult sufficiently long. Thus a whale with a large number of corpora lutea is almost certainly older than one with a small number, and if one large group of females on the average has more corpora lutea than another group, there is hardly any doubt that they are on the average older whales. We may make use of this in a general comparison of the ages of the whales caught in successive seasons and examined by us. The figures are as follows:

Blue Whales

Season	Number of adult females*	Average length	Average number of corpora lutea
South Georgia, Feb.–May 1925	18	25·46	5·78
South Georgia, 1925–6 season	21	25·56	6·67
South Georgia, 1926–7 season	47	25·54	10·96
Saldanha Bay, 1926 season	25	25·54	7·10

* In which the total number of functional and old corpora lutea could be counted.

It is seen from this that female Blue whales averaged about the same age during the second part of the 1924–5 season at South Georgia and during the 1925–6 season at South Georgia and the 1926 season at Saldanha Bay. But it is evident that their ages were, in general, distinctly greater in the 1926–7 season at South Georgia.

In the case of Fin whales (see table overleaf) it appears that in all four seasons there was no marked difference in the average ages.

It has been shown that the difficulty of estimating a whale's actual age from the number of old corpora lutea lies in the uncertainty of the number which are formed each season. Several years at least, and possibly many years, must elapse before the last traces of a corpus luteum disappear, but as one cannot be sure that they do not last indefinitely, any estimations of actual age must be applied only to the younger whales.

Fin Whales

Season	Number of adult females*	Average length	Average number of corpora lutea
South Georgia, Feb.–May 1925	33	21·56	9·18
South Georgia, 1925–6 season	75	21·78	10·05
South Georgia, 1926–7 season	18	21·96	11·00
Saldanha Bay, 1926	6	21·12	9·50

* In which the total number of functional and old corpora lutea could be counted.

In a polyoestrous animal the possible number of ovulations in any one season is restricted by the supervention of pregnancy or by the season itself. It is probable that the number will not be very great. Further, in a social and migratory animal like the whale, one might hope to find, at least for a season or two after the attainment of sexual maturity, a similarity in the experiences of the majority in respect of the number of ovulations which do occur. For instance, all whales in their first year of sexual maturity ovulate. After their first sexual season the minimum number of corpora lutea will be one (the whale having become pregnant at the first ovulation) and the maximum number will represent the number of dioestrous cycles, probably not much more than half a dozen. A majority of whales would perhaps have ovulated the same number of times, perhaps four or five corpora lutea being formed, and become pregnant. At the next season these whales will begin lactation and no corpora lutea will be formed, but further ovulations and a fresh batch of corpora lutea will occur at the third season.

Assuming that the number of old corpora lutea is normally increased in this way in alternate years, it is interesting to examine the frequencies of the numbers in which they are found to occur in the ovaries.

In Figs. 156 and 157 the frequencies of the numbers of corpora lutea are plotted for Blue and Fin whales. These show that four to five and ten are the numbers of corpora lutea which have been found most commonly in Blue whales' ovaries, and about four to five, twelve, and possibly nineteen among Fin whales.

The following explanation may be suggested for the prevalence of these numbers. Taking Blue whales first we may call those with from one to eight corpora lutea Group 1. The whales in this group would be expected to consist mostly of those in their first year after sexual maturity which have not become pregnant, those pregnant for the first time, and those lactating or resting after lactation for the first time. Lactating whales will of course be in their second year from sexual maturity. First pregnancies may be recognized by the undeveloped state of the mammary glands. Any whales that are pregnant yet show signs of previous pregnancy appearing in this group are three seasons mature and really belong to Group 2. Group 2 may be taken as including whales with from nine to fifteen corpora lutea. Pregnant whales in this group will have been adult

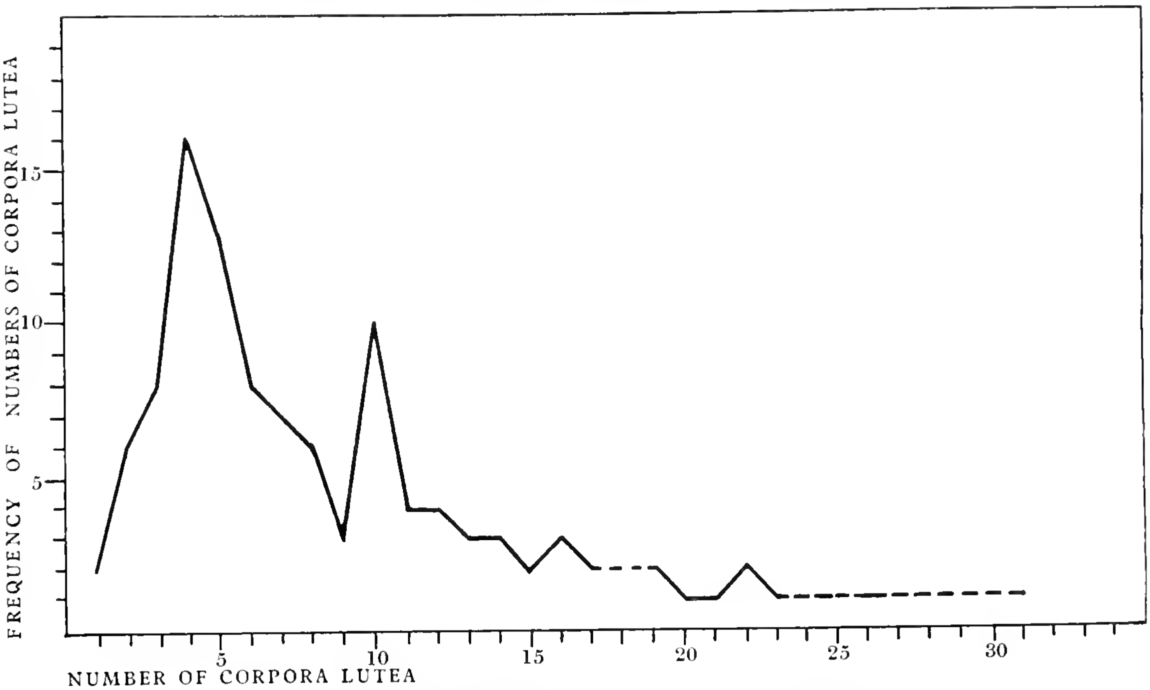


Fig. 156. Blue whales. Frequency of numbers of corpora lutea.

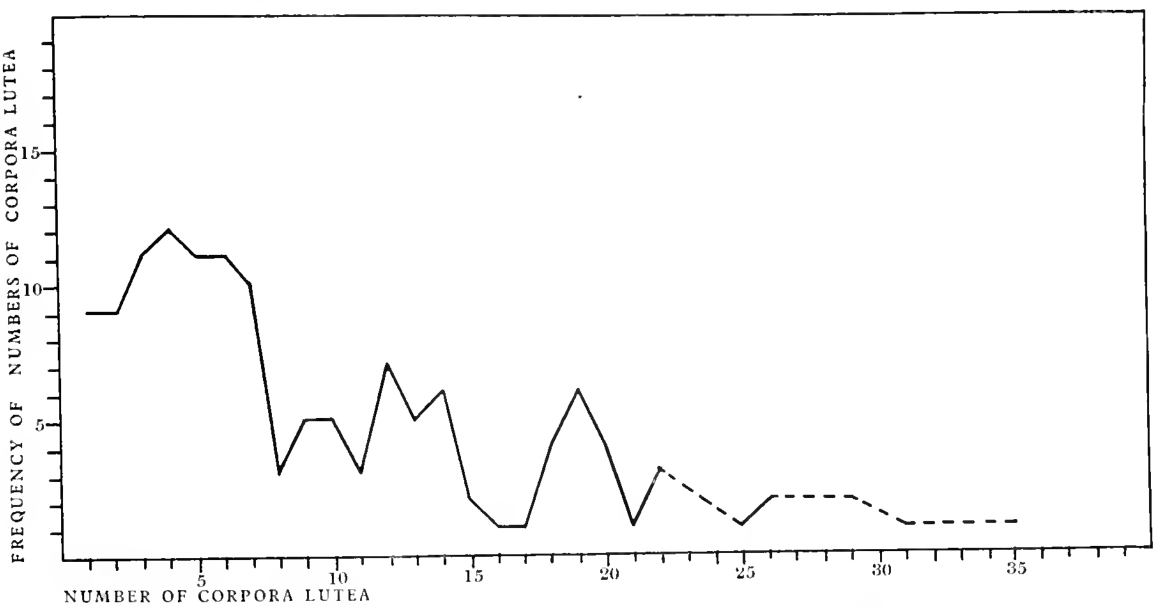


Fig. 157. Fin whales. Frequency of numbers of corpora lutea.

for three seasons, and lactating whales for four seasons. The remaining whales—those with sixteen or more corpora lutea—are presumed to be more than five years old.

Applying this grouping to the female Blue whales of South Georgia and South Africa we get the following analysis of the catches:

Seasons	Group 1		Group 2		Group 3
	3rd year from birth	4th year from birth	5th year from birth	6th year from birth	7th year and over
South Georgia, Feb.–May 1925	(1)*	14	1	1	1
South Georgia, 1925–6 season	1	9	5	4	1
South Georgia, 1926–7 season	6	8	10	12	11
Saldanha Bay, 1926 season	0	12	7	5	1
Total	8	43	23	22	14

* Maturity doubtful.

The columns here are headed by the supposed actual ages of the whales (on the assumption that two years elapse between birth and sexual maturity). Thus a whale in, say, its second year after maturity is in its fourth year after birth.

It will be realized that the exact distribution of the numbers of whales among the groups and sub-groups in the table is simply an expression of the probabilities so far as they can be understood at present, but the analysis at least strongly suggests that in the first two seasons at South Georgia a considerable proportion of the adult female Blue whales killed were not more than four or five years old, whereas in the 1926–7 season the majority had lived beyond this age.

In the case of Fin whales, the grouping shown in the frequency curve is not perhaps very well defined, but Group 1 may be taken as including whales with from one to seven corpora lutea in the ovaries, Group 2 those with from eight to fifteen, and Group 3 the remainder. The analysis is as follows:

Seasons	Group 1		Group 2		Group 3
	3rd year from birth	4th year from birth	5th year from birth	6th year from birth	7th year and over
South Georgia, Feb.–May 1925	4	14	2	6	7
South Georgia, 1925–6 season	4	19	27	11	15
South Georgia, 1926–7 season	2	3	7	1	5
Saldanha Bay, 1926 season	0	0	4	1	1
Total	10	36	40	19	28

Here the presumed age distribution shows greater similarity in the different seasons than in the case of Blue whales.

The tables suggest that in both species the majority of adult females killed are from about four to six years old. It must be emphasized that this is a very tentative conclusion, but it is interesting to note not only that Blue and Fin whales grow to sexual maturity in a remarkably short time, but also that there is some evidence to suggest that the whales killed are on the average unexpectedly young.

The small proportion of the total stock which appears to exceed six years is significant, for it suggests that the maximum age which a whale attains is a good deal lower than might have been anticipated.

THE STOCK OF WHALES

THE CONSTITUTION OF WHALE POPULATIONS

In the preceding sections the external characters, nourishment, reproduction and growth of the southern Blue and Fin whales have been separately dealt with and it remains now to consider the whole subject from a more general point of view. To begin with, in order to understand the effect which hunting is likely to have on the stock of whales, one needs to know, among other things, the composition of the communities or populations of whales which have become the object of the whalers' activities in different localities, and the fluctuations which take place in their occurrence and distribution. This involves an examination of the relative abundance of the species of whales; the proportions of males and females, of immature and adult whales, of pregnant, nursing and resting females; and a study of the fluctuations of these classes of whales and the degree to which they are mixed or segregated.

It need hardly be pointed out that whales are not scattered evenly throughout the southern ocean but are more or less concentrated in certain areas, although at the same time they are generally on the move. This implies that they tend to move in close aggregations through some comparatively limited regions and in a more dispersed form through other less limited areas, or that they travel perhaps in herds which spend part of their time in recurring visits to the same regions and part in travelling over various routes in the open ocean. For example, there must be great numbers of whales which regularly visit the coastal waters of South Georgia and other parts of the Dependencies where supplies of food are concentrated, and spend much of the rest of their time in migrations which take them far from land. It would appear in fact that the limitation of the areas in which *Euphausia superba* lives in such abundance is mainly responsible for the concentration of the whales in those areas, and therefore renders the catching of whales in large quantities comparatively easy. The vast majority of whales caught, for instance, off South Georgia are found within about forty miles of the coast, and if they happen at any time to become scarce within this range the whalers do not usually expect to find more by going much further from land.

The whaling industry does not, of course, need to rely on the great feeding grounds for its catches. Off the African coasts a moderate number of whales are caught, but here each station uses a comparatively large number of boats and the climatic conditions are much more favourable. The actual number of accessible whales is not to be compared with that at South Georgia or the South Shetlands.

The best known and most extensively exploited feeding grounds and areas of concentration are South Georgia and the South Shetlands. There are, of course, other such places as, for instance, in the Ross Sea where whales are known to exist in great numbers, but it is still uncertain to what extent the krill attracts large communities of whales round the less known fringes of the Antarctic Continent. The data upon which the present paper is based are, of course, restricted to the whales caught at South Georgia and Saldanha Bay, but it is convenient at this point to refer to the connection which exists between South Georgia and other parts of the Antarctic and sub-Antarctic.

Our knowledge of the whole stock of whales, so far as it is derived from the examination of whales at a whaling station, depends largely on the fact that there is very little discrimination in the killing of the whales in any particular area and that the nature and composition of the catches are therefore likely to be fairly representative of the nature and composition of the whale population of that area. Then, if that area is frequented by large numbers of whales of all ages and conditions, one can at least derive from it some idea of the probable nature of the whole stock. The danger of assuming too freely that the whales killed form a representative sample of the whole stock has already been pointed out (p. 430), and before a really thorough knowledge of the whole stock can be gained, it is desirable that observations should extend to a number of different localities so that comparisons can be made between the different whale populations, and the whole stock viewed from more than one angle.

In this connection a comparison between the catches at South Georgia and South Africa is of considerable interest, for it shows a striking contrast and serves to illustrate the segregation of different classes of whales and their distribution in different localities.

At Saldanha Bay Fin and Blue whales of two kinds are to be distinguished. There are (1) small immature whales which are relatively abundant, and (2) large and fully mature whales which are relatively scarce[1]. The former actually constitute 80 to 90 per cent of the whole catch. The length-frequency curves (Figs. 152, 153, pp. 440 and 441) show that intermediate-sized whales are very rarely taken. This being so, the large and small whales must be regarded as quite distinct. It is probable that the small whales are for the time being staying in this locality, feeding on what krill they can find, or are at least not actively migrating, while the large whales are taken while travelling past that part of the coast. This suggestion is supported by the greater regularity in the appearance of the smaller whales and the much better condition of the large whales, which, as has already been pointed out, have comparatively thick blubber although they have little or no food in their stomachs. There appears to be very little change in the composition of the local whale population during the season.

At South Georgia the constitution of the whale population is entirely different, and is much too complex to be classified into two simple groups. It is more representative than in the vicinity of Saldanha Bay, but there are considerable fluctuations in the numbers of whales, and indications of influxes and effluxes of different classes of whales during the season. The size and nature of the catches also varies, sometimes to a great extent, from season to season. The most obvious points, however, in which the whales of South Georgia differ from those of South Africa are their greater abundance and the fact that the majority are adult.

[1] This is commented on by Risting, 1928, p. 37.

In order to make a quantitative analysis of the constitution and variations of the catches it is necessary to separate the whales of both species into what we may call different "classes". These are as follows:

Females	*Males*
1. Immature	1. Immature
2. Mature	2. Mature
(*a*) Resting	
(*b*) Pregnant	
(*c*) Lactating	
(*d*) Pregnant or recently ovulated	

"Pregnant or recently ovulated" refers to whales in which a functional corpus luteum but no foetus was found. Such whales may be classed together since if a foetus was missed it would probably be so small that for our purpose the whale could practically be regarded as having "recently ovulated".

There is little object in separating males into more than the sexually mature and immature classes, but in the case of females some discrimination must be made between whales in the various stages in the sexual cycle.

The tables which follow show the ratios of the numbers of whales of each class which were caught in successive months, in successive seasons at South Georgia, in the season at South Africa, and in the whole period during which the observations were carried out.

In a number of whales it was of course impossible to examine the reproductive organs, generally on account of the decomposed condition of the carcass, and in some it was possible to examine, for instance, the mammary glands but not the internal genitalia. For this reason the exact number of whales in each class cannot be stated, but in order to give as accurate a comparison as possible between the numbers in each class, the number of whales, for example pregnant or lactating, are expressed as percentages of the number of whales in which the uterus or mammary glands respectively were examined. This applies only to the sub-classes of adult females.

Columns 8, 9 and 10 show the numbers of whales in which either some or all of the genitalia were examined. Thus in column 12, in January 1927 (1926–7 season), we see that 47 per cent of the thirty-two whales, quoted in column 8 as having had their uteri examined during that month, were pregnant.

Percentages are calculated to the nearest unit.

Reference should first be made to the total class ratios of all the Blue whales and all the Fin whales. In these figures we find a restatement of some of the results which have already been put forward. A relatively large number of immature whales, for instance, are caught, amounting in the case of Blue males and females to 55 per cent and 54 per cent respectively and Fin whales to 38 per cent and 41 per cent respectively. Even when the South African whales are left out of account, the figures for South Georgia show a high proportion of immature whales, at least in the case of Blue whales. About 31 per cent of the adult Blue whales and 46 per cent of the adult Fin whales are pregnant, and, as already explained, it may be argued from this that in all

Blue Whales

Locality	Periods	Males: Total no. of whales	Males: Percentage mature	Males: Percentage immature	Females: Total no. of whales	Females: Percentage mature	Females: Percentage immature	Adult females: Total no. mature	No. in which uterus, etc., were examined	No. in which mammary glands were examined	No. in which all genitalia were examined	Percentage (of col. 10) resting	Percentage (of col. 8) pregnant	Percentage (of col. 9) lactating	Percentage (of col. 8) recently ovulated or pregnant	Remaining percentage of doubtful cases
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
South Georgia, 1925	February	11	18	82	18	28	72	5	4	5	4	—	25	50	25	—
	March	24	21	79	24	54	46	13	13	13	13	62	—	38	—	—
	April	12	58	42	12	17	83	2	2	2	2	50	50	—	—	—
	May	3	67	33	4	100	—	4	3	3	3	33	—	33	33	1
		50	32	68	58	41	59	24	22	23	22	45	9	35	9	2
South Georgia, 1925–6	October...	4	50	50	8	88	12	7	7	7	7	—	29	57	14	—
	November	2	50	50	6	67	33	4	4	4	4	25	50	25	—	—
	December	1	—	(100)	—	—	—	—	—	—	—	—	—	—	—	—
	January...	10	80	20	5	80	20	4	3	4	3	67	33	—		—
	February	20	40	60	21	14	86	3	3	3	3	33	33	33	—	1
	March	21	5	95	30	37	63	11	9	9	8	75	—	11	11	3
		58	35	65	71	41	59	29	26	27	25	40	23	26	8	3
South Georgia, 1926–7	November	24	92	8	11	73	27	8	8	8	8	50	50	—	—	—
	December	50	94	6	40	82	18	33	22	25	22	59	41	—	—	—
	January...	40	70	30	51	75	25	38	32	33	30	50	47	—	—	3
	February	18	56	44	24	50	50	12	9	9	9	56	33	11	—	—
	March	18	44	56	14	86	14	12	12	12	12	25	42	25	8	—
	April	5	20	80	6	50	50	3	3	3	3	—	33	67	—	—
		155	75	25	146	73	27	106	86	90	84	48	43	7	1	1
Saldanha Bay, 1926	June	18	—	100	28	21	79	6	6	6	6	33	—	17	50	—
	July	31	26	74	26	19	81	5	5	5	5	40	20	20	20	—
	August	25	20	80	31	19	81	6	6	6	6	82	18	—	—	—
	September	37	22	78	28	25	75	7	7	7	7	29	28	43	—	—
	October...	9	—	100	14	15	85	1	1	1	1	—	(100)	—	—	—
		120	18	82	127	20	80	25	25	25	25	44	20	20	16	—
Totals and percentages for South Georgia		263	58	42	275	58	42	159	134	140	131	46	34	15	4	1
Grand totals and final percentages		383	45	55	402	46	54	184	159	165	156	46	31	16	6	1

Fin Whales

Locality	Periods	Males: Total no. of whales	Males: Percentage mature	Males: Percentage immature	Females: Total no. of whales	Females: Percentage mature	Females: Percentage immature	Adult females: Total no. mature	Adult females: No. in which uterus, etc., were examined	Adult females: No. in which mammary glands were examined	Adult females: No. in which all genitalia were examined	Adult females: Percentage (of col. 10) resting	Adult females: Percentage (of col. 8) pregnant	Adult females: Percentage (of col. 9) lactating	Adult females: Percentage (of col. 8) recently ovulated or pregnant	Adult females: Remaining percentage of doubtful cases
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
South Georgia, 1925	February	15	73	27	19	68	32	13	7	11	7	57	14		29	
	March	19	53	47	20	50	50	10	7	9	7	57	29	11		3
	April	17	53	47	31	77	23	24	22	24	22	59	23	17		1
	May	5	60	40	5	40	60	2	2	2	2	50	50			
		56	59	41	75	65	35	49	38	46	38	58	24	11	5	2
South Georgia, 1925–6	October...	4	100	—	2	(50)	(50)	1	1	1	1	—	(100)			
	November	5	100	—	9	100	—	9	9	9	9	33	67			
	December	3	100		9	100	—	9	8	8	8	12	63	25		
	January...	103	92	8	52	88	12	46	36	42	36	25	61	12	—	1
	February	71	85	15	39	79	21	31	27	29	27	44	44	10		2
	March	24	58	42	28	46	54	13	12	11	11	73	17	9		1
		210	86	14	139	78	22	109	93	100	92	36	52	11		1
South Georgia, 1926–7	November	6	100	—	5	100	—	5	4	4	4	25	75			
	December	2	100	—	2	100	—	2	2	2	2	—	(100)			
	January...	10	60	40	18	89	11	16	11	11	10	20	64	9		7
	February	9	67	33	15	63	47	8	8	8	8	25	62	13		
	March	18	39	61	13	46	54	6	4	4	4	—	75	25		
	April	16	62	38	9	56	44	5	4	5	4	50	25	20		5
		61	61	39	62	68	32	42	33	34	32	22	64	12		2
Saldanha Bay, 1926	June	22	—	100	15	7	93	1	1	1	1				(100)	
	July	17	12	88	15	7	93	1	1	1	1	—	—		(100)	
	August	42	19	81	26	4	96	1	1	1	1	—	(100)		—	
	September	26	38	62	15	20	80	3	3	3	3	67			33	
	October...	7	57	43	4	—	100									
		114	21	79	75	8	92	6	6	6	6	33	17		50	
Totals and percentages for South Georgia		327	77	23	276	72	28	200	164	180	162	38	48	10	1	3
Grand totals and final percentages		441	62	38	351	59	41	206	170	186	168	38	46	10	3	3

probability the majority of these whales normally become pregnant in alternate years, practically never in successive years, but sometimes once in three years. The low percentage of lactating whales (16 per cent in Blue whales and 10 per cent in Fin whales) is not sufficiently accounted for by the fact that the nursing period (about eight months) is shorter than the period of gestation (ten to eleven months) and one must suppose that the mother spends much of her time with the calf away from the areas of concentration where the hunting is mostly carried on.

The totals for South Georgia and South Africa provide now a more precise basis for comparing the two localities. Taking first the ratio of immature whales we see that whereas at South Georgia well over 50 per cent of the whales are adult the percentage of immature whales at South Africa works out at about 80 per cent for Blue males and females and Fin males and over 90 per cent in the case of Fin females. In the subclasses of female whales the most striking difference between the two localities appears in the number of whales which had recently ovulated. Among the South Georgia whales 4 per cent of the adult female Blue whales showed indications of having recently ovulated and 1 per cent of the adult female Fin whales, while at South Africa 16 per cent of the Blue and 50 per cent of the Fin females were in this condition. There is a slightly higher percentage of pregnant whales at South Georgia than at Saldanha Bay. This is to be expected since the period of gestation is mostly spent in the southward migration. The figures for lactating whales are inconclusive.

It will of course be realized that some of the distinctions between the whales of the two localities are due to actual differences in distribution, such as appear in, for instance, the ratio of immature whales or the tendency towards fluctuation in the whale population, and some are due simply to the fact that different months are being compared (e.g. the different ratios of females ovulating or pregnant).

The proportion of pregnant females at Saldanha Bay naturally shows a tendency to increase as the season advances (i.e. as the pairing season advances) and the percentage of immature Fin whales decreases fairly steadily. Apart from this, however, there seems to be little fluctuation in the local whale population.

The observed changes in the composition of the catches at South Georgia, however, are of great importance. Reference should be made here both to the foregoing tables and to Plates XLIII and XLIV which give a "bird's-eye" view of the catches in respect of the numbers, sexes and sizes of all the Blue and Fin whales examined. In the second half of the 1924–5 season (February–May 1925) Blue and Fin whales were caught in roughly equal numbers and there was little fluctuation during these months in respect of sex or size or of the proportions of pregnant, resting, lactating whales, etc. The percentage of mature whales does not show any significant change except in the case of Blue males, where it increases from very low figures in February and March to relatively high ones in April and May. There was not much variation in the numbers of whales caught, except that during the greater part of March comparatively few were brought in. Small fluctuations like this, however, are not of great significance and are often caused by bad weather or difficulty in locating the whales. Attention should be drawn to the fact that during these months there was a high percentage of immature whales, especially among Blue whales where the adults were in a minority. In the case of Blue whales very few of the adults were pregnant but a comparatively large proportion were lactating. Rather more Fin whales were pregnant but relatively few lactating.

In the 1925–6 season far more Fin than Blue whales were taken, and fluctuations in the catches were very marked. Mention has already been made of the peculiarities of this season. Whales were very scarce in October, November and December. A few individuals, mostly large ones, were taken at the beginning of the season but they became more and more scarce and the Blue whales almost disappeared altogether. The weather during this period was on the whole fine and food appeared to be plentiful. Among the whales caught a rather high proportion were pregnant and several Blue and one or two Fin whales were lactating.

At the end of December a change occurred in the catches which is strikingly shown in Plate XLIV. Immense numbers of Fin whales appeared in the vicinity of the island. They were found at first about seventy miles from the coast and consisted of a great majority of males of a fairly uniform size. It is worth noting that a transport ship which had recently arrived at South Georgia, had previously reported seeing great numbers of whales some hundreds of miles to the north of the island. There was at first little or no food in the stomachs of the whales caught, but later they were to be found nearer to land and seemed to be finding food. The change in the type of krill has already been commented on. During January about twice as many males as females were caught, but the proportion of females rose in February and March. At the same time the average length of the whales of both sexes declined. This was evidently due to an influx of immature whales, for the latter rose from about 10 per cent in January to about 50 per cent in March. Pregnant females declined from 61 per cent in January to 17 per cent in March, while the ratio of resting females showed a corresponding increase. Some lactating females were caught among these Fin whales, but the ratio fell very slightly during January, February and March. Few Blue whales were caught during this period, but there was a slight influx of small ones which became quite marked at the beginning of March. Pregnant and lactating Blue whales were on the whole relatively fewer than at the beginning of the season. Taking the season as a whole the majority of Fin whales were adult and the majority of Blue whales immature.

This 1925–6 season may be described as a "Fin whale season". The third season at South Georgia, 1926–7, was undoubtedly a "Blue whale season". As may be seen from the chart Blue whales were in a great majority over Fin whales and were abundant during the greater part of the season. Fin whales were extremely scarce at the beginning of the season, but slightly more plentiful in January, at the end of February and beginning of March. It is true that since the whalers prefer Blue whales to Fin whales one may expect comparatively few of the latter to be caught when the former are plentiful, but this is not enough to explain the exceptionally small numbers of Fin whales taken in November and December.

An unusual feature of this season was that towards the end, when Blue and Fin whales seemed to become less plentiful a considerable number of Sei whales were taken.

As in 1925–6 the great majority of whales of both species caught in the earlier part of the season (November to January) were adult, but the average length diminished considerably in the second half, through the appearance of large numbers of immature whales; these came to form a majority in the catches of Blue whales and at least a fairly high proportion among the Fin whales from about February onwards.

In contrast to the previous season the ratio of immature Blue whales for the whole season was reduced to 27 per cent. The proportion of pregnant females, 43 per cent, is a great increase over previous seasons. A greater proportion, 48 per cent were resting, but very few (7 per cent) were lactating. The latter were all taken in the later part of the season.

There were relatively rather more immature Fin whales this season. A very high proportion of the adult females were pregnant but the percentage fell heavily in April. A moderate number were lactating in the later part of the season.

The causes of the fluctuations in the catches which have been described above must now be considered. In spite of the small number of seasons over which the observations have extended there are indications that certain features and fluctuations are more or less constant, while others are variable. Taking the constant features first we see from a glance at Plates XLIII and XLIV that nearly all the time the sexes are equally distributed throughout the season. The only exception to this appears in the sudden influx of Fin whales in January 1926 when for a few weeks males were in a great majority. At Saldanha Bay the sexes were equally distributed through the whole season. From this it may be inferred that, in general, the sexes are evenly distributed in the whale "communities" but that in some cases a certain amount of segregation may take place. Again, when the first and second halves of a season at South Georgia are compared it is found that in the first half the catch is composed of a majority of mature whales, while in the second half there is an influx of immature whales (and perhaps a withdrawal of adults) which causes a sharp reduction in the average lengths. It is quite probable that observations over further seasons will show that this is a regular phenomenon. It is evident in both Blue and Fin whales, though perhaps more marked in the former. Reference to the tables on pp. 456 and 457 suggests that there is a tendency in each season for pregnant whales to be more numerous in the first half of the season and lactating whales in the second half. It should be noted that the lactating whales in October and November 1926 form an exception to this.

Apart from the fact that immature whales have occurred in relatively greater numbers in the latter part of the season, there is an indication that of the adult whales themselves, those taken early in the season are mostly older than those taken later. In the section on the ages of whales it was shown that adult females could be divided into three age groups mainly according to the numbers of corpora lutea in their ovaries. There are not sufficient data to enable us to compare the separate months of each season in this respect, but if the three seasons are amalgamated, the majority of adult females of both species are found to belong to Group 2 in October, November and December, and to Group 1 in the succeeding months. This is shown in the following table in which the number of whales in each group is shown for each month of the South Georgia whaling season. The group containing the majority of whales for each month is marked in heavy type.

	Blue			Fin		
	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
October	2	2	0	0	**1**	0
November	2	**5**	0	4	**6**	2
December	4	**7**	4	2	**4**	3
January	**8**	1	4	**11**	6	8
February	**9**	2	1	**24**	7	6
March	**21**	5	3	**14**	4	2
April	2	2	0	**11**	6	6
May	1	1	1	**2**	0	0

The more important variable features of the catches seem to be the result of certain mass movements of the whales which differ from year to year. There is little doubt that these movements are largely affected by meteorological conditions and in particular by the position of the icebergs and pack-ice. The distribution of whales, the meteorological and hydrological conditions, and the abundance and distribution of food, must all, in fact, be closely connected with one another.

It is not within the scope of the present memoir to explore these causes very far, but in this connection it is interesting to compare the 1925–6 and the 1926–7 seasons at South Georgia.

In the 1925–6 season there was a small and diminishing quantity of large whales during the first two months or so. Then there appeared a mass of Fin whales with a male vanguard apparently in search of food which they succeeded in finding at South Georgia. This community of Fin whales settled down at South Georgia but dispersed gradually as the season wore on. During this season the ice appears to have remained far south and did not, at any rate, approach the vicinity of South Georgia in any great quantity.

The 1926–7 season opened with the capture of big Blue whales similar to those found at the beginning of the previous season, but instead of dispersing they remained around South Georgia in large numbers. Fin whales were scarce until reinforced by the arrival of immature ones in the latter part of the season. It has already been pointed out (p. 452) that the adult Blue whales of this season were, on the average, older than those of the previous seasons when they were less plentiful. In contrast to the preceding season the ice had drifted exceptionally far north. There were numerous icebergs in the vicinity of South Georgia and the pack-ice itself had here and there penetrated as far as and even farther north than the latitude of the island.

One cannot be certain, but the circumstances seem to show that the distribution of the Blue whales in these two seasons was correlated with the position of the ice. The suggestion is that a big herd of Blue whales had travelled further south than South Georgia early in the 1925–6 season, a few stragglers being caught in the first month or two, and that a herd of the same kind visited the island in the 1926–7 season. On this occasion they perhaps found the conditions they sought further north than before and thus remained in the vicinity instead of travelling further south.

It has already been shown that the average age of the adult Blue females in the 1926–7 season was distinctly greater than in the 1925–6 season.

A rather more definite view can now be taken of the nature of the whale population which is exploited at South Georgia. It may be suggested as a working hypothesis that it is composed partly of sections of the main stock of whales and partly of whales whose movements are influenced less by the movements of the main stock than by some other factor. One would imagine that the movements of the main "herds" (recognized by their large numbers, high average age, high proportion of pregnant whales, etc.) would be controlled mainly by the distribution of food, and the meteorological conditions, and as these conditions vary from season to season the appearance of these big herds at South Georgia is also liable to vary.

On the other hand, we have the whales which appear at South Georgia independently of the main stock. Among these the lactating whales are probably to be counted, for it seems probable, apart from a certain regularity in their appearance near the end of the season, that they lead a comparatively secluded life while nursing the calf, which presumably would not be strong enough to keep up with the majority of adults during the southern migration. The immature whales are perhaps the most prominent among those which appear independently of the main stock. An explanation of their appearance at South Georgia later than the majority of adults might be that being smaller they also take longer over the southern migration. Finally, there are what seem to be schools of stragglers which include many resting and rather few pregnant whales and which may yet form a considerable proportion of the whole stock of whales. These are mostly rather young whales.

This view of the make-up of the whale population round South Georgia is of course to be taken as a hypothesis which must depend for its substantiation on the results of some more seasons' work at South Georgia and the analysis of statistics from past seasons. However, it is probably not far from the truth and it at least gives an adequate explanation of the catches in the three seasons during which the work has been carried on. Risting's analysis of the catches cannot be used much for comparing previous seasons in this connection as he does not indicate the fluctuations in sizes, percentage pregnant etc. from month to month, though he shows the variations in the numbers of whales through several separate seasons.

It is interesting to note that, according to the above account of the fluctuations in the catches, one must suppose that during the greater part of the season the tendency is either for whales to leave South Georgia to go further south, or to arrive at South Georgia from the direction of the equator. Similarly among the catches at Saldanha

Bay the fat adult whales which are presumed to have recently arrived from the southerly feeding grounds, are not taken only at the beginning but well on into the middle of the season. It is true that those taken there in the latter part of the season are not so fat as those which appear earlier and it may be that some of them have started again on the southern migration, but the fact remains that the condition of the majority of these mature whales suggests that they had been recently feeding, and not on the scanty krill of the South African coast.

There are two possible explanations of this state of affairs. It may be that the "north-south" migration lags behind the season so that instead of a punctual southerly migration in spring and northerly migration in autumn there is a continuous movement to the south through most of the summer and towards the equator through most of the winter. Or it may be that a kind of "one-way" system operates, according to which some sort of procession passes through the South Georgia area. In this case the whales which appear early in the whaling season at South Georgia would be on their way back towards the equator by some other route during the second half of the season and so on. The point, however, cannot be regarded as settled at present. Possibly both factors operate to some extent. There is, however, some indication of a return of some of the whales at the end of the South Georgia season. There was, for instance, a slight increase in the number of adult male and pregnant female Fin whales in May 1925. The adults of both sexes also showed a relative increase again in April 1927 (see tables on pp. 456 and 457). Among Blue whales also there was an indication of a return of sexually mature whales at the end of the 1924–5 season.

CONCLUSIONS REGARDING THE WHOLE STOCK

The conclusions, which have a direct effect on our knowledge of the stock, may be summarized as follows:

1. Although it has not yet been possible to make a proper comparison between the whales of the northern and southern hemispheres, records of the external characters and bodily proportions have shown that a very complete resemblance exists between the Blue and Fin whales of South Georgia and South Africa and they have revealed no definite grounds for separating any of these whales as distinct sub-species or races. The general similarity of all the whales examined suggests that it is possible for interchange to take place between the whales of different localities and for a reduced number of whales in one locality to be replenished from the population of another. In a sense this is a negative result, but it is important.

2. Among Blue and Fin whales it is a general rule that the two sexes are everywhere mixed together in roughly equal numbers, though at times a certain amount of segregation may take place. Presumably less harm is done to the stock by the killing of a male than of a female and it is therefore of some importance to know that of a given number of whales killed approximately only half will be females.

3. It has been shown that the ratio of immature whales among the catches is very high, and this is a point of great importance. There are two reasons why the killing of immature whales is economically unsound, and more than one previous author has drawn attention to them. In the first place, since an immature whale has had no chance of reproducing itself, its death constitutes, so to speak, a permanent reduction of the stock. In a community of animals, members of which are killed for commercial purposes, it is above all essential that the breeding should be subjected to a minimum of interference, and the killing of immature individuals is perhaps the worst form of interference with the natural replenishment of the stock. In the second place the number of immature whales required to produce a given quantity of oil and other products, would enormously exceed the required number of adult whales.

At South African stations such as Saldanha Bay, where more than 80 per cent of the Blue and Fin whales caught are immature, the hunting is for these reasons far more damaging to the stock in proportion to the value of the products obtained than in South Georgia and the South Shetlands. Even at South Georgia the ratio of immature whales in the catches is undoubtedly high, amounting as it did among Blue whales of both sexes to 42 per cent of the whales examined in the course of the work. Among the Fin whales it came to the more moderate quantity of 23 per cent in the case of males and 28 per cent in the case of females.

4. The conclusions regarding the breeding season confirm and slightly adjust those reached by previous authors. Perhaps the most important point is that the whales actually engaged in pairing and parturition are not much molested by the whalers. The examination of whales at whaling stations does not throw much light on the whereabouts of the actively breeding whales. The catches at Saldanha Bay indicate that some pairing and parturition takes place off the S.W. African coast, but although there is here an immense stretch of coastal water, so few of these whales are caught that one can hardly suppose it to be the normal destination of the whales which migrate northwards from any large community of whales in the Antarctic. It seems more probable that the breeding processes normally take place further from land, or at any rate outside the ordinary range of the land stations. It may be that the whales are more scattered at this time, but if they are at all concentrated during the periods of pairing or parturition serious damage would be done to the stock if they were to be hunted at such a time. Without any definite evidence one would expect a certain tendency towards concentration at least during the pairing season.

The protracted period of breeding is a feature which favours the maintenance of the stock, for it implies a certain elasticity of habit and an ability to take the opportunity of pairing when it arises.

5. The frequency of the recurrence of pregnancy is of great importance in connection with the maintenance of the stock. An element of uncertainty remains here, but it is certain that except perhaps on very rare occasions an interval of not less than two years elapses between successive pregnancies and it is highly probable that the interval

sometimes extends to three years. The point to be emphasized here is that, since normally only one whale is born at a time, an adult female can *at the most* produce only one young every two years. The rate of reproduction is thus very slow.

7. The hypothesis that gestation in these whales occupies nearly a year is confirmed and it has been shown by evidence from more than one source that the young whale grows up to sexual maturity in about two years after birth, during rather less than half of which period it is nourished by the mother. Thus the slowness of the rate of propagation is to some extent counterbalanced by the rate at which the young grow to sexual maturity. The most important point is perhaps that the immature whales which can least be spared to the stock are exposed to danger for a comparatively short period. In view of this it is curious that so high a proportion of immature whales appears among the catches. The phenomenon may be largely due to differences in the distribution of the adult and immature whales.

8. Owing to segregation in a greater or lesser degree, different areas may harbour communities of whales which are differently constituted in respect of age, proportions of different classes, etc. Different whaling centres must thus be examined individually when any measures for the control of the industry are considered. Further, in an area such as that of South Georgia, where the whale population undergoes fundamental changes in the course of the season, the effect on the stock as a whole of hunting at different times of year needs to be taken into account. So far as the three seasons, over which the observations have extended, are concerned, it is not easy to say whether the killing of whales in the earlier or later part of the season has had the greater effect. On the one hand a higher percentage of pregnant females is killed in the earlier part of the season and the majority of whales are less "fat" than later on, while on the other hand many more immature whales are killed in the second half of the season. At South Africa the whale population shows little or no sign of changing during the season, and it may be supposed that whereas at South Georgia a large number of whales are exposed to danger for a short time, at South Africa a smaller number are exposed to danger for a longer time.

In connection with the effect of hunting on the stock of whales it is desirable that as much as possible should be known of the composition both of local communities and of the stock as a whole, in respect of the relative numbers of the two sexes and of whales in different stages of the reproductive cycle at any given time.

The analysis of the whales examined during the work, which is shown in the tables on pp. 456 and 457, may be taken as representative of the catches as a whole at South Georgia during the period over which the observations extended. But the catches at South Georgia, as already explained, are not necessarily representative of the whole stock of southern Blue and Fin whales, and a distinction must therefore be drawn between what might be called the apparent and the real constitution of the stock as a whole.

The apparent constitution of the stock, i.e. the ratios of the different classes of Blue and Fin whales examined at South Georgia, is as follows:

Classes	Blue	Fin
Adult males...	28 %	42 %
Immature males	21 %	13 %
Pregnant females	10 }	16 }
Lactating females	4 } 29 %	3 } 32 %
Resting or ovulating females	15 }	13 }
Immature females	22 %	13 %

In contrast to the population in the S.W. African region, that at South Georgia seems to have a generalized character which suggests that it may not be very far from representing the stock as a whole. One point, however, in which it might be found to differ substantially from the real constitution of the stock is in the ratio of immature whales. It is difficult to believe that any community of mammals normally includes 30 per cent or 40 per cent of immature individuals. In the case of whales, among which the immature appear not to exceed two years of age, it would mean that the "expectation of life" for a whale was extraordinarily short. It must not be forgotten, however, that the effect of hunting is to shorten the expectation of life, and that such evidence which exists as to the ages of whales does suggest that the majority are unexpectedly young.

There is not sufficient data on which to base an actual estimation of the real constitution of the stock of southern Blue and Fin whales, but it may be hoped that future investigations will provide sufficient information for this purpose. It will then be possible to estimate the birth rate and hence the fraction of the stock which might reasonably be killed annually for commercial purposes.

Future work may be profitably directed among other things to the question of the numerical equilibrium of the whole community of whales, and any enquiry into the effect of hunting must take into consideration the natural factors which limit the size of the stock. Under natural conditions it is to be supposed that in the long run the number of deaths equals the number of births. If these deaths are simply the result of the number of whales exceeding the maximum for which there is, so to speak, room (e.g. if the number is limited by, say, the amount of food available), then a number equal to the number to be born each year may be killed annually. On the other hand, if the deaths were due to causes operating independently of the size of the stock (e.g. attacks by killer whales, deaths from old age, etc.), then any deaths from hunting will add to, and not replace, the deaths from natural causes, and will therefore tend to cause depletion. The equilibrium of the stock is probably influenced by both types of factor.

It will obviously be of no practical value to calculate the percentage of the whole stock which may safely be killed annually unless some kind of estimate can be made of the total number of whales in the whole community. Anything approaching an accurate census is naturally impossible, but there are grounds for anticipating that at least some very rough approximation, sufficient for this purpose, will be achieved in due course.

Among the features of the habits and general biology of Blue and Fin whales discussed in this section, it would appear that some favour the survival of the stock, while others must be considered serious weaknesses. For instance, the protracted polyoestrous breeding season, the comparative immunity during the breeding processes and nursing of the young, and the rapid growth of the young to sexual maturity, are all to be regarded with satisfaction. On the other hand, since each female can at the most produce one young every two years the rate of propagation is extremely slow.

It is difficult to say whether or not the "elasticity" of the breeding season and the natural protection of the whales during the essential stages of the sexual cycle, are sufficient to counterbalance the weakness of the slow rate of propagation, but the killing of a disproportionately large number of immature whales is a separate and very serious matter.

It is not the object of this memoir to discuss or recommend any definite measures by which the whaling industry should be adjusted, but rather, as a beginning, to bring forward certain facts and inferences about the biology and habits of whales which have a bearing on the effect of hunting on the stock. One thing, however, is perfectly clear, and that is that in proportion to the value of the products obtained, far more damage is done to the stock in temperate and sub-tropical waters, such as at certain South African stations, than is done by the whaling stations and factory ships in the Dependencies of the Falkland Islands. That is to say, that at these stations where some 80 per cent or more of the catches consists of lean immature whales and much of the remaining 20 per cent (or so) includes actively breeding whales, the very maximum of damage is inflicted on the stock, with practically a minimum return in respect of produce.

It is not suggested that the sub-Antarctic industry has actually less effect on the stock, but here at least a relatively good return is obtained from each whale, and the catches are drawn from a much larger proportion of the classes of whales which can be spared from the stock.

SUMMARY

The preceding pages deal with the results of direct investigations on whales carried out at the Marine Biological Station at South Georgia and at Saldanha Bay, South Africa, from 1925 to 1927. During this period a total of 1683 whales was examined, of which 1577 consisted in almost equal numbers of Blue and Fin whales. The present memoir is concerned only with these two species. Similar work is being continued at South Georgia as there is much to be gained by the accumulation of further material.

The work has been guided by three main objects:

1. The determination of the characters of southern Blue and Fin whales and the

detection or elimination of any possible sub-specific or racial distinctions such as might be associated with distribution or migrations.

2. An investigation of the reproductive processes, breeding habits and growth.

3. The examination of the interrelations of breeding, nourishment, distribution and local fluctuations of the whales.

The results of this work may be summarized as follows:

By a series of measurements carried out on a large number of whales, the normal bodily proportions of southern Blue and Fin whales, and the extent to which they vary, have been defined; and the same has been done for various external features by means of detailed descriptions of the colour, baleen, ventral grooves and hair.

It has been shown in both species that no distinction can be drawn between the whales of South Georgia and South West Africa, and that there are no indications that more than one race exists together in either locality.

The series of measurements, as well as the notes on external characters, provides a standard from which it will be easy to ascertain if Blue and Fin whales examined in the northern hemisphere or from any other part of the world fall within the limits of variation observed in South Georgia and on the south-west coast of Africa.

Attention is drawn to certain marked changes which take place in the bodily proportions as the whale grows, and which, at one point, may be associated with the attainment of physical maturity.

Leading up to the problems of breeding and growth, an account is given of the reproductive organs, of which the most important are the ovaries. It is a peculiarity of the ovaries of these whales that the corpus luteum formed at each ovulation persists in a recognizable form for a very long time, probably for years, with the result that accumulations of old corpora lutea give some indication as to the number of ovulations which may have taken place. Other conclusions to be drawn from the reproductive organs relate to the determination of sexual maturity and the progress of the sexual cycle throughout the year. It may be regarded as reasonably certain that Blue and Fin whales are polyoestrous.

From an estimation of the ratios of immature whales in the catches the important fact emerges that a very high proportion of immature whales is killed. Sexual maturity is reached on the average at the following lengths:

Male Blue whales	...	22·6 m.	Male Fin whales	...	19·4 m.
Female Blue whales	...	23·7 m.	Female Fin whales	...	20·0 m.

By application of these figures to the whales examined during the work the percentages of immature whales are found to be as follows:

	Blue whales		Fin whales	
	♂	♀	♂	♀
South Georgia	42·2	42·2	22·3	27·5
South Africa	82·5	80·3	79·0	92·0

The condition of the reproductive organs together with the gradation in the sizes of foetuses, and the mean curve of growth which can be derived therefrom, confirm the hypothesis that pairing takes place for the most part during certain months in the southern winter, reaching a pronounced maximum in June and July, and that gestation lasts for a little less than a year. It is further shown that not less than two years elapse between successive pregnancies in a whale, but that two years is probably the normal interval.

An examination of the sizes of young whales at different times of year strongly suggests that the nursing period lasts for six or seven months, during which the growth of the calf is very rapid, and that sexual maturity is reached about two years after birth. This rapidity of growth is corroborated by evidence from other sources.

A discussion on the ages of whales follows the question of the rate of growth. For whales less than two years old, the age can be determined from the total length by means of the curves of growth for young whales. After the attainment of sexual maturity a clue to the ages of females is to be found in the accumulations of old corpora lutea in the ovaries, and though calculations on this basis are somewhat speculative, it appears that a remarkably small proportion of the females included in the catches are more than about six years old.

The study of the relations of breeding, nourishment, distribution, etc. consists partly in an investigation of the food and thickness of the whale's blubber and partly in a more general consideration of the stock of whales. At South Georgia the food, which consists entirely of *Euphausia superba*, is very plentiful, but off the African coast food is very scarce. The thickness of the blubber reflects fairly well the condition of nourishment of a whale except where it is affected by pregnancy and lactation.

An analysis of the different species and "classes" of whales included in the catches reveals (*a*) a marked distinction between the local whale populations of South Georgia and South West Africa, and (*b*) a tendency for the population at South Georgia to undergo important changes both in the course of the season and from year to year. Some of these changes appear to recur annually, while others are variable and are probably to be attributed to changes in the environment and ultimately perhaps to meteorological conditions.

In the last section of the memoir the practical aspects of the results are considered, and attention is drawn mainly to the following points:

1. The general similarity of all the whales examined suggests that it is possible for a reduced number of whales in one locality to be replenished from the population of another.

2. The ratio of immature whales killed is unduly high, especially at South African stations.

3. The protracted breeding season, the freedom from molestation by man during this period, and the rapid growth to maturity all favour the maintenance of the stock. On the other hand, the very slow rate of propagation is to be set off against these points.

The economic extravagance of whaling in South African waters is specially emphasized, and it is pointed out that although the industry here is on a small scale, a maximum of damage is inflicted on the stock relative to the profit obtained.

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APPENDIX I

A NOTE ON THE COMPOSITION OF WHALE MILK

By A. J. CLOWES, A.R.C.S., M.Sc.

During my stay at South Georgia it was found possible to take three samples of cetacean milk and analyse these for fat, total solids, solids not fat, specific gravity and ash. The difficulties of correct sampling of whale milk are great, and if the milk is obtained by dissection of the mammary glands, blubber oil and blood are apt to contaminate the sample of milk. When, however, lactating whales are hauled upon the flensing "plan" of the whaling station, the increased strain upon the milk reservoirs usually causes the milk to spout from the nipples and in this manner clean samples of milk can be secured. No blood or blubber-fat is included in the milk samples taken from the whale in this way, which was adopted in sampling the three milks examined by me, and I venture to suggest that these samples were taken under better conditions than those of the other known analyses of whale milk which will be referred to later. The whales from which the samples at South Georgia were taken were all freshly killed, and indeed in the case of one of the samples, Fin whale No. 563, the whole analytical weighings and the results, with the exception of the ash content, were completed within a period of four to five hours of the death of the whale.

In sampling the milk of any mammal the sample should represent the average contents of the milk reservoir, if it is to be regarded as representative of the milk of that mammal. It has to be borne in mind, however, that the milk is sometimes not of uniform composition, and that the cream rises in the milk reservoir in the same way as it does in milk after removal from the animal. In the case of milk drawn from the cow, for instance, the "fore-milk" first drawn from the lower part of the udder may contain only 1·7 per cent of fat, while the "strippings", last drawn from the udder, at the same milking may contain 4–10 per cent of fat. A representative sample of such a milking could only be obtained by thorough mixing of the "strippings" with the whole of the remainder of the milking. It is probable that the milk of whales, being thick and creamy, will not vary in composition in different parts of the mammary gland to the same extent as cows' milk. It is possible, however, that the milk extruded from the nipples during handling of the whale may be different from that remaining in the mammary glands, and that neither the extruded milk nor the milk dissected from the mammary gland, especially if this is only a small portion of its contents, can be regarded strictly as representative of whale milk. The variations in the results obtained by the analysis of whale milk are probably largely due to the difficulty of obtaining a representative average sample. Variations also probably occur due to seasonal effects or to the period of lactation.

It is to be noted that these samples taken at South Georgia were not analysed after preservation with formalin, as was the case with other known analyses. Formalin has a disadvantage in that it combines with the protein matter in milk and makes it much more difficult for the hydrochloric acid, which is added in the fat analysis, to break up the protein masses which occlude the fat globules, and in this way the result for the fat content is liable to be too low in a formalin-preserved sample.

The usual routine analyses for milk were employed, the Werner-Schmid process being used for the fat content analysis. A summarized account of the methods is given later.

The following results were obtained at South Georgia:

South Georgian whales (results expressed as percentages)

Whale No. ...	563	244	642
Species ...	Fin	Blue	Blue
Water... ...	54·19	50·52	41·62
Fat	30·20	34·62	36·59
Albuminoids...	—	—	—
Milk sugar ...	—	—	—
Ash	1·43	1·43	—
Total solids ...	45·81	49·48	58·38
Specific gravity	1·0254	1·0160	1·0090
Solids not fat	15·61	14·86	21·79

Comparison of the above three analyses may be made with the following results, which represent all the cetacean milk analyses I have been able to find in the literature:

Results taken from other observers' papers (results are percentages)

	1	2	3	4
	Delphinus phocaena	*Globicephalus melas*	Blue whale	Whalebone whale
Water... ...	41·11	48·67	60·47	69·80
Fat	45·80	43·76	20·00	19·40
Albuminoids...	11·19	7·57	12·42	9·43
Milk sugar ...	1·33 (?)		5·63	0·38
Ash	0·57	0·46	1·48	0·99
Total solids ...	58·89	51·33	39·53	30·20
Specific gravity	—	—	—	—
Solids not fat	13·09	7·57	19·53	10·80

1. Porpoise, *Delphinus phocaena*, T. Purdie, *Chem. News*, vol. 52, p. 170, 1885.
2. Bottle-Nose whale, *Globicephalus melas*, Frankland and Hambly, *Chem. News*, vol. 61, p. 63, 1890.
3. Blue whale, *Balaenoptera sibbaldi*, Backhaus, *Molkerei Zeit.*, Berlin, vol. 14, p. 481, 1904.
4. Bartenwal (Whalebone whale), Schreibe, *Münchener Mediz. Wochenschrift*, vol. 55, p. 795, 1908.

High percentages for the fat and the solids not fat are immediately noticed in both sets of figures. Cetaceans have a large amount of blubber tissue to keep up the blood heat and form a reserve of combustible material for times when intensive feeding has ceased and foodstuffs are absent; and presumably the richness of cetacean milk in fat and solids not fat is entirely due to the needs of the young calf for food with a high fat and sugar content. It will be observed that in the results from South Georgia the percentage of fat is much higher than in the Blue whale and Bartenwal results given by Backhaus and Schreibe respectively. This may point to a fundamental difference in the composition of the milk of northern rorquals from southern ones, or be due to physiological differences of the individual whales from which the samples were taken, or again to errors incidental to sampling or analysis. It has been previously pointed out in this note that the addition of formalin inhibits the breaking up of the protein masses which occlude the fat globules and so tends to produce a low milk-fat result for a formalin-preserved sample. Also Backhaus and Schreibe state that their samples were (i) of a reddish tinge, (ii) slightly red colour, which points to a dilution of the milk sample by blood. However, it is obviously impossible to comment at length on such a small number of analyses.

One very striking difference occurs in the milk-sugar figures of the Blue whale of Backhaus and the Bartenwal of Schreibe. In the former the percentage of milk-sugar is 5·63, whilst in the latter it is 0·38, which latter figure points to the supposition that the sample was not taken from a freshly killed whale, as stated by Schreibe, and decomposition of the milk-sugar has occurred, giving a low figure for this estimation and consequently too high a figure for the water content.

The milk-fat is described by Backhaus as non-solid at ordinary temperatures and water-clear in colour. Schreibe describes it as yellowish, whilst I should describe it as decidedly solid at ordinary temperatures and whitish in colour with a very faint yellow tinge. At South Georgia, some whale milk was shaken up and the resulting "butter" resembled soft lard in appearance and colour.

The following is a brief *résumé* of the methods used at South Georgia in the analysis of whale milk.

Specific gravity. By specific gravity bottle at 15·5° C.

Total solids. 5 c.c. of the well-mixed sample were weighed out into a porcelain dish and 1 c.c. of acetone added. The milk was evaporated to dryness on a steam bath and was then dried to constant weight in a steam oven.

Ash. The residue from the total solids estimation was gently ignited and the ash cooled and weighed.

Fat content. Werner-Schmid process. About 10 c.c. of well-mixed milk were weighed out into a flat-bottomed graduated tube fitted with a cork. 10 c.c. of concentrated hydrochloric acid were added and the tube and its contents were heated in a water bath at about 60° C. for ten minutes, with constant shaking. The tube was then rapidly cooled by immersion under running cold water. 30 c.c. of alcohol-free ether were then added. The cork was then inserted and the tube shaken vigorously for two minutes. When separation into two layers had occurred the ether layer was blown over into a weighed flask. The ether extraction was repeated three times, with 20 c.c. of ether each time. The ether was then distilled off on a hot-water bath and the flask containing the milk-fat was dried in a steam oven until constant in weight. The fat was then redissolved with ether and the flask again dried and weighed. The difference in weight gave the amount of fat present.

Water. Estimated by difference. The percentage of total solids is subtracted from 100 and the difference is the percentage of water.

Solids not fat. Obtained by subtracting the fat percentage from the total solids percentage.

APPENDIX II

A NOTE ON THE OIL CONTENT OF BLUBBER

By A. J. CLOWES, A.R.C.S., M.Sc.

This investigation was made in order to see if there was any variation in the fat content of whale blubber throughout the season, which variation, if present, might be taken as some indication of the condition of the whale. It is well known that the blubber on a whale varies in thickness in different parts of the whale, being thickest behind the dorsal fin and thinnest on the back behind the head, but whether the actual oil content (expressed as percentage by weight) varies in different positions is not known. In all the experiments made the blubber was always cut from the same position on the whale as described below.

A piece of blubber, roughly measuring a six-inch cube, was cut from the flank opposite the tip of the dorsal fin. This place was used in "thickness" measurements. Two parallel strips, about 5 cm. long and 1 square cm. in cross-section, were cut from this cube of blubber with the aid of a razor and then weighed and placed in a weighed soxhlet extraction thimble. The sections were always taken from the skin inwards, the skin being trimmed off before the strip of blubber was weighed. All handling of blubber was done with forceps and no attempt was made to wipe off free oil.

The method used was one of continuous extraction of the blubber by carbon tetrachloride in a soxhlet apparatus. Carbon tetrachloride was chosen because in addition to the primary object of dissolving fat, it was more easy to recover than petroleum-ether, or other solvents.

Carbon tetrachloride extract may be regarded as synonymous with fat content, although a small amount of substances other than true fats are extracted with the fat. It was considered that as the investigation was to be made on a number of whales, this would not matter for the comparative result which was desired. The strips of blubber, after being cut and weighed in the soxhlet thimble, were placed on a glass dish and cut into thin sections by means of a razor and forceps. This was done in order to accelerate the penetration of the cells of the blubber by the solvent. Any oil liberated during this process was washed into the soxhlet flask with carbon tetrachloride. The same procedure was adopted in all experiments made and by this means the experimental error was cut down to a constant minimum.

The following figures from a preliminary test give some indication of the amount of oil extracted each two hours over a period of ten hours' constant extraction.

Weight of sample of blubber = 5·7920 grm. Oil extracted:

In 1st two hours 3·9024 grm. In 3rd two hours 0·1718 grm.
In 2nd two hours 0·3955 grm. In 4th two hours 0·0572 grm.
In 5th two hours 0·0146 grm.

It can be seen that the bulk of the oil is extracted in the first two hours, but even so, at the end of ten hours there is still some oil left in the blubber. For this reason a standard time of six hours was adopted in all experiments. Extraction was allowed to proceed for six hours on a water bath, the soxhlet syphon operating about once every four minutes. At the end of the first three hours the flask of the soxhlet apparatus was changed for another weighed one containing a fresh quantity of carbon tetrachloride. After six hours' extraction the soxhlet flask was removed immediately after the syphon had operated. The carbon tetrachloride was then distilled off and the flasks were dried in an air oven at 90–100° C. for three hours and then weighed. Duplicate experiments on strips of blubber cut side by side were made in some cases, but in no case did the two results agree to within 2 per cent, results being expressed as the percentage of the weight of oil extracted in six hours to the total weight of the sample. With regard to the disparity in the results obtained in the duplicate experiments it must be assumed that either the error of sampling is great or else the blubber varies in composition from one place to another 1 cm. away. It is admitted that the error of sampling may be high, but as the same procedure was adopted in all cases it is unlikely that the discrepancy is due solely to this cause.

The following results were obtained:

Whale number	Species	Sex	Oil extracted in six hours ÷ weight of sample	
249	Blue	Male	77·16 %	
256	Blue	Male	73·69 %	
257	Fin	Female	76·93 %	
264*	Fin	Female	(1) 73·81 (2) 71·71	72·76 % average
263†	Fin	Female	88·09 %	
269‡	Fin	Male	(1) 37·15 (2) 40·20	38·63 % average
259	Blue	Female	70·47 %	
270	Blue	Female	(1) 63·45 (2) 61·05	62·25 % average

* Reported by Zoologists as "very lean whale".
† Reported by Zoologists as "very fat whale".
‡ Reported by Zoologists as "very fibrous whale".

Sections of the blubber of all the whales in these experiments were made by Mr Wheeler, and these were stained with resorcin fuchsin. Very little correlation could be established between the microscopical examination of these sections and the corresponding oil content figures.

Messrs Mackintosh and Wheeler report from an examination of a large number of whales at South Georgia the presence of numerous white flecks or marks on the skin of the whale. These white marks are discussed on p. 373, where it is shown that they are scars resulting from injuries received by the whale.

A hand-cut section of blubber was made through one of the scars and stained with Sudan III. The section was photographed and is shown in Plate XXXVII, fig. 3. This photograph demonstrates very clearly the presence of a large number of fibres which radiate downwards and sideways from the white mark on the skin. In some whales it would be impossible to sample the blubber without including some of these fibres, and consequently it can be seen that the whole method of sampling is liable to grave errors, as the presence or absence of these fibres undoubtedly has a very large influence on the oil content of blubber.

It seems, therefore, that the results obtained by chemical investigation depend largely on the presence of fibre in the blubber and cannot be taken as an index of blubber condition.

APPENDIX III

MEASUREMENTS OF BODILY PROPORTIONS

All measurements are in metres

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1925												
9 Feb.	5	Male	18·40	—	3·30	3·70	3·74	8·20	0·99	4·70	1·14	5·80
10 ,,	6	Male	16·85	—	2·42	2·68	2·84	6·55	—	—	0·88	5·40
10 ,,	8	Male	18·00	0·25	3·18	3·38	3·40	7·75	—	4·00	0·95	5·20
10 ,,	9	Female	18·85	0·30	3·20	3·60	3·60	7·90	0·95	4·90	1·00	6·00
11 ,,	10	Female	20·15	—	3·00	3·30	3·50	7·95	—	5·55	1·20	6·50
11 ,,	13	Female	20·00	—	3·35	3·80	3·93	8·65	—	—	1·15	5·90
13 ,,	21	Male	25·50	0·60	5·10	5·44	5·62	11·70	1·44	6·20	1·25	7·15
16 ,,	24	Female	25·80	0·64	4·75	5·15	5·00	11·30	1·40	6·20	1·33	7·40
17 ,,	26	Female	25·30	0·46	4·80	5·32	5·55	11·20	1·30	6·28	1·22	7·35
17 ,,	27	Female	24·20	0·38	4·35	—	4·90	10·35	—	5·70	1·35	7·03
20 ,,	30	Male	21·60	—	3·80	4·20	4·21	9·30	1·20	—	1·25	6·40
20 ,,	31	Female	18·30	0·27	2·04	2·25	3·35	11·30	0·90	4·97	1·00	5·75
21 ,,	34	Male	21·80	—	3·70	—	4·20	9·10	1·15	5·60	1·15	6·50
21 ,,	36	Male	21·65	0·27	4·00	4·70	4·50	9·75	1·20	3·34	1·15	6·50
21 ,,	37	Female	17·80	0·33	3·00	3·30	3·40	7·30	0·98	4·85	0·89	5·85
23 ,,	40	Male	23·05	—	4·25	—	4·60	10·10	1·60	5·80	1·30	6·80
23 ,,	41	Female	21·95	—	3·70	4·10	4·20	—	—	5·30	1·27	6·35
23 ,,	43	Female	19·45	—	3·30	3·50	3·65	8·30	1·10	5·00	1·11	6·10
24 ,,	46	Female	22·58	0·40	4·10	4·58	4·58	10·00	1·22	5·70	1·70	6·75
25 ,,	47	Male	19·10	0·26	2·95	3·58	3·52	7·85	1·00	—	1·01	5·75
25 ,,	48	Female	21·45	—	3·80	4·14	4·20	8·95	1·13	5·51	1·12	6·35
25 ,,	49	Female	20·27	—	3·50	3·90	4·05	9·00	1·10	5·00	1·18	5·95
25 ,,	50	Female	18·21	—	—	2·80	3·00	7·00	0·95	5·00	1·05	6·00
25 ,,	52	Female	26·20	—	5·10	5·45	5·62	11·50	1·40	6·50	1·25	7·70
26 ,,	53	Male	18·60	—	3·35	3·65	3·68	7·90	—	—	0·90	5·15
26 ,,	54	Female	26·20	—	4·90	—	5·30	11·25	1·32	6·15	1·30	7·45
26 ,,	55	Female	22·15	—	4·00	4·28	4·57	9·10	1·15	5·75	1·30	6·65
28 ,,	60	Female	20·50	0·30	3·35	4·10	4·20	8·90	1·11	5·10	1·10	5·90
2 March	72	Male	21·70	0·35	4·00	4·40	4·50	9·30	1·24	5·30	1·20	6·50
4 ,,	81	Female	19·85	—	3·30	3·70	3·75	8·50	1·00	5·55	1·25	6·30
4 ,,	82	Male	25·45	—	5·10	5·25	5·40	10·90	1·35	6·25	1·30	7·35
10 ,,	85	Male	20·10	—	3·50	—	3·90	8·45	1·08	5·20	1·10	6·20
12 ,,	87	Male	22·05	—	4·40	4·65	4·80	9·80	1·26	5·56	1·18	6·40
12 ,,	88	Female	23·85	—	5·00	—	5·20	10·74	1·38	6·10	1·18	6·78
13 ,,	89	Female	20·80	—	—			—	—	—	1·15	6·55
13 ,,	90	Female	21·40	—	3·60	4·05	4·20	8·80	1·15	5·40	1·20	6·56
13 ,,	91	Male	21·40	—	3·70	4·20	4·25	9·20	1·14	5·40	1·30	6·40
13 ,,	92	Male	23·20	—	4·15		4·60	10·30	1·25	6·10	1·35	6·50
13 ,,	93	Male	20·40	0·32	3·60	4·10	4·10	8·70	1·05	—	1·20	6·60
16 ,,	95	Male	18·80	—	3·15	3·45	3·60	7·75	1·00	4·68	1·00	5·50
20 ,,	98	Male	19·50	0·30	3·00	3·45	3·60	7·90	1·17	—	1·12	6·40
21 ,,	99	Female	19·90	—	4·50	4·80	4·80	8·45	—	—	1·10	6·00
21 ,,	102	Male	19·90	—		3·70	3·75	8·45	—	—	1·10	5·80
21 ,,	103	Female	23·70	—	4·40	4·07	5·00	10·80	1·34	5·70	1·35	7·45
23 ,,	104	Female	26·95	—	5·10	5·50	5·60	11·60	1·50	6·70	1·50	7·90
23 ,,	106	Female	26·70	—	5·10	—	5·65	11·80	1·53	—	1·50	8·10
23 ,,	107	Male	21·30	—	3·35	3·60	3·60	7·30	1·03	—	1·10	6·15
23 ,,	108	Female	24·13	—	4·60	—	4·80	10·20	1·30	6·20	1·20	7·10
23 ,,	109	Male	17·60	—	2·80	3·30	3·35	7·10	0·90	4·80	0·96	5·45
23 ,,	110	Male	19·40	—	3·00	—	3·40	7·55	—	—	1·00	6·40
23 ,,	112	Female	27·10	—	5·30	5·40	5·55	12·00	1·50	6·30	1·50	7·90
24 ,,	113	Male	23·80	—	4·60	4·90	4·95	11·00	1·37	5·90	1·35	6·95
25 ,,	115	Male	22·10	—	3·70	4·10	4·20	9·05	1·16	5·45	1·30	6·65
25 ,,	116	Male	19·30	—	3·20	3·72	3·77	8·10	1·15	4·68	0·94	5·48
25 ,,	117	Male	23·40	—	3·90	—	4·60	9·30	—	—	1·35	7·10
26 ,,	122	Female	24·70		4·55	—	5·15	11·00	1·38	6·15	1·30	7·30
26 ,,	123	Female	26·10	—	—		5·59	11·55	1·45	—	1·35	7·70
27 ,,	124	Female	24·40	—	4·50	—	5·45	10·80	1·31	—	1·30	7·45
27 ,,	125	Male	19·90	—	3·10	—	3·50	7·00	1·03	5·13	1·05	6·00
27 ,,	126	Male	22·35	—	—	—	4·58	—	—	—	1·25	7·90

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
8·80	8·30	1·20	0·27	1·00	2·10	2·60	3·72	0·68	4·75	2·40	—	—	—
8·20	—	0·80	—	—	2·15	2·50	—	0·60	3·50	—	—	—	—
8·40	8·00	1·35	0·25	0·85	1·75	2·25	2·50	0·67	4·55	2·00	—	—	—
9·20	8·45	0·50	0·20	0·65	1·95	2·55	2·65	0·65	—	—	—	—	—
9·50	9·50	0·45	0·30	0·85	1·80	2·57	2·75	0·70	4·40	2·15	—	—	—
—	—	—	—	—	2·00	1·70	1·75	0·45	4·90	2·47	—	—	—
11·30	10·40	1·55	0·33	1·00	2·80	3·48	3·62	0·95	7·10	3·04	—	—	
11·70	10·85	0·60	0·17	0·80	2·70	2·87	3·10	0·90	6·50	3·50		—	—
11·50	10·13	0·63	0·23	0·82	2·60	3·40	3·60	0·92	6·70	—	—	—	—
10·85	10·50	0·67	0·30	1·25	3·55	—	—	—	6·34	—	—	—	—
9·90	—	1·10	0·13	—	2·15	2·43	2·60	0·76	—	—	—	—	—
8·55	8·10	0·25	0·25	0·80	1·85	2·53	2·80	0·75	4·15	2·25	—	—	—
9·75	9·50	0·81	0·20	0·90	2·20	2·80	2·88	0·75	5·23	2·40	—	—	—
10·20	9·65	1·70	0·27	1·10	2·15	2·80	2·90	0·80	3·45	3·54	—	—	—
8·75	—	0·60	0·28	0·65	1·70	2·30	2·45	0·60	4·30	2·30	—	—	—
10·50	9·65	1·80	—	0·88	2·40	3·00	3·10	0·90	5·70	2·70	—	—	—
10·15	9·90	0·55	—	1·00	—	—	—	—	—	—	—	—	—
9·25	8·76	0·60	—	0·70	2·10	2·40	2·55	0·76	—	—	—	—	—
10·35	9·55	0·55	0·25	0·90	2·35	3·30	3·40	0·90	5·80	2·70	—	—	—
9·20	—	0·70	0·25	0·70	1·81	2·40	2·50	0·68	5·90	2·20	—	—	—
9·88	9·35	0·55	0·40	1·30	1·91	2·55	2·60	0·75	5·25	2·70	—	—	—
9·22	8·65	0·48	0·20	0·55	1·90	2·80	2·90	0·80	—	—	—	—	—
8·95	8·75	0·45	0·20	0·65	1·75	2·55	2·65	0·65	—	—	—	—	—
11·98	11·40	0·58	0·27	1·00	2·58	3·55	3·80	0·92	6·84	3·40	—	—	—
—	—	0·65	—	—	1·84	2·53	2·65	0·74	4·60	2·00	—	—	—
11·50	10·70	0·70	0·25	0·80	2·10	3·20	3·44	1·00	7·00	2·90	—	—	—
10·40	9·50	0·55	0·22	0·75	1·50	—	—	—	5·50	—	—	—	—
9·50	8·85	0·50	0·30	0·90	2·15	2·55	2·75	0·70	5·10	2·35	—	—	—
10·20	9·40	1·20	0·25	0·90	2·10	—	—	—	5·40	2·34	—	—	—
9·70	9·10	0·45	0·32	1·06	2·05	2·80	3·00	0·79	4·60	2·25	—	—	1·90
11·60	10·70	1·95	—	1·15	2·30	—	—	—	—	—	—	—	2·30
9·35	8·80	1·50	0·32	1·00	2·05	2·80	2·95	0·78	5·00	2·20	—	—	1·98
10·00	9·15	1·40	0·25	0·90	—	2·90	3·08	0·85	5·90	—	—	—	2·20
10·55	10·05	0·59	0·29	0·98	2·55	3·32	3·48	0·94	6·30	2·80	—	—	2·20
9·55	—	0·60	—	—	—	2·70	2·75	0·75	4·80	2·20	—	—	—
9·80	9·30	0·50	0·24	0·80	2·00	2·85	2·97	0·65	5·10	2·36	—	—	—
9·80	9·10	1·20	0·27	0·90	2·20	2·90	2·95	0·85	5·30	2·25	—	—	2·15
10·25	10·00	1·50	0·35	0·80	2·30	—	—	—	6·10	2·60	—	—	2·45
9·50	—	1·05	—	—	1·90	2·80	2·90	0·72	4·70	2·20	—	—	—
9·00	8·45	1·30	0·27	0·55	1·75	2·35	2·45	0·68	4·50	2·05	—	—	1·70
9·65	—	0·90	—	0·70	1·90	2·60	2·65	0·72	4·30	2·10	—	—	—
9·60	—	0·65	—	—	1·90	2·37	2·48	0·68	4·70	2·16	—	—	—
9·10	—	0·85	—	—	—	—	—	0·72	4·70	2·20	—	—	—
10·70	—	0·45	0·49	1·15	2·50	3·05	3·23	0·87	6·35	2·95	—	—	—
11·90	11·05	0·75	0·23	0·95	2·20	—	—	—	7·00	3·10	—	—	—
12·30	—	0·45	—	—	2·50	3·65	3·80	1·00	6·80	3·10	—	—	—
9·30	—	0·80	—	—	1·30	2·40	2·40	0·68	4·50	2·20	—	—	—
11·30	10·30	0·65	0·39	0·87	—	3·10	3·30	0·84	5·05	2·80	—	—	2·45
8·60	7·90	1·20	0·24	0·58	1·70	—	—	—	—	—	—	—	1·80
9·70	—	—	—	—	1·75	2·60	2·65	0·60	4·10	2·10	—	—	—
12·05	9·10	0·52	0·26	0·66	3·00	4·25	4·30	1·05	—	—	—	—	2·34
10·40	9·70	1·57	0·40	1·00	2·40	3·30	3·50	0·88	6·15	3·00	—	—	2·50
10·45	9·80	1·25	0·32	0·80	2·15	—	—	0·77	5·30	2·55	—	—	2·25
8·90	8·50	1·52	0·25	0·85	1·80	2·55	2·67	0·67	—	—	—	—	1·60
10·65	—	1·00	—	—	2·20	—	—	—	5·70	3·00	—	—	—
11·00	10·40	0·50	—	1·20	2·70	—	—	—	—	—	—	—	—
11·35	—	0·65	—	0·95	—	3·50	3·65	—	6·90	2·98	—	—	—
11·40	—	0·75	0·26	0·80	—	3·60	3·95	0·98	6·30	2·79	—	—	—
9·55	9·05	1·40	0·29	0·85	1·85	—	—	—	—	—	—	—	1·95
—	—	0·95	—	—	—	3·02	3·25	0·80	5·65	2·23	—	—	—

Date	Whale Number	Sex	1. Total length, tip of snout to notch of flukes	2. Lower jaw, projection beyond tip of snout	3. Tip of snout to blow-hole	4. Tip of snout to angle of gape	5. Tip of snout to centre of eye	6. Tip of snout to tip of flipper	7. Eye to ear, centres	8. Notch of flukes to posterior emargination of dorsal fin	9. Flukes, width at insertion	10. Notch of flukes to anus
1925												
28 March	128	Female	21·10	—	—	3·80	3·92	8·80	—	—	1·15	6·10
28 ,,	129	Male	22·00	0·26	3·90	4·50	4·52	9·60	1·23	5·50	1·15	6·45
28 ,,	131	Female	20·70	—	—	—	3·95	—	—	—	—	—
28 ,,	132	Female	21·10	—	3·60	4·00	4·10	9·05	1·10	—	1·20	6·10
28 ,,	135	Female	17·90	—	—	—	3·50	7·65	—	—	1·05	5·55
30 ,,	136	Female	22·80	—	3·85	4·31	4·55	9·70	1·20	6·02	1·15	6·90
30 ,,	141	Female	25·80	—	4·73	—	5·35	11·40	1·37	6·95	1·45	7·60
30 ,,	142	Female	23·90	—	4·57	4·72	4·91	10·45	1·38	6·10	1·35	7·50
30 ,,	143	Male	21·97	—	3·80	—	4·36	9·44	1·14	5·55	1·10	6·40
30 ,,	145	Male	22·45	—	3·74	4·00	4·25	8·85	1·18	6·00	1·20	7·10
30 ,,	146	Male	21·25	—	3·80	4·08	4·17	8·70	1·16	6·14	1·20	6·65
31 ,,	147	Female	26·30	—	4·80	—	5·40	11·15	1·45	6·83	1·43	7·80
31 ,,	148	Male	24·50	—	4·48	—	5·02	10·60	1·42	6·48	1·41	7·52
31 ,,	149	Female	25·50	—	4·34	5·13	5·30	11·23	1·42	—	1·29	7·39
31 ,,	150	Female	23·90	—	4·74	—	5·22	10·79	—	5·65	1·28	6·87
31 ,,	151	Female	22·30	—	3·90	4·38	4·48	9·50	—	—	1·20	6·70
1 April	153	Female	20·40	—	3·15	3·60	3·55	8·20	1·18	5·30	1·05	6·00
1 ,,	154	Female	25·50	—	4·70	—	5·25	11·05	1·34	5·80	1·30	7·10
2 ,,	156	Male	24·10	—	4·60	—	5·27	11·00	1·30	—	1·30	6·87
2 ,,	157	Male	24·90	—	4·55	—	5·10	10·55	1·47	5·88	1·18	6·54
2 ,,	160	Male	21·20	—	3·60	4·05	4·15	9·00	1·16	5·35	1·05	6·30
3 ,,	167	Female	19·55	—	3·00	3·47	3·55	7·85	0·91	5·18	1·10	6·03
4 ,,	170	Male	18·45	—	3·00	3·27	3·27	7·55	—	—	0·90	5·25
6 ,,	171	Male	24·70	—	4·95	5·26	5·39	11·25	1·34	—	1·13	7·00
6 ,,	172	Female	19·55	0·27	3·08	3·45	3·55	7·90	1·05	4·85	1·10	6·17
13 ,,	182	Male	21·60	—	3·75	4·14	4·28	9·40	1·17	5·30	1·20	6·55
13 ,,	184	Female	26·30	—	5·10	—	5·60	12·00	—	—	1·45	7·35
14 ,,	191	Female	23·60	—	4·25	—	4·96	10·40	1·20	—	1·40	7·15
16 ,,	199	Male	25·10	—	—	5·15	5·33	11·30	—	—	1·22	6·90
18 ,,	202	Male	24·50	—	4·83	—	5·37	10·95	1·48	5·77	1·25	6·98
18 ,,	204	Female	18·39	—	3·24	3·76	3·80	7·55	1·00	4·60	0·95	5·47
20 ,,	205	Female	24·07	—	—	—	—	—	—	—	1·18	6·75
20 ,,	209	Female	23·00	—	4·10	—	4·75	10·16	1·30	5·80	1·08	6·92
21 ,,	211	Male	24·80	—	4·42	—	5·03	10·70	—	—	1·20	—
21 ,,	212	Male	22·25	—	4·00	—	4·58	9·70	1·30	5·56	1·25	6·25
21 ,,	215	Female	20·15	—	—	3·85	3·90	8·60	—	—	1·10	6·10
21 ,,	216	Female	20·30	—	3·60	4·08	4·18	8·30	1·07	—	—	6·03
29 ,,	220	Female	19·65	—	3·45	3·88	4·00	8·60	1·07	—	1·07	5·84
30 ,,	221	Male	25·83	—	—	—	—	—	—	—	1·30	—
30 ,,	224	Male	21·50	—	3·72	—	4·20	9·15	1·18	5·37	1·06	6·17
1 May	226	Female	25·75	—	4·74	—	5·32	11·37	1·42	6·36	1·30	7·50
4 ,,	232	Male	24·90	—	4·75	—	5·20	10·87	1·38	6·22	1·15	7·36
4 ,,	234	Female	25·00	—	5·40	—	5·66	11·50	1·37	6·00	1·20	7·02
4 ,,	235	Male	18·05	—	3·24	3·56	3·56	7·60	1·00	4·30	0·93	5·30
8 ,,	239	Female	27·15	—	4·90	—	5·70	11·37	—	—	—	8·28
11 ,,	240	Male	24·00	—	—	—	—	—	—	—	1·29	6·53
11 ,,	241	Female	26·60	—	5·00	—	5·40	12·00	1·48	6·28	1·45	7·65
15 Oct.	242	Female	25·90	—	4·85	5·47	5·55	11·90	1·53	6·08	1·37	7·80
20 ,,	243	Male	24·45	—	4·70	4·95	5·05	10·87	1·43	5·70	1·44	7·00
20 ,,	244	Female	26·37	0·43	4·95	—	5·55	11·47	—	6·55	1·60	7·60
20 ,,	245	Male	20·80	—	3·75	—	4·20	8·75	—	—	1·12	6·08
21 ,,	248	Female	16·25	—	2·03	2·28	2·47	6·14	0·75	—	0·90	5·50
24 ,,	249	Male	19·10	—	3·15	—	3·50	7·90	1·00	5·10	1·00	5·65
24 ,,	250	Female	27·20	—	5·20	—	5·60	11·45	1·38	6·60	1·35	7·50
27 ,,	253	Female	25·40	—	4·90	—	5·60	11·30	1·23	6·00	1·40	7·45
27 ,,	254	Female	25·70	—	4·50	4·90	5·17	10·75	—	—	1·33	7·00
28 ,,	256	Male	24·40	—	4·90	—	5·15	11·00	—	5·85	1·37	7·05
29 ,,	258	Female	24·84	—	3·96	—	4·93	10·90	1·54	5·88	1·28	7·10

11 Notch of flukes to umbilicus	12 Notch of flukes to end of system of ventral grooves	13 Anus to reproductive aperture, centres	14 Dorsal fin, vertical height	15 Dorsal fin, length of base	16 Flipper, tip to axilla	17 Flipper, tip to anterior end of lower border	18 Flipper, length along curve of lower border	19 Flipper, greatest width	20 Severed head, condyle to tip	21 Skull, greatest width	22 Skull length, condyle to tip of premaxilla	23 Flipper, tip to head of humerus	24 Tail, depth at dorsal fin
9·20	—	0·40	0·28	0·90	2·10	2·90	3·05	0·80	5·00	2·60	—	—	—
9·80	—	0·95	0·35	0·90	2·20	3·10	3·24	0·86	5·50	2·70	—	—	—
—	—	—	—	—	—	—	—	—	4·70	2·30	—	—	—
9·70	—	0·50	—	—	2·05	—	—	—	5·00	2·50	—	—	—
8·45	—	0·40	—	—	1·70	2·35	2·40	0·65	4·35	2·20	—	—	—
10·60	10·00	0·70	0·40	0·90	2·47	3·10	3·40	0·85	5·50	2·53	—	—	2·15
11·96	11·20	0·65	0·37	1·25	2·60	3·43	3·62	0·99	6·77	2·90	—	—	2·33
11·34	10·00	0·50	0·43	1·30	2·70	3·22	3·40	0·88	6·20	2·78	—	—	—
10·05	9·95	1·60	—	0·95	2·28	2·90	3·02	0·80	5·34	—	—	—	2·40
10·70	10·20	1·70	0·28	0·87	1·92	—	—	—	5·20	—	—	—	—
10·05	9·55	1·45	0·42	1·04	2·00	2·70	2·86	0·72	5·30	2·41	—	—	2·14
12·52	11·60	0·70	0·35	1·00	2·64	—	—	—	6·40	3·25	—	—	2·50
11·28	10·15	1·85	0·38	1·10	2·60	—	—	—	—	—	—	—	2·58
11·15	—	0·46	—	—	3·20	3·10	3·30	0·85	6·47	2·79	—	—	—
10·85	9·87	0·61	0·30	0·90	2·47	3·25	3·37	0·95	—	—	—	—	2·63
10·40	—	0·50	—	—	2·30	3·15	3·30	0·85	—	—	—	—	—
9·50	8·85	0·50	0·30	0·75	1·90	—	—	—	—	—	—	—	1·90
11·30	10·40	0·65	0·27	1·25	2·95	3·32	3·45	0·92	6·75	3·10	—	—	2·90
10·67	8·30	1·13	—	—	2·30	3·35	3·50	0·96	6·25	2·90	—	—	—
10·37	8·65	—	0·27	1·15	2·00	3·17	3·30	0·93	6·35	2·84	—	—	2·85
10·10	9·30	1·13	0·30	0·70	1·90	2·97	3·08	0·70	5·20	2·18	—	—	2·05
9·20	8·75	0·52	0·29	0·80	1·85	—	—	—	—	—	—	—	2·00
8·60	—	0·95	—	—	1·60	—	—	—	4·20	1·91	—	—	—
11·07	—	1·10	—	—	2·40	3·00	3·10	0·94	6·60	2·63	—	—	—
9·40	8·90	0·55	0·17	0·83	1·98	—	—	—	—	—	—	—	1·77
10·20	9·20	1·65	0·30	0·90	2·10	2·80	2·87	—	5·24	2·65	—	—	2·35
12·02	—	0·98	—	—	2·40	3·30	3·48	0·96	6·84	3·20	—	—	—
11·70	—	0·35	—	—	2·30	3·10	3·24	0·85	6·13	2·80	—	—	—
10·70	—	1·10	—	—	2·30	3·28	3·45	0·91	6·56	3·16	—	—	—
11·10	10·52	1·50	0·38	1·00	2·47	—	—	0·80	6·36	2·95	—	—	2·70
8·26	7·80	0·48	0·25	0·65	—	—	—	—	4·63	2·25	—	—	1·55
—	—	0·55	—	—	—	2·84	2·91	0·72	5·70	2·50	—	—	—
10·82	9·87	0·51	0·21	0·65	2·06	3·13	3·33	0·90	5·90	2·40	—	—	2·30
—	—	—	—	—	1·90	2·95	3·10	—	6·35	2·85	—	—	—
9·90	—	0·60	0·28	1·30	—	—	—	—	5·68	2·61	—	—	2·48
—	—	0·50	—	—	1·80	2·60	2·78	0·80	5·05	—	—	—	—
9·45	—	0·54	—	—	2·49	2·60	—	0·68	—	—	—	—	—
9·05	—	0·40	0·26	0·70	1·80	2·50	2·61	0·70	4·98	2·38	—	—	—
—	—	—	—	—	—	—	—	—	6·18	—	—	—	—
9·40	8·75	1·53	—	—	2·27	—	—	—	—	—	—	—	2·23
11·70	10·70	0·75	0·17	0·88	2·49	3·14	—	0·88	6·60	2·90	—	—	2·43
10·78	9·40	1·78	0·28	0·76	2·54	—	—	—	6·35	2·95	—	—	2·70
10·80	10·30	0·63	0·29	0·88	2·90	—	—	—	6·70	3·10	—	—	2·60
8·40	7·90	1·42	0·25	0·70	1·75	—	—	—	—	—	—	—	1·65
12·50	—	0·72	—	—	2·37	3·28	3·42	0·92	—	—	—	—	—
9·85	—	1·12	—	—	—	—	—	—	6·30	3·20	—	—	—
11·60	8·90	0·70	0·30	0·84	2·75	3·04	3·25	—	—	—	—	—	2·70
11·70	—	0·60	0·38	1·00	2·90	3·60	3·72	1·00	—	—	—	—	—
11·00	10·00	1·13	0·32	0·80	2·55	3·30	3·40	0·86	6·30	2·58	—	—	2·45
11·90	10·65	0·60	0·16	1·00	2·70	3·44	3·64	1·07	—	—	—	—	2·65
—	—	1·83	—	—	1·78	—	—	—	5·15	2·36	—	—	—
8·40	—	0·36	0·20	0·60	1·60	2·20	2·30	0·59	3·10	1·60	—	—	—
9·00	8·25	1·40	0·35	1·27	1·90	2·40	2·55	0·69	—	—	—	—	1·85
11·90	—	0·77	0·38	1·80	2·35	—	—	—	7·05	2·81	—	—	—
11·85	10·90	0·75	0·38	1·10	2·50	3·76	4·00	1·00	—	—	—	—	—
11·40	10·42	0·80	0·32	0·90	—	—	—	—	—	—	—	—	—
11·05	10·20	1·65	0·22	1·80	2·45	3·10	3·25	0·93	—	—	—	—	2·60
11·15	10·50	0·50	0·23	0·80	2·35	3·34	3·56	0·90	—	—	—	—	2·50

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1925												
31 Oct.	259	Female	26·20	—	5·20	5·30	5·70	11·55	1·40	6·30	1·35	7·40
2 Nov.	261	Female	26·70	—	4·65	—	5·85	11·90	1·45	5·80	1·50	7·47
6 ,,	265	Female	21·85	—	3·95	4·55	4·70	9·65	1·20	5·40	1·10	6·60
6 ,,	267	Male	21·50	—	3·70	4·30	4·40	9·40	1·18	5·30	1·25	6·20
9 ,,	270	Female	26·30	—	4·35	5·00	5·13	11·00	1·30	6·40	1·34	7·45
9 ,,	271	Female	26·20	—	4·55	5·45	5·48	11·30	1·40	6·66	1·30	7·65
9 ,,	272	Female	26·42	—	4·73	—	5·52	11·80	1·43	6·65	1·45	8·00
16 ,,	274	Male	23·80	—	4·25	4·70	4·90	10·10	1·27	5·95	1·15	6·63
17 ,,	275	Female	22·30	—	3·90	4·30	4·50	9·65	1·23	5·80	1·25	6·75
9 Dec.	282	Female	18·90	—	3·20	3·60	3·76	7·90	1·02	4·53	0·98	5·43
15 ,,	291	Male	18·60	—	2·95	3·25	3·35	7·60	0·94	4·88	1·05	5·75
1926												
8 Jan.	302	Female	24·40	—	4·45	—	4·90	10·40	1·30	6·05	1·35	6·95
13 ,,	346	Male	24·10	—	4·80	—	5·30	10·70	1·25	—	1·35	6·85
16 ,,	360	Female	25·95	—	5·05	—	5·50	11·20	1·47	5·87	1·40	7·15
20 ,,	378	Female	23·90	—	4·20	—	4·83	10·00	1·34	—	1·18	7·10
20 ,,	379	Male	22·70	—	3·90	4·27	4·40	9·35	1·25	5·66	1·12	6·85
20 ,,	383	Male	24·40	—	5·13	—	5·60	11·00	1·19	5·40	1·20	6·57
21 ,,	399	Female	26·75	—	4·95	—	5·85	11·70	—	6·62	1·50	7·60
22 ,,	401	Male	25·25	—	4·53	—	5·10	10·90	1·44	6·20	1·35	7·30
22 ,,	402	Male	20·20	—	3·30	3·68	3·71	8·10	1·00	—	1·14	6·43
22 ,,	403	Female	20·60	—	3·53	3·90	4·10	8·75	1·14	5·12	1·19	6·23
23 ,,	418	Male	24·20	—	4·75	—	5·25	11·10	1·50	6·30	1·25	7·00
24 ,,	424	Male	24·80	—	4·45	—	5·17	10·80	1·34	5·98	1·32	7·10
25 ,,	440	Male	17·25	—	2·75	—	3·26	7·10	—	—	1·03	5·20
25 ,,	442	Male	24·10	—	4·36	—	4·85	10·74	1·33	6·05	1·24	6·85
27 ,,	444	Male	24·65	—	4·50	4·80	5·02	11·00	1·35	—	1·28	6·85
2 Feb.	494	Female	25·00	—	4·88	—	5·35	10·60	1·38	6·50	1·25	7·80
5 ,,	510	Male	18·30	—	2·78	3·23	3·30	7·67	0·95	—	1·04	5·90
6 ,,	517	Female	20·80	—	3·67	—	4·18	8·76	1·23	5·00	1·02	6·00
7 ,,	528	Female	18·80	—	3·05	3·38	3·60	7·90	0·95	4·35	0·99	5·45
8 ,,	532	Male	17·80	—	2·80	3·00	3·27	7·25	0·95	4·35	0·95	5·20
9 ,,	534	Male	20·50	—	3·62	—	4·13	8·80	0·88	5·08	0·98	6·00
12 ,,	554	Male	17·30	—	2·75	—	3·25	7·00	0·90	4·59	0·90	5·25
13 ,,	557	Female	26·85	—	4·86	—	5·45	11·40	1·50	—	1·38	7·50
14 ,,	567	Male	17·50	—	2·70	3·10	3·19	7·20	1·16	—	0·85	5·57
14 ,,	568	Male	18·80	—	2·95	3·30	3·45	7·25	0·97	4·48	0·86	5·85
14 ,,	569	Male	23·00	—	4·45	—	4·90	10·55	1·36	5·37	1·15	6·50
14 ,,	570	Female	20·80	—	3·90	4·27	4·25	9·00	1·12	—	1·09	6·15
14 ,,	571	Male	22·70	—	4·34	—	4·88	10·35	1·20	5·25	1·19	6·55
14 ,,	572	Male	23·10	—	4·35	4·75	4·95	10·40	1·30	5·75	1·21	6·75
15 ,,	578	Male	19·30	—	3·40	3·75	3·82	8·15	0·99	4·65	0·98	5·70
15 ,,	580	Male	22·60	—	3·75	4·15	4·32	9·50	1·25	5·80	1·13	6·55
15 ,,	581	Female	16·65	—	2·90	—	3·25	6·80	0·85	—	0·94	4·97
15 ,,	582	Female	18·35	—	3·20	3·35	3·40	—	0·95	4·65	1·00	5·55
15 ,,	583	Female	19·10	—	3·00	—	3·55	7·65	0·98	4·65	1·00	5·30
15 ,,	584	Female	18·23	—	3·00	3·30	3·35	7·40	1·13	4·50	1·05	5·55
16 ,,	591	Male	20·85	—	3·63	4·10	4·20	8·95	1·08	—	1·20	5·80
16 ,,	592	Male	19·35	—	3·20	3·50	3·65	7·88	1·00	5·30	1·00	5·85
16 ,,	593	Male	23·40	—	4·40	—	4·80	10·20	—	5·95	1·30	6·90
16 ,,	594	Male	18·80	—	3·10	3·44	3·57	8·06	1·00	4·81	1·09	5·45
16 ,,	595	Female	20·20	—	3·48	3·82	3·92	8·45	1·10	5·18	1·10	6·40
16 ,,	596	Male	21·70	—	3·90	4·13	4·23	9·20	—	5·50	1·22	6·65
16 ,,	597	Female	17·80	—	2·60	3·00	3·07	7·00	0·83	—	1·05	5·70
16 ,,	598	Male	21·90	—	4·00	—	4·40	9·45	1·10	5·15	1·10	6·40
16 ,,	599	Female	24·70	—	4·38	—	4·90	10·50	1·52	6·30	1·50	7·20
18 ,,	605	Female	18·80	—	3·10	3·42	3·53	7·45	0·95	—	0·95	5·90
18 ,,	608	Female	19·30	—	3·26	3·44	3·55	7·85	1·07	5·10	1·05	5·95
19 ,,	612	Female	19·10	—	3·08	3·30	3·50	8·06	0·95	4·80	1·10	5·70
19 ,,	613	Male	25·50	—	4·70	—	5·15	11·00	1·48	6·20	1·35	7·30
20 ,,	614	Female	21·10	—	4·00	4·40	4·50	9·10	1·12	—	1·20	6·40

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
11·45	11·00	0·75	0·32	1·65	2·65	—	—	—	—	—	—	—	—
11·55	10·60	0·63	0·35	1·15	2·80	—	—	—	—	—	—	—	2·60
10·25	9·50	0·50	0·37	1·00	2·14	3·07	3·20	0·85	5·60	2·66	—	—	2·20
9·85	9·00	1·60	0·21	0·65	2·10	—	—	—	—	—	—	—	1·95
11·80	11·38	0·75	0·27	1·00	2·60	3·50	3·75	0·98	—	—	—	—	2·50
11·70	10·80	0·67	0·34	1·00	2·60	3·24	3·36	0·98	6·60	3·09	—	—	2·20
11·95	10·95	0·90	0·41	1·10	2·70	—	—	—	—	—	—	—	2·35
10·50	10·30	1·82	0·08	1·44	2·20	3·00	3·14	0·74	—	—	—	—	2·25
10·20	—	0·50	0·15	1·65	2·20	2·90	3·13	0·88	5·50	2·63	—	—	—
8·85	8·55	0·47	0·26	1·00	1·90	2·50	2·59	—	—	—	—	—	1·62
9·00	8·10	1·15	0·25	1·00	1·98	2·55	2·75	0·73	—	—	—	—	1·65
10·80	10·60	0·65	0·28	0·70	2·30	3·17	3·28	0·85	—	—	—	—	2·70
10·88	10·19	1·65	—	—	2·35	3·35	3·45	0·75	6·40	2·80	—	—	2·60
11·25	10·90	0·63	—	1·25	1·90	3·34	3·53	0·90	6·90	3·21	—	—	2·55
10·90	—	0·56	—	—	2·15	2·85	3·04	0·83	—	2·77	—	—	—
10·75	10·90	—	0·27	0·90	2·05	2·58	2·64	0·80	5·52	2·60	—	—	1·90
10·60	10·00	1·65	—	0·80	2·20	3·23	3·38	0·88	6·95	3·14	—	—	2·35
12·12	—	0·75	0·33	1·20	2·84	3·75	4·00	1·00	—	—	—	—	2·85
11·15	10·35	1·63	—	1·15	2·15	—	—	—	6·30	—	—	—	2·35
9·44	—	0·80	—	—	1·85	2·60	2·67	0·70	4·60	—	—	—	—
10·00	9·50	0·62	0·27	0·90	1·90	2·57	2·63	0·70	4·95	2·34	—	—	1·80
10·75	9·60	1·60	0·38	0·95	2·50	3·30	3·45	0·93	6·34	2·72	—	—	2·20
10·78	10·10	1·55	0·39	1·50	2·30	3·16	3·28	0·90	6·23	2·98	—	—	2·45
8·34	—	0·70	—	—	1·68	2·30	—	—	—	—	—	—	—
10·85	10·30	1·75	0·32	0·80	2·60	3·23	3·46	0·88	6·02	—	—	—	2·45
10·85	—	1·20	—	—	2·57	3·38	3·47	0·84	—	—	—	—	—
11·65	10·75	0·53	0·38	1·40	2·63	3·25	3·45	0·90	6·60	2·75	—	—	2·60
9·05	—	0·85	—	—	2·10	2·75	2·82	0·65	4·05	1·95	—	—	—
9·30	9·14	0·49	0·34	1·10	1·88	2·58	2·75	0·75	5·20	2·48	—	—	—
9·07	—	0·55	0·16	0·40	1·82	2·60	2·82	0·71	4·42	2·21	—	—	—
—	8·00	1·40	0·21	0·60	1·70	—	—	—	—	—	—	—	1·45
9·35	8·65	1·40	0·21	0·90	2·00	2·78	2·92	0·71	5·08	2·48	—	—	2·10
8·05	7·00	1·10	0·20	1·08	1·64	2·17	2·30	0·60	4·00	1·90	—	—	1·50
12·00	—	0·70	—	—	2·44	3·29	3·45	0·98	6·75	3·18	—	—	—
8·50	—	0·79	0·23	0·58	1·50	2·41	2·45	0·65	3·94	2·10	—	—	—
9·10	8·50	1·25	0·24	0·52	1·55	2·32	2·43	0·65	4·24	2·15	—	—	1·77
10·50	10·10	1·60	—	0·76	2·30	—	—	0·92	—	—	—	—	2·18
9·60	—	0·47	0·23	0·70	2·10	2·82	2·95	0·78	5·05	2·54	—	—	—
10·05	9·50	1·50	0·30	0·85	2·26	3·07	3·32	0·90	6·07	2·81	—	—	2·10
10·30	10·10	1·75	0·30	0·85	2·40	3·15	3·30	0·73	5·95	2·63	—	—	2·15
9·10	8·10	1·35	0·22	0·90	1·95	2·43	2·51	0·65	4·60	2·16	—	—	1·75
10·65	9·80	1·95	—	0·80	2·05	—	—	—	—	—	—	—	2·00
8·02	—	0·47	—	—	1·60	—	—	—	4·00	1·85	—	—	—
8·50	7·85	0·62	0·19	0·65	—	2·40	2·55	0·66	4·15	2·00	—	—	1·55
8·80	9·00	0·67	0·13	0·57	1·60	2·40	2·55	0·70	—	—	—	—	—
8·60	8·10	0·60	0·24	0·60	1·70	—	—	—	—	—	—	—	1·50
9·25	—	1·02	—	—	1·96	2·80	2·95	0·70	5·15	2·15	—	—	—
9·17	8·70	1·30	0·27	0·90	1·85	—	—	—	—	—	—	—	—
10·85	9·90	1·65	0·25	1·10	2·40	3·15	3·31	0·87	6·04	2·81	—	—	2·50
8·77	8·15	1·40	0·16	0·96	2·02	2·67	2·80	0·76	4·40	2·10	—	—	1·70
9·60	8·90	0·40	0·25	0·80	2·00	2·65	2·80	0·74	4·80	2·42	—	—	1·80
10·30	9·40	1·40	0·32	1·47	2·10	—	—	—	5·30	2·40	—	—	2·15
8·70	—	0·40	—	—	1·65	2·30	2·45	0·61	3·75	1·87	—	—	—
10·15	9·40	1·60	0·31	0·95	2·35	2·93	3·00	0·79	5·35	2·35	—	—	2·20
11·20	10·60	0·60	—	1·28	2·27	3·23	3·38	0·85	6·07	2·90	—	—	—
9·05	—	0·45	0·22	0·72	1·50	2·40	2·59	0·62	4·15	2·08	—	—	—
9·20	8·70	0·55	0·23	0·90	1·90	2·52	2·65	0·67	4·30	2·31	—	—	—
8·95	—	0·58	—	0·89	1·95	2·65	2·80	0·74	4·45	—	4·33	3·00	1·83
11·25	10·19	1·85	0·32	1·10	2·26	—	—	—	—	—	—	—	2·55
9·65	—	0·50	—	—	1·80	2·78	2·94	0·83	5·35	2·55	—	—	—

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
20 Feb.	615	Male	23.30	—	4.95	5.23	5.33	10.90	1.31	5.38	1.19	6.20
20 ,,	616	Female	22.75	—	4.30	4.70	4.82	—	1.32	5.72	1.20	6.76
20 ,,	617	Female	22.10	—	4.00	—	4.50	9.45	1.30	5.53	1.10	6.80
22 ,,	620	Female	21.55	—	3.70	4.00	4.28	9.45	1.26	5.58	1.09	6.85
22 ,,	623	Female	21.50	—	3.15	3.62	3.75	8.18	1.05	—	1.13	6.33
24 ,,	625	Female	19.00	—	3.18	3.47	3.60	8.10	1.00	4.90	1.02	5.70
25 ,,	628	Male	21.30	—	3.65	4.14	4.17	9.10	—	—	1.15	6.25
1 March	637	Female	26.70	—	4.87	—	5.63	11.47	1.40	6.67	1.55	7.95
1 ,,	638	Female	24.35	—	4.30	—	5.05	11.10	1.36	5.62	1.30	6.85
1 ,,	639	Female	20.00	—	3.40	—	3.82	8.35	1.03	—	1.10	5.15
1 ,,	640	Female	25.10	—	4.85	—	5.32	10.80	1.37	6.35	1.34	7.14
1 ,,	641	Female	20.30	—	3.60	—	4.05	8.70	—	4.82	1.06	6.00
1 ,,	642	Female	24.25	—	4.70	4.95	5.11	10.77	1.40	6.00	1.37	7.03
1 ,,	643	Male	24.40	—	4.80	—	5.25	10.75	1.34	5.75	1.30	6.85
1 ,,	644	Male	18.97	—	3.28	3.64	3.80	7.95	0.97	4.90	1.10	5.80
2 ,,	645	Female	26.40	—	—	—	5.25	—	—	—	1.39	6.85
2 ,,	646	Male	17.75	—	3.00	—	3.41	7.50	0.89	—	1.03	5.70
2 ,,	647	Male	21.75	—	—	4.03	4.15	—	—	5.60	1.11	6.55
2 ,,	648	Female	17.30	—	2.80	—	3.25	7.15	0.90	—	0.93	5.50
2 ,,	649	Male	18.05	—	3.00	3.30	3.55	7.80	0.96	4.85	0.96	5.35
2 ,,	650	Female	16.35	—	2.70	3.00	3.17	6.94	0.86	3.88	0.91	4.70
2 ,,	651	Female	18.25	—	2.50	3.30	3.45	7.65	0.94	4.15	1.00	5.60
2 ,,	652	Male	21.70	—	3.75	—	4.15	9.05	1.16	5.30	1.04	6.32
3 ,,	653	Male	19.20	—	3.35	3.81	3.93	8.35	0.98	—	1.07	5.75
3 ,,	654	Female	19.20	—	3.00	3.63	3.70	7.80	1.02	5.05	1.05	5.86
3 ,,	655	Female	22.00	—	4.10	4.35	4.43	9.25	1.22	5.45	1.15	6.40
3 ,,	656	Male	18.10	—	3.00	—	3.26	—	1.00	—	—	5.50
3 ,,	657	Female	16.80	—	2.45	2.90	2.91	6.90	—	—	0.96	5.50
4 ,,	658	Male	21.50	—	4.00	4.45	4.50	9.55	1.24	—	1.17	6.30
4 ,,	659	Female	25.25	—	4.15	4.64	4.85	10.45	1.33	6.65	1.22	7.70
4 ,,	660	Female	22.10	—	3.70	4.27	4.37	9.50	1.14	—	1.22	6.40
4 ,,	661	Female	23.20	—	4.10	—	4.30	—	1.23	—	—	6.70
4 ,,	662	Male	18.30	—	2.60	—	3.10	7.10	0.83	4.60	0.90	5.70
4 ,,	663	Female	18.87	—	2.70	3.13	3.10	7.60	0.95	4.90	0.97	5.72
4 ,,	664	Female	24.70	—	4.60	—	5.20	—	1.42	5.50	1.20	6.80
4 ,,	665	Female	19.65	—	2.95	3.62	3.65	8.15	1.35	—	1.00	6.00
4 ,,	666	Female	24.90	—	4.00	—	4.78	10.65	—	6.25	—	7.45
5 ,,	667	Female	28.50	—	—	—	—	—	—	—	1.30	—
5 ,,	668	Male	21.65	—	3.80	4.36	4.47	9.25	—	—	1.23	6.50
5 ,,	669	Male	19.80	—	3.30	3.70	3.90	8.35	1.00	4.95	1.04	6.00
5 ,,	670	Male	20.30	—	3.40	3.76	3.88	8.00	1.07	5.30	1.04	6.10
6 ,,	671	Male	20.65	—	3.50	3.80	3.92	8.70	1.13	—	1.07	6.35
6 ,,	673	Male	19.20	—	3.25	3.65	3.77	8.30	—	4.90	0.95	5.70
8 ,,	676	Female	18.90	—	2.90	—	3.50	7.60	—	4.85	0.95	5.65
13 ,,	681	Female	18.60	—	3.14	3.20	3.29	7.30	—	—	1.03	5.80
14 ,,	684	Male	18.75	—	3.00	3.42	3.57	7.80	0.97	—	0.90	5.95
14 ,,	688	Male	17.70	—	2.80	3.30	3.50	7.10	—	—	0.86	5.50
19 ,,	695	Female	18.10	—	3.50	3.70	3.84	7.70	0.98	4.55	0.88	5.30
20 ,,	698	Male	19.00	—	3.00	3.55	3.60	8.10	1.00	4.75	1.03	5.75
22 ,,	702	Male	19.64	—	3.20	—	3.65	7.80	1.00	—	1.02	6.00
22 ,,	703	Male	17.75	—	2.98	3.14	3.35	7.10	0.98	4.40	0.97	5.40
22 ,,	704	Female	26.10	—	4.85	—	5.53	11.30	—	6.65	1.18	8.15
23 ,,	712	Female	17.95	—	2.80	—	3.10	6.90	0.97	4.30	0.80	5.35
24 ,,	716	Female	19.50	—	3.80	4.40	4.40	8.70	—	—	1.08	5.55
24 ,,	718	Female	18.80	—	3.25	3.60	3.78	8.00	0.93	4.65	0.98	5.55
25 ,,	720	Male	20.07	—	3.85	—	4.10	8.55	1.13	—	1.10	6.15
26 ,,	726	Female	20.02	—	3.60	3.90	3.97	8.80	—	5.10	1.07	6.15
29 ,,	737	Female	18.20	—	3.10	3.45	3.50	7.40	0.96	4.80	0.99	5.75

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
10·20	9·70	1·50	—	1·25	2·37	3·16	3·33	0·91	6·40	2·95	6·29	—	2·35
10·37	—	0·71	0·49	1·00	—	3·25	3·36	0·92	5·88	2·60	—	—	2·15
10·85	10·20	0·50	0·38	1·15	2·17	2·87	3·07	0·74	5·50	2·53	—	—	2·25
9·91	9·80	0·71	0·24	0·65	2·24	3·06	3·25	0·80	5·20	2·44	—	—	1·72
9·42	—	0·48	0·30	0·79	1·90	—	—	—	—	—	—	—	—
9·05	8·53	0·60	0·28	0·70	2·00	2·70	2·83	0·68	4·40	2·05	—	—	1·55
—	—	0·87	—	—	2·15	2·85	2·94	0·74	5·25	—	—	—	—
12·35	11·45	0·80	—	1·50	2·33	—	—	—	6·66	3·15	—	—	2·35
10·75	10·10	0·60	0·37	1·40	2·75	3·48	3·65	0·92	6·30	2·97	—	—	2·50
9·25	—	0·63	0·14	0·52	1·85	2·59	2·68	0·73	4·64	2·31	—	—	—
11·35	11·10	0·62	0·36	1·20	2·30	2·99	3·31	0·99	6·20	2·86	—	—	2·45
9·20	9·00	0·52	0·24	0·85	2·10	—	—	—	—	—	—	—	2·00
10·80	10·50	0·57	0·37	1·00	—	3·60	3·70	0·90	6·18	2·80	6·05	—	2·00
11·00	10·40	1·75	—	1·25	—	—	—	—	—	—	—	—	2·40
9·00	7·90	1·30	0·24	1·06	1·85	2·37	2·48	0·77	—	—	—	—	1·90
10·80	—	0·52	—	—	2·50	3·24	3·32	0·96	6·30	3·08	—	—	—
8·55	—	0·75	0·27	0·60	1·62	—	—	—	—	—	—	—	—
10·20	10·00	1·65	0·24	0·80	—	2·75	—	0·79	5·00	2·24	—	—	2·00
8·30	—	0·35	—	—	1·70	2·50	2·65	0·68	4·18	1·97	—	—	—
8·65	8·20	1·50	0·29	0·50	1·78	—	—	0·66	4·15	2·13	—	—	1·70
7·62	7·40	0·51	0·24	0·62	1·75	—	—	—	—	—	—	—	1·45
8·64	7·80	0·47	0·23	0·70	1·75	2·62	2·70	0·70	—	—	—	—	—
10·31	9·62	1·53	0·27	0·81	2·10	2·85	2·90	0·72	5·20	2·39	—	—	—
8·85	—	0·95	0·21	0·60	2·00	2·76	2·88	0·80	4·75	2·30	—	—	—
9·30	9·00	0·49	0·49	0·90	1·78	2·40	2·56	0·66	4·46	2·16	—	—	1·70
9·95	9·95	0·60	0·30	0·80	2·10	—	—	—	5·50	2·65	—	—	2·10
8·75	—	0·75	—	—	—	2·34	2·53	0·68	4·37	2·40	—	—	—
8·40	—	0·35	—	—	—	2·32	2·43	0·62	3·88	1·86	—	—	—
9·50	—	1·05	—	—	1·70	3·00	3·14	0·85	5·55	2·58	—	—	—
12·00	11·30	0·80	0·30	0·80	2·65	3·30	3·55	0·91	6·05	2·82	—	—	2·35
10·00	9·65	0·60	0·22	0·65	2·00	—	—	—	—	—	—	—	—
11·10	—	0·60	0·20	0·70	—	3·20	3·43	0·88	—	—	—	—	—
8·95	—	0·85	—	—	—	3·06	3·25	0·80	4·15	2·17	—	—	—
9·05	8·70	0·60	0·25	0·88	—	2·40	2·47	0·64	—	—	—	—	1·98
10·80	10·40	0·60	0·26	0·80	—	—	—	—	—	—	—	—	2·20
9·25	—	0·60	—	—	2·15	2·29	2·44	0·75	—	—	—	—	—
11·70	11·00	0·53	—	0·90	—	—	—	—	—	—	—	—	2·45
—	—	—	—	—	—	—	—	—	7·00	—	—	—	—
10·30	—	1·00	—	—	2·50	2·80	2·93	0·81	5·48	2·40	—	—	—
9·10	8·75	1·30	0·22	0·70	1·87	—	—	—	—	—	—	—	1·90
9·70	8·60	1·50	0·20	0·60	1·90	—	—	—	—	—	—	—	1·90
9·75	—	0·85	0·23	0·64	1·98	2·65	2·75	0·75	4·95	2·34	—	—	—
8·60	9·00	0·85	0·22	0·70	1·90	—	—	—	—	—	—	—	—
8·60	8·35	0·55	0·22	0·80	—	—	—	—	—	—	—	—	1·70
9·00	—	0·55	—	—	1·70	2·27	2·43	0·67	4·00	2·18	—	—	—
9·00	—	0·75	0·20	0·80	1·80	2·29	2·36	0·59	4·40	2·13	—	—	—
8·45	—	0·65	0·22	0·60	1·80	—	—	—	4·15	2·15	—	—	—
8·40	7·95	0·55	—	0·60	1·73	2·22	2·38	0·61	4·75	2·01	—	—	1·65
8·90	8·30	1·20	0·26	0·75	2·04	2·70	2·80	0·75	4·50	2·20	—	—	2·08
9·20	—	0·90	—	—	1·88	2·50	2·72	0·69	4·50	2·08	—	—	—
8·30	8·20	1·40	0·26	0·60	1·66	2·29	2·46	0·65	—	—	—	—	1·60
12·20	11·25	0·70	0·44	1·10	2·30	3·55	3·80	0·94	6·60	3·01	—	—	2·35
8·90	8·65	0·45	0·17	0·80	1·60	—	—	—	4·10	2·08	—	—	—
8·80	—	0·50	—	—	2·00	—	—	—	4·85	2·42	—	—	—
8·90	8·20	0·75	0·26	0·60	1·85	—	—	—	—	—	—	—	1·80
9·60	—	0·70	0·26	0·70	1·75	2·50	2·75	0·75	5·05	2·40	—	—	—
9·50	—	0·56	0·22	0·65	2·10	2·85	3·00	0·75	4·90	2·31	—	—	—
8·65	8·10	0·45	0·14	0·55	1·80	2·37	2·55	0·65	4·32	2·01	—	—	1·55

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
Saldanha Bay 1926												
15 June	739	Female	18·25	—	2·82	3·48	3·35	7·40	0·94	5·00	1·10	5·75
15 ,,	740	Male	16·95	—	2·88	3·35	3·37	7·10	0·94	4·42	1·07	5·10
16 ,,	746	Female	17·90	—	2·92	3·20	3·37	—	0·91	4·50	0·92	5·45
16 ,,	747	Male	19·60	—	3·20	3·64	3·76	8·20	1·02	5·00	1·00	5·95
16 ,,	748	Female	21·00	—	3·65	—	4·25	9·05	1·10	5·13	1·10	6·20
17 ,,	753	Male	18·35	—	2·87	3·28	3·38	7·43	0·97	4·70	1·00	5·65
17 ,,	754	Female	24·30	—	4·90	—	5·40	11·10	1·35	—	1·27	6·70
17 ,,	756	Female	17·65	—	2·90	3·15	3·20	7·05	—	—	0·92	5·75
17 ,,	757	Female	19·65	—	3·10	3·50	3·65	8·05	1·00	5·15	1·02	6·50
19 ,,	759	Female	17·03	—	2·90	3·25	3·50	7·30	0·90	4·60	1·00	5·15
19 ,,	760	Male	18·40	—	3·00	3·16	3·40	—	1·01	4·80	1·00	5·65
20 ,,	761	Female	22·00	—	3·80	4·45	4·55	9·50	1·00	—	1·17	6·85
20 ,,	763	Female	16·90	—	2·45	2·85	2·86	6·75	0·70	4·40	0·92	5·50
20 ,,	764	Male	17·00	—	2·60	3·03	3·10	7·00	0·90	4·35	0·80	5·10
20 ,,	766	Male	19·00	—	2·85	3·25	3·40	7·55	0·90	4·80	0·93	5·80
20 ,,	767	Female	16·80	—	2·60	2·95	3·04	6·70	0·88	4·35	0·83	5·35
21 ,,	768	Female	21·70	—	3·60	4·00	4·17	8·80	1·20	5·20	1·08	6·70
21 ,,	769	Male	19·20	—	3·06	3·38	3·58	6·95	1·00	5·00	1·00	5·95
21 ,,	770	Female	23·64	—	4·15	—	4·78	10·15	1·29	6·03	1·20	6·90
22 ,,	773	Male	18·80	—	3·10	3·25	3·35	8·20	1·04	4·90	0·90	5·50
22 ,,	774	Male	18·00	—	2·95	3·40	3·54	7·60	0·94	4·57	1·01	5·50
22 ,,	776	Female	26·90	—	5·18	—	5·83	12·10	1·44	6·10	1·38	7·55
22 ,,	777	Male	19·80	—	3·30	3·70	3·85	—	1·02	4·90	0·91	5·75
23 ,,	779	Female	18·80	—	3·11	3·44	3·48	7·67	0·99	4·74	1·00	5·90
23 ,,	781	Female	16·75	—	2·80	—	3·22	6·95	0·95	4·30	0·85	5·20
24 ,,	785	Male	18·60	—	3·10	3·55	3·67	7·90	0·92	4·96	0·91	5·65
24 ,,	787	Female	16·90	—	2·85	3·25	3·32	7·20	0·95	4·37	0·89	5·35
25 ,,	794	Female	18·95	—	3·00	3·48	3·48	7·85	1·00	5·00	1·00	5·97
26 ,,	797	Male	18·40	—	3·15	3·54	3·67	8·00	1·00	4·60	0·96	5·60
26 ,,	799	Female	19·00	—	2·90	3·31	3·38	7·45	1·04	5·15	1·10	5·75
27 ,,	801	Female	26·10	—	5·15	—	6·00	11·90	1·55	6·12	1·37	7·14
27 ,,	802	Male	18·70	—	3·00	3·40	3·50	7·80	1·12	4·90	0·95	5·60
27 ,,	803	Female	17·90	—	2·85	—	3·23	7·10	0·98	4·65	1·00	5·60
27 ,,	805	Female	19·40	—	3·00	3·30	3·47	—	1·00	5·50	1·01	6·20
28 ,,	809	Male	18·90	—	2·95	—	3·53	7·90	0·94	—	1·04	5·45
28 ,,	810	Female	26·35	—	4·85	5·54	5·58	11·82	1·32	6·33	1·36	7·35
29 ,,	811	Male	17·85	—	—	—	—	—	—	—	0·95	—
29 ,,	812	Female	24·80	—	5·00	—	5·55	11·10	1·39	5·85	1·28	7·00
29 ,,	813	Male	16·90	—	2·72	3·10	3·18	7·04	1·20	4·30	0·80	5·15
29 ,,	814	Female	17·80	—	2·84	3·05	3·25	7·15	0·95	4·60	0·90	5·40
29 ,,	816	Female	22·40	—	4·00	4·40	4·60	—	1·22	5·40	1·18	6·45
29 ,,	818	Female	20·90	0·20	4·00	—	4·45	9·20	1·15	5·40	1·00	6·30
30 ,,	819	Male	17·50	—	2·80	3·14	3·20	7·30	0·91	—	0·89	5·40
30 ,,	820	Female	21·55	—	4·10	4·25	4·45	9·35	1·17	5·40	1·10	6·20
30 ,,	822	Female	20·60	—	3·75	4·04	4·28	—	1·14	5·00	1·09	5·85
30 ,,	823	Male	15·83	—	2·70	—	3·18	6·85	0·94	3·80	0·80	4·65
1 July	824	Male	18·30	—	3·35	3·66	3·70	8·00	0·96	—	0·88	5·30
1 ,,	825	Female	17·70	—	2·95	3·32	3·40	7·60	0·97	4·23	0·85	5·35
1 ,,	826	Female	19·30	—	3·25	3·63	3·73	8·20	—	—	1·00	5·95
1 ,,	827	Female	19·97	—	3·40	3·70	3·77	8·15	1·06	5·00	1·02	6·05
2 ,,	828	Male	17·80	—	2·82	3·20	3·32	7·45	0·95	—	1·00	—
2 ,,	829	Male	18·80	—	3·15	3·55	3·59	8·05	1·03	4·88	1·05	5·75
2 ,,	830	Male	22·90	—	3·85	4·41	4·58	10·20	1·31	5·95	1·17	6·70
2 ,,	833	Male	18·25	—	3·25	3·60	3·72	7·85	0·98	4·75	0·95	5·55
2 ,,	834	Male	18·17	—	3·10	3·40	3·56	7·75	1·04	4·45	0·95	5·60
3 ,,	835	Male	19·00	—	3·05	3·47	3·59	7·77	0·98	4·75	1·06	5·78
3 ,,	836	Female	19·10	—	3·10	3·54	3·67	7·90	0·98	5·16	1·13	5·95
3 ,,	838	Male	22·00	—	3·90	4·34	4·53	9·46	1·16	5·40	1·15	6·50

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
8·78	8·30	0·50	0·20	0·90	1·87	2·38	2·52	0·68	4·17	1·98	—	—	1·70
8·00	7·60	1·30	0·15	0·65	1·70	2·26	2·37	0·65	4·00	2·02	—	—	1·50
8·54	8·04	0·45	—	—	1·60	2·15	2·26	0·69	4·15	1·85	—	—	1·54
9·30	9·10	1·35	0·28	0·80	2·10	2·67	2·73	0·73	—	—	—	—	1·70
9·90	9·20	0·55	0·23	1·00	2·00	2·70	2·85	0·78	5·20	—	—	—	2·00
8·75	8·20	1·15	0·13	0·50	1·70	2·20	2·42	0·68	—	—	—	—	1·63
10·80	—	0·80	—	—	2·40	3·30	3·44	0·95	6·60	3·10	—	—	—
8·70	—	0·45	—	—	1·66	2·28	2·42	0·68	—	—	—	—	—
9·65	9·00	0·60	0·23	0·50	1·95	2·65	2·80	0·75	4·43	2·23	—	—	1·55
8·58	8·18	0·43	0·19	0·87	1·75	2·23	2·36	0·65	4·25	2·30	—	—	—
8·90	8·57	1·20	0·30	0·80	—	—	—	—	—	—	—	—	1·55
10·30	—	0·55	0·25	0·80	2·05	2·65	2·76	0·79	5·55	2·50	—	—	—
8·40	—	0·50	0·17	0·50	1·72	2·30	2·47	0·62	3·60	1·81	—	—	—
8·80	8·50	1·30	0·20	0·65	1·55	2·22	2·32	0·57	3·80	1·86	—	—	1·48
9·15	8·60	1·60	0·15	0·50	1·78	—	—	—	—	—	—	—	1·70
8·30	7·90	0·46	0·24	0·80	1·50	—	—	—	—	—	—	—	1·40
10·30	9·70	0·51	0·27	0·80	2·00	2·65	2·85	0·75	5·20	—	—	—	1·75
9·16	8·43	1·20	0·14	0·60	1·95	—	—	—	—	—	—	—	1·70
10·93	10·00	0·70	0·31	1·12	2·30	3·07	3·20	0·85	—	—	—	—	2·50
8·60	8·30	1·25	0·23	0·70	2·00	2·64	2·69	0·72	—	—	—	—	1·75
8·60	8·20	1·50	0·21	0·55	1·70	2·42	2·58	0·66	4·40	2·00	—	—	1·50
12·00	11·50	0·80	0·35	1·07	2·80	—	—	0·99	7·25	4·28	—	—	—
9·10	8·80	1·40	0·27	1·00	—	—	—	—	—	—	—	—	1·55
9·45	8·57	0·55	0·28	1·10	1·94	2·45	2·61	0·72	4·30	1·97	—	—	1·65
8·05	7·80	0·50	—	0·50	1·70	—	—	—	—	—	—	—	1·35
8·90	8·65	1·60	0·20	0·50	1·83	2·60	2·82	0·71	4·45	2·10	—	—	1·55
8·00	7·70	0·50	0·17	0·65	1·79	—	—	—	—	—	—	—	1·50
9·00	8·50	0·58	0·16	1·15	1·90	—	—	—	—	—	—	—	1·50
8·60	8·10	1·30	0·33	1·00	1·94	2·39	2·47	0·71	—	—	—	—	1·60
8·90	8·50	0·55	0·26	0·60	1·65	2·37	2·44	0·68	4·30	1·96	—	—	1·55
11·30	10·60	0·60	0·35	1·12	2·85	3·64	3·81	0·98	7·40	2·90	—	—	2·25
9·00	8·50	1·40	0·16	0·85	1·95	2·55	2·69	0·62	4·40	1·95	—	—	1·55
8·70	8·20	0·45	0·29	1·05	1·70	2·22	2·42	—	—	—	—	—	1·45
9·45	8·80	0·50	0·25	1·00	—	—	—	—	—	—	—	—	1·65
8·85	—	0·60	0·18	0·56	1·80	2·49	2·62	0·68	4·40	—	—	—	—
11·55	11·10	0·70	0·31	0·85	2·75	3·56	3·70	0·99	6·80	2·96	—	—	—
—	—	—	—	—	—	2·24	2·30	—	3·65	—	—	—	—
11·15	10·35	0·50	0·41	1·65	2·55	3·10	3·18	0·94	6·75	2·70	—	—	2·50
8·00	7·18	1·27	0·21	1·14	1·65	2·23	2·36	0·64	3·95	1·95	—	—	1·43
8·40	7·90	0·45	0·16	1·00	1·60	2·30	2·40	—	—	—	—	—	1·42
9·90	9·30	0·58	0·28	1·10	2·25	2·94	3·15	0·82	5·78	—	—	—	2·00
9·73	9·50	0·50	0·30	1·20	2·10	—	—	—	—	—	—	—	1·85
8·40	—	1·15	—	0·75	1·75	2·30	2·40	0·59	3·95	1·85	—	—	—
9·80	9·20	0·60	0·24	1·00	2·30	2·70	2·76	0·78	—	—	—	—	1·95
9·77	8·70	0·60	0·34	0·95	—	2·71	2·94	0·74	—	—	—	—	1·98
7·25	6·85	1·20	0·60	0·20	—	—	—	—	—	—	—	—	1·40
—	8·00	0·80	—	—	1·87	2·35	2·43	0·64	4·67	2·32	—	—	—
8·30	7·70	0·40	0·22	1·00	1·75	—	—	—	—	—	—	—	1·55
7·85	—	0·40	—	—	—	—	—	—	—	—	—	—	—
9·50	8·80	0·45	0·21	0·90	1·75	—	—	—	—	—	—	—	1·70
—	—	0·91	—	—	—	2·20	2·32	—	4·25	1·80	4·17	—	—
9·10	8·80	1·45	0·31	1·10	1·93	2·70	2·86	0·70	4·40	2·10	4·23	—	1·58
10·60	10·00	1·70	0·34	0·90	2·40	3·13	3·25	0·90	5·65	2·53	—	—	2·00
8·65	8·30	1·35	0·25	0·90	1·72	2·45	2·67	0·67	—	2·00	—	—	1·65
8·70	8·00	1·20	0·22	1·00	1·70	—	—	—	—	—	—	—	1·65
9·00	8·60	1·22	0·29	0·83	1·85	2·41	2·55	0·71	4·30	2·00	—	—	1·73
9·00	8·50	0·45	0·21	0·70	1·84	2·10	2·48	0·70	4·45	—	—	—	1·62
10·10	9·50	1·60	0·34	1·05	2·20	2·85	3·00	—	5·43	2·46	—	—	2·15

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
3 July	840	Female	17·30	—	2·75	3·24	3·30	7·17	0·89	4·46	0·87	5·40
4 ,,	843	Male	19·30	—	3·37	3·78	3·81	8·20	—	—	1·10	6·27
4 ,,	844	Female	25·90	—	4·60	—	5·35	11·15	1·37	7·00	1·27	7·55
4 ,,	845	Male	26·00	—	4·35	4·98	5·10	10·80	1·33	6·20	1·20	7·60
4 ,,	846	Female	18·80	—	3·40	3·60	3·75	7·95	—	4·60	1·00	5·58
4 ,,	847	Female	19·75	—	3·50	4·00	4·04	8·50	1·03	4·84	0·93	5·90
4 ,,	848	Male	21·85	—	3·75	4·25	4·42	9·55	1·14	5·50	1·08	6·80
4 ,,	849	Female	16·00	—	2·68	3·13	3·15	—	0·84	4·27	0·87	5·43
5 ,,	850	Female	19·10	—	3·30	3·73	3·84	8·63	1·00	—	1·04	5·75
7 ,,	851	Female	20·07	—	3·05	—	3·60	8·15	1·06	5·20	1·05	6·20
8 ,,	853	Female	18·65	—	3·16	3·50	3·65	8·07	1·06	4·65	1·00	5·40
8 ,,	855	Male	19·45	—	3·55	3·70	3·79	8·50	0·98	—	1·00	6·13
9 ,,	857	Female	19·45	—	3·25	3·60	3·73	7·95	0·91	—	1·08	6·25
9 ,,	859	Female	17·85	—	3·10	3·30	3·50	—	0·90	4·40	0·95	5·43
9 ,,	860	Male	19·40	—	2·90	—	3·60	7·55	1·00	4·85	1·10	6·00
9 ,,	862	Female	25·60	—	4·87	—	5·40	—	1·33	5·95	1·35	7·45
9 ,,	863	Female	18·60	—	—	—	3·40	—	—	—	0·98	6·00
9 ,,	864	Male	24·55	—	4·75	5·05	5·28	10·30	1·28	5·46	1·23	7·10
11 ,,	866	Female	18·50	—	2·90	3·28	3·31	7·30	0·94	—	1·00	5·77
11 ,,	867	Male	23·80	—	4·27	4·76	4·95	10·40	1·25	6·10	1·25	6·90
12 ,,	868	Female	17·60	—	2·88	3·24	3·28	7·33	0·97	—	1·01	5·53
12 ,,	869	Male	17·25	—	2·83	3·40	3·30	7·40	0·86	4·85	0·93	5·55
12 ,,	871	Female	20·15	—	3·46	—	4·03	8·45	—	—	1·10	6·30
12 ,,	872	Male	22·55	—	3·97	4·48	4·69	9·80	1·17	5·58	1·05	6·60
12 ,,	874	Male	18·95	—	3·35	3·72	3·85	8·22	1·06	4·45	0·93	5·70
13 ,,	879	Female	19·20	—	3·08	3·62	3·68	8·25	0·97	4·80	0·98	5·60
14 ,,	885	Male	22·20	—	3·90	4·35	4·48	9·45	1·10	5·37	1·23	6·46
14 ,,	886	Male	20·37	—	3·46	3·70	3·85	8·40	1·06	5·03	1·00	6·00
23 ,,	888	Male	24·80	—	4·40	4·95	5·14	—	1·37	6·30	1·25	7·30
24 ,,	889	Male	23·50	—	—	—	5·08	10·70	1·28	5·90	1·20	6·25
25 ,,	890	Male	24·25	—	4·52	4·80	4·95	10·40	1·38	5·95	1·23	7·20
25 ,,	894	Male	24·15	—	4·40	4·90	5·07	10·70	1·35	5·80	1·20	7·15
26 ,	895	Female	27·20	—	4·95	—	5·46	—	1·42	6·85	1·35	8·20
26 ,,	896	Male	17·90	—	2·80	—	3·45	7·60	0·92	4·48	0·89	5·07
27 ,,	900	Female	26·30	—	4·80	—	5·59	11·58	1·34	6·50	1·30	7·75
27 ,,	901	Female	20·20	—	3·50	4·04	4·14	8·75	1·09	5·05	1·08	5·93
28 ,,	904	Female	19·15	—	3·18	—	3·70	8·00	1·00	—	1·10	—
28 ,	906	Female	26·80	—	5·10	—	5·70	12·00	1·48	5·85	1·35	7·55
28 ,,	907	Male	17·40	—	2·90	3·10	3·32	7·25	0·98	4·40	0·98	5·25
28 ,,	908	Female	22·70	—	3·90	—	4·65	9·75	1·33	5·40	1·25	6·85
29 ,,	909	Male	20·00	—	3·20	3·68	3·80	8·25	1·01	5·15	1·10	6·35
3 Aug.	911	Female	20·42	—	3·70	—	4·30	9·03	1·20	4·75	1·02	5·85
3 ,,	915	Female	16·20	—	2·55	—	2·97	6·74	0·90	—	0·95	5·10
6 ,,	919	Female	26·60	—	4·87	5·48	5·65	11·30	1·37	6·60	1·40	8·00
6 ,,	920	Female	26·65	—	5·00	5·50	5·69	11·75	1·42	6·88	1·40	7·75
7 ,,	921	Female	19·75	—	3·47	3·72	3·90	8·50	1·08	4·85	1·00	5·80
7 ,,	923	Male	20·55	—	3·60	3·85	4·13	9·00	0·98	4·90	1·00	6·15
8 ,,	925	Female	24·80	—	4·45	5·20	5·25	11·10	1·30	—	1·30	7·30
9 ,,	926	Female	26·85	—	5·30	—	5·70	12·10	1·45	6·47	1·36	7·50
9 ,,	927	Female	18·05	—	3·07	3·35	3·39	7·67	1·00	4·45	1·00	5·47
9 ,,	928	Female	18·40	—	3·00	3·44	3·52	7·75	0·94	—	0·93	5·85
9 ,,	929	Male	22·74	—	4·35	4·65	4·80	10·70	0·96	5·82	1·30	6·50
9 ,,	930	Female	23·85	—	4·60	4·95	5·10	10·60	—	5·72	1·35	7·20
12 ,,	936	Female	18·05	—	2·85	3·24	3·37	7·50	0·97	4·67	0·94	5·55
13 ,,	937	Female	18·60	—	3·00	3·40	3·47	7·77	1·02	4·63	0·96	5·70
13 ,,	938	Female	21·85	—	3·92	4·34	4·45	9·48	1·18	5·38	1·02	6·40
14 ,,	942	Male	18·55	—	3·05	3·40	3·45	7·70	0·96	—	0·97	5·75
14 ,,	943	Male	22·60	—	4·00	—	4·60	9·65	—	5·40	1·16	6·69
14 ,,	944	Female	18·20	—	2·85	3·20	3·35	7·45	0·87	4·67	1·02	5·60
14 ,,	945	Female	20·00	—	2·60	3·97	4·12	8·60	—	—	1·05	—

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
8·20	7·80	0·40	0·21	1·00	1·62	2·17	2·26	0·59	4·05	1·82	—	—	1·45
9·50	—	0·80	—	—	2·00	2·60	2·68	0·69	4·53	2·20	—	—	—
11·95	11·45	0·75	0·15	1·00	2·30	3·21	3·33	0·94	6·26	3·00	—	—	2·65
11·65	10·80	1·60	—	1·10	2·44	3·19	3·37	0·90	6·12	2·86	—	—	2·25
8·90	8·50	0·43	0·24	0·90	1·93	—	—	—	—	—	—	—	1·80
9·40	8·90	0·50	0·19	0·70	1·90	2·63	2·75	0·70	4·90	2·06	—	—	1·30
10·20	9·20	1·60	0·36	1·20	1·33	2·98	3·20	0·82	5·40	2·50	—	—	2·00
7·70	—	0·40	0·19	0·65	—	—	—	—	3·96	1·74	—	—	1·18
8·90	—	0·48	0·24	0·70	2·15	2·78	2·92	0·72	—	—	—	—	—
9·65	9·30	0·55	0·27	0·80	2·00	2·70	2·85	0·73	—	—	—	—	—
8·70	8·00	0·50	0·20	0·70	1·78	2·38	2·52	0·72	4·45	2·16	—	—	1·54
9·60	—	0·57	0·34	0·85	2·05	2·66	2·89	0·78	4·80	—	—	—	—
9·55	—	0·38	—	—	1·67	2·39	2·53	0·62	4·55	—	—	—	—
8·55	7·90	0·42	0·24	0·95	1·65	2·33	2·42	0·60	—	—	—	—	1·58
9·50	8·70	1·35	0·21	0·90	1·95	2·53	2·63	0·68	4·34	2·20	—	—	1·53
11·30	11·00	0·70	0·14	0·80	2·20	—	—	—	6·65	3·15	—	—	2·58
—	—	0·48	—	—	2·02	2·55	—	0·60	4·20	—	—	—	—
11·15	10·60	1·60	—	1·25	2·10	2·94	3·15	0·95	6·20	2·84	—	—	2·20
8·68	—	0·38	—	—	1·63	2·18	2·30	0·61	4·14	1·83	4·07	—	—
10·45	9·46	1·45	0·26	1·10	2·50	3·05	3·25	0·88	—	—	—	—	2·25
8·70	8·20	0·66	0·21	0·65	1·69	2·30	2·47	0·64	4·10	1·90	—	—	—
8·55	8·10	1·45	0·24	0·75	1·78	2·35	2·46	0·65	4·03	1·80	—	—	1·37
9·58	—	0·51	0·22	0·60	1·83	2·53	—	0·75	4·95	2·30	—	—	—
10·45	10·20	1·50	0·23	0·65	2·39	2·98	3·12	0·89	5·73	2·53	—	—	1·98
8·95	—	1·00	0·24	1·00	1·95	2·44	2·56	0·74	4·63	2·11	—	—	—
8·75	8·40	0·54	0·26	0·70	2·00	2·75	3·02	0·76	4·40	2·12	—	—	1·55
10·20	9·60	1·60	0·29	1·00	2·25	2·97	3·10	0·78	—	—	—	—	1·91
9·20	8·85	1·25	0·24	0·97	1·85	2·55	2·68	0·77	4·80	2·08	4·71	—	1·90
11·60	10·90	1·90	—	1·35	—	—	—	—	—	—	—	—	2·05
10·35	—	1·54	—	1·20	2·50	3·30	3·55	0·95	6·36	2·60	—	—	2·37
11·20	10·95	1·20	—	0·90	2·55	3·06	3·20	0·82	6·50	2·80	—	—	—
11·15	10·60	1·55	0·26	0·95	2·32	—	—	—	—	—	—	—	2·15
12·65	12·00	0·75	0·25	1·15	3·00	3·78	—	0·93	6·80	2·90	—	—	2·10
8·20	8·00	1·28	0·26	0·77	1·65	—	—	—	—	—	—	—	1·40
12·10	11·20	0·80	0·32	1·00	2·60	3·24	3·50	0·95	6·82	3·00	—	—	2·51
9·55	8·95	0·55	0·23	0·68	2·00	2·70	2·81	0·70	5·00	2·22	—	—	1·73
9·20	—	—	—	—	1·80	2·44	2·60	0·71	—	—	—	—	—
12·00	11·13	0·75	0·23	1·00	2·68	3·60	3·98	—	7·00	3·08	—	—	2·30
8·15	—	1·20	0·21	0·85	1·70	—	—	—	—	—	—	—	1·60
10·50	10·20	0·54	0·28	0·70	2·05	2·80	2·97	0·87	—	—	—	—	—
9·70	—	0·87	0·31	1·00	1·95	2·55	2·70	0·77	—	—	—	—	1·80
9·35	8·90	0·55	0·26	1·00	—	—	—	—	5·30	2·48	—	—	1·95
8·00	7·40	0·49	0·22	—	1·65	—	—	—	—	—	—	—	—
12·30	12·10	0·80	0·37	1·25	2·50	3·10	3·28	0·93	6·85	3·02	—	—	2·20
11·90	11·10	0·68	0·47	1·10	—	—	—	1·00	—	—	—	—	2·15
9·05	8·55	0·55	0·22	0·90	1·95	2·55	2·68	0·72	—	—	—	—	1·64
9·80	—	1·35	0·35	1·00	2·13	2·75	2·90	0·80	5·05	2·35	—	—	2·05
10·95	—	—	—	—	2·30	3·25	3·55	0·92	—	—	—	—	—
11·60	11·00	0·70	0·31	1·10	—	—	—	—	—	—	—	—	2·65
8·55	—	0·50	0·25	0·78	1·80	2·40	2·50	0·70	4·30	—	—	—	—
—	—	0·50	0·17	0·55	1·88	2·40	2·58	0·63	4·27	2·06	—	—	—
—	—	1·05	0·31	0·90	2·45	3·20	3·38	0·90	—	—	—	—	—
10·95	10·15	0·65	—	—	2·06	2·90	3·26	0·85	6·30	2·60	—	—	2·15
8·60	8·20	0·42	0·23	0·75	1·91	2·47	2·60	0·70	—	—	—	—	1·55
8·77	—	0·53	0·19	0·60	1·82	2·45	2·59	0·70	4·20	2·02	—	—	—
10·15	9·50	0·60	0·25	0·80	2·12	2·77	2·90	0·78	5·05	2·50	—	—	1·95
9·00	—	—	—	—	1·80	2·40	2·50	0·71	4·25	1·90	—	—	—
10·50	—	1·55	0·24	0·70	2·00	2·80	3·05	0·75	—	—	—	—	1·95
8·80	8·20	0·55	0·22	0·95	1·95	2·50	2·60	0·65	—	—	—	—	1·54
9·30	—	—	—	—	2·03	2·60	2·78	0·72	—	—	—	—	—

			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1926												
16 Aug.	953	Female	17·80	—	2·90	3·25	3·40	7·40	0·92	4·40	1·00	5·60
17 ,,	956	Female	19·25	—	3·25	3·81	3·82	8·15	1·03	—	0·91	5·60
18 ,,	961	Male	25·20	—	—	5·45	5·70	11·80	1·55	5·56	1·28	6·90
19 ,,	964	Male	18·10	—	3·10	3·60	3·66	7·55	1·00	4·52	1·05	5·30
19 ,,	965	Male	17·53	—	2·85	3·20	3·28	7·20	0·95	—	0·91	5·25
19 ,,	967	Female	19·00	—	3·04	3·35	3·51	7·87	1·02	5·05	1·00	5·75
19 ,,	968	Female	25·05	—	4·45	—	5·12	10·65	1·28	6·48	1·31	7·80
20 ,,	971	Male	19·20	—	2·95	3·40	3·50	7·80	1·08	5·75	1·05	6·15
20 ,,	974	Male	20·00	—	3·45	3·87	3·95	8·45	1·07	4·90	0·93	5·90
20 ,,	976	Male	17·25	—	3·05	3·40	3·50	—	0·94	4·44	1·00	4·90
21 ,,	981	Female	20·10	—	3·13	3·69	3·76	8·05	1·05	5·32	1·02	6·07
22 ,,	984	Female	17·80	—	2·90	3·30	3·35	—	—	—	0·96	—
22 ,,	985	Male	18·10	—	2·90	3·25	3·35	—	0·97	4·62	1·00	5·75
23 ,,	991	Male	20·90	—	3·47	3·92	4·06	8·95	1·13	5·12	1·14	6·30
23 ,,	993	Female	19·60	—	3·50	3·85	4·05	8·35	0·99	5·20	1·17	6·20
24 ,,	994	Male	20·30	—	3·50	—	4·00	8·80	1·07	—	1·05	5·90
24 ,,	995	Female	18·17	0·19	3·20	—	3·55	7·60	0·97	4·20	0·97	5·60
24 ,,	996	Male	18·95	—	3·40	3·78	3·85	8·35	0·99	4·60	1·10	5·35
24 ,,	997	Male	19·85	—	3·38	4·69	4·82	—	—	—	1·05	5·55
24 ,,	998	Female	18·15	—	3·05	3·37	3·50	—	0·98	4·55	0·99	5·60
25 ,,	1006	Male	20·35	—	3·30	3·75	3·90	8·45	1·05	5·15	0·98	6·00
25 ,,	1007	Female	21·35	—	3·80	4·28	4·37	9·25	1·15	—	1·18	6·45
25 ,,	1008	Male	17·75	—	2·95	3·22	3·25	7·15	0·92	4·42	0·97	5·45
25 ,,	1010	Male	17·85	—	2·95	3·33	3·40	7·55	0·96	4·35	1·00	5·60
26 ,,	1012	Male	20·63	—	3·55	3·98	4·07	—	1·08	5·10	1·09	6·10
26 ,,	1013	Female	18·55	—	3·01	—	3·58	7·95	1·02	4·85	1·03	5·70
26 ,,	1016	Male	18·40	—	2·85	3·25	3·33	7·55	0·97	5·10	1·04	5·80
26 ,,	1017	Male	20·15	—	3·40	—	3·78	8·40	1·08	5·00	1·05	6·15
26 ,,	1018	Female	18·75	—	2·20	3·55	3·63	7·90	0·99	4·70	1·01	5·90
27 ,,	1022	Female	17·45	—	2·70	3·08	3·15	6·90	0·88	4·88	0·98	5·80
27 ,,	1023	Male	18·60	—	3·20	3·47	3·58	7·87	0·98	4·48	1·00	5·35
27 ,,	1026	Male	20·10	—	3·80	3·97	4·07	8·92	1·12	5·23	1·07	6·00
27 ,,	1027	Female	18·10	—	3·07	3·36	3·50	7·47	0·92	4·52	0·98	5·45
28 ,,	1029	Male	26·30	—	5·18	5·60	5·85	11·75	1·54	6·10	1·32	7·50
28 ,,	1031	Male	19·40	—	3·10	3·38	3·53	7·85	1·01	4·90	1·14	6·00
28 ,,	1034	Female	17·70	—	3·05	3·42	3·50	7·60	0·93	4·55	0·87	5·25
28 ,,	1036	Male	24·40	—	4·60	—	5·15	10·90	1·30	6·06	1·14	6·70
30 ,,	1041	Male	18·45	—	3·05	3·37	3·54	7·50	1·00	4·55	1·05	5·55
31 ,,	1045	Male	23·30	—	4·28	4·57	4·70	10·00	1·33	5·97	1·28	6·80
31 ,,	1046	Male	19·40	—	3·27	3·58	3·82	8·20	1·06	4·85	0·93	5·65
31 ,,	1047	Female	21·15	—	3·80	4·17	4·37	9·15	1·20	5·50	1·06	6·20
1 Sept.	1048	Female	18·20	—	2·95	3·18	3·37	—	0·87	—	0·94	5·70
1 ,,	1049	Male	19·05	—	3·10	3·44	3·58	7·95	0·98	4·96	1·00	6·00
1 ,,	1050	Male	19·55	—	3·45	3·77	3·94	8·30	1·07	4·70	1·10	5·75
2 ,,	1052	Female	20·00	—	3·35	3·73	3·87	8·20	1·05	5·35	1·11	6·30
2 ,,	1054	Male	18·40	—	2·94	3·23	3·44	7·75	0·97	4·65	1·00	5·65
3 ,,	1056	Male	23·90	—	4·70	5·26	5·30	10·70	—	—	1·20	6·75
3 ,,	1057	Female	25·10	—	4·45	5·05	5·16	10·95	1·46	6·25	1·30	7·30
4 ,,	1060	Female	18·00	—	2·75	3·18	3·27	—	0·94	4·73	0·94	5·70
4 ,,	1061	Male	24·45	—	4·80	5·10	5·25	10·88	1·31	5·85	1·22	7·00
4 ,,	1062	Male	17·50	—	2·90	3·22	3·33	—	0·93	4·00	0·87	5·30
5 ,,	1063	Male	19·85	—	3·40	3·85	3·90	8·35	1·04	4·85	1·00	5·85
5 ,,	1064	Female	13·35	—	1·75	1·95	2·00	5·05	0·67	3·67	0·84	4·53
5 ,,	1065	Female	21·30	—	4·05	4·40	4·53	9·27	1·13	—	1·12	6·15
6 ,,	1066	Male	18·20	—	3·05	3·45	3·51	7·65	0·97	4·40	0·98	5·50
6 ,,	1067	Male	20·80	—	3·58	4·00	4·15	8·80	1·07	4·90	1·02	5·73
6 ,,	1068	Male	19·50	—	3·30	3·57	3·72	8·30	1·05	5·05	1·05	5·75
7 ,,	1069	Female	17·90	—	3·15	3·40	3·45	7·50	1·00	—	—	5·35
7 ,,	1070	Male	22·90	—	4·10	—	4·73	10·25	1·38	5·20	1·20	6·35
7 ,,	1071	Female	25·47	—	4·78	—	5·35	11·35	1·36	6·05	1·18	7·50

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
8·55	—	—	0·22	1·05	1·85	2·40	2·50	0·66	—		—	—	1·55
9·00	—	0·55	0·20	0·80	1·79	2·45	2·56	0·68	4·70	—	—	—	—
11·15	10·20	1·75	—	1·65	2·65	3·16	3·30	0·98	—	—	—	—	2·07
8·45	7·85	1·30	0·23	0·75	1·84	—	—	0·67	—	—	—	—	1·65
8·20	—	0·70	—	—	1·68	2·35	2·45	0·62	4·10	1·98	—	—	—
9·00	7·70	0·52	0·18	0·50	1·92	2·50	2·69	0·75	4·28	2·12	—	—	1·59
11·80	11·10	0·70	0·28	0·70	2·40	3·16	3·23	0·90	—	—	—	—	1·95
9·55	8·70	1·10	0·26	1·15	1·90	2·45	2·57	0·69	4·25	2·05	—	—	1·60
9·35	8·95	1·55	0·35	1·25	1·86	2·55	2·74	0·73	4·48	2·17	—	—	1·80
7·87	7·45	1·20	0·25	1·20	—	—	—	—	—	—	—	—	1·60
9·35	8·75	0·60	0·16	0·45	1·90	—	—	0·66	—	—	—	—	1·47
8·30	—	—	—	—	—	2·40	2·60	0·71	4·20	1·97	—	—	—
8·80	8·30	1·25	0·22	1·00	—	—	—	—	—	—	—	—	1·45
10·10	9·80	1·70	0·30	1·00	2·15	2·76	2·93	0·75	4·90	2·41	—	—	1·73
9·45	8·70	0·60	0·22	0·70	1·94	—	—	—	—	—	—	—	1·80
9·40	—	—	—	—	2·15	2·74	2·88	0·73	4·80	2·20	—	—	—
8·65	8·15	0·57	0·21	0·85	1·70	2·30	2·38	0·66	4·45	1·85	—	—	1·55
8·57	8·00	1·35	0·27	0·90	2·00	2·80	3·00	0·74	—	—	—	—	1·75
9·00	—	—	0·24	0·90	—	—	—	0·76	4·70	2·10	—	—	—
8·60	8·08	0·38	—	0·90	1·82	2·35	2·45	0·70	4·25	2·00	—	—	1·58
9·45	8·90	1·60	0·24	0·80	1·97	2·60	2·74	0·77	4·62	2·30	—	—	1·73
9·90	—	0·40	—	—	2·18	2·80	2·95	0·75	5·20	2·50	—	—	—
8·70	8·30	1·40	0·22	0·85	1·65	2·31	2·44	0·64	4·00	1·82	—	—	1·45
8·70	7·85	1·40	0·24	0·60	1·83	—	—	—	—	—	—	—	1·15
9·70	9·20	1·50	0·28	1·00	2·12	2·68	—	0·70	5·00	2·25	—	—	1·75
9·00	8·30	0·55	0·26	1·10	1·95	2·55	2·68	0·68	—	—	—	—	1·63
9·00	8·75	1·35	0·21	0·90	1·85	—	—	—	4·20	1·80	—	—	1·45
9·50	—	1·40	0·16	1·20	2·20	2·80	2·96	0·77	—	—	—	—	1·73
9·05	8·90	0·50	0·24	—	1·75	2·45	2·50	0·68	—	—	—	—	1·65
8·75	8·10	0·53	0·17	0·60	1·55	2·15	2·21	0·59	—	—	—	—	1·48
8·75	8·10	1·40	0·23	0·88	1·77	—	—	0·72	—	—	—	—	1·59
9·15	8·60	1·60	0·37	1·00	2·03	2·67	—	0·79	5·15	2·50	—	—	1·90
8·35	7·98	0·55	0·20	0·50	1·75	2·20	2·40	—	—	—	—	—	1·42
11·80	10·60	1·80	0·45	1·30	2·70	3·35	3·47	1·00	7·10	3·00	—	—	2·37
9·15	8·60	1·30	0·18	0·70	2·05	2·55	2·64	0·68	4·30	2·10	—	—	1·60
8·20	7·80	0·48	0·27	0·80	1·67	2·28	2·41	0·68	4·20	1·98	—	—	1·57
10·85	10·10	1·90	0·35	0·80	2·70	3·08	3·17	0·90	—	—	—	—	1·85
8·70	8·35	1·30	0·26	1·10	1·68	2·34	2·46	0·62	4·38	2·02	—	2·67	1·65
10·60	10·20	1·75	0·28	0·80	2·33	3·00	3·13	0·87	—	—	—	—	2·03
9·05	8·60	1·45	—	0·60	1·90	2·58	2·69	0·73	4·67	2·30	—	—	1·74
9·85	9·40	0·60	0·21	0·60	2·10	2·85	2·95	0·80	—	—	—	—	1·74
8·75	—	0·45	0·21	0·60	—	2·41	2·56	0·64	4·15	1·86	—	—	—
9·10	8·75	1·30	0·32	0·70	1·88	2·53	2·67	0·70	4·32	2·18	—	—	1·70
9·10	8·60	1·35	0·26	0·80	1·90	—	—	—	—	—	—	—	1·77
9·70	9·10	0·55	0·38	0·85	1·87	2·43	2·55	0·73	4·65	2·25	—	—	1·80
8·85	8·00	1·20	0·28	1·00	2·04	—	—	—	—	—	—	—	1·54
9·55	—	1·72	—	1·50	2·36	3·05	3·24	0·87	6·45	2·70	—	—	—
11·05	10·80	0·60	0·37	1·00	2·43	3·24	3·45	0·85	—	—	—	—	2·05
8·80	8·35	0·50	0·29	1·00	1·95	2·46	2·60	0·67	4·10	2·00	—	—	1·68
10·90	9·80	1·78	—	0·90	2·40	3·13	3·30	0·87	6·30	2·86	—	—	1·80
8·25	7·70	1·35	0·18	0·50	—	—	—	—	—	—	—	—	1·40
9·00	8·65	0·40	0·21	1·00	1·85	2·60	2·69	0·64	—	—	—	—	1·65
6·98	6·70	0·27	0·31	0·85	1·36	1·85	2·00	0·60	—	—	—	—	1·43
9·70	—	0·65	—	—	1·88	2·79	2·94	0·70	—	—	—	—	—
8·60	8·20	1·10	0·32	0·80	1·70	2·32	2·44	0·64	4·33	2·03	—	—	1·75
9·30	8·30	1·60	0·28	0·85	1·87	2·54	2·62	0·74	5·00	2·30	—	—	1·67
9·15	8·75	1·55	0·25	0·65	2·14	—	—	—	—	—	—	—	1·65
8·55	—	0·50	—	—	1·84	2·30	2·47	0·69	—	—	—	—	—
10·30	9·65	1·70	—	0·95	2·30	3·20	3·40	0·88	—	—	—	—	1·90
11·60	10·85	0·65	0·29	1·20	2·47	3·27	3·48	0·90	6·60	2·70	—	—	2·00

			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1926												
7 Sept.	1072	Male	23·40	—	4·30	—	4·85	—	1·23	5·95	1·22	6·80
7 ,,	1073	Male	23·20	—	4·40	—	4·90	—	1·35	5·30	1·23	6·50
7 ,,	1075	Male	18·07	—	3·06	3·35	3·45	—	0·96	4·45	0·85	5·60
8 ,,	1076	Male	18·50	—	3·00	3·35	3·40	7·50	0·98	4·45	0·93	5·40
8 ,,	1077	Male	19·10	—	3·40	3·80	3·95	8·60	1·02	4·55	1·00	5·60
8 ,,	1078	Female	19·90	—	3·45	—	3·98	8·40	1·05	4·90	1·06	4·80
14 ,,	1079	Female	25·95	—	5·06	5·50	5·61	12·00	1·45	6·30	1·35	7·40
14 ,,	1081	Male	20·50	—	3·47	4·00	4·09	8·85	1·08	4·83	1·02	5·90
15 ,,	1085	Female	13·95	—	1·93	2·07	2·18	5·25	0·73	3·83	0·86	4·55
17 ,,	1088	Male	18·70	—	3·33	3·55	3·76	7·55	1·04	4·76	0·98	5·65
18 ,,	1095	Female	19·85	—	3·60	4·00	4·10	8·50	—	—	1·05	6·00
20 ,,	1098	Male	18·50	—	3·15	3·50	3·57	7·75	1·00	4·47	0·95	5·55
20 ,,	1099	Female	20·30	—	3·10	3·68	3·82	8·07	1·04	5·25	1·03	5·95
20 ,,	1100	Male	25·90	—	4·59	—	5·32	11·60	1·44	6·20	1·14	7·58
21 ,,	1104	Female	16·82	—	2·73	3·05	3·14	7·00	0·94	4·09	0·80	5·20
21 ,,	1107	Male	18·00	—	2·75	3·05	3·19	7·10	0·91	5·04	1·00	5·78
22 ,,	1109	Male	24·90	—	4·55	5·00	5·20	10·90	1·27	6·41	1·25	7·46
22 ,,	1110	Female	24·15	—	3·92	4·46	4·56	9·65	1·27	6·15	1·29	7·28
22 ,,	1112	Female	20·57	—	3·72	4·10	4·42	8·70	1·16	5·00	1·15	5·55
22 ,,	1113	Male	18·90	—	3·05	3·46	3·53	7·60	0·97	4·90	0·97	5·75
22 ,,	1116	Male	19·25	—	3·10	3·44	3·52	7·80	1·05	4·95	0·83	6·00
23 ,,	1117	Female	21·90	—	3·70	4·16	4·33	9·30	1·16	5·73	1·11	6·80
24 ,,	1119	Male	20·95	—	—	4·00	4·10	9·00	1·14	5·30	1·15	6·50
24 ,,	1121	Male	17·65	—	3·00	3·20	3·35	7·50	0·90	4·30	0·99	5·40
24 ,,	1122	Female	19·25	—	3·15	3·35	3·52	7·60	0·99	5·00	0·90	5·90
25 ,,	1123	Male	18·05	—	2·88	3·18	3·30	7·40	0·95	—	1·10	5·65
25 ,,	1124	Female	25·70	—	5·10	5·57	5·73	11·50	1·39	6·12	1·35	7·30
25 ,,	1126	Male	17·30	—	2·67	3·08	3·16	7·10	0·91	4·47	0·89	5·40
25 ,,	1128	Female	18·00	—	2·90	3·20	3·34	7·30	0·97	4·76	0·98	5·75
26 ,,	1129	Male	19·75	—	3·00	3·39	3·50	7·90	1·00	—	1·13	6·25
26 ,,	1131	Male	18·05	—	2·80	3·10	3·20	7·10	0·98	—	1·00	5·55
27 ,,	1137	Female	19·80	—	3·30	3·75	3·82	8·30	1·02	4·90	1·05	6·10
27 ,,	1138	Female	18·60	—	3·30	3·52	3·61	—	1·00	4·80	1·00	5·75
27 ,,	1139	Female	19·25	—	3·20	3·45	3·53	7·92	1·02	5·25	0·98	6·10
27 ,,	1141	Male	17·50	—	2·75	3·10	3·16	7·10	0·95	4·45	0·93	5·40
27 ,,	1142	Female	22·00	—	3·90	—	4·45	9·30	1·24	5·27	1·07	6·50
28 ,,	1147	Female	24·10	—	4·20	—	4·90	10·34	1·35	5·95	1·20	6·80
28 ,,	1150	Male	23·86	—	4·07	—	4·65	9·90	1·26	6·05	1·22	7·10
29 ,,	1151	Female	26·10	—	5·00	—	5·55	—	1·40	6·25	1·15	7·40
29 ,,	1152	Male	18·05	—	3·10	—	3·55	7·70	0·97	4·50	1·04	5·55
29 ,,	1153	Male	17·65	—	2·80	3·16	3·27	—	0·97	4·35	0·90	5·20
30 ,,	1154	Female	17·80	—	2·85	3·30	3·38	7·30	1·01	4·34	1·02	5·55
30 ,,	1155	Male	20·65	—	3·30	3·80	3·90	7·70	1·09	5·60	1·12	6·40
30 ,,	1156	Male	17·10	—	2·80	3·05	3·12	—	0·89	—	0·91	5·30
30 ,,	1157	Female	17·60	—	3·10	—	3·42	7·45	0·99	4·50	0·95	5·60
30 ,,	1158	Male	18·35	—	3·23	3·53	3·65	6·79	1·09	4·60	0·90	5·55
2 Oct.	1159	Female	19·75	—	3·10	3·65	3·70	8·35	1·02	—	1·05	6·50
2 ,,	1160	Female	18·10	—	2·90	3·17	3·30	7·25	0·93	4·85	0·94	5·70
2 ,,	1161	Female	19·40	—	2·25	—	2·75	8·35	1·01	5·10	0·99	6·00
3 ,,	1162	Male	19·45	—	3·15	3·60	3·65	8·10	1·01	—	1·00	5·85
3 ,,	1166	Female	24·20	—	4·54	—	4·98	10·44	1·25	6·10	1·25	7·30
3 ,,	1167	Male	19·45	—	3·25	3·75	3·88	8·50	1·08	4·92	0·97	5·75
4 ,,	1168	Male	19·85	—	3·40	3·80	3·95	8·45	1·09	4·97	1·00	6·10
4 ,,	1169	Male	17·10	—	2·60	—	2·90	7·05	1·00	4·25	0·93	5·30
4 ,,	1170	Male	17·60	—	2·75	3·20	3·30	7·35	0·96	—	1·05	—
4 ,,	1171	Female	18·30	—	3·00	3·40	3·50	7·45	0·93	4·50	1·09	5·65
5 ,,	1172	Female	18·70	—	—	—	3·60	—	—	—	0·98	—
5 ,,	1173	Female	18·70	—	3·00	3·36	3·45	7·60	1·02	4·90	0·95	5·70
7 ,,	1174	Male	19·65	—	3·20	3·70	3·85	8·75	1·07	—	1·04	—
7 ,,	1176	Female	18·78	—	3·20	—	3·65	7·90	1·05	—	0·95	5·70

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
10·55	9·90	1·70	0·25	1·00	2·50	3·10	3·22	0·80	5·90	2·40	—	—	1·90
10·60	—	1·40	0·30	1·15	2·35	3·10	3·20	0·85	5·95	2·60	—	—	—
8·50	8·00	1·15	0·31	1·10	1·86	2·40	2·55	0·65	—	—	—	—	1·40
8·50	7·45	1·35	0·30	1·00	1·75	2·45	2·60	0·68	4·10	1·95	—	—	1·45
8·70	8·20	1·45	0·34	1·00	2·00	—	—	—	—	—	—	—	1·50
9·35	9·35	0·56	0·29	0·80	—	—	—	—	—	—	—	—	1·77
11·40	11·10	0·66	0·32	1·10	2·84	3·50	3·74	0·96	6·92	3·10	—	—	2·23
9·28	9·00	1·34	0·26	0·80	1·87	2·60	2·76	0·69	4·98	2·48	—	—	1·90
7·05	6·80	0·40	0·17	0·50	1·48	1·80	1·94	0·51	—	—	—	—	1·50
8·75	8·30	0·38	0·35	0·60	1·92	2·35	2·46	0·69	4·60	2·16	—	—	1·48
9·05	8·50	0·45	—	—	1·91	2·35	2·66	0·76	5·02	2·30	—	—	—
8·65	8·40	1·40	0·22	0·45	1·70	2·45	2·56	0·69	4·40	2·02	—	—	1·40
8·90	8·60	0·55	0·30	0·80	1·68	2·50	2·65	0·68	4·69	2·33	—	—	1·54
11·80	11·20	1·85	—	0·90	2·70	3·42	3·58	0·98	6·50	3·04	—	—	1·87
8·10	7·70	0·55	0·19	0·60	1·54	2·27	2·46	0·61	3·78	—	—	—	1·44
8·85	8·30	1·42	0·26	0·75	1·65	2·30	2·42	0·70	3·84	1·89	—	—	1·47
11·55	10·80	1·74	0·23	0·60	2·38	3·30	3·68	0·92	6·30	2·74	—	—	2·05
11·50	11·00	0·70	0·36	1·00	2·13	2·75	2·87	0·83	5·45	2·90	—	—	2·16
9·35	8·90	0·55	0·28	0·75	1·92	2·61	2·75	0·75	5·18	2·51	—	—	1·88
9·05	8·60	1·50	0·31	0·80	1·78	2·36	2·44	0·67	4·30	2·10	—	—	1·84
9·45	8·80	1·40	0·17	0·85	1·91	—	—	—	—	—	—	—	1·64
10·35	9·90	0·60	—	0·70	2·00	2·80	2·94	0·78	—	—	—	—	1·95
10·15	9·60	1·35	0·34	1·25	2·20	2·90	3·07	0·81	—	—	—	—	1·90
8·55	7·80	1·38	0·23	1·07	1·80	2·34	2·48	0·66	—	—	—	—	1·65
9·30	8·80	0·60	0·25	0·85	1·65	—	—	—	—	—	—	—	1·37
8·90	—	1·00	—	—	1·78	2·35	2·45	0·70	4·10	2·08	—	—	—
11·00	10·10	0·60	0·27	0·85	2·40	3·40	3·58	0·95	6·96	3·18	—	—	2·25
8·30	8·10	1·35	0·28	0·85	1·74	—	—	—	—	—	—	—	1·40
8·80	8·65	0·50	0·27	0·80	1·62	—	—	—	—	—	—	—	1·46
9·75	—	1·30	—	—	1·85	2·50	2·68	0·74	—	—	—	—	—
8·65	—	—	0·17	0·55	1·60	2·20	2·35	0·59	4·00	1·90	—	—	—
9·35	8·85	0·50	0·24	0·90	2·00	2·63	2·73	0·78	4·80	2·23	—	—	1·55
8·60	8·30	0·50	0·22	0·80	1·94	2·29	2·41	0·61	—	—	—	—	—
9·10	8·75	0·55	0·19	0·90	1·85	2·49	2·64	0·68	—	—	—	—	1·70
8·30	7·90	1·20	0·21	0·90	1·65	2·26	2·38	0·63	3·98	1·90	—	—	1·95
10·10	9·93	0·50	0·24	0·82	2·12	2·65	2·74	0·75	—	—	—	—	1·60
11·00	10·45	0·79	0·22	1·10	—	—	—	—	—	—	—	—	2·35
10·85	—	1·60	0·38	1·25	2·20	—	—	—	—	—	—	—	2·05
12·00	11·40	0·60	0·31	0·90	2·40	3·20	3·45	0·83	—	—	—	—	2·45
8·65	8·10	1·00	0·28	1·20	1·89	2·40	2·45	0·68	4·28	2·12	—	—	1·55
8·40	7·90	1·40	0·28	1·00	—	—	—	—	—	—	—	—	1·55
8·90	8·10	0·35	0·23	1·05	1·70	2·27	2·38	0·59	4·25	1·93	—	—	1·68
9·55	8·95	1·45	0·29	0·90	2·10	2·67	2·87	0·68	—	—	—	—	1·75
8·10	—	—	—	—	1·70	2·20	2·35	0·59	3·94	1·71	—	—	—
8·50	8·00	0·50	0·25	0·95	1·65	2·26	2·37	0·70	4·34	1·93	—	—	1·60
8·40	7·55	1·35	0·23	0·90	1·67	—	—	—	—	—	—	—	1·50
9·75	—	—	—	—	1·97	2·65	2·73	0·70	4·60	2·15	—	—	—
8·85	8·15	0·50	0·24	0·95	1·87	2·40	2·49	0·64	4·10	—	4·00	—	1·45
9·05	8·80	0·50	0·36	1·30	2·08	2·65	2·82	0·69	—	—	—	2·93	1·60
9·00	—	—	—	—	2·02	2·65	2·82	—	4·45	2·10	—	—	—
11·30	10·65	0·70	—	1·35	2·30	3·00	3·10	0·86	—	—	—	—	2·10
9·00	8·50	1·35	0·23	1·00	2·00	—	—	—	—	—	—	—	1·65
9·50	9·00	1·30	0·19	1·20	2·00	2·70	2·82	0·74	—	—	—	2·92	1·67
8·25	7·60	1·20	0·21	0·90	1·90	—	—	—	—	—	—	—	1·50
—	—	—	0·22	0·70	1·70	2·35	2·52	0·66	—	—	—	—	—
8·65	8·30	0·55	—	1·00	1·78	—	—	—	—	—	—	—	1·50
8·80	—	—	—	—	—	2·42	2·57	—	4·40	2·08	—	—	—
8·95	8·25	0·50	0·39	1·40	1·75	—	—	—	—	—	—	—	1·53
9·10	—	—	—	—	1·87	2·45	2·54	0·70	—	—	—	—	—
8·90	—	—	—	—	1·80	2·60	2·66	0·68	—	—	—	—	—

			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1926												
8 Oct.	1177	Female	20·00	—	3·60	3·92	3·96	8·65	1·06	—	1·02	6·39
8 ,,	1178	Female	19·03	—	3·10	3·40	3·51	7·80	1·03	4·85	1·00	5·80
8 ,,	1179	Male	17·20	—	2·85	3·20	3·32	7·15	0·93	3·95	0·92	4·85
8 ,,	1181	Female	18·80	—	3·20	3·55	3·65	7·90	1·00	4·80	1·00	5·80
8 ,,	1182	Female	19·25	—	3·10	3·55	3·60	8·00	1·06	5·00	1·00	5·95
8 ,,	1183	Male	18·20	—	2·70	3·10	3·20	7·25	0·90	4·75	0·90	5·70
9 ,,	1185	Female	22·35	—	4·37	—	4·87	—	—	5·40	1·12	6·30
9 ,,	1186	Female	18·20	—	3·09	3·20	3·30	7·45	0·94	4·60	0·92	5·75
11 ,,	1191	Male	17·80	—	3·05	—	3·42	7·40	0·95	4·35	0·90	5·25
South Georgia												
15 Nov.	1195	Female	24·90	—	4·50	—	5·20	—	—	—	1·30	6·80
15 ,,	1196	Female	25·10	—	5·00	—	5·48	11·38	1·52	6·03	1·28	7·00
16 ,,	1200	Male	22·70	—	4·09	—	4·67	9·49	1·21	5·35	1·15	6·57
16 ,,	1201	Male	24·70	—	4·60	—	5·10	11·00	1·35	5·95	1·20	6·75
16 ,,	1202	Male	20·60	—	3·87	—	4·22	8·90	1·03	—	1·06	6·25
17 ,,	1204	Male	24·30	—	4·61	—	5·06	10·77	—	—	1·29	7·08
17 ,,	1205	Male	25·30	—	4·71	—	5·21	11·38	1·38	5·82	1·30	7·38
17 ,,	1206	Female	24·20	—	4·50	—	5·08	9·40	1·37	—	1·41	6·85
17 ,,	1207	Male	23·75	—	4·30	4·60	4·82	—	1·33	—	1·20	6·50
18 ,,	1208	Female	26·40	—	5·00	—	5·40	11·55	1·43	—	1·20	7·60
18 ,,	1209	Male	25·50	—	5·10	—	5·70	11·70	1·50	—	1·35	7·00
18 ,,	1212	Male	23·40	—	4·50	4·75	4·92	11·50	1·33	5·70	1·20	6·80
19 ,,	1213	Male	24·45	—	4·71	5·12	5·20	11·10	1·32	—	1·38	7·21
19 ,,	1214	Male	24·00	—	4·58	—	5·17	10·48	1·43	5·48	1·18	6·85
19 ,,	1215	Male	24·30	—	4·65	5·05	5·15	10·75	1·43	5·92	1·38	6·84
19 ,,	1216	Male	24·50	—	4·85	—	—	11·40	1·30	—	1·10	6·50
19 ,,	1217	Female	18·75	—	2·70	3·20	3·30	7·30	0·95	5·10	1·05	6·00
20 ,,	1218	Male	23·60	—	4·38	—	5·06	10·45	1·32	5·49	1·25	6·68
20 ,,	1219	Male	23·25	—	4·47	—	5·06	10·40	1·25	5·66	1·15	6·50
20 ,,	1220	Female	24·95	—	4·83	—	5·28	11·40	—	6·20	1·34	6·98
22 ,,	1222	Male	22·40	—	4·20	—	4·60	9·60	—	5·35	1·12	6·30
22 ,,	1223	Female	25·00	—	4·80	—	—	10·90	—	6·10	1·30	7·30
22 ,,	1225	Female	18·35	—	2·90	3·17	3·30	7·60	1·00	4·85	1·18	5·75
24 ,,	1226	Male	24·75	—	4·58	4·97	5·15	11·07	1·00	—	1·25	7·13
24 ,,	1227	Female	24·90	—	4·46	5·11	5·19	11·30	1·47	—	1·27	7·24
24 ,,	1228	Male	25·00	—	4·73	—	5·37	10·83	1·42	6·15	1·35	7·15
25 ,,	1229	Male	23·70	—	3·90	4·40	4·67	10·20	1·25	6·20	1·20	7·00
26 ,,	1230	Male	24·80	—	4·55	4·88	5·05	10·68	1·33	—	1·16	7·18
26 ,,	1232	Male	24·85	—	4·60	—	5·25	10·80	1·45	5·76	1·21	6·95
27 ,,	1233	Male	23·10	—	4·03	4·54	4·59	9·48	—	—	1·27	6·85
27 ,,	1234	Male	20·85	—	3·50	3·79	3·92	8·46	1·13	5·28	1·05	6·28
29 ,,	1236*	Female	25·40	—	5·04	—	5·58	11·14	1·32	4·92	—	5·77
30 ,,	1237	Female	21·10	—	3·56	4·19	4·28	9·10	—	—	1·04	6·23
30 ,,	1238	Male	24·20	—	4·68	—	5·30	11·00	1·41	5·65	1·27	6·74
30 ,,	1239	Male	24·20	—	4·71	—	5·12	10·90	1·41	5·20	1·23	6·79
1 Dec.	1240	Female	26·30	—	5·25	—	5·70	12·35	1·43	—	1·50	7·72
1 ,,	1241	Female	26·90	—	5·10	—	5·78	12·40	1·49	6·15	1·62	7·48
2 ,,	1242	Male	25·35	—	4·70	—	5·35	10·90	1·40	—	1·18	7·15
2 ,,	1243	Male	25·00	—	4·75	—	5·27	10·75	1·30	—	1·32	7·00
2 ,,	1244	Female	21·00	—	4·07	—	4·80	9·30	1·15	5·10	1·00	6·00
2 ,,	1245	Male	24·70	—	4·65	5·05	5·30	11·00	1·30	5·60	—	6·70
2 ,,	1246	Female	25·10	—	4·70	—	5·40	11·45	1·30	5·60	1·25	7·10
3 ,,	1247	Female	23·15	—	4·52	—	4·90	10·15	—	—	1·35	6·85
3 ,,	1248	Female	26·00	—	5·18	—	5·81	12·01	1·50	6·08	1·41	7·18
3 ,,	1249	Male	25·65	—	4·98	—	5·56	11·57	1·39	5·75	1·05	7·32
3 ,,	1250	Male	24·40	—	4·82	—	5·30	10·82	1·31	6·22	1·15	6·76
4 ,,	1251	Male	22·00	—	3·78	—	4·25	9·05	1·15	—	1·11	6·65
4 ,,	1252	Female	26·20	—	5·05	—	5·57	11·50	1·27	6·45	1·30	7·20
5 ,,	1253	Female	25·45	—	4·90	—	5·41	11·05	1·37	6·22	1·34	7·03
5 ,,	1254	Male	24·20	—	4·93	—	5·45	9·20	1·43	5·64	1·27	6·97

* Tail missing, measurement to stump.

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
—	—	—	—	—	1·72	2·48	2·56	—	4·65	2·25	—	2·53	—
8·90	8·40	0·55	0·34	1·10	1·85	2·50	2·58	0·73	—	—	—	2·63	1·58
7·95	7·60	1·30	0·20	1·20	1·60	—	—	—	—	—	—	—	1·50
8·95	8·40	0·45	0·23	1·10	1·85	2·40	2·53	0·70	4·50	—	—	—	1·40
9·20	8·80	0·50	0·21	1·17	1·90	2·52	2·65	0·73	—	—	—	—	1·60
8·95	—	—	0·21	0·85	1·80	2·30	2·47	—	—	—	—	—	—
9·95	8·70	0·50	0·34	1·50	1·23	—	—	—	—	—	—	—	2·15
8·85	8·30	0·45	—	0·70	1·77	2·32	2·47	0·66	4·09	2·00	—	—	1·40
8·40	8·00	1·40	0·32	0·90	1·71	2·33	2·44	—	4·20	1·75	—	—	1·40
11·15	10·15	0·70	0·26	—	—	3·20	3·37	0·90	—	—	—	—	2·35
10·85	9·80	0·50	0·25	1·00	2·27	—	—	—	6·75	3·03	—	—	2·25
9·41	10·10	1·51	0·30	1·10	2·22	3·00	3·18	0·82	5·70	2·70	—	—	—
10·90	9·80	1·95	0·26	1·05	2·50	3·27	3·56	0·95	—	—	—	—	2·10
9·69	—	0·90	—	—	—	2·65	2·78	—	5·25	2·20	—	—	—
11·03	—	1·03	—	—	2·10	—	—	0·98	6·25	2·80	—	—	—
11·17	10·90	1·81	—	1·89	2·59	3·38	3·62	—	—	—	—	—	2·30
10·65	—	0·58	—	—	2·20	—	—	—	6·13	2·70	—	—	—
10·40	—	1·15	—	—	—	3·22	3·49	0·93	—	—	—	—	—
11·85	—	0·70	0·32	—	2·50	3·55	—	0·90	6·65	2·85	—	—	—
10·70	—	1·10	—	—	—	3·50	3·65	0·98	6·75	2·96	—	—	—
11·20	11·20	1·55	—	1·30	2·55	—	—	—	—	—	—	—	1·90
11·10	—	0·94	—	—	2·45	3·24	3·40	0·90	6·40	2·80	—	—	—
10·75	9·80	1·65	0·40	1·59	2·10	2·94	3·09	0·93	—	—	—	—	2·30
10·80	10·25	1·59	0·37	1·30	2·45	—	—	—	6·30	2·75	—	—	2·15
10·75	—	—	—	—	—	3·30	3·40	0·96	6·70	—	—	—	—
9·05	8·45	0·50	0·27	0·80	1·80	2·40	2·49	0·68	—	—	—	—	1·60
10·70	—	1·07	—	0·90	2·30	3·31	3·40	0·90	6·10	2·70	—	—	—
9·98	9·30	1·95	—	1·40	2·40	—	—	—	6·28	2·63	—	—	2·28
11·10	10·45	0·65	0·22	0·73	2·70	3·45	3·58	0·95	—	—	—	—	2·25
9·95	9·20	1·60	0·39	1·60	2·10	—	—	—	5·67	—	—	—	2·20
11·00	10·40	0·63	—	1·25	—	—	—	—	—	—	—	—	2·15
9·00	8·40	0·70	0·33	1·20	1·93	—	—	—	—	—	—	—	1·80
11·05	—	1·12	—	—	2·55	—	—	—	—	—	—	—	—
11·00	—	0·60	—	—	2·78	3·48	3·52	0·92	6·12	2·73	—	—	—
11·25	10·60	1·65	0·40	1·20	2·25	3·01	3·18	0·93	—	—	—	—	2·55
11·00	10·45	1·67	0·27	1·15	2·20	—	—	—	—	—	—	—	2·10
11·90	—	1·17	—	1·05	2·38	3·20	3·39	0·90	6·25	2·69	—	—	—
10·73	10·37	1·83	0·24	1·20	2·25	3·14	3·26	0·95	—	—	—	—	2·35
10·48	—	1·00	—	—	2·02	2·89	3·00	0·80	5·48	2·71	—	—	—
9·75	9·25	1·49	0·32	1·20	1·73	2·61	2·75	0·72	—	—	—	—	2·15
9·98	9·40	0·78	0·27	1·05	—	—	—	—	—	—	—	—	—
—	—	0·55	—	—	2·33	2·67	2·85	0·69	5·25	2·42	—	—	—
10·53	9·81	1·61	—	1·20	2·48	—	—	—	6·45	3·01	—	—	2·08
10·75	9·50	1·76	0·22	1·45	2·54	—	—	—	—	—	—	—	2·20
11·50	—	0·54	—	—	3·10	3·88	3·99	1·07	—	—	—	—	—
12·05	11·60	0·60	0·29	1·30	3·00	3·74	3·95	1·07	7·05	3·00	—	—	2·45
11·55	—	—	—	—	2·54	3·17	3·25	0·89	6·45	2·85	—	—	—
11·00	10·20	1·65	—	—	2·60	3·28	3·44	0·92	6·35	2·90	—	—	2·30
9·30	8·55	0·60	0·22	0·90	2·07	—	—	—	5·55	2·48	—	—	1·85
10·80	10·20	1·75	—	1·06	2·60	—	—	1·00	—	—	—	—	2·00
11·00	10·50	0·65	—	1·10	2·95	—	—	—	—	—	—	—	—
—	—	0·62	—	—	—	—	—	—	5·82	2·68	—	—	—
11·07	10·38	0·57	0·18	1·25	2·40	3·45	3·52	1·04	6·95	—	—	—	—
11·35	10·75	1·82	0·28	1·30	2·42	3·54	3·65	0·86	—	—	—	—	2·38
10·85	9·90	1·39	—	0·90	2·29	3·14	3·21	0·88	—	—	—	—	2·24
10·35	—	0·95	—	—	1·92	—	—	—	5·14	2·40	—	—	—
11·40	10·50	0·65	0·32	1·10	—	—	—	—	—	—	—	—	2·55
11·25	10·48	0·62	0·21	1·40	2·45	—	—	—	6·48	—	—	—	2·07
10·65	10·00	1·67	—	1·00	2·78	—	—	—	—	—	—	—	2·40

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
6 Dec.	1255	Female	24·90	—	4·88	—	5·60	10·97	—	5·74	—	7·05
6 ,,	1256	Male	23·95	—	4·57	4·95	5·11	10·83	1·24	6·11	1·32	7·09
6 ,,	1257	Female	26·40	—	4·84	—	5·61	11·65	1·47	—	1·30	7·32
7 ,,	1258	Male	25·17	—	5·19	—	5·75	11·66	1·48	—	1·34	7·22
7 ,,	1259	Female	23·95	—	4·49	—	4·94	10·10	1·29	5·78	1·32	6·70
8 ,,	1260	Female	26·60	—	5·20	—	5·65	—	1·40	—	1·40	8·00
8 ,,	1261	Female	25·70	—	5·00	—	5·65	11·55	1·42	6·10	1·30	7·20
9 ,,	1262	Male	25·35	—	4·71	—	5·29	11·60	—	—	1·39	6·85
9 ,,	1263	Male	24·65	—	4·69	5·15	5·23	10·95	1·27	5·91	1·32	6·90
9 ,,	1264	Male	22·72	—	4·54	4·87	5·03	10·52	1·33	—	1·25	6·38
9 ,,	1265	Male	24·30	—	4·75	—	5·12	11·10	1·43	5·71	1·14	6·86
9 ,,	1266	Male	24·93	—	5·00	5·22	5·26	10·75	1·39	6·24	1·35	7·00
9 ,,	1267	Female	23·00	—	4·30	4·59	4·68	9·96	—	—	1·28	6·92
10 ,,	1268	Male	25·42	—	4·53	4·93	5·00	11·10	—	—	1·34	6·98
10 ,,	1269	Male	25·28	—	4·87	—	5·44	11·21	1·50	6·03	1·34	7·27
11 ,,	1271	Male	26·15	—	4·74	5·14	5·40	11·66	1·43	—	1·33	7·32
11 ,,	1272	Male	24·00	—	4·70	4·95	5·20	10·59	1·39	5·80	1·27	6·62
11 ,,	1273	Male	24·36	—	4·21	—	4·70	10·57	1·32	—	1·21	6·84
11 ,,	1274	Female	26·10	—	4·61	—	5·07	10·80	1·28	6·68	1·29	7·62
11 ,,	1275	Male	24·68	—	4·82	—	5·31	11·45	1·42	5·24	1·29	6·53
11 ,,	1276	Female	23·30	—	4·17	4·44	4·75	9·95	1·13	—	1·25	7·21
11 ,,	1277	Female	23·18	—	3·82	—	4·55	9·84	1·22	5·98	1·13	6·68
11 ,,	1278	Male	24·40	—	—	5·15	5·40	—	—	—	1·20	6·10
12 ,,	1279	Female	25·70	—	5·10	—	5·50	—	1·50	5·70	1·30	7·00
12 ,,	1280	Female	25·68	—	5·06	5·44	5·56	11·35	1·32	—	1·24	7·28
12 ,,	1281	Female	28·20	—	5·55	6·15	6·23	12·64	1·54	6·50	1·35	7·69
12 ,,	1282	Male	24·44	—	5·03	—	5·65	11·47	1·45	5·99	1·30	6·52
12 ,,	1283	Male	24·70	—	4·63	5·07	5·18	11·82	1·34	6·05	1·19	6·93
12 ,,	1284	Female	25·30	—	5·19	—	5·53	11·50	—	5·95	1·30	6·82
13 ,,	1285	Male	24·50	—	4·54	—	5·21	11·05	1·27	—	1·18	6·94
14 ,,	1287	Male	25·15	—	4·55	—	5·37	10·75	1·27	—	1·36	7·10
14 ,,	1288	Male	24·20	—	4·72	—	5·25	11·06	1·22	5·71	1·29	6·75
14 ,,	1289	Male	24·47	—	4·78	—	5·26	11·25	1·40	6·07	1·44	6·93
14 ,,	1290	Female	27·00	—	5·04	—	5·46	—	1·34	6·40	—	7·68
15 ,,	1291	Male	24·50	—	4·80	—	5·35	10·95	1·41	—	1·33	6·46
16 ,,	1293	Male	23·63	—	4·35	4·79	4·91	10·40	1·40	5·71	1·29	6·74
18 ,,	1294	Female	24·50	—	4·40	—	5·00	10·70	—	—	1·30	7·20
18 ,,	1295	Male	23·75	—	4·30	—	4·90	10·30	—	—	1·20	7·10
18 ,,	1296	Male	21·55	—	3·55	—	4·00	8·80	—	—	1·00	6·45
21 ,,	1298	Female	25·95	—	—	—	5·35	11·60	—	—	1·25	7·20
21 ,,	1299	Female	25·60	—	4·95	—	5·48	11·40	1·44	5·25	1·30	7·15
21 ,,	1300	Male	25·35	—	4·90	—	5·30	11·30	—	—	1·25	7·00
21 ,,	1301	Female	26·00	—	4·75	—	5·60	11·80	1·43	—	1·35	7·25
21 ,,	1302	Male	24·50	—	4·60	—	5·00	11·00	1·35	6·00	1·30	7·40
21 ,,	1303	Female	25·30	—	4·90	—	5·36	10·55	1·30	—	1·27	7·20
21 ,,	1304	Male	26·45	—	4·90	5·15	5·43	11·60	1·38	6·70	1·24	7·70
22 ,,	1305	Male	23·75	—	4·65	—	5·10	10·65	1·35	5·40	1·30	6·30
22 ,,	1306	Female	25·40	—	4·90	—	5·45	11·00	1·40	6·80	1·30	7·10
22 ,,	1307	Female	25·65	—	4·85	—	5·45	11·70	1·30	6·25	1·27	7·25
22 ,,	1308	Female	25·60	—	5·10	—	5·70	11·65	1·49	5·90	1·35	7·00
22 ,,	1309	Male	23·00	—	3·80	—	4·70	9·40	0·62	—	1·23	6·60
22 ,,	1310	Female	25·80	—	5·40	—	5·90	11·90	—	5·60	1·30	6·85
23 ,,	1311	Female	25·20	—	4·30	—	5·02	11·00	1·40	—	1·35	7·35
23 ,,	1312	Male	24·30	—	4·80	4·97	5·10	11·00	—	—	1·05	6·30
23 ,,	1313	Female	19·45	—	3·25	3·55	3·70	8·10	1·00	5·22	1·00	5·95
23 ,,	1314	Male	22·35	—	4·40	4·47	4·64	10·00	1·35	5·05	1·14	6·26
23 ,,	1315	Male	23·00	—	4·15	4·50	4·73	10·20	1·22	5·55	1·14	6·35
23 ,,	1316	Female	26·65	—	5·32	5·40	5·60	12·13	1·45	—	1·35	7·00
23 ,,	1317	Female	26·00	—	5·30	—	5·90	11·89	1·32	5·95	1·45	7·10
24 ,,	1318	Male	25·10	—	—	—	5·20	—	1·30	5·75	1·20	7·10

11 Notch of flukes to umbilicus	12 Notch of flukes to end of system of ventral grooves	13 Anus to reproductive aperture, centres	14 Dorsal fin, vertical height	15 Dorsal fin, length of base	16 Flipper, tip to axilla	17 Flipper, tip to anterior end of lower border	18 Flipper, length along curve of lower border	19 Flipper, greatest width	20 Severed head, condyle to tip	21 Skull, greatest width	22 Skull length, condyle to tip of premaxilla	23 Flipper, tip to head of humerus	24 Tail, depth at dorsal fin
11·00	10·25	0·58	0·20	1·50	2·32	—	—	—	6·78	3·00	—	—	—
10·97	10·56	1·80	0·33	1·15	2·57	—	—	—	—	—	—	—	2·34
11·65	10·98	0·63	—	—	3·11	3·48	3·74	—	—	—	—	—	—
11·27	—	1·15	—	—	2·55	3·59	3·67	0·99	7·05	3·00	—	—	—
10·65	9·89	0·65	0·15	1·35	2·34	—	—	—	—	—	—	—	2·42
11·70	—	0·60	—	—	—	—	—	1·08	7·15	2·85	—	—	—
11·00	11·00	0·55	0·33	1·00	2·34	—	—	—	6·80	—	—	—	2·00
10·98	—	1·15	—	—	2·53	3·43	3·53	0·94	6·35	2·90	—	—	—
10·97	10·29	1·81	0·30	1·53	2·13	3·07	3·22	0·80	—	—	—	—	2·20
9·83	—	1·00	—	—	2·41	3·27	3·30	0·97	6·18	—	—	—	—
11·00	10·80	1·74	0·27	1·15	2·38	3·21	3·36	0·89	6·29	2·70	—	—	2·20
11·70	11·10	1·75	0·42	—	—	—	—	—	—	—	—	—	2·52
10·40	—	0·41	—	—	2·65	3·05	3·21	0·73	5·70	2·69	—	—	—
10·80	—	1·03	—	—	2·31	3·42	3·75	0·90	6·25	2·76	—	—	—
11·41	10·83	1·68	0·34	1·10	2·47	3·27	3·58	0·78	6·57	—	—	—	2·23
11·09	10·70	1·35	—	—	2·56	3·39	3·58	0·87	6·51	2·84	—	—	—
10·20	9·53	1·62	—	0·94	2·43	3·25	3·32	0·94	6·25	2·80	—	—	2·26
11·05	—	1·10	—	—	2·15	3·08	3·16	0·83	—	2·98	—	—	—
11·88	11·17	0·70	—	1·40	2·43	3·11	3·20	0·88	6·05	2·78	—	—	2·44
10·91	—	1·23	0·29	1·27	2·90	3·24	3·45	0·90	6·55	2·84	—	—	—
10·98	—	0·54	—	0·80	2·16	2·92	3·05	0·85	—	—	—	—	—
10·79	10·08	0·55	0·30	0·80	2·20	—	—	—	—	—	—	—	1·83
—	—	—	—	—	—	—	—	—	—	—	—	—	—
11·20	10·20	0·50	0·26	1·00	—	—	—	—	—	—	—	—	2·05
11·20	—	0·59	—	—	2·24	3·24	3·37	0·89	6·74	2·61	—	—	—
12·30	11·50	0·60	0·33	1·18	2·85	3·68	3·85	—	7·45	3·31	—	—	3·02
10·64	9·95	1·43	—	1·85	2·55	—	—	—	—	—	—	—	2·15
10·75	10·00	1·92	0·38	1·30	2·42	3·49	3·65	1·00	—	—	—	—	2·29
10·75	10·75	0·63	0·37	1·60	—	—	—	—	7·08	2·97	—	—	2·75
10·82	—	1·10	—	—	2·65	—	—	—	—	—	—	—	—
11·40	—	—	0·32	1·00	—	—	—	—	—	—	—	—	—
10·35	10·35	1·45	0·36	1·30	2·47	3·37	3·50	0·93	6·08	2·73	—	—	2·10
10·82	9·72	1·50	0·34	1·14	2·61	—	—	—	6·50	—	—	—	2·44
11·80	11·15	0·98	—	1·15	—	—	—	—	—	—	—	—	2·45
11·52	—	1·20	—	—	—	3·33	3·47	0·88	—	—	—	—	—
—	—	0·97	0·18	0·90	2·25	—	—	—	—	—	—	—	2·09
11·00	—	0·50	0·27	0·80	2·55	3·30	3·47	0·80	6·05	2·60	—	—	—
11·20	—	—	—	—	2·30	3·25	3·43	0·90	6·00	2·60	—	—	—
10·30	—	—	—	—	2·00	—	—	—	—	—	—	—	—
—	—	0·75	—	—	2·50	—	—	—	—	—	—	—	—
11·40	—	0·55	0·27	1·45	—	—	—	—	—	—	—	—	2·75
11·00	—	—	—	1·00	2·45	—	—	—	—	—	—	—	—
11·80	—	0·75	—	—	2·60	3·45	3·58	0·98	6·43	2·80	—	—	—
11·35	10·50	1·60	0·43	1·37	2·40	—	—	—	—	—	—	—	2·35
11·15	—	0·69	—	—	2·22	3·00	3·18	0·84	6·20	2·96	—	—	—
11·85	11·30	1·65	0·42	1·23	2·45	3·45	3·60	1·03	—	—	—	—	2·20
10·55	10·40	1·50	0·70	0·90	2·83	3·55	3·75	0·95	6·30	2·80	—	—	2·30
11·20	10·90	0·70	0·33	1·20	2·35	3·58	3·75	0·90	6·40	2·91	—	—	2·45
11·85	10·80	0·70	0·38	1·25	2·65	3·45	3·63	0·89	—	—	—	—	2·35
11·35	10·40	0·60	0·32	1·25	2·71	3·60	3·93	—	6·90	3·30	—	—	2·60
10·20	—	1·00	—	—	2·20	3·20	3·35	0·81	5·65	2·75	—	—	—
10·85	9·80	0·65	0·34	1·15	2·58	3·70	3·89	1·08	—	—	—	—	—
11·47	—	0·65	0·34	1·00	2·55	3·23	3·45	0·89	6·00	3·00	—	—	—
10·20	—	1·05	—	—	2·45	3·10	3·28	0·90	6·05	3·00	—	—	—
9·20	8·85	0·50	0·23	0·60	1·75	2·47	2·59	0·67	4·45	2·35	—	—	1·85
10·00	9·30	1·64	—	0·80	2·70	—	—	—	—	—	—	—	2·20
10·35	9·65	1·85	0·40	0·90	2·30	—	—	0·87	5·27	2·65	—	—	2·20
11·10	—	0·75	—	—	2·82	3·25	3·38	0·96	6·70	2·90	—	—	—
11·00	10·50	0·70	0·33	1·10	2·54	—	—	—	—	—	—	—	—
11·30	10·55	1·90	0·25	1·20	2·50	3·30	3·49	0·94	—	—	—	—	2·15

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
24 Dec.	1319	Male	24·14	—	4·40	—	4·95	10·50	1·32	—	1·15	7·00
24 ,,	1320	Female	26·90	—	5·25	—	5·60	—	—	—	1·45	7·50
24 ,,	1321	Male	24·20	—	4·65	—	5·00	10·00	1·32	—	1·20	—
24 ,,	1322	Male	24·75	—	4·60	—	5·20	—	1·40	5·90	1·20	6·90
28 ,,	1323	Female	26·05	—	5·20	—	5·40	10·80	—	—	1·32	7·60
28 ,,	1324	Male	24·55	—	4·30	—	4·75	10·00	1·30	6·20	1·36	7·60
28 ,,	1325	Male	24·80	—	4·75	—	5·30	10·60	1·35	5·98	1·20	6·80
28 ,,	1326	Male	23·60	—	4·45	4·80	4·90	10·40	1·45	—	1·30	6·90
28 ,,	1327	Female	26·70	—	4·80	—	5·40	11·80	1·45	6·30	1·37	7·45
29 ,,	1328	Male	23·90	—	4·10	4·70	4·83	10·40	1·29	—	1·25	7·00
29 ,,	1329	Male	24·75	—	4·70	5·10	5·45	11·22	1·37	5·95	1·22	7·30
30 ,,	1330	Male	25·00	—	—	—	5·25	—	—	—	1·47	6·47
30 ,,	1331	Female	22·75	—	4·05	4·30	4·45	9·60	1·17	5·55	1·08	6·65
30 ,,	1332	Male	23·55	—	4·60	—	5·10	11·30	1·35	—	1·25	6·50
30 ,,	1333	Male	26·00	—	5·30	—	5·70	—	1·50	5·90	1·25	7·15
1927												
3 Jan.	1334	Female	24·90	—	4·45	—	5·25	11·10	1·30	—	1·25	7·20
3 ,,	1335	Female	25·75	—	4·80	—	5·55	11·20	1·00	5·95	1·40	7·00
3 ,,	1336	Female	25·90	—	5·15	—	5·70	10·90	—	5·90	1·40	7·30
4 ,,	1337	Female	25·60	—	4·50	—	5·05	11·00	1·32	—	1·32	7·30
4 ,,	1339	Male	22·65	—	4·15	4·43	4·54	9·45	—	5·70	1·08	6·70
4 ,,	1340	Male	25·80	—	5·25	5·46	5·58	11·35	—	6·35	1·40	7·40
5 ,,	1341	Male	25·40	—	—	—	5·35	—	1·37	—	1·25	—
5 ,,	1342	Female	23·90	—	4·20	4·60	4·80	10·35	1·28	—	—	—
5 ,,	1343	Female	26·40	—	4·75	—	5·40	—	1·40	6·40	1·30	7·60
5 ,,	1344	Male	24·85	—	4·50	—	5·15	10·75	—	—	1·20	7·20
5 ,,	1345	Male	22·75	—	—	—	—	—	1·38	5·45	1·15	6·30
6 ,,	1346	Female	26·15	—	4·75	—	5·40	10·70	1·40	5·75	1·30	7·35
6 ,,	1347	Female	21·70	—	3·60	—	4·10	8·90	1·20	5·60	1·05	6·25
6 ,,	1348	Female	26·10	—	5·00	—	5·60	11·20	—	6·00	1·35	7·40
7 ,,	1349	Female	22·90	—	4·50	—	5·00	—	1·24	—	1·20	6·60
7 ,,	1350	Male	23·05	—	4·50	—	4·80	—	1·30	5·40	1·20	6·40
7 ,,	1351	Male	24·90	—	5·00	—	5·35	—	1·44	6·05	1·50	7·10
7 ,,	1352	Female	22·40	—	4·20	—	4·65	9·70	1·23	5·35	1·10	6·60
8 ,,	1353	Female	25·20	—	4·50	—	5·00	11·25	1·25	—	1·30	7·40
9 ,,	1355	Female	23·40	—	4·10	—	4·75	10·35	—	5·90	1·15	7·00
9 ,,	1356	Male	24·90	—	4·30	—	5·00	11·10	1·35	—	1·13	6·80
9 ,,	1359	Female	25·35	—	4·75	—	5·20	10·90	1·40	6·00	1·20	7·15
9 ,,	1360	Female	24·50	—	4·70	—	5·24	10·70	1·30	5·63	1·20	6·80
9 ,,	1361	Female	26·05	—	5·00	—	5·60	11·75	1·45	6·05	1·25	7·10
10 ,,	1362	Male	19·10	—	4·00	4·37	4·40	7·95	1·07	—	0·90	5·70
10 ,,	1363	Female	25·85	—	4·60	—	5·30	11·20	1·35	6·50	1·10	7·30
10 ,,	1364	Male	23·50	—	4·25	—	4·70	10·30	1·35	—	1·30	6·90
10 ,,	1366	Female	24·40	—	4·25	4·80	4·95	10·30	1·30	6·15	1·33	7·00
10 ,,	1367	Female	26·20	—	5·10	—	5·75	11·20	1·35	6·35	1·30	7·25
10 ,,	1368	Female	26·20	—	4·65	—	5·25	10·90	1·25	6·15	1·30	7·35
12 ,,	1373	Female	26·15	—	5·40	—	5·90	11·10	1·45	—	1·22	7·40
12 ,,	1374	Male	25·50	—	4·20	—	4·95	10·60	1·35	6·00	1·00	7·00
12 ,,	1375	Female	20·90	—	3·50	4·00	4·20	9·10	1·07	—	1·10	6·30
12 ,,	1376	Male	18·90	—	2·80	—	3·37	7·60	1·02	4·85	1·00	5·75
15 ,,	1378	Female	26·00	—	4·75	—	5·40	11·20	1·33	5·85	1·30	7·05
15 ,,	1379	Male	17·55	—	2·85	3·10	3·35	7·30	0·96	4·50	0·88	5·40
15 ,,	1380	Female	26·60	—	5·20	5·35	5·50	12·00	1·40	—	1·37	7·30
15 ,,	1382	Male	20·30	—	3·10	3·50	3·65	7·95	1·05	5·40	0·95	6·05
15 ,,	1383	Female	25·65	—	—	—	5·50	—	1·35	—	1·27	7·35
15 ,,	1384	Male	20·80	—	3·70	4·05	4·14	9·10	1·12	—	1·00	6·20
15 ,,	1385	Female	26·30	—	5·10	—	5·50	—	—	6·10	1·23	7·44
17 ,,	1386	Male	24·70	—	4·20	—	5·05	10·80	1·35	—	1·20	6·89
17 ,,	1387	Male	22·30	—	3·85	—	4·50	9·25	1·25	5·40	1·10	6·45
17 ,,	1388	Male	25·20	—	4·50	—	5·15	10·20	1·32	5·80	1·33	7·10

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
10·95	—	—	—	—	—	3·20	3·30	0·82	6·10	2·70	—	—	—
12·55	—	0·80	—	—	—	—	—	—	—	—	—	—	—
10·60	—	—	—	—	2·30	3·18	3·33	0·85	6·20	2·90	—	—	—
10·90	10·40	1·60	0·33	1·25	—	—	—	—	—	—	—	—	2·40
12·10	—	0·50	—	—	2·60	3·15	3·30	0·90	6·60	3·10	—	—	—
11·65	11·25	0·65	0·31	1·36	2·43	3·08	3·18	0·81	5·80	2·70	—	—	2·15
10·80	9·75	1·65	0·20	1·30	—	—	—	—	6·40	3·10	—	—	2·20
10·60	—	1·05	—	—	2·74	3·30	3·35	0·98	6·05	2·90	—	—	—
11·85	11·40	0·70	0·30	1·45	—	—	—	—	—	—	—	—	2·45
10·90	—	1·15	0·13	0·60	2·20	3·20	3·35	0·90	5·88	2·95	—	—	—
11·15	10·90	1·65	0·22	0·80	2·65	3·05	3·24	1·03	—	—	—	—	2·10
11·80	—	—	—	—	2·60	3·25	3·45	—	—	—	—	—	—
10·50	9·80	0·65	0·21	1·10	2·10	—	—	—	—	—	—	—	1·95
9·90	9·30	1·60	—	—	—	—	—	—	—	—	—	—	—
11·50	11·00	1·95	0·27	1·10	2·55	—	—	—	—	—	—	—	—
11·45	—	0·70	—	—	2·55	3·34	3·45	0·90	6·35	3·20	—	—	—
11·50	10·80	0·70	0·30	1·50	—	—	—	—	—	—	—	—	2·40
11·10	10·30	0·60	0·23	1·35	2·30	3·10	3·20	1·00	6·80	3·30	—	—	2·20
11·55	—	0·60	—	—	2·43	3·33	3·47	1·01	6·20	2·86	—	—	—
10·50	10·00	1·80	0·34	1·10	1·90	—	—	—	5·40	2·66	—	—	1·98
11·60	—	1·35	—	0·75	2·35	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	0·50	0·36	0·90	—	3·40	3·55	0·87	5·80	2·70	—	—	—
11·70	10·80	0·70	—	1·30	—	—	—	—	6·60	2·50	—	—	2·30
11·10	—	—	—	1·10	2·43	—	—	—	—	—	—	—	—
10·30	9·40	1·70	0·28	1·60	—	—	—	—	—	—	—	—	2·30
11·60	11·30	0·65	0·20	1·10	—	—	—	—	6·65	3·10	—	—	2·05
10·10	9·05	0·60	0·30	0·80	2·05	2·75	2·80	0·80	5·15	2·50	—	—	2·10
12·00	11·40	0·75	0·29	1·40	—	—	—	—	—	—	—	—	2·40
10·50	—	0·60	—	—	—	3·18	3·30	0·90	6·00	2·80	—	—	—
10·45	—	—	—	1·18	—	—	—	—	5·60	2·65	—	—	—
11·10	10·10	1·80	—	1·30	—	3·30	3·42	0·95	6·65	2·75	—	—	2·25
10·10	10·00	0·70	0·30	1·15	2·30	—	—	—	—	—	—	—	2·00
11·40	—	0·60	0·31	1·20	2·75	3·32	3·45	0·90	6·15	2·86	—	—	—
10·90	—	0·50	0·33	1·30	2·50	—	—	—	5·80	2·45	—	—	—
11·15	—	—	0·22	—	2·60	3·40	3·65	0·86	—	—	—	—	—
11·30	10·60	0·75	0·36	0·30	—	3·15	3·35	0·90	—	—	—	—	2·65
10·85	9·90	0·60	0·19	1·00	2·37	—	—	0·95	6·70	2·90	—	—	2·30
11·40	10·40	0·75	0·40	1·40	—	3·60	3·80	1·08	—	—	—	—	2·30
9·00	—	1·10	—	—	2·07	2·75	2·85	0·78	4·65	2·30	—	—	—
11·50	11·00	0·60	0·35	1·20	2·68	3·50	3·85	0·90	6·55	3·20	—	—	2·65
10·80	—	1·10	0·26	1·25	2·45	3·39	3·63	0·91	5·90	2·40	—	—	2·25
11·25	10·50	0·70	0·34	1·10	2·50	3·26	3·50	0·87	6·10	2·60	—	—	2·20
11·60	10·95	0·70	0·43	1·10	2·75	3·60	3·80	0·94	6·90	—	—	—	2·50
11·30	10·90	0·80	0·35	1·30	2·54	3·40	3·70	0·87	6·35	3·00	—	—	2·15
11·65	—	0·65	—	—	3·00	3·45	3·75	1·02	7·00	3·20	—	—	—
10·75	10·30	1·70	—	1·55	2·45	3·25	3·40	0·92	6·50	3·10	—	—	2·34
9·55	—	0·45	0·21	0·80	2·17	2·75	2·90	0·70	5·20	2·45	—	—	—
9·70	9·10	1·52	0·22	0·90	—	—	—	—	4·23	2·12	—	—	1·80
11·15	10·45	0·70	0·30	1·55	—	—	—	—	—	—	—	—	—
8·40	8·10	1·30	—	1·00	1·70	—	—	—	—	—	—	—	1·60
—	—	0·62	—	—	2·50	3·65	3·87	1·04	—	—	—	—	—
9·50	9·10	1·35	0·19	1·10	1·65	—	—	—	—	—	—	—	2·00
—	—	0·45	—	—	—	—	—	—	—	—	—	—	—
9·65	9·15	0·65	0·18	1·05	2·10	—	—	—	—	—	—	—	—
11·50	11·00	0·66	0·32	1·30	—	—	—	—	—	—	—	—	—
11·00	—	1·20	—	—	2·50	3·28	3·34	0·89	6·15	3·05	—	—	—
10·30	9·90	1·55	0·26	0·95	—	—	—	—	5·50	2·75	—	—	1·95
11·45	10·35	1·65	0·37	0·95	—	—	—	—	—	—	—	—	2·55

			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1927												
17 Jan.	1389	Female	27·45	—	4·45	—	5·50	11·70	1·38	—	1·27	7·90
17 ,,	1390	Male	22·80	—	3·90	—	4·25	9·10	1·14	—	1·25	6·70
18 ,,	1395	Male	25·00	—	4·60	—	5·20	—	1·23	5·90	1·15	7·00
19 ,,	1396	Male	19·25	—	2·90	—	3·47	8·05	0·97	—	0·95	6·00
19 ,,	1397	Female	27·75	—	5·20	—	5·85	11·90	1·64	6·80	1·35	7·90
21 ,,	1402	Male	24·00	—	—	—	—	—	—	—	—	—
21 ,,	1403	Male	25·20	—	4·65	—	5·30	10·40	1·30	5·70	1·25	6·85
21 ,,	1405	Female	19·20	—	2·90	3·30	3·45	8·30	1·00	5·03	0·90	6·05
21 ,,	1406	Female	25·30	—	4·90	—	5·45	10·90	1·30	—	1·25	7·50
21 ,,	1407	Male	24·00	—	4·30	—	5·95	10·40	1·50	5·55	1·20	6·55
21 ,,	1408	Female	23·10	—	3·90	—	4·65	9·95	1·27	5·62	1·25	6·70
22 ,,	1409	Female	24·50	—	—	—	5·35	11·40	1·34	—	1·17	6·25
22 ,,	1410	Male	22·60	—	4·00	—	4·50	9·45	1·29	5·50	1·07	6·20
22 ,,	1411	Female	25·70	—	4·55	—	5·15	11·00	1·50	5·80	1·25	7·35
22 ,,	1412	Male	18·45	—	2·95	—	3·55	7·65	—	4·40	1·07	5·65
23 ,,	1417	Female	28·00	—	5·25	—	5·75	11·40	1·46	—	1·35	7·80
23 ,,	1418	Female	26·50	—	4·90	—	5·75	11·40	1·35	6·15	1·25	6·42
23 ,,	1419	Female	25·25	—	4·75	—	5·40	11·05	1·35	—	1·30	7·00
23 ,,	1420	Male	23·90	—	4·45	—	5·30	10·50	1·20	5·30	1·40	6·50
23 ,,	1421	Male	22·95	—	4·30	—	4·90	10·50	1·28	5·30	1·20	6·30
24 ,,	1422	Female	25·10	—	4·65	—	5·10	—	1·40	6·15	1·25	7·25
24 ,,	1423	Female	26·10	—	5·30	—	5·75	12·05	1·47	5·95	1·35	7·15
24 ,,	1424	Male	23·90	—	4·60	—	4·95	—	1·30	—	1·23	6·45
25 ,,	1425	Female	25·70	—	4·90	—	5·25	11·60	1·45	—	1·40	7·70
25 ,,	1426	Male	25·40	—	4·90	—	5·40	11·00	1·55	5·60	1·23	7·00
25 ,,	1427	Female	25·60	—	4·60	—	5·40	11·35	1·40	—	1·35	6·90
25 ,,	1428	Male	23·70	—	4·00	—	4·70	10·00	1·37	5·40	1·20	6·35
25 ,,	1429	Female	22·55	—	3·75	—	4·45	9·50	1·17	5·50	1·20	6·55
25 ,,	1430	Male	23·80	—	4·10	—	4·70	10·20	1·24	5·35	1·18	6·90
25 ,,	1431	Male	25·35	—	4·70	—	5·45	11·00	1·25	5·56	1·30	7·00
26 ,,	1432	Female	25·65	—	5·00	—	5·45	10·80	1·42	5·45	1·35	6·85
27 ,,	1434	Male	19·55	—	3·55	—	3·85	8·15	0·98	—	1·00	5·75
27 ,,	1436	Female	23·00	—	4·20	—	4·72	9·90	—	5·75	1·13	6·65
27 ,,	1437	Male	18·80	—	2·95	—	3·45	7·75	1·17	—	0·95	—
28 ,,	1438	Male	25·00	—	4·90	—	5·30	11·25	1·35	6·50	1·25	6·85
28 ,,	1439	Female	26·50	—	—	—	—	—	—	5·90	1·25	7·40
28 ,,	1440	Female	26·15	—	4·75	—	5·40	11·50	—	6·20	1·40	7·45
28 ,,	1441	Female	25·00	—	4·50	—	5·00	10·70	1·25	6·20	1·35	7·30
28 ,,	1442	Male	19·60	—	3·15	3·60	3·75	7·90	1·00	—	1·05	—
28 ,,	1443	Male	23·25	—	4·05	—	4·65	10·00	1·28	5·70	1·20	6·90
28 ,,	1444	Male	23·10	—	4·00	—	4·60	9·80	—	5·80	1·10	6·40
29 ,,	1445	Female	19·30	—	3·00	—	3·62	7·50	1·00	—	1·07	6·00
29 ,,	1446	Male	23·90	—	4·70	—	5·50	10·90	1·35	5·85	1·30	6·50
29 ,,	1447	Female	26·90	—	5·00	—	5·70	—	1·45	6·00	1·55	7·55
30 ,,	1448	Female	26·35	—	5·05	5·65	5·77	—	—	—	1·30	7·30
30 ,,	1449	Male	23·95	—	4·70	—	5·25	10·90	—	—	1·20	—
30 ,,	1450	Female	20·10	—	3·75	3·85	4·20	8·80	1·05	5·20	1·10	5·75
7 Feb.	1453	Female	25·60	—	5·20	—	5·75	11·00	1·41	—	1·30	6·60
7 ,,	1454	Female	19·60	—	3·30	3·00	3·66	8·15	1·02	5·18	1·02	6·30
7 ,,	1455	Male	23·50	—	4·30	4·55	4·70	10·10	1·32	5·40	1·18	6·80
7 ,,	1457	Female	18·55	—	3·23	3·50	3·66	7·85	0·95	4·30	0·96	5·30
8 ,,	1458	Male	23·90	—	4·35	—	5·05	10·60	1·30	—	—	6·60
8 ,,	1459	Female	25·00	—	5·00	—	5·50	11·15	1·40	5·90	1·20	6·65
8 ,,	1460	Male	23·50	—	4·40	—	5·00	9·95	1·30	5·24	1·25	6·40
8 ,,	1461	Male	17·60	—	2·80	—	3·20	7·25	0·95	4·65	0·95	5·30
8 ,,	1462	Male	25·40	—	4·55	—	5·10	11·35	1·26	6·30	1·30	7·00
8 ,,	1463	Female	23·70	—	4·30	—	5·00	10·20	1·43	5·70	1·33	7·05
9 ,,	1464	Female	23·40	—	4·85	5·00	5·06	10·70	1·30	—	1·32	7·00
9 ,,	1465	Female	24·60	—	4·78	4·84	5·04	10·30	1·34	5·80	1·23	6·90
9 ,,	1466	Male	24·80	—	4·60	—	5·35	11·10	—	—	1·18	7·15

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
12·25	—	0·70	—	—	2·71	3·36	3·74	0·98	6·75	3·20	—	—	—
10·60	—	1·00	—	—	2·17	3·35	3·75	0·75	5·30	2·60	—	—	—
10·90	10·90	1·90	—	1·55	3·05	—	—	—	—	—	—	—	2·30
9·55	—	0·95	—	—	1·90	2·65	—	0·70	4·30	2·25	—	—	—
12·45	12·00	0·80	0·15	1·10	3·00	3·55	3·60	1·00	7·00	3·20	—	4·10	2·25
—	—	—	—	—	—	—	—	—	—	—	—	—	—
10·90	8·55	0·85	0·30	1·20	2·65	3·45	3·55	0·99	6·55	2·95	—	—	2·30
9·15	—	0·33	0·29	0·90	—	—	—	—	4·34	2·20	—	—	—
11·65	—	0·60	—	—	2·50	3·55	3·30	1·00	6·60	3·15	—	—	—
10·50	9·45	1·70	0·40	1·25	—	—	—	—	6·10	2·85	—	—	2·25
10·40	10·75	0·55	0·33	1·10	2·50	3·00	3·10	0·80	5·70	2·70	—	—	2·30
10·30	—	0·65	—	—	—	—	—	—	6·45	2·85	—	—	—
9·90	9·45	1·60	0·24	1·15	—	—	—	—	—	—	—	—	2·10
11·60	10·80	0·75	—	1·35	2·55	3·20	3·40	0·90	6·30	2·95	—	—	2·65
8·75	8·35	1·05	0·22	1·30	1·92	—	—	—	—	—	—	—	1·80
12·60	—	0·75	—	1·30	2·70	3·60	3·97	1·04	7·10	3·30	—	—	—
11·45	10·60	0·75	0·23	1·20	2·55	3·36	3·79	—	—	2·80	—	—	2·15
11·20	—	0·55	—	—	2·85	3·45	3·70	0·95	6·45	2·90	—	—	—
10·40	9·30	1·65	0·15	1·30	2·50	3·10	—	—	6·40	2·80	—	—	2·55
9·85	9·40	1·70	0·34	1·20	2·60	3·50	3·80	0·73	5·90	—	—	—	2·25
11·65	11·00	0·65	—	—	—	—	—	—	—	—	—	—	2·40
11·20	10·70	0·65	0·38	1·35	2·50	—	—	—	—	—	—	—	2·55
10·15	10·00	1·55	—	—	—	—	—	—	—	—	—	—	2·20
12·00	—	0·70	—	—	3·00	3·75	3·97	1·03	6·60	3·15	—	—	—
11·55	10·50	1·85	0·36	—	—	—	—	—	6·60	3·20	—	—	2·35
11·30	—	0·40	—	—	2·50	3·45	3·60	0·92	6·45	2·90	—	—	—
10·50	9·80	1·70	0·22	1·10	—	—	—	—	5·85	2·55	—	—	2·25
10·00	9·75	0·55	0·19	1·00	2·26	3·01	3·17	0·82	5·55	2·65	—	—	2·20
10·90	—	1·15	0·29	1·10	2·30	3·00	3·20	0·88	5·80	2·75	—	—	—
11·10	10·60	1·65	0·30	1·15	2·67	3·46	3·54	0·98	—	—	—	—	2·35
11·20	10·65	0·75	0·29	1·30	—	—	—	—	—	—	—	—	2·35
8·95	—	0·82	—	—	1·97	2·65	2·80	0·71	—	—	—	—	—
10·40	10·50	0·70	0·25	1·10	2·35	3·20	3·44	0·75	—	2 75	—	—	2·50
8·50	7·55	1·30	—	1·00	1·88	2·55	2·65	0·69	4·30	2·30	—	—	—
10·95	10·40	1·70	0·37	1·35	2·44	3·40	3·60	0·95	6·60	2·75	—	—	2·40
11·50	10·80	0·60	0·33	1·40	2·60	3·40	—	0·95	6·90	3·10	—	—	2·15
11·75	11·20	0·65	0·36	1·75	2·60	—	—	—	6·70	3·10	—	—	2·60
11·50	10·80	0·75	0·24	1·20	2·50	—	—	—	6·00	2·80	—	—	2·40
9·10	—	—	—	—	1·65	—	—	—	—	—	—	—	—
10·75	10·25	1·70	—	1·30	2·25	3·10	3·25	0·88	—	—	—	—	2·05
10·40	9·75	1·70	0·31	1·20	—	—	—	—	—	—	—	—	2·30
9·10	—	0·50	—	—	1·77	2·48	2·60	0·74	—	—	—	—	—
10·70	10·20	1·75	0·32	1·25	2·55	3·25	3·49	0·95	6·30	2·80	—	—	2·15
11·80	11·70	0·65	0·20	1·30	—	—	—	—	—	—	—	—	2·60
11·44	—	0·60	—	—	2·65	3·40	3·50	0·95	6·90	3·00	—	—	—
—	—	—	0·44	1·30	2·50	—	—	—	6·50	2·75	—	—	—
8·90	8·40	0·35	0·37	1·25	1·85	2·62	2·77	0·74	—	—	—	—	—
10·70	—	0·60	—	—	2·30	3·18	3·36	0·95	7·00	3·00	—	—	—
9·60	9·00	0·45	0·36	0·76	2·02	2·59	2·85	0·57	4·53	2·10	—	—	1·77
10·30	9·80	1·60	0·38	0·80	2·45	—	—	—	—	—	—	—	2·55
8·50	8·00	0·50	0·22	0·46	1·92	—	—	—	—	—	—	—	1·55
10·70	—	1·10	—	—	2·50	3·25	3·48	0·85	6·30	2·90	—	—	—
10·70	10·35	0·65	0·35	1·10	2·55	3·50	3·78	0·95	6·80	3·00	—	—	2·50
10·65	—	1·15	0·22	0·80	—	—	—	—	6·30	2·95	—	—	—
8·30	7·70	0·75	0·28	0·94	1·50	2·42	2·50	0·71	4·05	2·25	—	—	1·70
11·35	9·85	1·70	0·15	1·50	2·25	3·10	3·20	0·87	6·35	2·80	—	—	—
10·40	10·30	0·45	0·25	1·10	—	—	—	—	—	—	—	—	—
10·60	—	0·60	—	—	2·35	3·27	3·48	0·85	6·20	2·70	—	—	—
11·05	10·70	0·55	0·37	0·70	2·02	—	—	—	—	—	—	—	2·05
11·45	—	1·20	0·31	0·80	2·66	3·54	3·68	0·94	—	—	—	—	—

			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1927												
9 Feb.	1467	Male	20·50	—	3·38	3·86	4·02	8·20	—	—	1·12	5·90
14 ,,	1468	Female	25·55	—	—	—	—	—	—	—	—	—
14 ,,	1470	Male	22·50	—	3·15	—	3·65	—	1·05	5·10	1·05	6·20
14 ,,	1471	Female	25·50	—	4·85	—	5·60	11·30	1·35	5·50	1·20	7·17
15 ,,	1472*	Male	22·00	—	3·85	—	4·42	9·60	—	5·40	—	6·40
15 ,,	1473	Male	17·50	—	2·90	3·27	3·40	7·15	0·86	4·43	1·00	5·30
17 ,,	1477	Male	19·10	—	2·85	—	3·42	7·60	—	4·65	1·02	5·73
17 ,,	1478	Female	17·90	—	3·08	4·35	4·50	7·40	0·91	4·40	0·90	5·60
21 ,,	1479	Female	27·60	—	5·22	—	5·80	11·70	1·44	—	1·24	7·70
21 ,,	1480	Male	23·10	—	4·45	—	5·03	10·30	1·23	5·10	—	6·43
21 ,,	1481	Female	26·50	—	5·25	—	5·80	12·10	1·50	6·45	1·32	7·60
21 ,,	1482	Female	23·40	—	4·10	—	4·75	9·95	1·15	5·75	1·11	7·10
21 ,,	1483	Male	23·30	—	4·40	—	4·94	10·30	1·26	5·50	1·20	6·20
21 ,,	1484	Male	21·50	—	3·63	—	4·25	8·80	1·13	5·30	1·15	6·15
21 ,,	1486	Female	22·70	—	4·00	—	4·62	9·40	1·24	5·50	1·13	6·35
22 ,,	1491	Female	20·30	—	3·30	—	3·85	8·20	0·95	5·10	1·10	6·10
23 ,,	1493	Female	26·10	—	5·08	—	5·75	—	—	—	1·28	7·10
23 ,,	1494	Female	27·70	—	5·00	—	5·60	9·25	1·45	6·87	1·38	8·20
23 ,,	1495	Female	19·00	—	2·65	3·08	3·14	5·40	0·89	5·20	1·03	6·15
24 ,,	1496	Female	22·50	—	3·80	—	4·45	9·30	1·12	5·10	1·05	6·70
24 ,,	1497	Female	24·30	—	4·65	—	5·10	10·50	1·30	5·75	1·20	6·85
25 ,,	1503	Female	17·10	—	2·65	3·13	3·27	†	0·91	4·30	0·90	5·50
25 ,,	1504	Male	20·40	—	3·60	—	4·17	8·95	1·10	5·50	1·08	6·05
26 ,,	1508	Male	25·15	—	4·60	—	5·10	10·70	1·29	—	1·28	7·30
26 ,,	1509	Female	21·25	—	3·70	—	4·30	9·15	1·12	—	1·15	6·25
27 ,,	1512	Female	25·00	—	—	—	5·20	10·80	—	—	1·28	6·88
27 ,,	1514	Male	17·85	—	2·73	3·12	3·22	7·30	0·97	5·06	1·00	5·70
27 ,,	1517	Female	19·40	—	3·15	—	3·64	7·93	0·97	5·20	1·03	5·90
28 ,,	1520	Male	25·30	—	4·60	—	5·25	10·50	1·33	5·90	1·25	6·65
1 March	1525	Female	25·50	—	4·80	—	5·70	11·30	1·38	6·35	1·25	7·00
3 ,,	1532	Male	20·05	—	3·05	3·40	3·56	8·00	1·07	5·30	1·07	6·17
3 ,,	1533	Female	24·45	—	4·33	—	4·90	10·31	1·25	—	1·22	7·20
3 ,,	1534	Male	22·35	—	3·86	4·10	4·42	9·89	1·24	5·60	1·20	6·77
4 ,,	1538	Female	24·45	—	4·20	—	4·90	10·40	1·20	6·20	1·25	7·00
4 ,,	1547	Female	26·45	—	5·35	—	5·83	11·95	1·37	5·95	1·22	6·95
5 ,,	1549	Male	22·50	—	4·20	—	4·58	7·60‡	1·20	—	1·10	6·30
5 ,,	1550	Female	25·55	—	4·78	—	5·45	11·40	1·37	6·05	1·25	7·15
5 ,,	1551	Male	19·82	—	3·20	3·65	3·75	—	1·05	5·15	1·04	5·95
7 ,,	1557	Male	21·70	—	3·90	—	4·45	9·10	1·04	—	1·09	6·03
7 ,,	1558	Male	24·45	—	5·10	—	5·50	11·20	1·40	5·70	1·20	6·60
9 ,,	1561	Female	24·70	—	5·05	—	5·60	11·50	1·44	5·75	1·28	6·86
9 ,,	1562	Male	19·00	—	2·98	—	3·58	7·80	—	—	0·92	5·80
11 ,,	1563	Male	23·70	—	4·15	—	4·60	10·50	1·17	5·70	1·25	6·85
11 ,,	1564	Male	17·65	—	2·45	—	2·91	5·00§	0·95	4·60	0·92	5·05
11 ,,	1565	Male	24·45	—	—	—	5·30	8·60	1·39	5·70	1·26	7·10
11 ,,	1566	Female	18·10	—	—	—	3·67	5·60	0·94	4·68	—	5·60
12 ,,	1568	Male	23·70	—	—	—	4·95	8·00	—	5·50	—	6·90
12 ,,	1569	Male	23·80	—	—	—	5·18	8·35	1·34	5·40	—	6·60
12 ,,	1570	Male	25·15	—	—	—	5·55	8·90	1·25	—	—	6·50
12 ,,	1571	Male	24·10	—	—	—	4·85	8·10	—	5·40	—	6·90
13 ,,	1573	Female	25·23	—	—	—	—	—	—	—	—	6·62
13 ,,	1574	Female	23·70	—	—	—	5·15	8·20	—	—	—	7·15
13 ,,	1576	Male	19·86	—	—	—	4·02	6·45	1·04	4·70	—	5·87
18 ,,	1583	Female	26·40	—	—	—	6·25	9·75	1·45	5·80	—	6·95
18 ,,	1584	Male	16·95	—	—	—	2·97	5·10	0·92	—	—	5·15
20 ,,	1586	Female	18·30	—	—	—	3·30	5·65	0·95	4·95	—	5·85
20 ,,	1588	Female	25·50	—	—	—	5·40	8·50	—	5·95	—	7·15
21 ,,	1593	Female	23·50	—	—	—	5·10	8·10	1·23	5·30	—	6·65
29 ,,	1600	Male	17·10	—	—	—	2·77	4·65	0·98	4·50	—	5·18
29 ,,	1605	Female	24·95	—	—	—	5·35	10·20	1·42	5·96	—	6·98

* Flukes broken off, 1 m. added to all. † R. 7·10. L. 7·42. ‡ Measurement taken to the axilla.
§ Subsequent to this (No. 1564) this measurement was always taken to the axilla.

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
9·35	—	0·95	—	—	1·80	2·63	2·80	0·74	—	—	—	—	—
—	—	—	—	—	—	—	—	—	6·75	—	—	—	—
9·30	9·10	1·40	0·22	1·20	1·85	2·30	2·40	0·85	4·50	2·25	—	—	1·60
11·50	11·25	0·48	0·28	1·00	2·70	3·47	3·67	1·05	6·80	2·80	—	—	2·65
9·95	9·30	1·55	0·34	0·90	2·25	3·10	3·24	0·80	5·50	2·70	—	—	—
8·40	8·30	1·35	0·23	0·65	1·70	—	—	—		—	—	—	1·74
9·15	8·75	1·47	—	—	1·96	2·42	2·50	0·70	4·20	—	—	—	—
8·33	7·65	0·40	0·21	0·60	1·77	—	—	—	—	—	—	—	1·68
11·95	—	0·60	0·26	0·80	2·40	3·25	3·46	0·95	7·10	2·96	—	—	—
10·28	9·60	1·52	—	0·90	2·10	2·92	3·00	0·93	6·05	2·86	—	—	2·20
11·50	10·90	0·55	0·34	1·20	2·52	3·24	3·50	1·00	7·00	3·40	—	—	2·55
10·70	10·20	0·58	—	0·45	2·07	—	—	—	5·60	2·70	—	—	2·18
9·70	9·50	1·35	0·23	0·60	2·40	—	—	—	6·05	—	—	—	2·20
9·60	8·60	1·62	0·27	0·80	1·88	2·47	2·63	0·74	5·30	2·60	—	—	2·10
10·20	9·50	0·65	0·31	0·80	2·00	—	—	—	5·60	2·54	—	—	2·00
9·65	9·00	0·60	0·30	0·90	1·97	2·64	2·90	0·70	4·60	2·20	—	—	—
11·00	—	0·45	—	—	2·51	3·26	3·34	1·09	7·00	3·20	—	—	—
12·30	11·70	0·60	0·35	0·90	2·30	3·00	3·17	0·90	6·70	3·05	—	—	2·07
9·65	9·07	0·55	0·31	0·60	1·53	—	—	—	—	—	—	—	1·72
10·20	—	0·50	0·20	0·85	2·10	2·70	2·93	0·76	5·45	2·60	—	—	—
10·70	10·40	0·65	0·15	1·35	2·35	3·20	3·30	0·90	6·30	2·80	—	—	2·20
8·20	7·80	0·35	0·20	0·60	—	2·33	2·46	0·65	—	—	—	—	1·70
9·40	9·10	1·50	0·27	0·70	2·00	2·65	2·81	0·76	—	—	—	—	2·20
11·25	—	1·15	—	—	2·50	3·25	3·37	0·94	6·10	2·90	—	—	—
9·90	—	0·65	0·36	0·90	2·17	2·90	3·00	0·83	5·20	2·70	—	—	—
10·70	—	0·57	—	—	2·70	—	—	—	6·20	2·88	—	—	—
8·45	8·20	1·15	0·22	0·70	1·75	2·45	2·57	0·65	—	2·07	—	—	1·80
9·10	8·50	0·45	0·32	1·10	1·86	2·41	2·58	0·68	4·40	2·38	—	—	2·00
10·55	9·75	1·55	0·40	1·10	2·40	3·10	3·35	0·88	6·45	3·00	—	—	2·40
11·00	10·50	0·60	0·28	0·80	2·77	3·10	3·20	0·87	6·95	3·15	—	—	2·60
9·35	8·90	1·43	0·27	0·83	1·82	2·48	2·63	0·74	—	—	—	—	1·95
11·00	—	0·60	—	—	2·43	3·25	3·36	0·88	5·96	2·86	—	—	—
10·55	9·90	1·80	0·40	0·90	2·34	2·83	3·00	0·84	5·37	2·56	—	—	—
10·90	10·10	0·65	—	0·95	2·35	3·10	3·40	0·92	5·90	—	—	—	—
11·00	10·80	0·70	0·28	0·95	2·35	3·45	3·80	1·02	6·90	3·30	—	—	2·35
10·25	—	1·35	—	—	—	—	—	—	5·70	2·65	—	—	—
10·80	10·30	0·67	0·33	0·80	2·65	3·40	3·58	—	6·68	2·90	—	—	2·60
9·25	8·75	1·55	0·22	0·70	2·00	2·30	2·42	0·63	4·70	2·10	—	—	2·00
9·78	—	1·07	—	—	1·79	2·52	2·61	0·77	5·48	2·50	—	—	—
10·65	10·10	1·70	0·16	0·60	2·40	3·30	3·43	0·90	6·60	3·00	—	—	—
10·35	9·55	0·60	0·37	1·00	2·68	3·52	3·77	1·02	—	—	—	—	2·65
9·10	—	0·88	0·24	0·53	1·80	—	—	—	—	—	—	—	—
10·65	10·10	1·45	0·35	—	2·45	3·04	3·26	0·83	—	—	—	—	1·45
8·10	7·90	1·35	0·22	0·75	1·45	1·97	—	—	3·70	2·00	—	—	2·15
11·00	10·80	1·50	0·21	0·75	2·20	3·11	—	0·92	6·15	2·98	—	—	2·40
8·60	—	0·45	—	—	1·70	—	—	—	—	—	—	—	—
10·70	—	1·70	0·29	—	2·64	—	—	0·93	6·00	2·90	—	—	2·45
10·50	—	1·65	0·29	—	2·55	—	—	0·93	6·30	3·00	—	—	2·45
10·65	—	1·55	—	—	2·80	—	—	0·97	6·80	3·00	—	—	—
10·75	—	1·70	—	—	2·93	—	—	—	6·00	2·80	—	—	—
—	—	—	—	—	2·55	—	—	0·90	6·53	3·16	—	—	—
11·35	—	0·58	—	—	2·35	—	—	0·85	6·15	2·96	—	—	—
9·03	—	0·43	0·23	—	2·19	—	—	0·69	4·94	2·24	—	—	1·85
11·55	—	0·65	—	—	2·30	—	—	0·93	7·40	3·20	—	—	—
8·00	—	0·75	—	—	1·70	—	—	0·68	3·80	1·95	—	—	—
8·60	—	0·35	—	—	1·88	—	—	0·65	4·10	2·00	—	—	1·80
11·25	—	0·60	0·39	—	2·65	—	—	0·90	6·70	3·05	—	—	—
10·50	—	0·68	0·28	—	2·60	—	—	0·86	6·40	2·95	—	—	2·25
8·33	—	1·37	0·23	—	1·63	—	—	0·49	3·90	1·52	—	—	2·00
10·76	—	0·58	0·28	—	2·30	—	—	0·83	6·37	3·10	—	—	—

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1927												
30 Mar.	1609	Male	25·60	—	—	—	5·12	8·25	1·25	6·30	—	7·50
1 April	1623	Female	26·00	—	—	—	5·10	8·30	1·50	6·15	—	7·50
8 ,,	1631	Female	25·10	—	—	—	5·34	8·40	1·30	6·30	—	7·25
8 ,,	1632	Male	18·45	—	—	—	2·90	5·25	0·94	4·95	—	5·70
9 ,,	1638	Female	19·10	—	—	—	3·45	6·20	0·94	5·00	—	6·10
12 ,,	1642	Male	18·80	—	—	—	3·37	6·05	0·98	4·80	—	5·70
12 ,,	1644	Female	27·50	—	—	—	5·65	9·70	1·56	6·65	—	7·80
12 ,,	1648	Male	17·75	—	—	—	3·15	5·50	0·90	4·50	—	5·40
19 ,,	1659	Male	18·50	—	—	—	3·60	5·95	—	5·00	—	5·65
19 ,,	1661	Male	23·45	—	—	—	5·00	7·85	1·30	5·20	—	6·45
23 ,,	1672	Female	19·40	—	—	—	3·75	6·00	1·06	—	—	6·00
25 ,,	1680	Female	19·10	—	—	—	3·60	5·80	1·00	5·00	—	5·80

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
11·60	—	1·60	0·30	—	2·55	—	—	0·90	6·80	3·10	—	—	2·60
12·00	—	0·70	—	—	2·45	—	—	0·99	6·14	3·20	—	—	2·60
11·40	—	0·75	0·34	—	2·18	—	—	0·98	6·26	2·90	—	—	—
8·70	—	1·30	0·26	—	—	—	—	0·54	3·65	1·80	—	—	—
9·60	—	0·40	0·20	—	—	—	—	—	4·20	2·20	—	—	1·90
9·05	—	1·50	0·24	—	1·80	—	—	0·70	4·22	1·96	—	—	—
11·75	—	0·60	0·31	—	3·10	—	—	1·10	6·94	3·05	—	—	—
8·15	—	1·36	0·24	—	1·73	—	—	0·59	3·95	2·00	—	—	—
8·80	—	1·45	0·20	—	1·70	—	—	0·67	4·45	2·20	—	—	—
10·05	—	1·55	0·24	—	2·35	—	—	0·80	6·15	2·70	—	—	—
9·20	—	0·40	—	—	2·15	—	—	0·75	4·60	2·35	—	—	—
9·20	—	0·45	0·25	—	2·00	—	—	0·72	4·45	2·20	—	—	—

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1925												
5 Feb.	2	Female	20·80	0·20	4·03	—	4·53	8·85	1·00	4·90	1·05	6·20
5 ,,	3	Female	17·60	—	3·50	—	3·80	7·50	—	4·80	0·90	5·10
5 ,,	4	Male	—	—	—	—	—	—	—	5·25	1·00	6·00
10 ,,	7	Female	19·55	0·30	4·00	4·20	4·35	8·35	1·00	5·00	1·00	5·50
11 ,,	11	Male	19·50	—	4·00	4·19	4·25	8·20	1·10	4·70	0·95	5·20
11 ,,	12	Female	17·30	—	3·23	3·50	3·65	7·20	0·87	4·30	0·85	4·75
11 ,,	14	Male	17·90	—	3·15	3·42	3·55	7·15	0·88	4·35	0·85	5·35
12 ,,	15	Male	19·00	—	—	3·85	3·87	7·70	—	—	0·95	—
12 ,,	16	Male	20·50	0·15	4·07	4·40	4·36	9·00	1·05	4·80	0·85	5·40
12 ,,	17	Male	19·60	—	3·85	4·00	4·30	8·20	0·95	4·18	1·00	5·20
12 ,,	18	Male	18·70	—	3·70	—	4·10	7·73	0·90	4·80	0·95	5·25
12 ,	19	Male	19·45	—	3·85	4·15	4·25	7·80	1·00	4·65	0·95	5·30
13 ,,	20	Female	20·80	0·24	3·75	4·15	4·23	8·50	0·93	—	1·00	6·10
13 ,,	22	Male	20·30	—	3·60	3·80	4·00	8·25	0·94	5·60	1·05	6·20
16 ,,	23	Female	21·50	—	4·05	4·20	4·35	8·90	1·06	—	1·23	6·10
16 ,,	25	Male	19·90	—	3·70	3·95	4·00	8·30	1·00	5·13	1·20	6·60
17 ,,	28	Female	17·65	—	3·30	3·50	3·76	7·40	0·90	4·60	0·93	4·88
18 ,,	29	Female	21·70	0·27	4·25	4·50	4·60	9·20	1·00	5·00	1·05	5·70
20 ,,	32	Female	18·05	0·15	3·25	3·70	3·60	7·25	0·82	4·50	0·92	5·25
21 ,,	33	Female	15·50	0·10	2·33	—	2·50	5·45	0·68	—	0·95	4·70
21 ,,	35	Male	17·55	—	—	—	—	—	—	—	—	—
21 ,,	38	Male	21·20	—	4·40	—	4·93	9·30	1·00	5·30	0·92	5·80
23 ,,	39	Female	22·80	—	4·53	4·79	4·88	9·70	—	—	1·25	6·50
23 ,,	42	Female	23·60	—	4·80	5·10	5·00	10·00	—	—	1·12	6·70
23 ,,	44	Male	20·20	—	3·75	3·98	4·10	8·30	1·05	5·30	0·97	5·78
23 ,,	45	Female	22·55	—	4·25	4·63	4·93	9·85	1·10	5·70	1·20	6·40
25 ,,	51	Male	20·60	—	4·00	4·30	4·50	—	1·00	—	1·05	4·70
27 ,,	56	Male	20·87	0·25	4·20	4·65	4·75	8·17	1·05	—	1·15	4·95
27 ,,	57	Female	19·35	0·22	3·65	3·98	3·85	7·95	0·92	4·75	1·05	5·55
27 ,,	58	Female	20·90	—	3·78	4·18	4·28	8·40	1·00	5·20	1·00	5·88
27 ,,	59	Female	21·25	—	4·15	4·40	4·55	8·75	—	5·52	1·07	5·80
28 ,,	61	Female	21·12	—	4·25	4·58	4·80	9·10	1·00	5·20	1·10	6·02
28 ,,	62	Female	21·40	—	4·20	4·50	4·65	8·70	1·05	5·50	1·15	6·00
28 ,,	63	Female	20·50	—	3·80	4·20	4·30	8·60	0·90	—	1·15	5·90
1 Mar.	64	Male	19·10	—	3·65	—	3·80	7·70	—	—	1·00	5·60
1 ,,	65	Male	20·10	—	3·70	3·90	4·10	8·20	1·00	5·10	0·95	5·60
1 ,,	66	Female	19·25	—	3·50	4·00	3·95	7·80	—	4·90	0·85	5·50
1 ,,	67	Female	22·50	—	4·70	5·10	5·10	9·60	—	4·85	1·15	6·00
1 ,,	68	Female	23·30	—	—	—	—	—	—	—	1·00	—
1 ,,	69	Male	20·50	—	4·00	—	4·30	8·60	1·00	—	1·10	6·05
1 ,,	70	Male	19·70	—	4·00	4·00	4·10	8·10	0·93	4·65	1·00	—
2 ,,	71	Female	19·30	—	3·30	3·75	3·78	7·60	0·91	—	0·90	5·80
3 ,,	73	Female	22·35	—	4·55	—	5·00	9·90	1·05	—	1·15	6·20
3 ,,	74	Female	21·50	—	4·50	4·75	4·85	9·20	1·00	4·95	1·10	6·10
3 ,,	75	Female	21·20	—	4·00	4·20	4·30	8·60	1·05	5·40	1·15	6·00
3 ,,	76	Female	20·20	—	4·10	—	4·40	8·40	1·00	—	1·05	5·90
3 ,,	77	Female	19·70	—	3·85	4·10	4·20	8·10	1·00	5·00	1·05	5·70
3 ,,	78	Male	18·70	—	3·50	4·00	4·15	8·00	0·95	4·50	0·90	5·20
3 ,,	79	Male	20·80	—	4·20	4·35	4·65	8·70	0·95	5·25	1·15	5·90
3 ,,	80	Female	21·50	—	4·00	4·05	4·25	8·60	—	5·40	1·10	6·10
9 ,,	83	Female	20·00	—	3·95	4·35	4·50	8·45	0·95	5·20	1·00	5·90
10 ,,	84	Male	13·55	—	1·85	—	3·35	—	0·95	—	0·90	4·30
12 ,,	86	Male	19·90	—	3·75	4·00	4·10	7·75	0·98	5·00	0·96	5·80
19 ,,	97	Male	19·35	—	3·85	—	4·25	8·05	0·99	—	0·93	5·43
21 ,,	100	Male	19·55	0·25	3·70	3·92	4·15	8·10	0·95	5·00	1·05	5·60
21 ,,	101	Female	21·00	—	4·55	—	5·15	9·80	1·15	5·03	1·10	5·50
23 ,,	105	Female	18·50	—	3·15	3·60	3·55	7·20	0·85	4·90	0·90	5·60
23 ,,	111	Female	22·60	—	4·35	4·78	4·90	9·40	1·16	5·70	1·00	6·30
25 ,,	114	Male	20·20	—	3·70	4·35	4·30	8·30	1·03	—	1·10	5·85
25 ,,	118	Male	18·60	—	3·30	3·74	3·85	7·70	0·92	—	0·93	6·47

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
9·30	9·30	0·60	0·50	—	—	—	—	0·58	5·50	—	—	—	—
8·20	8·20	0·70	0·50	—	1·45	1·85	1·90	0·48	4·58	—	—	—	—
9·50	—	1·50	0·50	1·40	—	—	—	—	—	—	—	—	—
8·80	—	0·50	0·50	1·10	1·65	2·25	—	0·56	5·35	3·15	—	—	—
8·35	8·00	1·55	0·50	1·20	—	—	—	—	5·30	2·20	—	—	—
7·70	7·40	0·50	0·40	0·95	—	1·60	—	0·50	—	—	—	—	—
8·30	—	0·90	0·38	0·90	1·50	2·10	2·11	0·53	—	—	—	—	—
—	—	—	—	—	1·45	—	—	—	—	—	—	—	—
8·70	8·45	1·55	0·50	1·00	1·65	2·10	2·20	0·55	—	—	—	—	—
8·75	8·50	1·50	0·55	1·25	—	—	—	—	—	—	—	—	—
8·65	8·00	1·50	0·52	1·40	1·50	1·80	—	0·45	4·95	2·05	—	—	—
8·55	8·20	1·20	0·60	1·00	1·40	2·00	2·20	0·52	—	—	—	—	—
9·65	—	0·65	0·47	1·00	2·25	2·16	2·18	0·55	5·21	2·43	—	—	—
9·50	9·40	1·30	—	1·20	1·75	—	—	—	—	—	—	—	—
9·50	—	0·65	—	—	1·90	—	—	—	5·45	2·27	—	—	—
9·35	9·30	0·77	0·48	1·30	1·65	—	—	—	—	—	—	—	—
—	7·25	0·59	0·45	1·40	1·50	—	—	—	—	—	—	—	—
9·50	9·60	0·85	0·50	1·50	1·85	2·58	2·67	0·64	5·65	2·47	—	—	—
8·45	8·45	0·50	0·35	0·80	1·55	1·90	2·00	0·43	4·55	1·85	—	—	—
7·20	—	—	—	0·90	1·25	1·60	1·77	0·43	3·45	1·80	—	—	—
—	—	—	—	—	—	—	—	—	4·65	2·10	—	—	—
9·40	9·00	1·70	0·35	3·80	1·70	—	—	—	—	—	—	—	—
10·00	—	0·50	0·50	1·60	2·00	3·00	3·50	0·65	5·90	2·40	—	—	—
—	—	0·60	—	—	2·00	—	—	—	6·40	—	—	—	—
9·10	9·10	1·52	0·52	1·20	1·70	—	—	—	5·00	2·20	—	—	—
10·25	9·90	0·70	0·48	1·20	2·18	—	—	—	—	—	—	—	—
—	—	0·80	0·42	0·95	—	—	—	—	5·50	2·45	—	—	—
9·50	—	1·10	0·42	1·30	1·92	2·40	2·42	0·60	5·75	2·25	—	—	—
9·00	8·52	0·55	0·53	1·08	1·75	2·20	2·28	0·56	4·92	2·16	—	—	—
9·14	8·72	0·47	0·55	0·97	1·20	2·35	2·40	0·53	5·20	2·20	—	—	—
—	8·70	0·55	0·48	1·00	—	—	—	—	—	—	—	—	—
9·65	9·30	0·60	0·60	1·15	1·80	—	—	—	5·70	2·30	—	—	2·40
9·30	8·90	0·60	0·50	1·25	1·75	—	—	—	—	—	—	—	2·35
9·30	—	0·55	—	—	1·65	2·20	2·35	0·55	5·23	2·16	—	—	—
8·85	—	0·95	—	—	1·40	2·27	2·33	0·55	—	—	—	—	—
8·95	8·60	1·50	0·62	1·30	1·40	2·20	2·25	0·53	5·30	2·16	—	—	—
8·90	8·40	0·35	0·53	0·95	1·40	2·15	2·17	0·52	4·90	2·00	—	—	1·87
9·95	9·20	0·60	—	1·20	1·50	—	—	0·60	—	—	—	—	3·00
—	—	—	—	—	—	—	—	—	5·80	2·40	—	—	—
9·60	—	1·05	—	—	1·70	—	—	—	5·50	2·65	—	—	—
—	—	—	0·50	1·05	1·50	2·30	3·60	0·61	—	—	—	—	2·25
9·00	—	0·50	—	—	1·50	—	—	—	4·60	1·85	—	—	—
9·60	—	0·50	—	—	1·80	2·60	2·70	0·68	6·00	2·30	—	—	—
10·00	9·50	0·60	0·49	0·92	1·90	2·28	3·05	0·62	5·85	2·30	—	—	1·75
9·65	9·20	0·65	0·55	1·20	1·80	—	—	—	—	—	—	—	1·75
8·90	—	0·35	—	—	1·40	2·00	—	0·60	5·40	2·16	—	—	—
8·85	8·70	0·40	0·68	1·10	1·50	2·00	2·05	0·53	5·20	2·15	—	—	1·80
8·55	8·00	0·67	0·50	1·00	1·70	—	—	—	5·00	2·30	—	—	1·90
9·35	9·00	1·40	0·50	1·15	1·80	2·15	2·20	0·57	5·50	2·30	—	—	2·30
9·80	—	0·50	0·50	1·10	1·60	2·40	2·42	0·50	5·20	2·20	—	—	2·15
9·20	8·75	0·50	0·55	1·10	1·85	2·25	2·30	0·55	5·50	2·05	—	—	2·05
6·95	—	0·85	—	—	—	1·40	1·50	0·45	3·00	1·22	—	—	—
9·10	9·00	1·30	0·55	1·10	2·15	2·10	2·18	0·51	5·60	2·00	—	—	2·00
8·65	—	1·20	—	1·00	1·60	2·25	2·29	0·51	5·25	2·05	—	—	—
9·00	—	1·00	0·55	1·08	1·45	2·10	2·15	—	4·92	2·30	—	—	—
9·10	8·90	0·70	0·46	1·00	2·10	2·60	2·70	0·67	6·15	2·60	—	—	1·80
8·85	8·40	0·60	0·46	0·80	1·70	—	—	—	—	—	—	—	1·70
9·90	9·30	0·50	0·53	1·20	1·70	2·50	2·56	0·68	5·90	2·60	—	—	2·20
9·10	—	0·95	—	1·50	—	—	—	—	5·45	2·05	—	—	—
8·50	—	0·90	—	—	1·50	2·05	2·07	0·51	4·68	2·10	—	—	—

			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1925												
25 Mar.	119	Male	20·40	—	3·85	—	4·20	8·90	—	—	1·10	5·90
26 ,,	120	Female	22·40	—	3·98	—	4·38	8·75	—	—	1·07	6·40
26 ,,	121	Male	19·95	—	3·65	3·95	4·05	8·22	1·00	5·08	1·10	5·85
27 ,,	127	Female	17·90	—	3·15	3·60	3·70	7·40	0·90	—	0·95	5·40
28 ,,	130	Male	20·40	—	4·00	—	4·54	8·70	—	4·95	1·24	5·70
28 ,,	133	Male	16·75	—	3·10	3·35	3·43	7·00	0·85	4·40	0·85	5·00
28 ,,	134	Female	18·65	—	3·70	4·03	4·05	7·90	0·91	4·80	1·00	5·70
30 ,,	137	Female	18·15	—	3·55	3·85	3·90	7·50	—	4·50	0·95	5·05
30 ,,	138	Female	16·00	—	2·75	3·08	3·20	6·25	0·82	4·20	0·90	4·60
30 ,,	139	Female	18·50	—	—	3·65	3·75	7·80	—	—	0·92	5·40
30 ,,	140	Male	19·15	0·29	3·46	—	3·90	7·80	0·85	—	1·00	5·40
30 ,,	144	Male	18·96	—	3·60	3·78	3·96	7·95	—	4·65	0·98	5·40
31 ,,	152	Male	20·30	—	3·90	4·38	4·42	8·50	1·00	5·10	1·08	5·88
1 April	155	Female	19·65	—	3·68	3·98	4·05	8·00	0·95	4·80	1·00	5·50
2 ,,	158	Female	20·65	—	3·80	4·09	4·30	8·30	1·02	5·00	0·96	5·70
2 ,,	159	Female	19·90	—	3·90	4·22	4·25	8·05	1·00	—	1·10	5·32
2 ,,	161	Female	21·70	—	4·20	—	4·55	8·90	—	5·17	1·13	5·93
2 ,,	162	Male	21·70	—	4·65	4·72	4·95	9·38	1·07	5·20	1·01	5·75
2 ,,	163	Female	17·40	—	2·70	3·37	3·37	6·50	0·87	4·48	0·90	5·10
3 ,,	164	Female	22·35	—	4·50	4·90	5·00	9·55	1·11	—	1·10	6·20
3 ,,	165	Male	17·10	—	3·00	3·13	3·20	6·50	0·82	4·55	0·90	5·25
3 ,,	166	Female	23·00	—	4·60	—	5·00	9·90	1·18	—	1·18	6·20
3 ,,	168	Female	21·82	—	4·20	4·40	4·57	8·90	1·08	5·45	1·05	6·18
3 ,,	169	Male	20·10	—	3·90	3·95	4·20	8·40	1·20	4·78	1·00	5·65
6 ,,	173	Female	22·33	—	—	4·70	4·80	—	—	—	—	—
6 ,,	174	Female	20·15	—	3·94	4·35	4·42	8·73	0·95	—	1·04	6·75
6 ,,	175	Female	23·25	—	4·90	5·00	5·17	9·90	1·12	5·70	1·13	6·50
6 ,,	176	Male	18·60	—	3·40	3·79	3·88	7·75	0·96	—	0·95	5·40
11 ,,	177	Male	19·10	—	3·30	3·65	3·75	7·64	—	—	1·00	5·60
11 ,,	178	Female	22·85	—	4·45	4·90	5·05	9·45	1·00	5·20	1·05	6·10
11 ,,	179	Female	22·45	—	4·20	4·43	4·64	9·28	1·10	5·65	1·07	6·45
11 ,,	180	Male	17·10	—	2·90	—	3·30	6·95	—	—	0·90	4·85
11 ,,	181	Female	22·60	—	4·44	—	4·93	9·85	1·15	5·35	1·03	6·38
13 ,,	183	Female	22·50	—	5·00	—	5·35	—	1·20	5·30	1·15	5·80
13 ,,	185	Female	21·00	—	4·30	4·45	4·70	9·40	1·02	5·10	1·06	5·76
13 ,,	186	Female	21·70	—	4·00	4·23	4·50	9·10	—	—	1·07	6·10
13 ,,	187	Female	18·00	—	3·15	—	3·53	7·05	—	—	0·94	5·30
14 ,,	188	Male	19·75	—	3·40	3·80	3·87	8·00	0·89	—	0·98	5·70
14 ,,	189	Male	21·20	—	4·10	—	4·69	8·73	1·00	4·80	1·07	5·55
14 ,,	190	Female	22·00	—	3·90	4·17	4·30	8·65	1·05	5·65	1·17	6·50
14 ,,	192	Female	18·60	—	3·50	3·73	3·85	7·75	—	—	0·90	5·55
14 ,,	193	Female	21·70	—	4·44	4·55	4·65	9·23	—	5·35	1·02	6·05
15 ,,	194	Male	19·17	—	—	—	4·20	—	—	—	1·00	—
15 ,,	195	Female	16·70	—	2·90	3·18	3·26	6·65	0·81	—	0·80	5·00
15 ,,	196	Male	18·90	—	3·64	3·80	3·94	8·00	—	4·50	0·98	5·30
15 ,,	197	Male	16·75	—	—	3·10	3·05	6·55	—	—	0·95	4·75
15 ,,	198	Female	22·60	—	4·70	4·90	5·10	9·60	1·07	5·25	1·16	6·35
17 ,,	200	Female	24·15	—	4·50	5·02	5·02	10·25	—	—	1·10	6·75
18 ,,	201	Female	22·70	—	4·44	4·80	4·85	9·60	—	—	1·15	6·30
18 ,,	203	Female	19·25	0·21	3·70	—	4·20	8·23	—	—	0·90	5·25
20 ,,	206	Male	20·30	—	3·80	4·20	4·27	8·35	0·90	—	1·02	5·80
20 ,,	207	Male	20·30	—	4·10	4·47	4·46	9·00	1·03	4·68	0·98	5·46
20 ,,	208	Female	20·02	—	—	—	—	7·97	—	—	1·01	5·70
20 ,,	210	Male	21·70	—	4·15	4·15	4·45	9·05	1·06	5·16	1·10	6·14
21 ,,	213	Male	20·55	—	4·20	—	4·66	8·83	1·03	4·65	1·00	5·80
21 ,,	214	Female	20·70	—	3·65	3·95	4·15	8·15	—	—	1·04	5·67
25 ,,	217	Female	21·40	—	4·50	—	5·00	9·45	1·10	—	1·06	5·90
27 ,,	218	Male	21·10	—	4·07	4·05	4·36	9·10	1·08	—	1·10	6·13
27 ,,	219	Female	21·50	—	4·30	—	4·84	9·25	0·98	5·25	1·00	5·95
30 ,,	222	Female	18·20	—	3·30	3·59	3·73	7·49	0·89	4·57	0·91	5·40

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
9·30	—	1·05	0·50	1·20	1·80	2·45	2·47	0·62	5·25	2·36	—	—	—
10·25	—	0·65	0·55	0·95	1·70	2·16	2·18	0·60	5·33	2·12	—	—	—
9·55	9·05	1·60	0·54	1·40	—	2·40	2·45	0·61	5·05	2·07	—	—	2·10
8·55	—	0·45	—	1·00	1·75	—	—	—	4·48	1·90	—	—	—
9·30	8·80	1·10	0·50	1·00	1·90	—	—	—	5·40	2·45	—	—	—
8·00	7·60	1·20	0·42	1·02	1·50	—	—	—	4·25	1·70	—	—	1·70
8·90	8·45	0·50	0·45	1·00	1·80	—	—	—	—	—	—	—	1·90
8·30	8·15	0·65	0·45	1·15	1·27	—	—	—	4·79	1·86	—	—	1·90
7·63	7·45	0·53	0·40	1·10	—	—	—	—	—	—	—	—	1·65
—	—	0·40	—	—	1·53	—	—	—	4·72	1·98	—	—	—
8·30	—	0·80	—	—	1·65	—	—	—	4·71	1·98	—	—	—
8·64	8·56	1·45	—	1·00	1·67	—	—	—	4·76	—	—	—	1·96
9·00	8·70	1·42	0·45	1·18	1·40	—	—	—	—	—	—	—	1·85
8·15	8·10	0·50	0·49	1·10	1·50	2·05	2·10	0·47	—	—	—	—	1·75
9·70	9·00	0·62	0·58	0·92	1·55	—	—	—	5·15	2·20	—	—	1·85
8·77	—	0·48	0·44	0·85	1·85	—	—	—	5·25	2·20	—	—	—
9·75	9·25	0·70	0·44	0·85	1·70	—	—	—	—	—	—	—	2·35
9·60	9·10	1·55	0·60	1·30	2·18	—	—	—	6·00	2·55	—	—	—
8·10	7·90	0·40	0·46	0·90	1·30	—	—	—	—	—	—	—	1·75
9·70	—	0·50	—	—	1·85	2·50	2·55	0·59	6·10	2·35	—	—	—
8·32	8·12	1·15	0·42	0·80	1·30	—	—	—	4·00	1·90	—	—	1·75
9·90	—	0·60	—	—	1·90	—	—	—	6·22	2·50	—	—	—
10·05	9·50	0·52	0·54	1·10	1·70	2·30	2·40	0·60	5·50	2·20	—	—	—
9·15	8·75	1·45	0·44	1·00	1·70	—	—	—	5·05	2·35	—	—	2·10
—	—	—	—	—	—	—	—	—	5·50	2·30	—	—	—
9·00	—	0·45	—	—	1·70	2·40	2·45	0·58	5·35	2·14	—	—	—
10·64	10·30	0·70	0·46	1·09	2·10	—	—	—	6·20	—	—	—	2·40
8·30	—	0·75	—	1·20	1·55	—	—	0·54	—	—	—	—	—
—	—	0·90	—	—	1·54	—	—	—	4·50	—	—	—	—
9·85	9·50	0·55	0·49	1·20	1·75	—	—	—	6·00	2·60	—	—	2·11
10·50	10·00	0·55	0·56	1·00	1·85	—	—	—	—	—	—	—	2·10
7·80	—	0·85	—	—	1·45	2·00	2·05	0·40	4·10	1·90	—	2·19	—
10·05	9·55	0·62	0·55	0·90	2·20	2·58	2·63	0·58	6·10	2·34	—	—	2·10
9·43	9·30	0·50	0·60	1·40	—	—	—	—	—	—	—	—	2·35
—	8·45	0·66	0·46	0·90	1·95	2·20	2·23	0·55	5·74	3·10	—	2·45	2·05
9·70	—	0·40	—	—	1·70	—	—	—	—	—	—	—	—
8·27	—	0·42	—	—	1·35	—	—	—	—	—	—	—	—
8·90	—	0·90	0·54	1·00	1·67	2·00	2·05	0·50	4·80	1·80	—	—	—
9·30	9·15	1·20	0·44	1·20	1·40	—	—	—	5·53	2·47	—	—	2·08
10·10	10·10	0·65	0·50	1·20	1·85	—	—	—	—	—	—	—	2·15
8·60	—	0·50	—	—	1·60	2·05	2·15	0·47	4·78	1·90	—	—	—
9·60	9·30	0·60	0·50	1·40	1·70	2·35	2·46	0·56	—	—	—	—	1·99
—	—	—	—	—	—	—	—	—	5·07	2·20	—	—	—
7·60	—	0·35	—	—	1·35	—	—	—	4·06	1·70	—	—	—
8·45	8·20	1·40	0·48	1·00	1·50	—	—	—	—	—	—	—	1·92
—	—	0·72	—	—	1·25	1·70	1·73	0·45	3·60	1·67	—	—	—
10·30	9·50	0·65	0·47	1·24	1·95	—	—	—	6·10	2·47	—	—	2·20
10·40	—	0·41	—	—	1·95	2·58	2·63	0·63	6·09	2·49	—	—	—
10·10	—	0·55	—	—	1·83	2·40	2·47	—	6·93	3·30	—	—	—
8·43	—	0·50	—	—	—	—	—	—	5·60	2·16	—	—	—
9·40	—	1·07	—	—	1·55	—	—	—	5·14	2·07	—	—	—
8·90	8·60	1·60	0·45	1·33	1·87	2·45	2·50	—	—	—	—	—	2·00
9·10	—	0·50	—	—	—	—	—	—	5·02	2·17	—	—	—
10·10	9·50	1·56	0·35	0·85	1·95	—	—	—	—	—	—	—	2·22
9·30	8·99	1·55	0·63	1·40	1·65	—	—	—	5·60	2·29	—	—	2·00
9·40	—	0·55	—	—	1·40	—	—	—	5·16	2·02	—	—	—
9·20	—	0·55	—	1·15	1·94	2·45	2·50	0·65	6·00	2·52	—	—	—
9·58	—	1·00	—	—	1·70	—	—	—	5·32	2·36	—	—	—
9·30	8·68	0·57	0·56	1·15	1·65	—	—	—	—	—	—	—	2·10
8·50	8·21	0·70	0·47	1·15	1·68	—	—	—	—	—	—	—	1·89

Date	Whale Number	Sex	1 Total length, top of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1925												
30 April	223	Male	19·80	—	3·63	3·90	4·07	7·95	0·93	5·00	0·98	5·85
1 May	225	Male	18·15	—	3·68	—	4·03	8·04	0·90	—	0·86	5·15
1 ,,	227	Female	19·73	—	3·53	4·15	4·15	8·25	—	5·04	0·98	5·65
1 ,,	228	Male	19·20	—	3·90	—	4·22	8·20	0·98	4·50	0·95	5·40
1 ,,	229	Female	15·40	—	2·65	2·95	2·95	6·10	—	—	0·82	5·00
4 ,,	230	Female	20·20	—	3·65	4·06	4·08	7·80	0·96	—	1·03	6·00
4 ,,	231	Male	21·25	—	4·36	—	4·37	8·79	1·03	5·25	1·00	6·00
4 ,,	233	Male	18·55	—	3·30	3·50	3·40	7·47	0·85	—	0·96	5·76
8 ,,	236	Female	21·70	—	—	4·74	4·80	—	1·02	—	1·20	6·10
8 ,,	237	Male	20·00	—	3·95	—	4·40	8·20	1·10	4·90	1·00	5·67
8 ,,	238	Female	21·70	—	4·10	—	4·63	8·90	—	5·70	1·15	6·50
21 Oct.	246	Male	19·25	—	3·95	4·00	4·35	8·15	0·94	4·70	0·90	5·10
21 ,,	247	Female	19·30	—	—	—	4·20	—	—	—	1·00	5·60
26 ,,	251	Male	20·90	—	4·00	4·27	4·50	8·60	1·03	5·30	1·05	5·65
27 ,,	252	Male	19·60	—	3·50	—	4·08	8·00	1·05	4·87	0·95	5·44
27 ,,	255	Male	21·77	—	3·80	4·13	4·30	8·90	1·00	5·57	1·10	6·17
29 ,,	257	Female	22·57	—	4·67	4·96	5·12	9·60	1·08	5·37	1·10	6·25
2 Nov.	260	Female	21·30	—	4·15	—	4·60	8·75	1·00	5·33	1·10	6·00
3 ,,	262	Female	22·40	—	4·80	4·97	5·20	9·90	1·08	5·40	1·10	6·20
4 ,,	263	Female	24·00	—	4·80	5·28	5·40	10·37	1·17	5·48	1·08	6·90
5 ,,	264	Female	21·05	—	3·90	—	4·50	8·70	1·10	5·10	1·05	5·85
6 ,,	266	Male	20·55	—	4·00	4·30	4·40	8·80	1·05	4·65	1·07	5·85
7 ,,	268	Male	20·00	—	3·70	3·95	4·20	8·60	0·95	5·05	1·10	5·60
7 ,,	269	Male	20·30	—	4·00	4·10	4·40	—	1·02	4·55	1·00	5·45
11 ,,	273	Female	22·10	—	4·30	4·65	4·90	8·65	—	5·20	1·15	6·00
17 ,,	276	Female	22·45	—	4·30	4·70	4·80	9·25	1·05	5·55	1·05	6·30
18 ,,	277	Male	20·20	—	4·08	4·36	4·50	8·70	0·98	4·72	0·86	5·35
18 ,,	278	Female	21·85	—	3·85	—	4·50	8·80	1·00	—	1·13	6·15
24 ,,	279	Male	20·60	—	4·00	4·30	4·48	8·90	1·02	4·80	1·00	5·70
26 ,,	280	Female	22·15	—	—	—	4·65	—	—	—	1·10	6·30
27 ,,	281	Female	21·75	—	4·05	4·30	4·40	8·80	1·06	4·15	1·05	6·20
10 Dec.	283	Male	20·90	—	3·90	4·33	4·45	8·90	0·98	—	1·10	6·00
14 ,,	285	Female	22·90	—	4·60	4·85	5·15	10·17	1·18	5·40	1·08	6·10
14 ,,	286	Female	22·20	—	4·45	—	4·85	9·40	1·14	5·10	1·17	6·20
14 ,,	287	Female	20·30	—	4·25	—	4·60	8·70	0·95	4·95	1·00	5·60
14 ,,	288	Female	21·40	—	4·00	—	4·68	9·05	1·12	—	1·14	6·10
15 ,,	289	Female	22·15	—	4·25	4·45	4·70	9·25	1·03	—	1·10	6·20
15 ,,	290	Female	23·95	—	4·80	5·00	5·27	10·25	1·15	5·45	—	6·50
16 ,,	292	Female	20·90	—	4·10	4·50	4·65	8·25	0·90	5·15	1·06	5·80
17 ,,	293	Female	22·65	—	4·62	4·90	4·95	9·65	1·13	5·80	1·10	6·35
17 ,,	294	Male	20·65	—	4·00	4·40	4·52	9·00	1·03	4·88	1·08	5·65
17 ,,	295	Male	20·60	—	4·25	4·30	4·48	8·80	1·00	4·70	1·04	5·60
17 ,,	296	Female	21·50	—	4·30	4·60	4·70	9·20	1·03	5·40	1·12	6·00
1926												
8 Jan.	297	Male	21·10	—	4·20	—	4·55	9·20	—	—	1·00	6·15
8 ,,	298	Male	18·75	—	3·26	3·55	3·70	7·50	0·93	4·50	1·00	5·50
8 ,,	299	Male	21·30	—	3·80	—	4·37	8·70	1·10	5·10	1·07	6·00
8 ,,	300	Female	21·60	—	4·20	—	4·78	9·56	1·00	4·86	1·20	5·95
8 ,,	301	Male	19·20	—	3·65	3·66	3·95	7·65	0·94	4·65	1·00	5·50
8 ,,	303	Male	20·85	—	4·00	—	4·40	8·80	—	5·04	1·05	6·00
8 ,,	304	Female	22·80	—	4·75	4·72	5·00	9·70	1·12	5·48	1·10	6·40
8 ,,	305	Male	20·00	—	3·88	—	4·18	8·35	—	4·60	0·93	5·25
8 ,,	306	Male	20·70	—	4·10	4·20	4·48	9·25	1·00	5·15	1·12	5·90
8 ,,	307	Male	19·20	—	3·40	3·65	3·90	7·67	0·92	4·70	0·95	5·50
8 ,,	308	Male	21·70	—	4·30	4·35	4·60	9·00	1·14	5·62	1·07	6·10
9 ,,	309	Female	21·70	—	4·34	—	4·80	8·94	1·08	—	1·15	6·10
9 ,,	310	Male	20·50	—	4·10	—	4·50	8·90	1·07	5·35	1·00	5·60
9 ,,	311	Male	20·40	—	4·20	4·20	4·60	8·85	1·08	5·90	1·02	5·66
9 ,,	312	Male	19·00	—	3·70	4·13	4·20	8·10	—	—	0·95	5·55

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
9·47	9·10	1·58	—	1·00	1·50	—	—	—	4·88	—	—	—	1·70
7·95	—	0·85	—	—	1·74	—	—	—	4·86	2·20	—	—	—
9·05	8·68	0·48	0·50	1·13	1·55	—	—	—	5·16	2·18	—	—	—
8·60	8·20	1·30	0·53	1·25	1·90	—	—	—	—	—	—	—	2·12
7·40	—	0·23	—	—	1·33	1·62	1·70	0·50	—	—	—	—	—
9·33	—	0·53	—	—	1·32	—	—	—	4·93	2·20	—	—	—
9·16	8·80	1·50	0·60	1·25	1·74	2·00	2·07	0·62	5·47	2·32	—	—	2·38
9·00	—	0·82	—	—	1·56	1·95	1·98	0·46	4·45	—	—	—	—
9·45	—	0·53	—	—	—	—	—	—	—	—	—	—	—
9·07	9·10	1·43	0·59	1·45	1·85	—	—	—	—	—	—	—	2·27
10·15	9·70	0·60	0·60	1·30	1·90	—	—	—	—	—	—	—	2·30
8·50	7·90	1·40	—	1·80	1·55	2·30	2·36	0·58	—	—	—	—	1·75
8·60	—	0·40	—	—	1·80	—	—	—	5·00	2·20	—	—	—
9·25	8·70	1·43	0·62	1·10	1·70	—	—	—	—	—	—	—	1·77
8·87	8·60	1·34	0·48	1·45	1·50	2·06	2·08	0·55	4·90	2·06	—	—	2·00
10·00	9·10	1·57	0·47	1·00	1·80	2·60	2·63	0·64	—	—	—	—	—
9·70	—	0·59	0·42	1·05	1·73	2·67	2·78	0·66	6·10	2·42	—	—	—
9·60	9·30	0·70	0·48	1·20	1·50	2·30	2·30	0·58	5·50	2·30	—	—	2·20
—	9·40	0·65	0·60	1·70	1·90	2·60	2·70	0·72	6·26	2·58	—	—	1·90
10·90	10·30	0·70	0·47	1·20	1·93	2·82	2·87	0·63	6·50	2·57	—	—	2·15
9·60	9·20	0·60	0·52	1·40	1·90	2·20	2·27	—	5·40	2·29	—	—	1·95
9·15	8·80	1·61	0·52	1·20	1·80	2·30	2·35	0·58	5·45	2·21	—	—	1·70
9·20	8·70	1·40	0·65	1·40	1·95	2·50	2·60	—	5·10	2·29	—	—	1·70
8·80	—	1·35	0·55	1·50	—	—	—	—	—	—	—	—	1·70
9·65	—	0·50	0·45	1·10	—	2·48	2·58	0·60	5·90	2·32	—	—	—
10·35	9·90	0·75	0·38	1·20	1·80	—	—	—	5·90	2·43	—	2·75	1·90
—	8·55	1·65	0·50	1·08	1·73	2·30	2·38	—	—	—	—	—	1·75
9·60	—	0·60	—	—	1·65	2·37	2·39	0·60	—	—	—	—	—
9·20	9·05	1·60	0·50	1·40	1·75	2·30	2·32	0·52	5·43	2·20	—	—	1·83
—	—	0·55	—	1·10	—	—	—	—	5·70	2·50	—	—	—
9·80	—	0·60	0·45	1·10	1·50	2·26	2·33	0·58	5·40	2·22	—	—	—
9·50	—	1·15	—	—	1·82	2·45	2·57	0·60	5·45	2·31	—	—	—
10·00	9·60	0·65	0·50	1·10	2·10	2·75	2·80	0·67	6·10	2·50	—	—	1·50
10·30	9·90	0·60	0·55	1·68	1·80	2·75	2·80	0·67	5·90	2·35	—	—	2·10
9·00	8·70	0·60	0·52	1·35	1·65	—	—	—	5·55	—	—	—	2·15
9·80	—	0·65	0·40	1·10	1·85	—	—	0·65	5·55	2·56	—	—	—
10·00	—	0·55	—	—	1·85	2·60	2·70	0·61	5·75	2·34	—	—	—
10·15	10·10	0·75	0·65	1·80	2·10	2·65	2·68	0·65	6·30	2·75	—	—	2·05
9·50	9·00	0·65	0·58	1·30	1·77	2·38	—	0·55	—	—	—	—	2·00
10·08	9·40	0·70	0·53	1·60	1·90	2·55	2·65	0·64	—	—	—	—	1·70
9·40	9·05	1·60	0·56	1·22	2·00	2·52	2·58	0·60	—	—	—	—	1·67
9·50	9·20	1·47	0·59	1·33	1·70	2·43	2·44	0·57	5·40	2·26	—	—	1·76
9·40	9·30	0·60	0·65	1·35	1·80	2·33	2·45	0·61	—	—	—	—	1·70
9·65	—	0·85	—	—	1·90	2·27	2·32	0·60	5·45	2·08	—	—	—
8·50	8·30	1·30	0·52	1·20	1·35	2·10	2·17	0·54	4·55	2·10	—	—	1·75
9·90	9·55	1·45	0·53	1·10	1·75	—	—	—	5·35	2·20	—	—	2·15
—	—	0·60	0·38	1·20	2·05	2·58	2·70	0·58	5·60	2·42	—	—	—
8·80	8·55	1·50	0·38	1·10	1·40	2·10	2·13	0·55	4·70	2·09	—	—	1·70
9·60	9·40	1·40	0·47	1·20	1·85	2·40	2·41	0·60	5·22	2·30	—	—	1·80
10·40	10·25	0·70	0·44	1·15	2·00	2·55	2·75	0·65	6·00	2·56	—	—	1·95
8·95	8·80	1·50	0·54	1·00	1·86	2·17	2·20	0·60	5·15	2·15	—	—	1·90
9·15	9·15	1·35	0·53	0·90	—	2·40	2·43	0·59	5·35	2·32	—	—	2·00
8·75	8·50	1·50	0·44	1·00	1·56	2·20	2·25	0·55	4·65	2·20	—	—	1·80
9·95	9·65	1·70	0·52	0·85	1·75	2·45	—	0·62	—	—	—	—	1·80
9·70	—	0·70	—	—	1·70	2·32	—	0·60	5·85	—	—	—	—
8·90	8·55	1·55	0·54	1·30	1·80	—	—	—	5·54	—	—	—	1·95
9·32	8·80	1·42	0·53	1·13	1·70	—	—	—	—	—	—	—	—
8·90	—	1·05	—	—	1·80	2·17	2·23	0·57	4·80	2·24	—	—	—

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
9 Jan.	313	Male	21·70	—	4·50	—	4·80	9·40	1·14	5·15	1·10	5·90
9 ,,	314	Male	21·15	—	3·85	4·02	4·35	8·70	1·06	5·50	1·00	6·10
9 ,,	315	Female	17·40	—	3·22	3·45	3·55	7·20	0·88	—	0·90	5·45
9 ,,	316	Female	22·35	—	4·30	4·40	4·70	9·50	1·05	—	1·05	6·45
9 ,,	318	Female	21·95	—	4·30	4·47	4·80	9·60	1·05	5·55	1·15	6·30
10 ,,	319	Male	20·70	—	4·50	—	4·60	8·60	1·00	—	1·05	5·90
10 ,,	320	Male	21·75	—	4·40	—	4·67	9·28	1·14	5·40	1·06	6·10
10 ,,	322	Male	21·60	—	4·20	—	4·70	9·10	1·18	5·27	1·04	6·20
10 ,,	323	Male	21·45	—	4·10	4·34	4·53	8·95	1·05	—	1·17	6·15
10 ,,	324	Male	19·50	—	3·80	—	4·40	8·50	1·02	4·75	0·90	5·20
10 ,,	325	Male	21·10	—	4·40	—	4·71	9·20	1·07	5·10	1·12	5·80
10 ,,	326	Male	20·40	—	3·88	—	4·30	8·30	1·10	—	1·00	5·62
10 ,,	327	Male	20·90	—	4·25	—	4·51	9·00	1·14	4·95	1·02	5·46
10 ,,	328	Male	21·10	—	4·10	4·17	4·40	—	1·10	5·00	1·10	5·90
10 ,,	329	Male	21·00	—	3·95	4·12	4·38	8·45	1·03	5·34	0·95	5·95
10 ,,	330	Male	21·80	—	4·17	4·32	4·65	9·25	1·12	5·27	1·05	6·15
11 ,,	331	Female	21·80	—	4·45	—	4·87	9·40	1·12	—	1·05	6·10
11 ,,	332	Female	22·35	—	4·59	4·83	4·98	9·42	1·00	5·55	1·05	5·15
11 ,,	333	Male	20·50	—	4·04	4·20	4·40	8·58	1·00	5·00	1·02	5·85
11 ,,	334	Male	21·70	—	4·15	—	4·57	9·30	—	—	1·12	6·15
11 ,,	335	Female	22·70	—	4·50	—	4·70	—	1·13	5·55	1·14	6·35
11 ,,	336	Male	20·83	—	4·15	4·28	4·45	—	1·05	5·25	1·18	5·50
11 ,,	337	Male	21·20	—	4·30	4·50	4·65	8·80	0·98	5·30	1·06	6·25
11 ,,	338	Male	19·50	—	3·70	3·98	4·10	8·45	1·00	4·95	1·00	5·55
12 ,,	339	Male	20·47	—	4·10	4·28	4·45	8·75	1·17	5·00	1·08	5·65
12 ,,	341	Male	21·20	—	3·90	4·15	4·30	8·30	1·04	5·15	1·03	5·40
12 ,,	342	Female	23·00	—	4·37	4·55	4·80	—	—	5·47	1·10	6·30
12 ,,	343	Female	23·00	—	4·60	4·95	5·00	9·80	1·04	5·45	1·05	6·30
12 ,,	344	Male	20·65	—	4·00	4·12	4·45	8·68	0·98	4·65	1·00	5·75
13 ,,	347	Male	21·75	—	3·98	4·20	4·48	8·65	1·09	5·30	0·97	5·85
13 ,,	348	Male	20·90	—	3·90	4·00	4·18	8·20	1·05	—	1·15	6·30
13 ,,	349	Male	19·25	—	3·75	3·88	4·18	8·30	0·95	4·80	1·00	5·40
13 ,,	350	Female	23·80	—	4·74	4·93	5·20	10·20	1·15	5·85	1·14	6·90
13 ,,	351	Male	21·50	—	4·50	4·50	4·70	9·40	1·18	5·28	1·12	6·25
13 ,,	352	Female	20·50	—	4·06	4·35	4·56	8·77	1·00	5·14	1·09	6·03
13 ,,	353	Male	20·75	—	4·46	4·50	4·77	—	1·07	5·02	0·95	5·65
13 ,,	354	Male	20·34	—	3·85	4·06	4·39	8·60	0·97	4·97	1·10	5·75
13 ,,	356	Male	22·65	—	4·42	—	4·80	9·67	1·16	5·35	1·07	6·40
15 ,,	357	Female	21·43	—	4·35	4·53	4·70	9·00	1·11	5·00	1·12	6·00
15 ,,	358	Female	23·60	—	4·87	5·28	5·32	10·17	1·20	5·70	1·15	6·30
15 ,,	359	Female	21·20	—	4·10	4·50	4·60	8·80	1·05	5·00	1·05	6·00
18 ,,	362	Male	20·85	—	4·25	4·63	4·75	8·90	1·02	—	1·02	5·75
18 ,,	363	Female	21·90	—	4·40	4·45	4·70	9·20	1·15	5·38	1·08	6·30
18 ,,	364	Female	20·00	—	3·92	4·20	4·25	9·00	1·05	5·04	0·98	5·75
18 ,,	365	Male	19·60	—	3·95	4·10	4·45	8·10	0·95	5·00	1·00	5·55
18 ,,	366	Male	20·30	—	3·90	4·40	4·58	9·00	0·98	4·85	1·15	5·85
18 ,,	367	Male	21·35	—	4·20	—	4·74	8·90	1·05	5·15	1·06	5·90
18 ,,	368	Male	20·70	—	3·90	4·25	4·43	8·50	1·03	5·08	1·03	5·82
18 ,,	369	Female	23·10	—	4·65	—	5·26	9·80	1·15	5·68	1·04	6·60
18 ,,	370	Male	21·15	—	4·15	4·48	4·60	9·07	0·95	4·80	1·07	5·90
18 ,,	371	Male	20·20	—	3·75	3·85	4·14	8·48	1·01	4·95	1·00	5·72
18 ,,	372	Male	21·10	—	4·05	4·37	4·63	7·90	1·00	5·20	0·95	5·75
19 ,,	374	Male	20·32	—	4·20	4·40	4·52	8·54	1·04	—	1·10	5·80
19 ,,	375	Male	20·30	—	4·00	4·24	4·40	8·55	0·96	5·00	1·00	5·65
19 ,,	376	Female	22·55	—	4·36	4·52	4·73	9·45	1·05	5·54	1·08	6·20
19 ,,	377	Female	19·60	—	3·80	4·00	4·15	8·15	0·99	4·60	1·03	5·80
20 ,,	380	Male	18·70	—	3·70	3·92	4·10	7·75	0·88	4·60	0·96	5·36
20 ,,	381	Female	22·70	—	—	—	4·92	—	—	5·67	1·10	6·30
20 ,,	382	Male	20·60	—	4·05	—	4·42	8·70	1·02	—	1·08	5·70
20 ,,	384	Male	21·30	—	4·20	4·38	4·70	9·10	0·98	5·10	0·99	6·05

11 Notch of flukes to umbilicus	12 Notch of flukes to end of system of ventral grooves	13 Anus to reproductive aperture, centres	14 Dorsal fin, vertical height	15 Dorsal fin, length of base	16 Flipper, tip to axilla	17 Flipper, tip to anterior end of lower border	18 Flipper, length along curve of lower border	19 Flipper, greatest width	20 Severed head, condyle to tip	21 Skull, greatest width	22 Skull length, condyle to tip of premaxilla	23 Flipper, tip to head of humerus	24 Tail, depth at dorsal fin
9·80	9·30	1·50	0·50	1·30	1·90	2·45	2·47	0·60	5·90	2·35	—	—	2·00
9·80	9·55	1·60	0·56	1·10	1·80	—	—	—	—	—	—	—	1·80
8·25	—	0·45	—	—	1·40	1·95	2·00	0·50	4·30	1·85	—	—	—
10·35	9·75	0·50	—	—	1·85	—	—	—	5·70	—	—	—	—
—	—	0·60	0·50	1·30	1·95	—	—	—	—	—	—	—	—
9·20	—	1·15	—	—	1·55	2·30	2·36	0·58	5·36	2·31	—	—	—
9·70	9·35	1·60	0·45	1·50	2·00	2·40	2·42	0·64	—	—	—	—	2·00
9·90	9·65	1·70	0·75	1·55	1·85	2·60	2·67	0·62	5·75	2·38	—	—	2·10
9·85	—	1·05	—	—	1·60	—	—	—	5·10	2·26	—	—	—
8·65	8·40	1·40	0·47	1·20	1·70	2·30	2·33	0·56	5·60	—	—	—	2·05
9·40	9·00	1·50	0·54	1·50	1·80	2·40	2·41	0·58	5·70	—	—	—	1·85
—	—	1·13	0·42	1·00	1·60	2·30	2·32	0·60	5·20	2·18	—	—	—
9·20	8·70	1·64	0·62	1·15	1·75	2·30	2·37	0·60	5·27	2·26	—	—	1·95
9·50	9·15	1·40	0·50	1·20	1·70	2·42	2·49	0·61	5·35	2·36	—	—	1·90
9·60	9·30	1·55	—	0·70	1·65	2·27	2·37	0·59	5·40	2·21	—	—	1·85
9·75	9·45	1·60	0·58	1·15	1·90	—	—	—	—	—	—	—	1·70
9·80	—	0·65	—	—	—	—	—	—	5·80	—	—	—	—
10·27	9·78	0·68	0·53	1·25	1·82	—	—	—	—	—	—	—	2·10
9·50	9·30	1·47	0·58	1·50	1·80	—	—	—	—	—	—	—	1·95
9·70	—	1·15	—	—	2·12	—	—	—	5·50	2·49	—	—	—
10·05	9·60	0·45	0·56	1·00	1·82	2·68	2·70	0·60	—	—	—	—	—
9·30	8·80	1·50	0·70	1·45	—	2·45	2·56	0·60	5·45	—	—	—	—
9·70	9·70	1·35	0·51	1·20	1·65	2·44	2·52	0·60	5·50	2·36	—	—	1·75
8·80	8·50	1·35	0·26	0·90	1·67	2·30	—	0·52	—	—	—	—	1·60
9·20	8·90	1·45	0·38	1·30	1·73	2·28	2·30	0·56	5·60	2·22	—	—	1·90
9·25	8·90	1·40	0·42	1·25	1·70	—	—	—	—	—	—	—	1·86
9·80	9·55	0·50	0·50	1·50	—	—	—	—	5·55	2·48	—	—	2·00
10·70	10·20	0·70	0·47	1·60	1·80	2·18	2·28	0·59	—	—	—	—	—
9·10	8·90	1·55	0·60	1·30	1·48	—	—	—	—	—	—	—	1·70
9·35	8·98	1·45	0·55	1·50	1·70	—	—	—	5·40	2·32	—	—	1·80
9·75	—	1·10	—	—	1·80	2·50	2·56	0·60	4·88	2·30	—	—	—
8·80	8·70	1·45	0·51	1·10	1·80	2·40	2·45	0·58	5·00	2·26	—	—	1·80
10·75	10·60	0·73	0·59	1·30	2·17	2·70	2·76	0·62	5·17	2·46	—	—	2·00
9·85	9·60	1·45	0·62	1·30	2·00	2·50	2·57	0·63	—	—	—	—	2·05
9·36	—	0·36	0·60	1·46	1·60	2·18	2·27	0·57	5·43	2·24	—	—	—
9·10	8·88	1·45	0·54	1·25	—	2·40	2·46	0·58	—	—	—	—	—
9·13	8·95	1·55	0·48	1·25	1·79	2·56	2·60	0·56	5·10	2·36	—	—	1·68
10·45	10·15	1·80	0·52	1·50	1·95	—	—	—	—	—	—	—	1·90
9·70	9·40	0·70	0·48	1·10	1·76	2·46	2·52	0·59	5·60	2·41	—	2·74	2·05
9·95	9·90	0·60	0·51	1·50	1·87	2·70	2·75	0·63	6·40	2·76	—	—	1·90
9·75	9·40	0·60	0·42	1·10	1·70	2·45	2·50	0·65	5·60	2·36	—	—	—
—	—	1·25	—	—	1·70	2·52	2·55	0·60	—	—	—	—	—
10·20	10·00	0·65	—	1·30	1·90	2·60	2·65	0·61	5·60	2·26	—	—	2·00
9·10	8·90	0·55	0·54	1·15	1·80	2·36	2·42	0·59	5·00	2·36	—	—	1·75
9·10	8·75	1·45	0·49	1·26	1·67	2·10	2·15	0·55	5·10	2·16	—	—	1·90
9·30	9·10	1·00	0·50	1·30	1·95	—	—	—	5·50	—	—	—	1·90
9·10	9·00	1·35	0·59	1·60	1·90	2·58	2·62	0·06	5·70	—	—	—	1·80
9·35	9·35	1·43	0·55	1·50	1·64	2·38	2·43	0·62	—	—	—	—	1·90
10·45	10·10	0·65	0·51	1·23	1·96	2·78	2·84	0·70	6·30	2·62	—	—	2·00
9·40	9·25	1·55	0·51	1·40	1·77	2·52	2·58	0·58	5·45	2·26	—	2·82	1·80
9·25	9·10	1·35	0·47	1·04	1·80	—	—	—	5·00	2·18	—	—	1·90
9·75	9·50	1·55	0·50	1·40	1·75	2·33	2·40	0·52	5·40	2·40	—	—	1·65
8·95	—	1·10	—	1·40	1·58	2·35	2·37	0·55	—	—	—	2·70	—
9·00	9·00	1·45	0·46	1·55	1·70	2·28	2·40	0·60	5·45	—	—	—	1·79
10·00	9·75	0·65	0·52	1·43	1·90	2·45	2·55	0·62	—	—	—	—	2·04
9·00	8·65	0·45	0·53	1·26	1·63	—	—	—	—	—	—	—	1·85
8·80	8·60	1·49	0·50	1·20	1·40	—	—	—	—	—	—	—	1·60
10·00	9·70	0·66	0·58	1·60	—	2·35	2·43	0·67	5·80	2·46	—	—	2·00
9·80	—	1·14	—	—	1·64	1·98	2·01	—	5·45	2·37	—	—	—
9·60	9·30	1·45	0·53	1·00	1·87	2·47	2·58	0·68	5·60	2·10	—	—	1·60

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
20 Jan.	385	Male	20·25	—	3·90	4·18	4·20	8·45	1·00	4·90	1·00	5·50
21 ,,	389	Female	23·90	—	4·85	—	5·30	10·30	1·10	—	1·20	6·85
21 ,,	390	Female	21·85	—	4·42	4·64	4·80	9·45	1·05	5·45	1·12	5·88
21 ,,	391	Male	20·00	—	3·75	4·00	4·15	8·30	1·01	5·00	0·98	5·65
21 ,,	392	Male	19·20	—	3·73	3·88	4·04	8·00	0·90	4·80	0·95	5·60
21 ,,	393	Male	20·30	—	4·10	4·37	4·54	8·85	1·06	4·82	1·04	5·65
21 ,,	394	Female	22·55	—	4·55	4·65	4·87	9·40	1·08	5·50	1·06	6·18
21 ,,	395	Female	21·80	—	4·24	4·30	4·58	8·90	1·08	5·55	1·06	6·50
21 ,,	396	Male	20·90	—	3·80	4·00	4·27	8·40	0·98	5·18	0·96	5·90
21 ,,	397	Female	22·05	—	4·49	—	4·98	9·80	1·12	5·35	1·15	6·08
21 ,,	398	Female	21·20	—	—	—	4·50	8·70	0·98	5·20	1·05	6·00
21 ,,	400	Male	20·55	—	3·85	4·18	4·40	8·35	1·03	5·00	0·95	5·80
22 ,,	404	Male	19·70	—	3·75	—	4·10	7·90	0·93	5·00	0·97	5·77
22 ,,	405	Female	22·30	—	4·50	—	5·00	9·50	1·05	5·30	1·20	6·15
22 ,,	406	Female	17·00	—	3·15	3·50	3·63	6·95	0·84	4·30	0·88	5·10
22 ,,	409	Female	22·30	—	4·30	—	4·75	9·60	1·05	5·26	1·10	6·15
22 ,,	410	Female	22·30	—	4·40	4·55	5·00	9·35	0·90	5·55	1·00	6·45
23 ,,	411	Female	21·85	—	4·30	4·53	5·70	9·20	1·00	—	1·05	6·20
23 ,,	412	Male	20·30	—	3·95	4·28	4·46	8·25	0·92	4·85	1·05	5·80
23 ,,	413	Female	22·80	—	4·40	4·70	4·85	9·35	1·05	6·85	1·20	6·90
23 ,,	414	Female	21·90	—	4·40	4·76	4·76	9·35	1·05	5·73	1·12	6·10
23 ,,	415	Male	21·00	—	4·20	4·58	4·70	9·20	1·04	4·87	0·99	5·80
23 ,,	416	Male	17·15	—	2·90	3·26	3·38	6·87	1·04	4·48	0·90	5·15
23 ,,	417	Male	20·90	—	3·90	4·07	4·28	8·45	1·12	5·06	1·08	5·62
23 ,,	419	Male	19·90	—	3·75	3·95	4·15	8·25	0·95	4·80	1·00	5·95
23 ,,	420	Female	20·65	—	3·85	4·10	4·33	8·43	0·99	5·40	1·13	6·10
23 ,,	421	Female	20·65	—	4·00	4·16	4·25	8·75	1·02	5·25	1·08	6·00
23 ,,	422	Female	22·83	—	4·50	4·76	5·05	9·63	1·15	5·60	1·02	6·03
24 ,,	423	Female	21·75	—	4·75	4·97	5·05	9·55	1·15	—	1·00	5·90
24 ,,	425	Female	21·60	—	4·65	4·85	5·06	9·35	0·97	5·20	1·00	6·00
24 ,,	426	Female	22·45	—	4·25	4·63	4·81	9·70	1·13	4·55	1·27	6·40
24 ,,	427	Male	21·28	—	4·00	4·22	4·37	8·83	1·03	4·90	1·10	6·00
24 ,,	428	Male	21·35	—	4·10	—	4·54	8·90	1·10	5·30	1·15	5·95
24 ,,	429	Male	21·70	—	4·35	4·62	4·78	9·10	1·08	5·27	1·19	6·00
24 ,,	430	Male	20·20	—	4·10	4·25	4·50	8·80	1·09	4·82	0·83	5·40
24 ,,	431	Female	21·80	—	4·15	4·20	4·48	8·75	1·10	4·80	1·12	6·20
24 ,,	432	Female	19·55	—	3·70	3·80	4·08	8·10	—	5·15	0·98	5·75
25 ,,	433	Female	20·70	—	3·76	4·05	4·17	8·30	0·91	—	1·05	6·10
25 ,,	434	Female	18·75	—	3·25	3·50	3·65	7·30	0·85	—	0·92	5·45
25 ,,	435	Male	20·15	—	3·90	4·20	4·33	8·55	1·01	4·77	1·00	5·65
25 ,,	436	Male	21·40	—	4·10	—	4·45	9·10	1·04	—	1·07	6·10
25 ,,	437	Male	19·55	—	3·90	4·20	4·37	8·25	1·00	4·72	1·00	5·50
25 ,,	438	Male	20·00	—	3·50	3·80	3·96	8·05	0·99	5·03	0·95	5·75
25 ,,	439	Male	19·70	—	4·00	4·03	4·17	8·30	0·93	4·86	0·96	5·55
25 ,,	441	Female	18·75	—	3·40	3·50	3·75	—	0·95	4·77	1·00	5·47
25 ,,	443	Male	19·10	—	3·73	3·87	3·95	8·15	0·89	4·43	0·97	5·10
27 ,,	445	Male	19·75	—	3·80	4·00	4·20	8·30	0·95	4·83	1·00	5·40
27 ,,	446	Male	19·50	—	3·70	4·00	4·22	8·30	1·02	—	0·92	5·45
27 ,,	447	Female	21·00	—	4·14	4·15	4·38	8·65	1·00	5·06	1·02	6·02
27 ,,	448	Male	20·75	—	3·95	4·17	4·32	8·06	1·08	5·05	0·96	5·83
27 ,,	450	Male	21·35	—	4·15	—	4·60	9·35	1·07	5·00	1·05	5·80
27 ,,	451	Male	20·85	—	3·70	—	4·17	8·75	1·03	4·96	1·08	5·90
27 ,,	452	Female	19·80	—	3·68	3·90	4·19	8·29	—	4·89	0·95	5·65
28 ,,	454	Male	20·15	—	3·60	4·15	4·19	7·50	0·89	—	1·02	5·93
28 ,,	455	Male	19·70	—	3·72	4·05	4·15	8·20	0·96	4·74	0·95	—
29 ,,	456	Female	22·57	—	4·30	—	4·85	9·55	1·08	—	1·15	—
29 ,,	457	Male	22·30	—	4·55	—	4·90	9·80	1·08	5·25	1·10	6·10
29 ,,	458	Male	19·54	—	4·05	4·10	4·38	8·30	1·00	5·75	1·03	5·45
29 ,,	459	Male	20·90	—	3·90	—	4·40	9·00	—	4·80	—	5·90
29 ,,	460	Male	20·45	—	4·20	—	4·66	8·85	0·97	5·20	1·02	6·00

11 Notch of flukes to umbilicus	12 Notch of flukes to end of system of ventral grooves	13 Anus to reproductive aperture, centres	14 Dorsal fin, vertical height	15 Dorsal fin, length of base	16 Flipper, tip to axilla	17 Flipper, tip to anterior end of lower border	18 Flipper, length along curve of lower border	19 Flipper, greatest width	20 Severed head, condyle to tip	21 Skull, greatest width	22 Skull length, condyle to tip of premaxilla	23 Flipper, tip to head of humerus	24 Tail, depth at dorsal fin
9·30	9·20	1·30	0·48	1·30	1·70	2·24	2·31	0·54	5·53	—	—	—	1·95
11·10	—	0·55	—	1·00	2·05	2·76	—	0·65	—	—	—	—	—
9·55	9·21	0·58	0·51	1·48	1·90	2·53	2·58	0·62	5·80	2·39	—	—	2·20
9·15	8·70	1·40	0·55	1·20	1·70	2·35	2·43	0·58	5·10	2·22	—	—	1·85
8·90	8·65	1·40	0·45	1·15	1·50	2·20	2·22	0·60	4·80	2·17	—	—	1·70
9·00	8·70	1·15	0·56	1·30	1·77	2·55	2·61	0·60	5·45	2·34	—	—	1·85
9·97	9·90	0·69	0·46	1·20	1·83	2·50	2·57	0·59	5·76	2·42	—	—	1·95
10·36	10·08	0·80	0·47	1·25	1·74	2·38	2·42	0·62	—	—	—	—	1·90
9·90	9·50	1·60	0·57	1·55	1·52	2·30	2·37	0·57	5·10	2·06	—	—	1·88
9·50	9·30	0·47	0·59	1·50	1·92	2·64	2·73	0·65	6·10	2·43	—	—	2·33
9·65	9·42	0·77	0·45	1·40	1·50	—	—	—	5·50	—	—	—	1·83
9·43	9·10	1·35	0·47	1·35	1·65	2·14	2·18	0·55	5·30	2·16	—	—	1·92
8·85	8·95	1·48	0·52	1·30	1·62	—	—	—	5·02	2·05	—	—	1·70
9·95	9·84	0·70	0·54	1·40	1·90	2·37	2·44	0·59	5·40	—	—	—	—
7·80	7·80	0·50	0·38	0·95	1·40	1·85	1·85	0·50	4·36	1·85	—	—	1·60
9·70	9·70	0·75	0·48	1·30	1·80	2·72	2·78	0·63	5·65	2·42	—	—	2·05
10·00	9·80	0·75	0·63	1·70	1·80	—	—	0·61	5·86	2·24	—	—	2·00
9·65	—	0·65	—	—	1·50	2·20	2·27	0·59	5·70	2·18	—	—	—
9·26	9·00	1·45	0·42	1·39	1·80	2·30	2·40	0·55	5·40	—	—	—	1·80
10·35	10·40	—	0·49	1·48	1·80	—	—	—	5·75	2·30	—	—	—
9·65	9·40	0·60	0·51	1·50	1·87	2·60	2·65	0·59	5·77	2·41	—	—	2·20
9·60	9·20	1·50	0·52	1·50	1·86	2·35	2·41	0·56	5·55	2·42	—	—	1·90
8·20	7·75	1·10	0·42	1·30	1·28	1·90	1·97	0·43	4·08	1·78	—	—	1·60
9·45	9·20	1·48	0·50	1·25	1·61	—	—	—	5·23	2·15	—	—	1·75
—	9·10	1·45	0·40	1·40	1·70	2·35	2·45	0·55	5·10	1·95	—	—	1·85
9·40	9·54	0·65	0·35	1·10	1·70	2·25	2·30	0·50	5·22	2·28	—	—	1·93
9·35	9·05	0·60	0·50	1·40	1·85	2·35	2·44	0·58	5·30	2·23	—	—	1·85
9·50	9·60	0·50	0·53	1·30	1·65	2·55	2·58	0·67	6·00	2·50	—	—	2·15
9·70	—	0·70	0·56	1·02	1·92	2·37	2·47	0·60	—	—	—	—	—
9·85	10·00	0·75	0·42	1·25	1·90	—	—	0·55	5·90	—	—	—	1·82
9·45	9·80	0·74	0·52	1·08	2·10	2·77	2·84	—	5·88	2·40	—	—	2·20
9·70	9·26	1·15	0·59	1·15	2·18	2·50	2·60	0·62	5·30	2·17	—	—	1·89
9·46	9·25	1·50	0·51	1·40	1·90	2·36	2·44	0·64	5·60	2·40	—	—	2·18
9·35	9·58	1·60	0·62	1·20	1·66	2·38	2·42	0·60	5·65	2·36	—	—	2·00
8·85	8·50	1·40	0·55	1·40	1·83	2·23	2·31	0·56	5·40	2·37	—	—	2·00
10·10	9·70	0·60	0·55	1·30	1·60	—	—	—	—	—	—	—	1·80
9·25	9·00	0·50	0·48	1·20	1·70	—	—	—	—	—	—	—	1·90
9·70	—	0·60	—	—	1·88	2·35	2·48	0·53	5·00	2·14	—	—	—
8·47	—	0·45	0·44	0·90	1·40	—	—	—	4·45	1·96	—	—	—
9·10	9·00	1·60	0·53	1·15	1·80	—	—	—	—	—	—	—	1·85
9·70	—	1·05	—	—	1·86	2·47	2·57	0·57	5·45	—	—	—	—
8·70	8·70	1·20	0·42	1·10	1·60	2·00	2·00	0·46	5·07	2·23	—	—	1·90
9·25	9·30	1·51	0·51	1·40	1·70	2·17	2·21	0·58	4·84	2·06	—	—	1·75
9·70	9·20	1·70	0·57	1·40	1·65	—	—	—	—	—	—	—	1·85
—	8·52	0·60	0·45	1·00	—	—	—	—	—	—	—	—	1·80
8·30	8·10	1·50	0·43	0·90	1·75	—	—	—	—	—	—	—	1·85
8·70	8·50	1·40	0·48	1·43	1·60	2·32	2·40	0·56	—	—	—	—	1·90
—	—	0·95	—	—	1·60	2·27	2·31	0·59	5·87	2·50	—	—	—
9·85	9·50	0·83	0·55	1·10	1·65	2·38	2·44	0·60	5·27	2·30	—	—	1·90
9·50	9·15	1·48	0·49	1·50	1·42	2·10	2·15	0·55	5·15	2·09	—	—	1·80
—	9·10	1·60	0·58	1·60	1·75	2·45	2·54	0·62	—	—	—	2·85	2·06
9·55	9·25	1·50	0·48	1·48	1·70	2·35	2·40	0·58	—	—	—	—	1·90
—	8·74	0·65	0·47	0·90	1·63	2·20	2·22	0·57	—	—	—	—	2·00
9·25	—	0·97	0·54	1·20	1·67	2·13	2·17	—	5·07	2·13	—	—	—
8·90	8·50	1·85	0·46	1·30	—	2·40	2·47	—	—	—	—	—	1·90
10·30	—	—	—	—	1·80	2·30	2·38	0·57	5·80	2·30	5·71	—	—
9·75	9·65	1·50	0·58	1·06	1·90	2·55	2·62	0·63	6·10	2·50	—	—	2·20
—	8·58	1·40	0·41	1·15	1·50	—	—	—	—	—	—	—	1·80
—	8·95	1·50	0·45	1·10	2·02	2·48	2·60	0·63	5·40	2·25	—	—	1·70
9·25	9·00	1·00	0·55	1·50	1·82	2·34	2·42	0·60	5·60	2·18	—	—	1·90

Date	Whale Number	Sex	1. Total length, tip of snout to notch of flukes	2. Lower jaw, projection beyond tip of snout	3. Tip of snout to blow-hole	4. Tip of snout to angle of gape	5. Tip of snout to centre of eye	6. Tip of snout to tip of flipper	7. Eye to ear, centres	8. Notch of flukes to posterior emargination of dorsal fin	9. Flukes, width at insertion	10. Notch of flukes to anus
1926												
29 Jan.	461	Male	21·00	—	4·05	4·28	4·52	9·25	1·04	5·30	1·07	6·00
29 ,,	462	Male	20·60	—	4·00	4·02	4·26	8·70	0·92	—	0·96	5·77
29 ,,	463	Female	24·00	—	4·86	—	5·37	9·80	1·16	5·65	1·04	6·90
29 ,,	464	Male	20·10	—	3·75	—	4·33	8·55	1·00	4·65	1·04	5·37
29 ,,	465	Female	20·37	—	4·35	4·55	4·85	9·90	1·10	5·87	1·20	6·75
29 ,,	466	Male	21·15	—	4·25	—	4·60	—	—	4·98	1·14	—
29 ,,	467	Male	21·25	—	3·98	4·17	4·41	9·00	1·00	—	1·10	6·00
29 ,,	468	Male	20·40	—	3·84	4·05	4·27	—	1·30	4·80	1·04	5·55
30 ,,	469	Male	21·00	—	4·10	4·30	4·44	8·80	1·06	5·25	1·00	5·80
30 ,,	470	Male	21·60	—	3·95	4·18	4·38	8·70	1·05	5·67	1·04	6·10
30 ,,	471	Male	20·35	—	3·85	4·10	4·27	8·50	1·00	4·85	1·09	5·70
30 ,,	472	Male	21·80	—	4·15	—	4·56	9·20	1·03	5·40	1·08	6·15
30 ,,	473	Male	21·75	—	3·90	—	4·45	9·00	1·03	5·50	1·09	6·30
30 ,,	474	Male	21·70	—	3·85	3·95	4·15	8·45	0·95	5·05	1·04	6·12
30 ,,	475	Male	20·00	—	3·70	—	4·15	8·30	1·00	—	1·00	—
30 ,,	476	Male	20·90	—	3·85	—	4·37	—	1·00	4·85	1·10	6·00
30 ,,	477	Male	20·90	—	4·07	4·10	4·38	8·70	—	—	1·05	5·85
31 ,,	478	Female	24·53	—	—	—	—	—	—	—	—	—
31 ,,	479	Male	19·57	—	—	—	4·30	8·15	1·02	—	1·05	5·30
31 ,,	480	Male	20·53	—	3·65	3·72	4·10	—	0·98	5·25	1·02	5·90
1 Feb.	481	Male	21·17	—	4·02	—	4·35	—	1·07	5·10	1·08	5·78
1 ,,	482	Male	20·20	—	3·90	4·10	4·25	8·60	1·10	4·70	1·05	5·65
1 ,,	483	Female	22·20	—	4·45	—	4·90	9·60	—	5·70	1·24	6·35
2 ,,	484	Female	22·35	—	4·25	4·50	4·67	9·50	1·00	—	1·10	6·35
2 ,,	485	Male	20·95	—	4·13	4·23	4·50	8·78	1·03	5·23	1·08	5·84
2 ,,	486	Male	21·85	—	4·25	4·50	4·59	9·10	0·98	4·74	1·05	5·75
2 ,,	489	Male	21·40	—	4·13	—	4·32	—	1·01	—	1·20	—
2 ,,	490	Male	21·70	—	4·34	4·40	4·72	9·32	1·15	5·00	1·15	5·96
2 ,,	491	Female	23·10	—	4·70	—	5·13	—	—	5·44	1·03	6·25
2 ,,	492	Male	19·80	—	3·68	—	4·16	8·00	0·98	—	0·94	5·50
2 ,,	493	Male	19·30	—	3·80	3·95	4·05	7·95	1·00	4·75	0·94	5·60
2 ,,	495	Male	18·70	—	3·66	4·00	4·00	8·05	1·00	4·50	0·97	5·35
2 ,,	496	Female	18·45	—	3·40	3·65	3·84	7·55	0·88	4·60	0·90	5·15
2 ,,	497	Female	22·65	—	4·57	4·60	4·82	9·55	1·18	5·58	1·10	6·27
3 ,,	498	Male	20·30	—	3·90	4·18	4·38	8·40	0·99	—	1·05	5·87
3 ,,	499	Male	20·80	—	3·70	—	4·10	8·20	0·98	4·85	1·05	5·78
3 ,,	500	Male	20·70	—	4·10	4·25	4·40	8·95	1·13	5·40	1·15	6·00
3 ,,	501	Female	19·30	—	3·80	4·00	4·20	7·95	—	—	0·98	5·40
3 ,,	502	Female	22·74	—	4·25	—	4·85	9·60	1·10	5·47	1·15	6·45
4 ,,	504	Female	21·75	—	4·24	4·70	4·80	9·15	1·00	—	1·11	5·88
4 ,,	505	Male	19·40	—	3·75	—	4·10	8·20	0·96	4·90	0·90	5·20
4 ,,	506	Male	20·05	—	3·75	4·00	4·18	8·30	1·00	4·55	0·95	5·38
4 ,,	507	Male	18·60	—	3·50	3·70	3·88	7·85	—	4·37	0·89	5·10
4 ,,	508	Female	20·10	—	3·80	—	4·15	8·25	0·96	5·00	0·90	5·90
4 ,,	509	Male	20·25	—	4·00	4·10	4·25	—	1·03	4·92	1·05	5·70
5 ,,	511	Male	20·00	—	3·65	—	4·00	8·20	1·03	5·13	0·96	5·60
5 ,,	512	Male	17·70	—	3·10	3·19	3·45	7·00	0·81	4·33	0·85	5·15
6 ,,	513	Male	19·20	—	3·60	3·85	3·99	8·17	1·03	4·80	1·08	5·35
6 ,,	514	Female	20·95	—	4·00	4·28	4·45	8·85	1·00	5·30	1·00	6·00
6 ,,	515	Male	18·75	—	3·35	3·72	3·86	7·60	0·89	4·50	1·00	5·15
6 ,,	518	Male	22·40	—	4·75	4·84	5·00	10·00	1·16	5·30	1·14	6·07
6 ,,	519	Male	21·90	—	4·37	—	4·77	9·40	1·12	5·10	1·03	5·95
6 ,,	520	Male	20·00	—	3·75	4·07	4·24	8·30	0·87	4·97	1·02	5·75
6 ,,	521	Female	21·25	—	4·80	—	5·10	9·20	1·02	5·03	1·02	5·70
7 ,,	522	Female	20·80	—	4·00	—	4·50	—	1·00	—	1·00	5·90
7 ,,	523	Female	21·70	—	4·15	—	4·55	8·60	1·02	5·60	1·00	6·35
7 ,,	524	Male	21·30	—	4·20	—	4·70	—	—	4·80	1·08	5·70
7 ,,	525	Male	18·00	—	3·42	3·70	3·80	7·25	—	—	0·92	5·35
7 ,,	526	Male	21·05	—	4·15	4·41	4·65	8·90	1·08	4·90	1·04	5·65
7 ,,	527	Male	20·40	—	3·95	3·96	4·24	—	1·02	5·15	1·07	6·00

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
9·65	9·20	1·55	—	1·60	1·85	2·63	2·70	0·69	5·50	2·19	—	—	2·05
9·45	9·30	1·48	—	1·00	1·70	2·40	2·44	0·61	5·10	2·23	—	—	1·75
10·55	10·20	0·64	0·47	1·25	2·25	2·50	2·60	0·67	6·40	2·50	—	—	2·00
9·00	8·72	1·42	0·40	1·08	1·85	2·17	2·25	0·55	5·20	2·30	5·11	—	1·95
10·80	10·25	0·68	0·51	1·35	1·73	2·68	2·77	0·64	—	—	—	—	—
9·47	9·00	—	—	1·14	1·65	2·30	2·36	0·58	5·55	2·10	—	—	2·03
9·60	—	1·10	0·47	1·40	—	2·58	2·62	0·60	5·45	2·30	—	—	—
—	8·80	1·40	0·49	1·20	—	2·26	2·35	0·61	5·25	2·46	—	—	1·65
9·65	9·40	1·80	0·46	1·27	1·70	2·30	2·45	0·62	5·20	2·37	—	—	1·70
10·10	9·85	1·60	0·56	1·10	1·80	2·41	2·51	0·62	5·38	2·28	—	—	1·85
9·20	8·70	1·50	0·44	1·38	1·82	2·26	2·33	0·58	5·20	2·28	—	—	2·05
9·55	9·25	1·55	0·51	1·30	1·86	2·50	2·65	0·66	5·50	2·46	—	—	2·05
10·20	10·10	1·70	0·48	2·20	1·70	—	—	—	5·50	2·34	—	—	2·05
9·65	9·40	1·33	0·52	1·20	1·44	2·29	2·34	0·61	—	—	—	—	1·90
9·00	—	1·00	0·55	1·20	1·60	2·35	2·42	0·60	4·90	2·24	—	—	—
9·50	9·10	1·35	0·43	1·15	1·48	2·20	2·25	0·55	5·27	2·20	—	—	—
—	9·00	1·40	—	1·60	1·70	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	5·60	—	—	—	—
—	—	1·00	—	—	1·30	2·05	2·13	0·55	5·17	—	—	—	—
—	9·40	1·00	—	1·40	—	2·30	2·39	0·58	5·00	2·22	—	—	1·92
9·30	9·07	1·37	0·53	1·30	1·78	2·52	2·62	0·65	5·37	—	—	—	1·90
9·00	8·65	1·55	0·62	1·38	1·75	2·35	2·40	0·59	—	—	—	—	1·97
—	9·75	0·60	0·52	1·70	1·80	—	—	—	—	—	—	—	2·35
10·13	—	0·81	—	—	1·88	2·60	2·67	0·61	5·55	2·44	—	—	—
—	8·95	1·61	0·55	1·15	1·74	2·34	2·39	0·66	5·50	2·28	—	—	1·90
9·50	9·00	1·65	0·50	1·60	1·78	2·35	2·44	0·63	5·50	2·32	—	—	1·85
9·53	—	—	0·54	1·35	1·72	—	—	—	5·39	2·30	—	—	—
9·50	9·04	1·44	0·53	1·10	1·90	2·36	2·43	0·62	5·73	2·40	—	—	—
—	9·84	0·55	0·47	1·10	—	—	—	—	—	—	—	—	2·20
8·80	—	0·99	—	—	1·40	2·10	2·14	0·56	4·92	2·31	—	—	—
8·80	8·60	1·40	0·44	1·20	1·50	2·28	2·33	0·58	4·95	2·16	—	—	1·60
8·23	8·17	0·95	0·52	1·25	1·57	2·30	2·37	0·57	4·75	2·11	—	—	—
9·45	8·00	0·57	0·40	1·00	1·52	—	—	—	—	—	—	—	1·75
10·38	10·38	0·69	0·56	1·20	1·84	—	—	—	—	—	—	—	2·10
9·23	—	1·13	—	—	1·55	2·30	2·36	0·58	5·35	2·13	—	—	—
9·13	8·74	1·32	0·48	1·30	1·73	2·30	2·35	0·64	4·85	2·08	—	—	2·00
9·78	9·40	1·20	0·55	1·30	2·04	—	—	—	5·52	2·15	5·42	—	2·10
8·85	8·70	0·60	0·55	—	1·48	2·25	2·32	0·56	5·07	2·08	—	—	—
10·50	10·06	0·65	0·60	1·40	1·80	—	—	—	—	—	—	—	2·45
9·53	—	0·55	—	1·45	1·74	2·36	2·41	0·64	—	—	—	—	—
8·30	8·70	1·50	0·50	1·10	1·62	2·26	2·34	0·55	4·90	2·10	—	—	1·85
8·90	8·50	1·39	0·48	1·50	1·80	2·50	2·55	0·58	5·05	2·23	—	—	1·90
8·15	8·25	1·40	0·50	1·15	1·40	2·08	2·22	0·50	4·75	2·01	—	—	1·78
9·10	8·90	0·70	0·45	1·30	1·50	2·33	2·39	0·56	5·50	2·10	—	—	1·75
9·20	9·00	1·53	0·56	1·20	—	—	—	—	—	—	—	—	1·85
9·20	8·85	1·40	0·46	1·10	1·63	2·25	2·30	0·55	4·05	2·10	—	—	1·92
8·45	8·40	1·20	0·37	0·95	1·30	—	—	—	—	—	—	—	1·55
8·70	8·60	1·45	0·47	1·40	1·80	2·40	2·44	0·58	4·85	2·18	—	—	1·90
9·40	9·25	0·63	0·51	1·20	1·83	2·42	2·47	0·57	5·45	2·32	—	—	1·90
8·25	8·10	1·45	0·52	1·20	1·49	—	—	—	—	—	—	—	1·80
9·45	9·30	1·78	—	1·40	1·96	2·80	2·85	0·65	6·15	2·38	—	—	1·90
9·70	9·30	1·15	0·61	1·40	1·83	2·58	2·62	0·65	5·85	2·31	—	—	2·10
9·25	8·90	1·60	0·47	1·40	1·60	2·19	2·28	0·62	5·20	2·11	—	—	1·85
9·35	8·40	0·60	0·46	1·20	—	—	—	—	6·10	2·40	—	—	2·00
9·45	—	0·45	—	—	—	2·35	2·40	0·55	5·40	2·15	—	—	—
9·85	9·65	0·70	0·48	1·20	1·60	2·20	2·25	0·55	5·40	2·35	—	—	1·95
—	8·65	1·40	0·47	1·39	—	—	—	—	—	—	—	—	2·10
8·20	—	0·85	—	—	1·50	2·10	2·15	0·53	4·60	1·94	—	—	—
9·30	9·10	1·55	0·50	1·40	1·68	2·37	2·42	0·63	5·55	2·33	—	—	1·90
9·75	9·50	1·60	0·51	1·10	1·65	2·35	2·45	0·59	5·00	2·24	—	—	1·85

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
7 Feb.	529	Female	22·40	—	4·55	4·62	4·83	—	1·11	5·55	1·06	6·27
8 ,,	530	Female	22·75	—	4·65	4·95	5·10	9·90	1·11	—	1·07	6·20
8 ,,	531	Female	21·25	—	4·50	—	4·70	9·10	1·02	5·05	1·00	5·65
9 ,,	533	Male	21·55	—	4·00	—	4·55	8·85	1·02	5·10	1·03	5·90
9 ,,	535	Female	22·90	—	4·46	4·65	4·88	9·26	1·08	—	—	—
9 ,,	536	Male	21·00	—	4·37	4·63	4·74	9·25	1·00	—	1·16	5·90
9 ,,	537	Male	19·70	—	3·96	4·20	4·37	9·00	1·07	4·45	0·95	5·20
9 ,,	538	Male	20·45	—	4·15	4·45	4·56	8·80	1·07	4·93	0·99	5·70
9 ,,	539	Female	22·50	—	4·10	4·30	4·50	8·80	1·05	5·73	1·06	6·70
9 ,,	540	Male	19·50	—	3·60	4·06	4·17	8·00	0·89	4·90	1·00	5·55
9 ,,	541	Female	22·50	—	4·45	4·70	4·84	9·50	1·08	5·58	1·09	6·65
9 ,,	542	Male	19·65	—	3·75	4·10	4·18	8·15	0·99	4·70	1·00	5·50
10 ,,	543	Male	19·70	—	3·85	—	4·25	8·40	0·96	—	0·95	5·65
10 ,,	544	Female	16·20	—	3·15	3·36	3·50	6·80	0·80	4·00	0·80	4·70
10 ,,	545	Male	19·50	—	3·80	4·05	4·19	8·10	0·97	4·80	0·90	5·60
10 ,,	546	Male	20·35	—	4·10	—	4·55	9·35	1·13	4·45	1·00	5·30
10 ,,	547	Female	21·85	—	4·15	—	4·45	9·10	1·15	5·60	1·10	6·55
11 ,,	548	Female	21·00	—	4·00	—	4·45	8·80	0·98	—	1·10	6·30
11 ,,	549	Female	21·45	—	4·30	4·60	4·67	9·00	1·07	5·20	0·98	5·90
11 ,,	550	Male	19·10	—	3·90	4·20	4·39	8·24	0·99	4·55	0·90	5·30
11 ,,	551	Male	20·70	—	3·89	4·20	4·37	8·60	1·00	5·13	0·96	5·90
12 ,,	552	Male	19·75	—	3·95	—	4·28	8·34	0·94	—	1·15	5·30
12 ,,	553	Male	21·60	—	4·28	4·37	4·63	8·98	1·00	5·00	1·13	6·00
12 ,,	555	Male	19·60	—	4·30	4·54	4·71	9·20	1·06	4·70	1·00	5·40
12 ,,	556	Male	20·60	—	3·80	4·10	4·28	8·80	1·00	—	1·05	5·80
13 ,,	558	Male	21·10	—	4·25	4·45	4·60	9·10	0·97	5·02	0·98	5·70
13 ,,	559	Male	22·08	—	4·70	4·74	4·90	9·57	1·12	5·15	0·98	6·07
13 ,,	560	Female	21·15	—	4·50	4·80	5·00	9·05	1·04	5·10	1·02	5·80
13 ,,	561	Male	20·50	—	3·20	3·65	3·90	8·13	1·00	5·03	0·96	6·00
13 ,,	562	Male	20·40	—	3·70	4·00	4·30	8·60	1·10	4·85	1·04	5·90
13 ,,	563	Female	22·30	—	4·53	4·95	5·08	9·50	0·98	5·78	1·06	6·70
13 ,,	564	Male	20·80	—	4·36	—	4·75	8·95	1·10	—	1·02	5·80
13 ,,	565	Female	22·60	—	4·30	—	4·75	9·20	1·16	5·70	1·15	6·33
13 ,,	566	Female	21·65	—	4·00	—	4·55	8·90	—	5·38	1·00	6·25
14 ,,	573	Male	19·80	—	3·90	—	4·05	8·75	0·97	—	0·98	5·30
14 ,,	574	Male	21·00	—	4·10	4·30	4·40	8·82	1·00	5·30	1·03	5·20
14 ,,	575	Female	21·00	—	4·40	—	4·76	9·83	1·11	5·23	0·97	5·75
14 ,,	576	Male	20·30	—	3·70	3·88	4·00	8·00	0·98	—	0·97	5·85
14 ,,	577	Male	20·60	—	4·10	4·25	4·45	9·00	1·05	4·83	0·94	5·80
15 ,,	579	Male	20·00	—	3·80	4·14	4·35	8·30	1·00	4·80	0·98	5·55
15 ,,	585	Female	22·55	—	4·25	4·65	4·70	9·60	—	5·10	1·20	6·40
15 ,,	586	Male	19·30	—	3·65	—	4·05	8·10	—	4·46	0·90	5·25
15 ,,	587	Female	20·70	—	3·90	4·10	4·28	8·44	1·07	5·18	0·97	5·80
15 ,,	588	Female	22·90	—	4·54	4·74	4·87	9·60	1·06	—	1·25	6·40
15 ,,	589	Male	21·60	—	4·27	—	4·70	9·30	1·09	5·22	1·07	6·20
15 ,,	590	Male	20·20	—	3·60	—	4·15	8·10	—	5·15	1·04	5·60
16 ,,	600	Male	18·53	—	3·55	3·64	3·92	7·73	0·93	4·30	0·95	5·10
16 ,,	601	Male	21·30	—	4·30	—	4·67	9·40	1·03	5·33	1·02	5·85
18 ,,	602	Male	21·75	—	4·20	—	4·75	9·00	0·98	—	1·00	5·60
18 ,,	603	Female	20·30	—	3·87	4·10	4·24	8·36	1·06	4·85	0·98	5·70
18 ,,	604	Female	15·20	—	2·70	2·88	3·05	6·10	0·73	3·90	0·70	4·60
18 ,,	606	Male	20·40	—	4·07	4·26	4·40	8·60	1·00	4·90	1·03	5·80
18 ,,	607	Male	19·73	—	3·47	3·80	3·94	8·10	0·95	4·70	1·00	5·74
18 ,,	609	Male	20·10	—	3·70	4·02	4·25	8·13	0·95	5·10	1·02	5·70
18 ,,	610	Female	22·20	—	4·60	5·00	5·14	9·60	1·08	5·29	1·07	6·35
19 ,,	611	Male	20·50	—	—	—	4·30	8·45	—	—	1·00	5·80
20 ,,	618	Female	18·50	—	3·50	3·65	3·84	7·88	—	4·90	0·90	5·70
22 ,,	619	Male	18·70	—	3·60	3·95	4·03	8·07	0·92	4·70	0·92	5·55
22 ,,	621	Female	21·70	—	3·90	4·16	4·27	8·45	1·00	5·25	1·03	6·35
22 ,,	622	Male	20·20	—	3·57	3·90	4·05	8·25	0·98	5·00	1·03	5·70

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
10·20	10·00	0·88	0·53	1·00	—	—	—	—	—	—	—	—	—
10·10	—	0·65	—	—	1·90	2·60	2·70	0·67	—	—	—	—	—
—	9·00	0·62	0·37	1·00	1·50	2·00	—	—	—	—	—	—	1·95
9·73	9·10	1·20	0·30	1·40	—	2·25	2·32	0·61	5·47	2·34	—	—	—
—	—	0·75	0·50	1·40	1·66	2·40	2·42	0·65	5·90	2·39	—	—	—
9·65	—	1·05	—	1·30	1·86	2·35	—	0·69	5·75	2·26	—	—	—
8·55	8·20	1·75	0·56	1·10	1·84	2·37	2·44	0·67	—	2·15	—	—	—
9·15	—	1·50	0·48	1·10	1·71	2·33	2·36	0·59	5·57	—	—	—	2·05
10·40	10·45	0·65	0·61	1·40	1·90	—	—	—	5·40	2·50	—	—	2·30
9·10	8·80	1·50	0·51	1·20	1·75	—	—	—	—	—	—	—	1·90
10·50	10·20	0·80	0·41	1·20	2·00	2·70	2·78	0·65	5·75	2·56	—	—	2·00
8·90	8·70	1·55	0·58	1·00	1·50	—	—	—	—	—	—	—	1·70
8·70	—	1·00	—	—	—	2·20	2·28	0·58	5·00	2·20	—	—	—
7·45	7·30	0·52	0·38	1·10	1·40	—	—	—	—	—	—	—	1·60
—	8·77	1·30	0·46	1·22	1·55	—	—	—	—	—	—	—	1·80
8·85	8·45	1·50	0·47	1·40	1·85	2·60	2·68	0·60	5·35	—	—	—	2·02
10·00	10·05	0·70	0·70	1·70	1·88	—	—	—	—	—	—	—	2·40
9·58	—	0·65	—	—	1·65	2·24	2·35	0·57	5·25	2·32	—	—	—
9·45	9·20	0·60	0·56	1·20	1·67	2·26	2·34	0·62	5·68	2·31	—	—	1·77
8·50	8·40	1·30	0·48	1·30	1·58	—	—	—	—	2·33	—	—	1·80
—	9·85	1·65	0·51	1·20	1·87	—	—	—	—	—	—	—	1·99
8·80	—	1·20	—	—	1·68	2·20	2·24	0·53	5·10	2·14	—	—	—
9·45	9·35	1·45	0·52	1·20	1·70	—	—	—	5·50	2·25	—	—	1·90
—	8·40	1·40	0·53	1·40	1·80	2·40	2·48	0·59	5·70	—	—	—	1·90
9·30	8·60	1·55	—	1·30	2·00	2·50	2·54	0·62	5·20	2·26	—	—	1·90
9·25	9·10	1·20	0·41	1·00	1·87	2·45	2·56	0·50	5·47	2·24	—	—	2·05
9·90	9·50	1·53	0·57	1·30	1·88	2·55	2·64	0·68	5·88	2·60	—	—	1·95
9·20	8·75	0·60	0·53	1·10	1·68	2·20	2·30	0·64	6·00	2·35	—	—	2·00
9·65	—	1·17	0·45	1·20	1·75	2·40	2·48	0·59	4·75	2·20	—	—	—
9·46	9·00	1·40	0·52	1·20	1·79	2·34	2·39	0·63	5·20	2·29	—	—	1·70
10·55	10·15	0·70	0·53	1·35	1·75	—	—	—	6·05	2·46	—	—	1·90
9·50	—	1·10	0·50	1·20	1·50	2·20	2·28	0·60	5·65	2·28	—	—	—
10·20	9·70	0·71	0·52	1·10	1·70	2·46	2·53	0·62	5·85	2·39	—	—	2·20
9·90	10·00	0·65	0·54	1·17	1·80	2·52	2·59	0·53	5·30	2·33	—	—	1·90
8·75	—	1·10	0·51	0·87	1·52	2·32	2·36	0·63	5·30	2·38	—	—	—
9·85	9·60	1·50	0·67	1·50	1·64	2·45	2·55	0·61	5·40	2·30	—	—	1·85
9·24	9·50	0·55	0·53	1·40	1·88	—	—	—	5·75	2·38	—	—	2·00
9·20	—	1·25	—	—	1·60	—	—	—	—	—	—	—	—
9·45	9·20	1·40	0·48	1·20	1·73	2·40	2·50	0·60	5·35	2·28	—	—	1·65
8·99	8·90	1·40	0·51	1·10	1·68	—	—	—	5·12	2·29	—	—	1·95
10·15	9·95	0·55	0·52	1·50	2·20	—	—	—	—	—	—	—	2·35
8·75	8·00	1·45	—	1·50	1·65	—	—	—	4·94	2·03	—	—	1·75
9·20	9·00	0·60	0·45	1·00	1·92	2·26	2·31	0·54	—	—	—	—	1·87
10·10	—	0·67	—	—	1·70	2·52	2·60	0·68	—	—	—	—	—
9·90	—	1·30	0·46	1·10	1·60	—	—	—	—	—	—	—	—
9·40	9·20	1·35	0·60	1·20	1·75	—	—	—	—	—	—	—	2·05
8·15	8·05	1·45	0·47	1·10	1·50	2·00	2·10	0·50	4·65	2·20	—	—	1·95
9·50	9·45	1·55	0·54	1·22	1·98	—	—	—	—	—	—	—	2·20
8·90	—	1·15	0·51	1·10	1·55	2·27	2·31	0·58	5·45	—	—	—	—
9·20	8·90	0·70	0·49	0·90	1·65	2·16	2·21	0·53	5·20	2·24	—	—	1·80
7·05	7·00	0·40	0·42	0·75	1·28	1·68	1·72	0·39	—	—	—	—	1·40
9·25	9·10	1·50	0·51	1·35	1·64	2·19	2·25	0·60	5·40	2·16	—	—	1·97
9·30	8·90	1·56	0·49	0·90	1·64	2·20	2·28	0·53	4·85	2·16	—	—	1·80
9·40	9·20	1·23	0·58	1·20	1·42	2·20	2·26	0·54	5·13	2·24	—	—	1·90
9·80	9·70	0·45	0·49	1·27	1·75	2·37	2·44	—	—	—	—	—	2·00
9·00	—	1·00	—	—	—	2·25	2·37	0·58	5·25	2·10	—	—	—
9·17	8·75	0·50	0·40	1·00	1·65	—	—	—	—	—	—	—	1·70
8·70	—	0·85	0·50	1·05	1·78	2·30	2·36	0·54	4·85	2·10	—	—	1·80
9·80	9·85	0·40	0·45	1·55	1·80	2·15	2·28	0·60	5·15	2·26	—	—	1·95
9·50	9·47	1·50	0·52	1·37	1·70	2·24	2·30	0·57	4·90	2·21	—	—	2·03

			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1926												
24 Feb.	624	Male	19·45	—	3·50	3·90	4·00	8·25	0·90	—	0·96	5·30
24 ,,	626	Female	22·47	—	4·60	—	5·05	9·55	1·14	5·10	1·00	6·20
24 ,,	627	Male	21·60	—	4·25	4·45	4·70	9·20	1·04	5·16	1·08	6·00
25 ,,	629	Male	19·75	—	3·70	4·04	4·10	8·24	1·02	5·18	0·98	5·80
25 ,,	630	Male	20·55	—	3·90	4·18	4·57	8·55	0·96	5·07	1·03	6·00
25 ,,	631	Male	19·30	—	3·78	4·06	4·24	8·40	0·94	4·70	0·94	5·30
25 ,,	632	Female	19·20	—	3·56	3·80	4·10	8·10	1·06	4·70	0·94	5·45
25 ,,	633	Male	16·90	—	3·00	3·30	3·47	7·00	0·82	4·07	0·85	4·97
27 ,,	634	Female	22·24	—	4·42	—	4·80	9·60	—	—	1·16	6·76
27 ,,	635	Male	21·25	—	4·10	4·50	4·65	9·65	1·02	—	1·10	5·90
1 March	636	Female	21·30	—	—	—	—	—	—	—	1·15	—
6 ,,	672	Female	20·00	—	4·05	—	4·40	8·50	1·00	4·95	0·90	5·55
8 ,,	674	Male	20·00	—	3·70	4·17	4·16	7·90	—	—	1·05	5·15
8 ,,	675	Female	22·20	—	4·15	—	4·62	8·95	1·05	5·30	1·10	6·10
11 ,,	677	Female	16·00	—	2·60	2·82	2·90	6·30	0·72	3·80	0·88	4·80
12 ,,	678	Female	16·30	—	2·85	—	3·30	6·65	—	—	0·85	4·95
12 ,,	679	Male	15·90	—	2·65	2·90	3·03	6·00	0·72	4·00	0·75	4·65
12 ,,	680	Male	20·40	—	4·05	—	4·57	8·65	1·03	4·55	1·08	5·40
13 ,,	682	Male	19·00	—	3·45	3·90	3·94	7·90	0·92	4·70	0·94	5·40
13 ,,	683	Male	17·80	—	3·30	3·55	3·68	7·20	0·85	4·45	0·89	5·15
14 ,,	685	Male	19·70	—	3·55	3·96	4·10	8·10	0·92	4·70	0·92	5·40
14 ,,	686	Female	20·00	—	3·70	4·00	4·10	8·10	—	5·20	1·02	5·85
14 ,,	687	Female	14·80	—	2·40	—	2·80	5·87	—	4·25	—	4·70
14 ,,	689	Male	16·25	—	2·15	—	3·00	6·40	0·73	4·30	0·85	4·90
14 ,,	690	Female	16·55	—	2·15	3·00	3·05	6·55	0·80	4·10	1·10	5·00
14 ,,	691	Female	17·15	—	2·90	3·15	3·30	6·90	0·84	4·40	0·90	4·90
14 ,,	692	Female	15·20	—	2·40	—	2·55	—	0·70	4·30	0·79	5·00
15 ,,	693	Female	21·45	—	—	—	—	—	—	—	1·03	6·15
15 ,,	694	Male	20·10	—	4·20	—	4·68	8·90	0·85	4·60	0·93	5·40
19 ,,	696	Male	18·35	—	3·30	3·55	3·67	7·20	0·85	4·77	0·90	5·60
20 ,,	697	Female	19·90	—	3·80	—	4·30	8·30	1·00	4·90	0·87	5·40
20 ,,	699	Female	21·40	—	4·10	—	4·65	8·80	1·03	5·30	1·10	6·00
20 ,,	700	Female	18·60	—	3·20	—	3·70	7·30	0·83	—	0·86	5·30
20 ,,	701	Male	19·90	—	3·70	4·00	4·10	8·15	1·06	4·65	1·05	5·50
22 ,,	705	Male	14·70	—	2·45	2·77	2·82	6·00	0·76	3·70	0·79	4·40
22 ,,	706	Male	20·20	—	3·60	4·05	4·15	8·10	0·93	5·20	0·97	6·00
22 ,,	707	Male	20·35	—	4·18	4·35	4·45	8·65	1·07	5·25	0·98	6·10
23 ,,	708	Female	20·05	—	3·80	—	4·13	8·30	0·97	—	0·98	5·65
23 ,,	709	Male	21·00	—	4·00	4·30	4·30	8·50	1·03	4·85	1·06	5·85
23 ,,	710	Female	16·35	—	2·70	2·85	2·95	6·25	0·83	4·00	0·85	4·80
23 ,,	711	Female	16·20	—	2·60	—	3·00	6·20	—	—	0·82	4·75
23 ,,	713	Female	18·85	—	3·55	3·80	3·90	7·75	0·94	4·55	0·91	4·90
23 ,,	714	Female	21·50	—	4·20	—	4·67	9·00	0·97	5·00	1·04	5·90
23 ,,	715	Male	14·20	—	2·15	2·35	2·40	5·25	0·65	—	0·80	4·45
24 ,,	717	Female	19·45	—	3·70	3·95	4·04	8·00	0·93	4·85	0·90	5·65
24 ,,	719	Male	17·35	—	3·35	3·55	3·72	7·20	0·86	4·35	0·84	5·35
25 ,,	721	Female	21·00	—	3·90	—	4·45	8·65	1·00	4·80	1·10	5·65
25 ,,	722	Male	15·75	—	3·00	—	3·35	7·00	0·95	4·39	1·08	4·50
25 ,,	723	Male	21·50	—	4·10	—	4·35	8·60	1·02	5·55	—	6·30
25 ,,	724	Female	23·10	—	4·00	—	4·80	9·35	1·08	5·65	1·10	6·20
25 ,,	725	Male	20·10	—	3·90	4·25	4·30	8·00	1·01	5·00	1·20	5·65
26 ,,	727	Female	20·95	—	4·20	—	4·47	8·90	1·05	5·25	1·05	5·80
27 ,,	728	Male	20·25	—	3·70	—	4·05	8·20	0·99	4·90	1·00	6·05
29 ,,	729	Male	20·60	—	3·90	—	4·40	8·70	1·05	4·80	1·10	5·60
29 ,,	730	Male	19·80	—	3·80	—	4·40	8·00	0·90	4·95	1·00	5·55
29 ,,	731	Female	18·70	—	3·75	3·90	3·95	7·90	0·94	4·55	0·95	5·15
29 ,,	732	Female	21·90	—	4·70	—	5·20	9·70	1·20	5·25	1·08	6·00
29 ,,	733	Female	18·00	—	3·40	—	3·90	7·50	0·95	4·30	0·92	5·00
29 ,,	734	Male	16·80	—	3·00	3·30	3·35	6·55	0·83	4·00	0·90	4·85
29 ,,	735	Female	18·25	—	3·35	—	3·80	7·25	0·90	4·30	0·83	4·95

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
8·55	—	1·00	0·48	1·00	1·82	2·20	2·27	—	4·85	2·10	—	—	—
9·70	9·70	0·80	0·53	1·25	1·80	2·34	2·40	0·60	6·15	2·34	—	—	1·95
9·70	10·10	1·55	0·56	1·40	1·90	—	—	—	—	—	—	—	1·90
9·18	8·90	1·45	0·54	1·10	1·77	2·23	2·32	0·54	5·44	2·13	—	—	1·74
9·65	9·40	1·35	0·48	1·08	1·70	—	—	—	5·17	2·26	—	—	1·80
9·00	8·80	1·60	0·46	1·10	1·82	2·20	2·27	0·61	5·10	2·13	—	—	1·85
8·70	8·50	0·55	0·56	1·20	1·66	2·13	2·20	0·56	5·07	—	4·95	—	1·65
7·85	7·70	1·12	0·35	1·00	1·42	—	—	—	—	—	—	—	1·50
9·47	—	0·67	0·56	1·15	1·98	—	—	0·60	—	—	—	—	—
9·40	—	1·20	0·56	1·05	1·90	2·52	2·61	0·61	5·60	2·38	—	—	—
—	—	—	—	—	—	—	—	—	5·50	—	—	—	—
9·10	8·90	0·65	0·50	0·90	1·60	2·18	2·24	—	5·20	2·15	—	—	1·90
—	—	1·00	—	—	—	—	—	—	—	—	—	—	—
9·55	9·60	0·63	0·44	1·50	—	—	—	—	—	—	—	—	2·05
7·70	7·30	0·50	0·40	1·00	—	1·70	—	0·50	3·85	1·90	—	—	—
7·64	—	0·32	—	—	1·34	1·80	1·83	0·45	4·00	1·76	—	—	—
7·70	7·40	1·20	0·33	1·10	1·20	1·67	1·68	0·44	3·65	1·80	—	—	1·30
9·15	8·80	1·50	—	1·40	1·55	—	—	—	—	—	—	—	—
8·70	8·50	1·45	0·53	1·00	1·73	—	—	—	4·70	1·92	—	—	1·90
8·35	8·20	1·35	0·44	1·13	1·53	—	—	—	—	—	—	—	1·60
8·85	8·60	1·55	0·43	1·10	1·57	—	—	—	4·85	2·26	—	—	—
9·40	9·00	0·70	0·55	1·20	—	2·22	2·27	0·55	5·00	2·11	—	—	—
7·10	6·90	0·40	0·42	0·90	—	—	—	—	—	—	—	—	—
7·70	7·47	1·15	0·37	1·00	1·40	1·67	2·00	0·42	3·80	1·70	—	—	1·48
7·75	8·00	0·45	0·36	1·10	—	1·70	1·76	0·40	4·07	1·90	—	—	1·45
8·00	7·60	0·70	0·40	0·75	1·35	1·88	1·96	0·48	4·25	2·10	—	—	1·70
7·60	7·32	0·45	0·35	0·80	1·17	1·70	1·76	0·40	—	—	—	—	1·40
8·80	—	0·50	—	—	—	—	—	—	5·35	2·35	—	—	—
9·00	—	1·10	0·39	1·50	1·80	2·45	2·49	—	5·75	2·35	—	—	2·00
9·00	8·70	1·40	0·36	1·00	1·45	—	—	—	—	—	—	—	1·60
8·90	8·50	0·45	0·52	1·05	1·85	2·37	2·42	0·55	5·20	2·24	—	—	2·20
9·90	9·10	0·55	—	1·27	1·50	—	—	—	5·70	2·55	—	—	2·15
8·50	—	0·45	—	—	1·45	1·95	2·00	0·51	4·55	2·30	—	—	—
8·80	8·65	1·30	0·45	1·10	1·65	2·35	2·10	0·58	5·05	2·40	—	—	1·85
7·20	6·85	1·25	0·38	0·75	1·20	1·68	1·70	0·44	3·58	1·54	—	—	1·30
9·45	9·20	1·40	0·48	1·20	1·65	2·24	2·30	0·57	5·25	2·16	—	—	2·00
9·45	9·30	1·40	0·57	1·05	1·52	—	—	—	—	—	—	—	1·90
8·95	—	0·55	—	—	1·65	2·25	2·29	0·60	5·20	2·35	—	—	—
9·60	9·30	—	0·55	1·10	1·75	2·34	2·42	0·58	5·45	2·35	—	—	1·90
7·60	7·50	0·50	0·60	0·80	1·20	1·62	1·73	0·45	—	—	—	—	1·40
7·30	—	0·35	—	—	1·10	1·66	1·71	0·41	3·90	1·83	—	—	—
8·20	8·00	0·50	0·50	1·00	1·40	—	—	—	4·90	2·13	—	—	1·90
9·30	8·80	0·50	0·60	1·10	1·75	—	—	—	—	—	—	—	1·90
7·00	—	0·65	0·45	0·80	1·10	1·58	1·59	0·44	—	—	—	—	—
9·00	8·80	0·60	—	1·00	1·74	2·20	2·25	0·54	4·90	2·00	—	—	1·75
8·55	8·40	1·35	0·41	0·90	1·53	—	—	—	—	—	—	—	1·40
9·40	9·00	0·55	0·46	1·05	1·70	2·30	2·34	0·58	5·35	2·23	—	—	—
7·25	7·35	1·30	0·44	1·02	1·47	1·85	1·90	0·47	4·10	1·71	—	—	1·40
10·10	9·90	1·50	0·51	1·36	1·80	1·80	1·83	0·50	5·35	2·31	—	—	2·10
10·10	10·35	0·60	0·55	1·05	1·75	2·35	2·44	0·62	5·90	2·31	—	—	1·82
9·40	9·00	1·45	0·52	1·11	1·57	2·20	2·29	0·56	5·30	2·10	—	—	1·90
9·50	9·20	0·65	0·42	1·12	1·60	2·25	2·30	0·61	5·65	2·46	—	—	2·00
9·80	—	1·00	0·50	1·10	1·70	2·20	2·25	0·56	5·05	2·21	—	—	—
9·10	9·00	1·60	—	1·10	1·85	2·45	—	0·62	—	—	—	—	2·10
9·08	9·00	1·40	0·60	1·30	1·65	2·15	2·22	0·55	5·25	2·00	—	—	1·90
8·30	8·30	0·55	0·50	1·20	1·85	—	—	—	—	—	—	—	1·80
9·60	9·30	0·70	—	1·08	2·00	2·65	2·70	0·63	6·30	2·61	—	—	2·40
7·90	—	0·50	0·40	1·00	1·55	2·08	2·15	0·56	4·70	2·04	—	—	—
—	7·80	1·15	0·45	1·05	1·37	1·86	1·90	0·46	—	—	—	—	1·50
8·10	8·05	0·60	0·45	0·85	1·40	1·85	1·92	0·48	4·65	2·01	—	—	1·60

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
29 March	736	Female	20·20	—	3·70	—	4·20	8·15	1·00	5·00	1·10	5·70
29 ,,	738	Male	21·00	—	4·00	—	4·40	8·55	1·03	5·05	1·10	6·00
Saldanha Bay												
15 June	741	Female	16·77	—	3·10	3·45	3·47	7·10	0·83	4·20	0·91	4·80
15 ,,	742	Female	16·85	—	2·97	3·30	3·36	6·57	0·77	4·20	0·79	4·48
15 ,,	743	Male	13·92	—	2·29	—	2·60	5·72	0·70	3·45	0·75	4·25
15 ,,	744	Male	15·50	—	2·90	—	3·33	6·50	0·78	3·87	0·81	4·60
15 ,,	745	Male	13·90	—	2·32	2·60	2·65	5·45	0·72	3·58	0·77	4·28
16 ,,	749	Male	15·50	—	2·50	2·85	3·00	6·00	—	3·75	0·80	4·80
16 ,,	750	Male	17·15	—	3·30	3·70	3·77	7·35	0·83	4·35	0·85	4·90
16 ,,	751	Male	15·75	—	2·70	3·04	3·10	—	0·75	4·05	0·85	4·85
17 ,,	752	Male	16·60	—	—	3·40	3·46	6·50	0·86	—	0·90	5·05
17 ,,	755	Female	16·50	—	3·00	3·48	3·52	6·90	0·80	3·78	0·88	4·95
20 ,,	762	Female	17·10	—	3·05	3·45	3·55	7·10	0·83	4·05	0·78	4·90
20 ,,	765	Female	20·85	—	3·67	4·15	4·25	8·60	0·97	5·15	1·00	6·05
22 ,,	771	Male	16·50	—	3·05	3·25	3·37	6·70	0·76	—	0·79	5·00
22 ,,	772	Male	15·45	—	2·70	3·05	3·16	6·45	0·70	3·80	0·81	4·65
22 ,,	775	Female	21·70	—	4·20	4·40	4·53	8·94	1·05	5·50	1·01	6·50
23 ,,	778	Female	17·75	—	3·40	3·65	3·80	7·45	0·82	—	0·90	4·95
23 ,,	780	Male	17·10	—	2·90	3·35	3·42	6·90	0·84	4·33	0·84	5·30
24 ,,	782	Male	15·60	—	3·00	3·17	3·21	6·55	0·78	—	0·80	4·65
24 ,,	783	Male	16·50	—	3·10	3·20	3·35	6·70	0·84	4·07	0·80	4·70
24 ,,	784	Female	17·65	—	3·25	3·57	3·68	7·35	0·85	4·47	0·90	5·45
24 ,,	786	Male	14·48	—	2·70	2·96	3·09	6·00	0·74	3·53	0·70	4·20
24 ,,	788	Female	15·95	—	3·00	3·35	3·40	6·80	0·76	—	0·92	4·85
25 ,,	789	Male	16·45	—	3·10	3·20	3·30	6·87	0·87	—	0·82	5·18
25 ,,	790	Male	16·50	—	2·94	3·16	3·29	6·70	0·85	4·15	0·85	4·89
25 ,,	791	Male	15·10	—	2·54	2·79	2·90	7·96	0·74	3·95	0·88	4·70
25 ,,	792	Female	18·50	—	3·85	4·20	4·23	8·10	0·98	—	0·93	5·35
26 ,,	795	Male	15·60	—	2·80	2·95	3·04	6·28	—	—	0·82	4·80
26 ,,	796	Male	15·25	—	2·70	2·94	3·08	6·20	0·74	3·85	0·73	4·30
26 ,,	798	Female	15·85	—	2·65	2·90	3·05	6·15	0·73	4·17	0·76	4·78
26 ,,	800	Female	16·25	—	2·90	3·05	3·16	6·42	0·72	4·42	0·86	4·80
27 ,,	804	Male	16·00	—	2·80	3·00	3·16	6·50	0·83	4·23	0·90	4·70
27 ,,	806	Male	14·67	—	2·60	—	2·98	5·94	0·73	3·76	0·74	4·35
28 ,,	807	Female	20·15	—	4·12	4·45	4·46	8·35	0·93	—	0·94	5·73
28 ,,	808	Female	15·14	—	2·70	3·10	3·17	6·00	0·75	3·80	0·80	4·40
29 ,,	815	Male	16·50	—	2·80	3·00	3·15	6·50	0·81	4·33	0·90	4·95
29 ,,	817	Female	14·60	—	2·60	2·78	2·93	5·90	0·74	3·85	0·80	4·60
30 ,,	821	Male	16·10	—	2·74	2·84	3·03	6·15	0·72	4·10	0·80	4·70
2 July	831	Male	18·85	—	3·65	4·40	4·68	7·55	0·96	4·77	1·02	5·55
2 ,,	832	Female	15·32	—	2·68	3·03	3·09	6·26	0·73	3·80	0·70	4·48
3 ,,	837	Male	15·55	—	2·77	2·95	3·05	6·30	0·77	3·78	0·75	4·30
3 ,,	839	Female	14·80	—	2·40	2·60	2·75	5·62	0·70	3·97	0·74	4·50
3 ,,	841	Female	14·23	—	2·40	2·65	2·78	5·65	0·66	3·82	0·77	4·60
3 ,,	842	Female	14·90	—	2·50	2·70	2·83	5·65	0·70	3·70	0·72	4·45
8 ,,	852	Female	14·60	—	2·73	2·04	2·08	6·05	—	—	0·70	4·35
8 ,,	854	Female	15·75	—	3·00	3·15	3·26	6·55	0·76	3·95	0·82	4·63
8 ,,	856	Male	17·20	—	3·17	3·33	3·48	7·03	0·84	4·27	0·90	5·00
9 ,,	858	Male	15·00	—	2·77	2·98	3·06	6·05	0·80	3·87	0·80	4·50
9 ,,	861	Male	19·20	—	3·78	4·12	4·18	8·25	0·98	4·70	0·90	5·30
10 ,,	865	Male	15·43	—	2·75	—	3·05	6·20	0·79	4·00	0·79	4·60
12 ,,	870	Male	19·00	—	3·80	4·12	4·28	8·37	0·95	4·66	0·96	5·45
12 ,,	873	Male	16·60	—	3·17	3·35	3·45	6·85	0·87	4·62	0·88	5·00
12 ,,	875	Female	19·20	—	3·75	4·12	4·20	8·10	1·00	4·73	0·96	5·45
13 ,,	876	Male	16·47	—	2·76	3·10	3·13	6·25	0·84	—	0·78	5·15
13 ,,	877	Female	21·60	—	4·10	4·35	4·50	8·80	0·98	5·58	1·05	6·25
13 ,,	878	Female	15·30	—	2·75	3·00	3·15	6·20	0·72	3·90	0·75	4·40
13 ,,	880	Female	15·55	—	2·85	3·10	3·24	6·55	0·83	3·90	0·75	4·40

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
9·20	9·00	0·70	0·37	0·85	1·65	2·20	2·25	0·59	5·10	2·36	—	—	1·80
9·45	9·35	1·40	0·67	1·35	1·65	2·25	2·33	0·60	5·40	2·06	—	—	2·15
7·45	7·10	0·50	0·41	1·00	1·42	1·91	1·95	—	4·30	1·66	—	—	1·38
7·25	7·00	0·47	0·39	1·00	1·30	1·70	1·75	0·45	4·18	1·73	—	—	1·35
6·70	6·55	1·02	0·33	0·85	1·28	1·72	1·76	0·41	3·18	1·41	—	—	1·30
7·25	7·00	1·30	0·45	0·78	1·30	1·88	—	0·43	—	1·63	—	—	1·15
6·70	6·60	1·09	0·26	0·87	1·15	—	—	—	—	—	—	—	1·20
7·50	7·10	1·00	0·28	—	1·15	1·80	1·87	0·47	—	—	—	—	1·40
7·90	7·65	1·30	0·36	0·90	1·45	—	—	—	4·60	1·76	—	—	1·50
7·65	7·20	1·20	0·39	1·00	—	—	—	—	—	—	—	—	1·35
—	—	0·65	—	—	1·24	—	—	—	4·25	1·74	—	—	—
8·10	7·70	0·45	0·49	1·13	1·35	1·90	1·92	0·48	—	—	—	—	1·30
7·50	7·40	0·45	0·38	0·90	1·40	1·90	1·99	0·47	4·35	1·86	—	—	1·50
10·00	9·60	0·60	0·39	0·90	1·70	2·30	2·42	0·54	5·00	2·20	—	—	1·80
7·60	—	0·75	—	—	1·32	1·84	1·90	0·44	3·95	1·60	—	—	—
7·45	7·30	1·25	0·32	0·90	1·40	1·82	1·90	0·43	3·90	1·60	—	—	1·23
9·75	9·75	0·70	0·50	1·00	1·75	2·46	2·49	—	5·50	—	—	—	1·85
8·05	—	0·40	—	—	1·57	2·10	2·14	—	4·45	2·00	—	—	—
8·10	7·90	1·01	0·41	1·20	1·37	2·00	2·05	0·50	4·23	1·65	—	—	1·50
7·27	—	0·64	—	—	1·30	1·78	1·84	0·45	3·90	—	—	—	—
7·55	7·15	1·20	0·39	0·80	1·43	—	—	—	4·13	—	—	—	1·35
—	8·40	0·35	0·41	1·10	1·48	—	—	—	—	—	—	-	1·52
6·70	6·50	1·10	0·28	0·55	1·14	1·58	1·67	0·40	3·72	1·48	—	—	1·04
7·80	—	0·33	—	—	1·42	1·83	1·89	0·46	—	—	—	—	—
8·00	—	0·68	—	—	1·35	1·87	1·93	0·47	4·10	1·80	—	—	—
7·86	7·58	0·99	0·46	1·20	1·40	1·95	1·98	0·50	4·05	—	—	—	1·47
7·35	7·28	1·08	—	0·80	1·32	—	—	—	—	—	—	—	1·30
8·40	—	0·35	—	—	1·67	—	—	—	5·12	2·15	—	—	—
8·17	—	0·85	—	—	1·25	1·79	1·83	0·46	3·62	1·66	—	—	—
7·27	7·00	1·18	0·37	0·80	1·25	1·81	1·86	0·44	3·74	1·52	—	—	1·25
7·60	7·45	0·39	0·42	0·86	1·27	1·62	1·65	0·38	3·72	1·60	—	—	1·32
7·50	7·20	0·40	0·36	0·93	1·34	1·68	1·71	0·41	—	—	—	—	1·30
7·43	7·30	1·23	0·43	1·00	1·35	1·89	1·94	0·46	3·95	1·70	—	—	1·46
6·90	6·75	1·12	0·40	1·03	1·32	—	—	—	—	—	—	—	1·40
9·10	—	0·49	0·50	0·80	1·50	2·10	2·16	—	5·42	—	—	—	—
6·90	6·85	0·48	0·40	0·70	1·18	1·53	1·60	0·37	3·75	1·60	—	—	1·27
7·85	7·60	1·20	0·37	1·20	1·40	—	—	—	3·84	1·53	—	—	1·35
6·95	6·80	0·30	0·39	1·00	1·20	—	—	—	3·60	1·40	—	—	1·18
7·55	7·35	1·20	0·41	0·80	1·30	1·72	1·75	0·34	3·85	1·60	—	—	1·24
9·00	8·80	1·45	0·62	0·90	1·66	2·17	2·22	0·57	4·88	2·06	—	—	1·68
6·90	6·75	0·46	0·34	0·70	1·35	1·77	1·81	0·43	3·72	1·50	—	—	1·25
7·10	6·85	1·30	0·35	0·80	1·35	1·95	2·08	0·47	3·70	1·50	—	—	1·13
7·20	6·90	0·45	0·31	0·80	1·15	1·59	1·63	0·41	3·40	1·48	—	—	1·19
7·00	6·80	0·30	0·37	0·95	1·13	1·55	1·58	0·39	3·30	1·50	—	—	1·24
7·00	7·40	0·45	0·36	0·80	1·20	1·70	1·72	0·42	—	—	—	—	1·11
—	—	0·35	—	—	1·13	1·51	1·56	0·40	3·70	1·50	—	—	—
7·15	7·00	0·49	0·46	1·00	1·20	1·75	1·78	0·41	—	—	—	—	1·35
7·80	7·95	1·25	0·48	0·90	1·38	2·02	2·10	0·48	—	—	—	—	1·40
7·25	7·00	1·30	0·32	0·90	1·22	1·70	1·70	0·43	—	—	—	—	1·20
8·80	8·45	1·40	0·46	1·25	1·75	2·35	2·50	—	5·04	1·94	—	—	1·80
—	6·90	1·10	0·43	1·20	1·20	—	—	—	—	—	—	—	1·35
8·80	8·20	1·35	0·51	1·10	1·70	—	—	—	5·12	2·30	—	—	1·80
8·10	7·60	1·20	0·51	0·95	1·32	1·90	1·94	0·49	4·27	1·72	—	—	1·40
8·50	8·40	0·65	0·57	1·25	1·56	2·05	2·10	0·53	—	2·05	—	—	1·88
8·15	—	0·45	—	—	1·25	1·84	1·89	0·46	3·90	1·62	—	—	—
10·20	10·00	0·70	0·56	1·30	1·75	2·34	2·40	0·58	5·35	2·25	—	—	2·15
7·20	7·00	0·58	0·36	1·00	1·30	1·72	1·76	0·43	3·90	1·60	—	—	1·13
7·05	6·95	0·40	0·43	1·20	1·23	1·86	1·89	0·45	3·85	1·63	—	—	1·35

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
13 July	881	Male	14·85	—	2·55	2·79	2·89	5·92	0·71	3·82	0·76	4·35
13 ,,	882	Female	14·80	—	2·65	2·85	2·98	—	0·69	4·10	0·80	4·70
14 ,,	883	Female	16·45	—	2·85	—	3·23	5·35	—	—	0·75	5·00
14 ,,	884	Female	15·20	—	2·52	2·79	2·86	5·90	0·70	4·00	0·80	4·75
14 ,,	887	Male	15·60	—	2·75	—	3·10	6·30	0·79	3·90	0·76	4·90
25 ,,	891	Male	12·30	—	2·22	—	2·42	5·00	—	—	0·60	3·83
25 ,,	892	Male	17·40	—	3·15	3·50	3·60	7·20	0·88	4·40	0·90	5·20
25 ,,	893	Male	16·88	—	3·06	3·42	3·47	6·97	0·80	4·48	0·92	4·92
26 ,,	897	Male	15·40	—	2·38	2·65	2·73	5·85	0·70	—	0·84	—
26 ,,	898	Male	20·70	—	4·10	—	4·45	8·70	1·05	4·90	0·98	6·15
27 ,,	899	Female	15·85	—	2·82	—	3·20	6·45	0·79	4·04	0·85	4·80
27 ,,	902	Male	14·85	—	2·34	2·68	2·71	5·90	0·71	3·80	0·75	4·45
27 ,,	903	Female	15·25	—	2·78	3·03	3·12	6·35	0·75	4·00	0·80	4·65
3 Aug.	910	Male	13·38	—	—	—	2·48	—	—	—	0·72	4·07
3 ,,	912	Female	17·10	—	3·35	3·60	3·78	7·17	0·77	4·05	0·85	4·65
3 ,,	913	Female	16·10	—	2·85	3·09	3·15	6·39	0·81	3·90	0·80	4·63
3 ,,	914	Male	15·78	—	2·65	2·88	2·97	6·35	0·79	—	0·80	4·80
6 ,,	916	Female	17·75	—	3·18	3·55	3·68	7·30	0·83	—	0·82	5·75
6 ,,	917	Female	14·52	—	2·80	2·90	3·03	6·06	0·73	3·75	0·78	4·35
7 ,,	922	Female	14·65	—	2·45	2·80	2·85	5·85	0·70	—	0·79	4·10
7 ,,	924	Male	16·20	—	2·80	3·15	3·22	6·45	0·79	4·00	0·86	4·80
11 ,,	933	Female	15·80	—	2·97	—	3·33	6·85	0·81	3·85	0·76	4·85
12 ,,	934	Male	15·80	—	—	—	3·50	7·00	0·79	—	0·81	4·60
12 ,,	935	Male	14·40	—	2·78	2·85	2·98	5·55	0·70	3·69	0·71	4·10
13 ,,	940	Male	15·43	—	2·58	2·85	2·97	6·07	0·76	3·94	0·79	4·77
13 ,,	941	Female	14·70	—	2·55	2·73	2·80	5·72	0·68	3·80	0·79	4·50
15 ,,	946	Female	14·25	—	2·57	—	2·94	—	0·70	—	0·73	4·28
15 ,,	948	Female	16·80	—	2·04	3·20	3·33	6·75	0·81	4·30	0·91	5·00
15 ,,	949	Female	20·70	—	4·00	4·45	4·53	8·74	0·99	4·88	1·00	5·84
15 ,,	950	Male	20·80	—	3·85	4·22	4·32	8·53	1·05	4·90	1·07	6·00
16 ,,	954	Female	15·35	—	—	—	3·05	—	—	—	0·77	4·45
16 ,,	955	Male	20·22	—	3·88	4·03	4·34	8·40	0·95	4·80	1·07	5·74
17 ,,	957	Male	14·20	—	2·50	2·70	2·76	5·77	0·71	3·65	0·75	4·20
17 ,,	959	Male	14·90	—	2·40	2·60	2·75	5·75	0·73	3·90	0·81	4·55
18 ,,	960	Female	15·60	—	2·90	3·22	3·25	6·35	—	—	0·80	4·75
19 ,,	962	Male	14·55	—	2·48	2·82	2·82	5·97	0·75	—	0·78	4·40
19 ,,	963	Female	16·78	—	3·10	3·40	3·45	6·77	0·76	4·45	0·86	5·05
19 ,,	966	Male	17·90	—	3·35	3·68	3·80	7·48	0·89	4·40	0·83	5·10
20 ,,	969	Male	15·65	—	—	—	2·90	—	—	—	0·84	—
20 ,,	970	Male	15·20	—	2·75	—	3·19	6·20	—	4·15	0·83	5·00
20 ,,	972	Male	20·90	—	3·80	4·20	4·36	—	1·03	5·20	1·05	5·85
20 ,,	973	Male	14·10	—	2·45	2·72	2·81	5·65	0·66	3·45	0·78	4·15
20 ,,	975	Male	18·00	—	3·40	3·65	3·80	7·50	0·96	4·50	0·90	5·15
20 ,,	977	Male	14·00	—	2·45	2·60	2·70	5·40	0·69	3·70	0·76	4·30
21 ,,	978	Male	14·45	—	2·58	—	2·83	5·85	—	—	0·77	4·50
21 ,,	979	Female	15·47	—	2·60	2·80	2·94	5·95	0·73	4·00	0·81	4·75
21 ,,	980	Female	15·75	—	2·75	—	3·14	6·27	0·75	3·91	0·79	4·65
21 ,,	982	Male	14·45	—	2·42	2·59	2·72	5·60	0·74	3·88	0·80	4·44
21 ,,	983	Female	15·67	—	2·79	3·04	3·17	6·30	0·75	3·87	0·88	4·60
22 ,,	986	Male	19·95	—	4·08	4·30	4·42	—	0·98	4·45	1·00	5·40
23 ,,	987	Male	15·55	—	2·65	2·95	2·95	6·05	—	—	0·87	4·80
23 ,,	988	Male	16·05	—	2·87	3·10	3·22	6·26	0·69	3·90	0·77	4·45
23 ,,	989	Female	14·60	—	2·53	2·73	2·85	5·86	0·76	3·90	0·79	4·62
23 ,,	990	Female	16·20	—	2·86	3·21	3·32	6·62	0·78	4·18	0·81	4·75
23 ,,	992	Male	16·70	—	2·98	3·23	3·33	6·77	0·80	4·34	0·89	4·90
24 ,,	999	Male	13·35	—	2·43	2·50	2·58	5·40	0·66	3·35	0·71	4·03
24 ,,	1000	Male	15·50	—	2·65	2·90	3·00	6·20	0·77	4·20	0·85	4·35
24 ,,	1001	Male	15·10	—	2·88	3·10	3·25	6·55	0·71	4·15	0·80	4·80
24 ,,	1002	Male	14·65	—	2·30	2·65	2·75	5·70	0·72	3·65	0·83	—
24 ,,	1003	Male	18·15	—	4·25	4·50	4·64	7·40	0·84	4·40	0·90	5·35

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
7·10	7·20	1·10	0·34	0·80	—	1·56	1·62	0·41	3·40	1·60	—	—	1·13
7·20	7·00	0·40	0·30	0·65	—	—	—	—	—	—	—	—	1·30
7·80	—	0·42	—	—	1·31	1·85	1·87	0·42	—	—	—	—	—
7·50	7·30	0·50	0·41	0·90	1·09	1·85	1·88	0·39	—	—	—	—	1·20
7·60	—	—	0·38	1·10	1·25	1·70	1·72	0·40	—	—	—	—	—
6·40	—	0·50	—	—	1·05	1·42	1·45	0·35	3·00	1·26	—	—	—
8·30	8·00	1·32	0·42	1·07	1·40	1·87	1·92	0·47	4·32	1·81	—	—	1·44
7·75	7·65	1·28	0·46	1·00	1·40	1·75	1·78	0·44	4·12	—	—	—	1·50
7·35	—	—	—	—	1·17	1·65	1·74	0·41	3·50	1·40	—	—	—
10·00	9·50	1·45	0·55	1·30	1·70	2·20	2·35	—	—	—	—	—	—
7·60	7·40	0·47	0·38	0·78	1·26	1·67	1·71	0·42	3·92	1·70	—	—	1·42
7·40	6·95	1·22	0·34	0·60	1·32	1·65	1·68	0·41	3·35	1·48	—	—	1·10
7·85	7·25	0·47	0·57	1·15	1·25	—	—	—	—	—	—	—	1·38
6·37	—	0·74	—	—	1·05	1·56	1·62	0·41	3·15	1·40	3·08	—	—
7·80	7·55	0·50	0·42	1·10	1·48	—	—	—	4·50	1·75	—	—	1·45
—	7·43	0·45	0·39	1·10	1·31	1·68	1·77	0·42	4·00	1·55	—	—	1·30
7·50	—	0·70	0·35	—	1·30	1·70	1·78	0·44	3·70	1·55	—	—	—
8·05	—	0·30	0·37	0·78	1·32	1·88	1·90	0·45	4·48	1·68	—	—	—
7·10	6·70	0·45	0·37	0·80	1·24	1·72	1·75	0·39	3·70	1·55	—	—	1·25
7·10	—	0·40	0·33	—	1·16	1·55	1·62	0·38	3·45	1·45	—	—	—
8·00	7·57	1·20	0·44	1·00	1·23	—	—	—	—	—	—	—	1·25
7·40	—	0·30	0·30	1·00	1·45	1·82	1·87	0·45	—	—	—	—	—
7·15	—	—	—	—	1·40	1·94	2·00	0·50	4·25	—	—	—	—
—	6·70	0·85	0·31	0·90	1·25	1·65	1·73	0·43	—	—	—	—	1·25
7·30	7·10	1·20	0·35	0·95	1·20	1·57	1·62	0·42	3·60	1·60	—	—	1·18
7·30	7·00	0·40	0·39	0·80	1·20	1·58	1·60	0·39	—	—	—	—	1·32
6·85	—	0·29	—	—	—	—	—	—	—	—	—	—	—
8·00	7·65	0·43	0·40	0·80	1·30	2·10	2·19	0·45	4·03	1·76	—	—	1·38
9·15	8·85	0·79	0·43	1·20	1·70	2·30	2·37	0·56	5·50	2·18	—	—	1·85
9·75	9·45	1·64	0·50	1·40	1·65	—	—	—	—	—	—	—	1·78
7·10	—	—	—	—	1·52	1·74	1·76	—	3·75	1·52	—	—	—
9·00	8·70	1·23	0·45	1·35	1·67	2·20	2·26	0·58	—	—	—	—	1·72
6·75	6·25	1·10	0·41	0·70	1·18	1·53	1·57	0·38	3·40	1·57	—	—	1·35
7·07	7·00	1·10	0·35	0·75	1·24	1·64	1·67	0·41	—	—	—	—	1·20
7·30	—	—	0·30	0·75	1·15	1·66	1·73	0·42	—	—	—	—	—
6·90	—	0·58	—	—	1·22	1·62	1·65	0·42	2·52	1·55	—	—	—
8·00	7·80	0·50	0·44	0·85	1·30	1·80	1·85	0·44	4·07	1·74	—	—	1·32
8·75	8·25	1·40	0·39	0·95	1·55	2·03	3·11	0·52	4·62	1·84	—	—	1·50
7·60	—	—	—	—	1·20	1·60	1·64	0·42	3·85	1·50	—	—	—
7·90	7·49	1·10	0·39	1·05	—	1·65	1·70	0·41	—	—	—	—	1·40
9·00	9·22	1·50	0·59	1·75	—	—	—	—	—	—	—	—	1·65
6·75	6·60	1·10	0·35	1·00	1·07	1·60	1·64	0·41	3·40	1·45	—	—	1·35
8·15	8·05	1·20	0·51	1·35	1·39	1·95	2·03	—	4·65	1·80	—	—	1·50
—	6·50	0·90	0·40	0·98	1·05	1·42	1·45	0·39	—	—	—	—	1·20
7·05	—	—	—	—	1·13	1·64	1·66	0·43	3·50	1·53	—	—	—
7·65	7·15	0·45	0·36	0·80	1·30	1·64	1·67	0·42	—	—	—	—	1·31
7·55	7·00	0·49	0·39	0·80	1·18	1·62	1·66	0·44	3·75	1·70	—	—	1·23
7·25	6·80	1·00	0·49	0·90	1·25	1·49	1·54	0·43	2·38	1·57	—	—	1·46
7·30	7·10	0·47	0·38	0·80	1·20	1·64	1·68	0·42	—	—	—	—	1·23
9·00	8·55	1·45	0·55	1·40	—	—	—	—	—	—	—	—	1·60
7·45	—	0·80	—	—	1·20	1·74	1·76	0·43	3·67	1·65	—	—	—
6·90	6·70	0·90	0·45	0·90	1·17	1·68	1·74	0·42	3·90	1·55	—	—	1·40
7·05	6·90	0·43	0·32	0·98	1·16	1·61	1·64	0·44	3·58	1·62	—	—	1·38
7·35	7·00	0·40	0·39	1·00	1·40	1·74	1·79	0·46	4·03	1·70	—	—	1·40
7·85	7·55	1·35	0·36	0·75	1·26	—	—	—	—	—	—	—	1·28
6·40	6·27	0·97	0·33	0·90	1·02	1·50	1·60	0·37	3·20	1·32	—	—	1·00
7·65	7·40	1·00	0·40	1·15	1·30	1·85	1·90	0·42	—	—	—	—	1·20
—	7·45	1·16	0·38	1·05	1·35	1·90	1·95	0·42	3·85	1·55	—	—	1·30
7·30	—	—	0·42	1·00	1·22	1·70	1·76	0·41	—	—	—	—	—
8·50	8·10	1·27	0·54	1·10	1·45	2·00	2·04	0·47	—	—	—	—	1·35

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1926												
24 Aug.	1004	Male	20·45	—	4·27	—	4·65	9·06	1·05	4·95	1·07	5·80
25 ,,	1005	Male	17·70	—	3·20	3·50	3·68	7·35	0·84	—	0·82	5·30
25 ,,	1009	Female	16·28	—	3·00	3·20	3·43	6·85	0·77	4·25	0·86	4·90
26 ,,	1011	Male	14·30	—	—	—	2·80	—	—	—	0·76	—
26 ,,	1014	Female	17·05	—	3·32	3·50	3·55	7·15	0·82	—	0·91	4·80
26 ,,	1015	Male	15·85	—	2·87	3·10	3·33	6·40	0·77	3·85	0·82	4·34
27 ,,	1021	Male	14·95	—	2·60	—	2·83	6·00	—	—	0·75	4·90
27 ,,	1024	Male	19·60	—	4·00	4·07	4·20	8·45	0·96	4·70	1·04	5·60
27 ,,	1025	Female	15·90	—	2·80	2·95	3·12	6·35	0·73	4·40	0·76	5·05
28 ,,	1028	Male	15·50	—	2·60	2·86	2·98	6·23	—	—	0·79	4·88
28 ,,	1030	Male	19·00	—	3·65	3·90	4·00	7·90	0·98	4·80	0·88	5·35
28 ,,	1032	Male	16·10	—	2·80	3·05	3·20	6·55	0·80	4·15	0·91	4·90
28 ,,	1033	Male	20·90	—	4·15	4·35	4·62	8·95	0·96	5·20	1·03	5·80
28 ,,	1035	Male	15·75	—	2·90	3·13	3·26	6·47	0·76	3·85	0·85	4·55
29 ,,	1037	Female	15·80	—	2·80	3·08	3·10	6·20	0·75	—	0·85	4·95
29 ,,	1038	Female	17·20	—	3·30	3·55	3·70	7·30	0·86	4·27	0·81	4·93
29 ,,	1039	Female	14·60	—	2·42	2·64	2·73	5·70	0·74	3·85	0·76	4·35
29 ,,	1040	Male	16·80	—	3·13	3·38	3·47	6·93	0·90	4·10	0·88	4·80
30 ,,	1042	Male	20·15	—	3·75	4·06	4·23	8·30	1·01	4·90	0·95	5·70
31 ,,	1043	Female	16·70	—	2·95	3·20	3·24	6·45	0·83	—	0·85	5·05
31 ,,	1044	Female	15·85	—	2·88	3·04	3·16	6·83	0·74	4·05	0·88	4·80
2 Sept.	1051	Male	14·85	—	—	—	—	5·70	—	—	0·80	4·90
2 ,,	1053	Female	14·40	—	2·36	2·53	2·67	5·55	0·67	3·75	0·80	4·33
3 ,,	1055	Female	21·20	—	4·30	4·54	4·73	9·00	1·01	5·10	0·98	5·75
4 ,,	1058	Male	20·20	—	4·00	4·23	4·28	8·45	0·99	—	0·98	5·50
4 ,,	1059	Male	20·17	—	4·00	4·28	4·43	—	0·93	4·98	0·99	5·50
14 ,,	1080	Male	16·00	—	2·78	2·98	3·04	6·16	0·74	4·10	0·80	4·80
14 ,,	1082	Male	15·25	—	2·65	2·80	2·98	5·95	0·70	3·73	0·76	4·47
15 ,,	1083	Male	17·70	—	3·35	3·70	3·73	7·48	0·86	—	0·88	5·40
15 ,,	1084	Male	20·45	—	2·85	4·10	4·24	8·55	1·03	4·75	1·03	5·60
15 ,,	1086	Female	20·25	—	4·05	4·40	4·48	8·40	0·92	4·77	0·98	5·50
17 ,,	1087	Male	14·71	—	—	—	2·55	—	—	—	0·82	4·65
17 ,,	1089	Male	17·00	—	3·10	3·28	3·44	6·80	0·80	4·17	0·83	5·05
17 ,,	1090	Male	14·45	—	2·60	2·92	2·96	5·55	—	—	0·76	4·50
17 ,,	1091	Female	15·95	—	2·82	3·03	3·20	6·35	0·71	3·88	0·87	4·78
17 ,,	1092	Female	16·35	—	3·18	3·35	3·48	6·80	0·81	3·95	0·93	4·79
17 ,,	1093	Female	15·30	—	2·68	2·89	2·98	5·96	0·72	4·00	0·73	4·72
17 ,,	1094	Male	21·20	—	4·04	4·20	4·42	8·70	1·03	5·10	1·01	5·68
18 ,,	1096	Male	13·90	—	2·25	2·49	2·60	5·28	0·66	3·46	0·78	4·12
18 ,,	1097	Female	12·75	—	2·01	2·33	2·36	4·80	0·61	3·49	0·67	3·90
20 ,,	1102	Male	16·50	—	2·96	3·20	3·38	6·70	0·72	—	0·75	4·75
21 ,,	1103	Female	15·20	—	2·60	—	2·95	6·10	—	—	0·82	4·45
21 ,,	1105	Male	15·25	—	2·45	2·77	2·90	6·05	0·72	3·90	0·77	4·50
21 ,,	1106	Female	15·05	—	2·71	2·89	2·98	6·06	0·78	3·90	0·77	4·68
21 ,,	1108	Male	14·80	—	2·76	3·00	3·10	6·15	0·72	3·58	0·74	4·18
22 ,,	1111	Male	20·35	—	3·87	4·00	4·17	8·20	1·01	5·00	0·95	5·75
22 ,,	1114	Female	15·25	—	2·88	3·07	3·17	6·20	0·80	3·73	0·77	4·62
22 ,,	1115	Female	17·90	—	3·40	3·70	3·85	7·60	0·89	4·47	0·84	5·10
24 ,,	1118	Male	14·05	—	2·35	2·50	2·60	5·45	0·66	—	0·81	4·30
24 ,,	1120	Female	14·80	—	2·35	2·60	2·69	5·70	0·75	3·80	0·83	4·60
25 ,,	1127	Female	21·25	—	4·07	4·32	4·56	8·70	1·08	5·40	1·00	5·90
26 ,,	1130	Male	19·20	—	3·40	3·70	3·84	7·70	0·92	4·78	0·95	5·45
26 ,,	1132	Male	21·75	—	4·20	—	4·77	9·20	0·98	5·30	1·13	6·10
26 ,,	1133	Male	21·20	—	4·23	—	4·64	8·95	1·04	5·10	0·96	5·60
26 ,,	1134	Male	14·25	—	2·55	2·70	2·77	5·68	0·75	—	0·77	4·15
26 ,,	1135	Female	17·45	—	3·35	3·55	3·67	7·20	0·85	4·40	0·85	5·30
26 ,,	1136	Male	20·15	—	3·90	—	4·30	—	1·00	4·90	0·90	5·55
27 ,,	1140	Male	14·65	—	2·25	2·70	2·70	5·60	0·69	—	0·76	4·40
27 ,,	1144	Female	16·65	—	3·10	3·45	3·50	—	0·80	4·00	0·83	4·80
28 ,,	1146	Male	19·60	—	3·98	4·15	4·34	8·00	0·98	—	0·93	5·45

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
9·50	9·10	1·50	0·52	1·30	1·58	—	—	—	—	—	—	—	2·00
8·30	—	—	—	—	1·37	1·95	1·98	0·48	4·45	1·84	—	—	—
7·85	7·70	0·50	0·43	1·00	1·40	1·90	1·95	0·49	4·18	2·80	—	—	1·45
6·95	—	—	—	—	1·08	1·54	1·62	—	3·40	1·30	—	—	—
7·50	—	0·45	—	—	1·45	—	—	—	4·37	1·65	—	—	—
7·30	6·90	1·00	0·39	1·10	1·12	1·67	1·71	0·40	3·92	1·50	—	—	1·35
6·90	—	0·50	0·38	1·00	1·20	1·65	1·67	—	3·50	1·45	—	—	—
8·90	8·60	1·42	0·51	1·05	1·80	—	—	—	5·00	2·27	—	—	1·59
7·90	7·70	0·55	0·32	0·80	1·27	1·78	1·81	0·43	3·74	1·64	—	—	1·25
7·30	—	—	0·39	0·80	—	1·77	1·85	0·44	3·70	1·63	—	—	—
8·90	8·60	1·30	0·46	1·40	1·60	2·10	2·18	0·54	4·85	1·98	—	—	1·77
7·80	7·50	1·25	0·44	0·80	1·37	1·87	1·92	0·48	3·88	1·83	—	—	1·25
9·60	9·20	1·70	0·63	1·30	1·70	—	—	—	5·50	2·14	—	—	1·67
7·30	7·05	1·23	0·48	0·90	1·35	1·70	1·75	0·44	3·98	1·65	—	—	1·34
7·50	—	0·35	—	—	1·34	1·70	1·75	0·41	3·80	1·61	—	—	—
8·00	7·70	0·57	0·43	0·90	1·43	1·99	2·02	0·49	4·48	1·86	—	—	1·52
7·00	6·65	0·45	0·37	0·70	1·28	—	—	—	—	—	—	—	1·33
7·85	7·70	1·33	0·39	1·00	1·30	—	—	—	—	—	—	—	1·53
9·10	8·75	1·50	0·42	1·20	1·70	—	—	—	—	—	—	—	1·77
7·80	—	0·43	0·37	0·73	1·30	1·80	1·87	0·43	4·00	1·71	—	—	—
7·60	7·35	0·50	0·38	1·00	1·20	1·84	1·91	0·42	3·86	1·54	—	—	1·28
7·65	—	0·75	—	—	—	—	—	—	3·36	1·65	—	—	—
6·90	6·65	0·47	0·42	0·85	1·14	1·65	1·73	0·38	—	—	—	—	1·25
9·30	9·00	0·65	0·45	1·00	1·75	2·32	2·40	0·60	5·63	2·40	—	—	1·78
9·00	—	1·18	0·62	1·00	1·60	2·20	2·28	0·57	5·10	2·35	—	—	—
8·65	8·25	1·55	—	1·24	1·65	2·30	2·36	—	5·25	2·14	—	—	1·75
7·60	7·45	0·75	0·36	0·75	1·22	1·57	1·63	0·41	—	—	—	—	1·24
7·10	7·00	1·22	0·42	0·95	1·13	1·61	1·67	0·39	—	—	—	—	1·35
8·20	—	0·80	0·45	0·80	1·45	—	—	0·50	4·45	1·90	—	—	—
9·30	9·10	1·70	0·56	1·20	1·70	2·25	2·30	0·60	5·15	—	—	—	1·83
8·90	8·60	0·65	0·55	1·30	1·56	2·09	2·13	0·56	—	—	—	—	1·75
7·00	—	—	—	—	1·31	1·77	1·81	0·43	3·21	1·56	—	—	—
8·10	7·90	1·30	0·37	0·85	1·25	—	—	—	—	—	—	—	1·35
6·85	—	—	—	—	1·12	1·47	1·51	0·37	—	—	—	—	—
7·55	7·30	0·37	0·36	1·00	1·37	1·76	1·79	0·45	3·87	1·62	—	—	1·32
7·45	7·25	0·41	0·44	0·90	1·37	1·79	1·82	—	—	—	—	—	1·47
7·30	7·10	0·38	0·30	0·80	1·18	1·63	1·69	0·38	—	—	—	—	1·28
9·60	9·45	1·72	0·51	0·90	1·48	—	—	—	5·36	2·20	—	—	1·54
6·57	6·40	1·08	0·33	0·65	1·10	1·65	1·70	0·38	3·19	1·40	—	—	1·20
6·25	6·40	0·42	0·32	0·70	1·00	1·59	1·62	0·35	—	—	—	—	1·05
7·60	7·70	1·20	0·38	0·80	1·34	1·90	1·96	—	—	—	—	—	—
7·00	—	0·35	—	—	1·17	1·61	1·65	0·43	3·68	1·53	—	—	—
7·18	7·00	1·00	0·41	0·80	1·21	1·62	1·66	0·40	3·57	1·51	—	—	1·36
7·20	6·90	0·42	0·45	1·00	1·36	1·94	2·00	0·40	3·72	1·49	—	—	1·35
6·60	6·45	1·18	0·41	0·90	1·18	1·80	1·86	0·42	—	—	—	—	1·31
9·26	8·90	1·55	0·57	1·10	1·44	1·95	1·96	0·55	5·04	2·04	—	—	1·63
7·25	7·00	0·46	0·52	1·00	1·15	1·47	1·56	0·38	3·90	1·60	—	—	1·38
8·10	7·80	0·50	0·38	1·00	1·38	1·98	2·10	0·46	4·65	1·94	—	—	1·57
6·75	—	—	0·38	0·80	1·08	1·55	1·61	0·37	3·19	1·50	—	—	—
7·25	7·25	0·40	0·39	0·95	1·18	1·61	1·70	0·41	—	—	—	—	1·15
9·60	9·20	0·65	0·55	1·10	1·60	2·17	2·21	0·62	5·46	2·36	—	—	1·87
9·00	8·65	1·50	0·42	1·15	1·46	1·72	1·76	0·49	—	—	—	—	1·60
9·90	9·55	1·58	0·50	1·15	1·80	2·50	2·34	0·66	—	—	—	—	1·60
9·45	9·10	1·15	0·47	1·10	1·75	2·29	2·34	0·64	5·65	2·20	—	—	1·80
6·80	—	1·16	0·36	0·60	1·15	1·40	1·49	0·38	—	—	—	—	—
8·45	8·10	0·40	0·47	1·20	1·45	1·92	1·97	0·51	—	—	—	—	1·50
8·95	8·60	1·55	0·38	1·37	—	2·20	2·26	0·58	—	—	—	—	1·70
7·00	—	—	0·43	1·05	1·22	1·55	1·58	0·40	—	—	—	—	—
7·55	7·45	0·45	0·37	0·90	1·37	1·79	1·86	0·46	—	—	—	—	1·45
8·95	—	—	—	—	—	—	—	—	—	—	—	—	—

			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1926												
28 Sept.	1148	Male	16·80	—	3·14	3·35	3·43	6·80	0·83	4·25	0·85	4·90
28 ,,	1149	Male	15·95	—	2·80	3·15	3·28	—	0·76	4·00	0·77	4·70
3 Oct.	1163	Female	15·40	—	2·75	2·83	2·92	6·05	0·74	4·10	0·81	4·75
3 ,,	1165	Female	18·80	—	3·45	3·85	3·90	7·80	0·93	4·66	0·94	5·40
7 ,,	1175	Male	19·60	—	4·19	—	4·40	—	0·97	4·65	0·90	5·50
8 ,,	1180	Male	14·90	—	2·40	2·60	2·68	5·55	0·70	—	0·81	4·40
9 ,,	1184	Female	16·70	—	2·90	3·20	3·26	6·60	0·82	—	0·90	5·00
9 ,,	1187	Female	13·55	—	2·20	2·48	2·57	5·39	0·66	3·48	0·68	4·05
9 ,,	1188	Male	15·00	—	2·75	3·00	3·10	6·15	0·74	3·75	0·75	—
11 ,,	1189	Male	19·35	—	3·60	—	4·13	—	1·02	4·45	1·00	5·45
11 ,,	1190	Male	21·70	—	4·00	—	4·30	—	0·98	5·00	0·90	6·05
11 ,,	1192	Male	20·70	—	4·10	—	4·48	8·90	1·05	4·70	1·00	5·70
11 ,,	1193	Male	15·25	—	2·47	2·65	2·75	5·95	0·77	3·95	0·85	4·75
South Georgia												
15 Nov.	1194	Male	20·25	—	3·90	—	4·20	—	1·03	—	1·04	6·10
15 ,,	1197	Male	21·30	—	3·89	4·34	4·52	9·24	1·04	4·75	1·03	5·89
15 ,,	1198	Male	21·33	—	4·65	5·45	4·85	9·67	—	—	1·08	5·73
16 ,,	1199	Male	19·60	—	3·75	4·05	4·21	8·33	0·94	—	0·90	5·02
17 ,,	1203	Female	20·70	—	4·26	—	4·50	9·31	—	—	1·03	5·95
18 ,,	1210	Female	21·80	—	4·44	4·82	4·88	—	—	—	0·98	6·00
18 ,,	1211	Male	20·30	—	3·90	—	4·37	8·30	1·03	5·00	1·00	5·60
22 ,,	1221	Female	22·40	—	4·25	—	4·65	—	1·05	—	0·95	6·40
22 ,,	1224	Female	22·35	—	4·40	—	4·85	9·65	—	—	1·00	6·00
26 ,,	1231	Male	20·96	—	4·12	4·28	4·37	8·76	1·05	4·86	1·10	6·20
29 ,,	1235	Female	22·48	—	4·05	—	5·13	9·50	1·10	—	1·12	6·47
10 Dec.	1270	Male	22·50	—	3·85	4·11	4·25	8·30	0·91	5·11	0·96	5·81
13 ,,	1286	Male	20·24	—	3·88	—	4·27	—	1·02	4·87	1·00	5·69
16 ,,	1292	Female	22·03	—	4·21	4·71	4·71	9·25	1·10	—	0·95	5·91
20 ,,	1297	Female	22·75	—	4·00	4·60	4·70	8·80	1·03	—	1·02	5·60
1927												
4 Jan.	1338	Female	21·80	—	4·55	4·62	4·77	9·25	1·05	5·07	1·09	6·00
9 ,,	1354	Female	21·85	—	4·30	4·60	4·65	—	1·05	—	1·10	6·40
9 ,,	1357	Female	21·70	—	4·40	—	4·90	9·20	1·08	—	1·00	5·65
9 ,,	1358	Male	20·20	—	4·05	—	4·57	8·61	—	—	1·05	5·62
10 ,,	1365	Female	21·40	—	4·20	—	4·80	9·25	1·02	5·30	1·00	6·00
10 ,,	1369	Female	21·00	—	4·10	—	4·55	8·45	1·00	—	1·05	5·80
11 ,,	1370	Female	22·45	—	4·70	—	5·20	10·00	1·08	—	1·15	6·10
11 ,,	1371	Male	23·60	—	4·60	—	5·05	10·10	1·06	—	1·05	6·15
11 ,,	1372	Male	18·90	—	3·55	3·88	4·00	7·95	0·89	—	0·85	5·15
15 ,,	1377	Male	20·20	—	—	—	—	—	—	—	—	—
15 ,,	1381	Female	23·35	—	—	—	—	—	—	—	—	—
17 ,,	1391	Male	21·05	—	—	—	—	—	—	—	—	—
18 ,,	1392	Male	19·60	—	—	—	—	—	—	—	—	—
18 ,,	1393	Male	20·05	—	—	—	—	—	—	—	—	—
18 ,,	1394	Female	20·60	—	—	—	—	—	—	—	—	—
19 ,,	1398	Male	19·30	—	—	—	—	—	—	—	—	—
19 ,,	1399	Female	21·10	—	—	—	—	—	—	—	—	—
19 ,,	1400	Female	21·80	—	—	—	—	—	—	—	—	—
19 ,,	1401	Female	22·00	—	—	—	—	—	—	—	—	—
21 ,,	1404	Female	21·40	—	—	—	—	—	—	—	—	—
22 ,,	1413	Female	20·40	—	—	—	—	—	—	—	—	—
22 ,,	1414	Female	21·10	—	—	—	—	—	—	—	—	—
22 ,,	1415	Male	17·40	—	—	—	—	—	—	—	—	—
22 ,,	1416	Female	22·05	—	—	—	—	—	—	—	—	—
26 ,,	1433	Female	17·30	—	—	—	—	—	—	—	—	—
27 ,,	1435	Male	19·60	—	—	—	—	—	—	—	—	—
30 ,,	1451	Male	18·30	—	—	—	—	—	—	—	—	—
30 ,,	1452	Female	21·80	—	—	—	—	—	—	—	—	—
7 Feb.	1456	Female	19·50	—	—	—	—	—	—	—	—	—
14 ,,	1469	Male	16·00	—	—	—	—	—	—	—	—	—

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
7·90	7·65	1·30	0·44	1·10	1·40	—	—	—	4·23	1·70	—	—	1·35
7·27	—	0·95	0·44	1·00	—	—	—	—	—	—	—	—	1·32
7·60	6·15	0·55	0·32	1·15	1·32	1·80	1·82	0·44	3·60	—	3·52	2·00	1·40
8·40	—	0·45	0·54	1·30	1·60	2·21	2·30	0·52	4·70	2·00	4·61	2·42	1·62
8·90	—	1·40	0·29	1·10	1·70	2·18	2·20	0·58	—	—	—	—	1·65
7·03	—	1·15	—	—	1·10	—	—	—	3·40	1·45	—	1·62	—
7·80	—	—	0·49	1·00	1·36	1·85	1·90	0·44	4·00	1·62	3·92	2·03	—
—	6·15	0·50	0·31	0·90	1·10	1·44	1·49	0·35	—	—	—	1·62	1·22
7·00	—	—	0·38	0·85	1·15	1·60	1·62	—	—	—	—	—	—
8·60	8·60	1·45	—	1·45	—	2·10	2·19	0·50	4·90	2·00	—	—	1·70
9·95	9·75	1·65	—	1·20	—	—	—	—	—	—	—	—	1·60
—	8·85	1·50	—	1·30	1·85	2·46	2·52	—	—	—	—	—	1·70
—	7·63	1·29	0·36	1·00	1·25	1·67	1·68	—	—	—	—	—	1·30
9·55	—	1·05	—	—	—	—	—	—	—	—	—	—	—
9·43	—	1·01	—	1·30	1·75	2·39	2·50	0·60	—	—	—	—	—
9·20	8·70	1·53	—	1·38	1·88	2·49	2·52	0·61	—	—	—	—	—
8·91	—	1·27	—	—	1·75	2·20	2·25	0·54	5·15	2·14	—	—	—
8·86	—	0·51	—	—	1·77	2·35	2·41	0·62	5·60	2·30	—	—	—
9·90	—	0·65	—	—	—	—	—	—	5·85	2·40	—	—	—
9·10	8·80	1·40	0·57	1·40	1·55	—	—	—	—	—	—	—	1·85
10·30	—	0·70	—	—	—	—	—	—	—	—	—	—	—
9·70	—	0·70	—	—	1·75	—	—	—	—	—	—	—	—
9·95	9·58	1·45	0·57	1·70	1·83	2·29	2·32	0·60	—	—	—	—	1·85
9·50	—	0·58	0·42	1·05	2·05	2·31	2·42	0·64	6·28	2·58	—	—	—
9·83	9·27	1·40	0·54	1·40	1·67	—	—	—	—	—	—	—	1·90
9·25	9·25	1·43	0·53	0·97	—	—	—	—	—	—	—	—	1·87
9·79	—	0·65	—	—	1·82	2·41	2·47	0·62	5·58	2·48	—	—	—
9·30	—	0·55	0·56	—	2·03	—	—	0·65	5·65	2·40	—	—	—
9·70	9·50	0·60	0·53	1·36	1·87	2·44	2·57	0·65	5·60	2·36	—	—	1·94
10·10	—	0·60	—	—	—	—	—	—	—	—	—	—	—
9·20	—	0·55	—	—	1·60	—	—	—	6·00	2·20	—	—	—
9·10	—	—	—	—	—	—	—	0·51	5·50	2·20	—	—	—
9·65	—	0·50	0·40	1·30	2·29	2·42	2·50	0·54	5·85	2·40	—	—	—
9·20	9·00	0·60	0·50	1·30	—	—	—	—	5·50	—	—	—	1·95
—	—	—	—	—	1·80	—	—	—	6·20	2·50	—	—	—
10·40	10·40	1·15	—	—	2·10	—	—	—	6·05	2·37	—	—	—
8·45	—	—	0·46	—	1·50	—	—	—	—	—	—	—	—
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			1	2	3	4	5	6	7	8	9	10
Date	Whale Number	Sex	Total length, tip of snout to notch of flukes	Lower jaw, projection beyond tip of snout	Tip of snout to blow-hole	Tip of snout to angle of gape	Tip of snout to centre of eye	Tip of snout to tip of flipper	Eye to ear, centres	Notch of flukes to posterior emargination of dorsal fin	Flukes, width at insertion	Notch of flukes to anus
1927												
15 Feb.	1474	Male	21·30	—	—	—	4·30	—	—	—	—	6·00
15 ,,	1475	Female	22·80	—	—	—	4·87	—	—	—	—	6·40
17 ,,	1476	Male	17·00	—	—	—	3·42	—	—	—	—	4·97
21 ,,	1485	Female	23·40	—	—	—	5·27	—	—	—	—	6·58
22 ,,	1487	Male	19·40	—	—	—	3·15	6·40	0·95	4·80	—	5·40
22 ,,	1488	Male	21·70	—	—	—	4·55	7·25*	1·08	5·00	—	5·95
22 ,,	1489	Male	19·80	—	—	—	3·50	6·55	0·90	4·75	—	5·55
22 ,,	1490	Female	22·40	—	—	—	4·65	7·45	1·05	5·50	—	6·25
24 ,,	1498	Female	20·50	—	—	—	4·40	6·80	0·95	4·95	—	5·90
24 ,,	1500	Male	20·00	—	—	—	4·45	7·00	1·03	4·70	—	5·70
24 ,,	1501	Female	17·60	—	—	—	3·35	5·45	0·81	4·90	—	5·10
25 ,,	1502	Female	21·20	—	—	—	4·58	7·20	1·08	—	—	5·95
25 ,,	1505	Female	22·10	—	—	—	4·94	7·60	1·10	—	—	6·40
25 ,,	1506	Female	18·30	—	—	—	3·70	5·90	0·94	4·60	—	5·25
26 ,,	1510	Male	20·30	—	—	—	4·25	6·75	0·90	4·83	—	5·30
26 ,,	1511	Male	17·10	—	—	—	3·67	5·85	0·85	4·20	—	4·70
27 ,,	1513	Female	20·40	—	—	—	4·20	6·50	—	5·13	—	5·72
27 ,,	1515	Female	17·55	—	—	—	3·72	5·90	0·88	4·53	—	5·20
27 ,,	1516	Female	22·85	—	—	—	4·95	7·40	1·20	5·15	—	6·30
27 ,,	1519	Female	14·10	—	—	—	2·36	4·07	0·67	3·95	0·73	4·52
28 ,,	1521	Female	20·80	—	—	—	4·30	5·80	—	5·05	—	6·10
28 ,,	1522	Female	15·85	—	—	—	2·85	4·50	0·80	4·15	—	4·80
1 March	1527	Female	20·10	—	—	—	4·33	6·65	1·05	4·90	—	5·55
1 ,,	1528	Male	18·50	—	—	—	3·80	6·00	0·88	4·55	—	5·20
3 ,,	1529	Male	21·00	—	4·00	—	4·50	7·15	0·98	—	—	5·95
3 ,,	1531	Female	19·40	—	—	—	3·95	6·20	0·88	4·80	—	5·25
3 ,,	1536	Male	17·65	—	—	—	3·62	5·75	0·83	4·45	—	5·00
3 ,,	1537	Female	21·50	—	—	—	4·58	7·35	1·05	5·20	—	5·65
4 ,,	1539	Male	17·30	—	—	—	3·63	5·75	0·91	4·20	—	5·10
4 ,,	1540	Female	18·80	—	—	—	3·80	6·05	0·90	4·90	—	5·60
4 ,,	1541	Female	18·40	—	3·50	—	4·10	6·65	—	—	—	5·40
4 ,,	1542	Male	19·10	—	—	—	4·05	6·40	0·90	4·45	—	5·20
4 ,,	1543	Male	20·10	—	—	—	4·59	7·30	1·03	—	—	5·55
4 ,,	1544	Male	20·10	—	—	—	4·23	6·85	—	—	—	5·50
4 ,,	1545	Male	18·85	—	—	—	3·90	6·30	—	4·20	—	5·15
4 ,,	1546	Male	18·20	—	—	—	3·90	6·00	—	4·35	—	5 10
4 ,,	1548	Male	19·70	—	—	—	3·80	6·25	0·87	4·60	—	5·50
5 ,,	1552	Female	21·50	—	—	—	4·30	7·10	1·00	5·55	—	6·50
5 ,,	1553	Male	18·30	—	—	—	3·75	5·90	0·86	4·65	—	5·10
5 ,,	1554	Male	20·78	—	—	—	4·30	7·00	0·98	4·85	—	5·80
16 ,,	1580	Male	20·09	—	—	—	4·47	6·95	1·48	—	—	5·10
20 ,,	1585	Male	20·80	—	—	—	4·45	7·00	—	—	—	5·45
20 ,,	1587	Female	20·80	—	—	—	4·65	7·70	1·03	4·35	—	6·10
20 ,,	1589	Male	15·30	—	—	—	3·50	4·56	0·74	4·80	—	4·60
20 ,,	1590	Female	15·10	—	—	—	2·55	4·45	0·75	3·90	—	4·60
21 ,,	1591	Male	15·90	—	—	—	—	—	—	—	—	4·61
21 ,,	1592	Male	15·00	—	—	—	2·75	4·70	0·71	3·90	—	4·40
21 ,,	1594	Female	21·05	—	—	—	4·38	6·55	1·33	5·28	—	6·05
23 ,,	1595	Female	18·90	—	—	—	3·98	6·20	0·88	—	—	5·58
23 ,,	1596	Male	21·20	—	—	—	4·20	7·45	0·97	5·15	—	5·95
24 ,,	1597	Female	20·90	—	—	—	4·23	6·90	0·95	—	—	6·20
24 ,,	1598	Female	21·05	—	—	—	4·50	7·05	1·03	5·10	—	5·70
29 ,,	1603	Female	15·80	—	—	—	2·93	4·86	—	—	—	4·80
5 April	1626	Female	20·90	—	—	—	4·35	6·45	1·00	4·25	—	5·90
6 ,,	1627	Male	19·50	—	—	—	4·03	6·35	—	—	—	5·60
6 ,,	1628	Female	20·95	—	—	—	4·35	7·00	1·00	6·10	—	5·85
6 ,,	1629	Male	19·70	—	—		4·38	6·70	0·96	4·65	—	5·50
9 ,,	1641	Male	19·90	—	—	—	4·20	6·75	1·00	—	—	5·25
12 ,,	1643	Male	20·80	—	—	—	4·36	6·95	0·97	5·10	—	5·80
12 ,,	1645	Female	22·90	—	—	—	5·08	7·60	1·10	5·55	—	6·20

* Measurements to the axilla.

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
8·70	—	1·45	0·50	—	1·60	—	—	0·55	4·80	2·15	—	—	1·95
9·50	—	1·55	0·45	—	—	—	—	—	5·50	2·45	—	—	—
8·90	—	1·45	0·45	—	1·51	—	—	0·58	5·00	2·10	—	—	—
10·00	—	0·70	0·50	—	1·65	—	—	0·55	5·70	2·40	—	—	—
9·50	—	0·65	0·57	—	—	—	—	—	5·35	2·35	—	—	2·00
9·25	—	1·30	0·53	—	1·60	2·10	—	0·47	—	—	—	—	—
8·15	—	0·50	—	—	1·36	2·08	—	0·50	4·15	1·90	—	—	—
9·75	—	—	—	—	—	—	—	—	5·50	2·29	—	—	—
9·60	—	—	—	—	—	—	—	—	—	—	—	—	—
8·35	—	0·42	—	—	—	—	—	—	—	—	—	—	—
8·69	—	1·00	0·46	—	1·75	2·30	—	0·60	5·15	2·27	—	—	2·00
7·70	—	—	0·52	—	1·50	1·97	—	0·45	4·57	1·98	—	—	—
9·25	—	—	0·46	—	1·67	2·33	—	0·60	5·00	2·36	—	—	—
8·05	—	—	0·53	—	1·60	1·92	—	0·46	4·50	1·98	—	—	1·65
10·20	—	—	0·51	—	2·08	2·48	—	0·64	5·95	2·55	—	—	—
6·90	—	0·44	0·33	—	1·17	1·67	—	0·37	—	—	—	—	1·47
9·30	—	0·60	0·50	—	1·75	2·30	—	0·55	5·15	2·30	—	—	—
7·70	—	0·60	0·43	—	1·25	1·67	—	0·42	3·60	1·70	—	—	—
8·95	—	—	0·42	—	1·80	2·35	—	0·58	5·18	2·30	—	—	—
8·40	—	—	0·48	—	1·53	—	—	—	—	—	—	—	1·77
9·45	—	—	—	—	1·78	2·53	—	0·63	—	—	—	—	—
8·40	—	—	0·40	—	1·54	2·24	—	0·53	—	—	—	—	1·93
8·10	—	—	0·46	—	1·28	1·80	—	0·46	4·39	1·89	—	—	—
9·30	—	—	0·51	—	—	—	—	—	—	—	—	—	—
7·90	—	1·25	0·40	—	1·30	1·93	—	0·47	4·45	2·00	—	—	—
8·80	—	0·40	0·40	—	—	—	—	—	—	—	—	—	—
8·75	—	0·50	—	—	—	—	—	—	—	—	—	—	—
8·40	—	1·45	0·45	—	1·70	—	—	0·50	4·95	2·20	—	—	—
9·85	—	1·35	—	—	—	—	—	—	5·50	2·55	—	—	—
9·00	—	1·05	0·48	—	1·78	2·25	—	0·58	5·50	2·35	—	—	—
8·30	—	1·35	0·42	—	1·56	2·05	—	0·52	4·70	2·20	—	—	—
8·40	—	1·55	0·45	—	1·55	1·97	—	0·55	4·50	2·10	—	—	—
8·80	—	1·30	0·43	—	1·45	2·02	—	0·52	4·67	2·10	—	—	—
9·95	—	0·60	0·55	—	1·75	2·20	—	0·58	—	—	—	—	—
8·38	—	—	0·43	—	1·49	—	—	—	—	—	—	—	—
9·40	—	—	0·53	—	1·58	—	—	—	—	—	—	—	—
8·55	—	1·00	—	—	1·95	—	—	0·59	5·45	2·60	—	—	—
8·50	—	1·15	—	—	1·80	—	—	0·55	5·20	2·05	—	—	—
9·80	—	0·50	—	—	1·90	—	—	0·62	5·60	2·60	—	—	—
7·20	—	1·10	0·37	—	1·25	—	—	0·45	3·50	1·70	—	—	1·45
7·40	—	0·45	0·32	—	1·24	—	—	0·41	3·30	1·70	—	—	—
—	—	0·74	—	—	—	—	—	—	3·50	1·60	—	—	—
7·30	—	1·30	0·28	—	1·02	—	—	0·37	3·65	1·80	—	—	1·65
9·55	—	0·75	0·55	—	1·63	—	—	0·55	—	—	—	—	—
8·95	—	0·52	—	—	1·63	—	—	0·51	4·78	1·90	—	—	—
9·30	—	1·45	0·56	—	—	—	—	—	—	—	—	—	—
9·80	—	0·60	0·49	—	1·74	—	—	0·53	5·10	2·25	—	—	—
9·40	—	0·75	0·50	—	1·96	—	—	0·62	5·65	2·25	—	—	2·05
7·55	—	0·38	—	—	1·13	—	—	0·41	3·65	1·71	—	—	—
9·60	—	0·70	0·40	—	1·59	—	—	0·54	5·32	2·32	—	—	—
9·10	—	1·15	—	—	1·46	—	—	0·62	4·90	2·14	—	—	—
9·50	—	0·62	0·38	—	1·73	—	—	0·60	5·52	2·24	—	—	—
8·50	—	1·30	0·46	—	1·55	—	—	—	—	—	—	—	—
9·00	—	1·25	—	—	1·75	—	—	0·53	5·25	2·20	—	—	—
9·36	—	1·45	0·53	—	1·78	—	—	0·58	5·32	2·11	—	—	—
10·60	—	0·60	—	—	1·91	—	—	—	6·03	2·50	—	—	—

Date	Whale Number	Sex	1 Total length, tip of snout to notch of flukes	2 Lower jaw, projection beyond tip of snout	3 Tip of snout to blow-hole	4 Tip of snout to angle of gape	5 Tip of snout to centre of eye	6 Tip of snout to tip of flipper	7 Eye to ear, centres	8 Notch of flukes to posterior emargination of dorsal fin	9 Flukes, width at insertion	10 Notch of flukes to anus
1927												
12 April	1646	Male	21·20	—	—	—	4·65	—	—	4·95	—	5·65
12 ,,	1647	Female	18·90	—	—	—	3·78	5·80*	0·79	—	—	5·90
13 ,,	1650	Female	19·25	—	—	—	4·20	6·40	0·85	4·55	—	5·35
13 ,,	1651	Male	21·19	—	—	—	4·40	6·95	1·05	—	—	5·80
13 ,,	1652	Male	20·90	—	—	—	4·50	7·35	1·20	—	—	5·50
13 ,,	1653	Female	21·15	—	—	—	4·25	7·00	1·00	5·60	—	6·20
13 ,,	1654	Male	21·10	—	—	—	4·45	7·15	1·06	5·05	—	5·70
13 ,,	1655	Male	19·80	—	—	—	4·05	6·50	0·93	4·70	—	5·40
19 ,,	1660	Male	20·30	—	—	—	4·20	6·80	1·10	4·50	—	5·75
19 ,,	1662	Male	15·55	—	—	—	2·80	4·70	0·75	4·10	—	4·80
20 ,,	1663	Male	20·30	—	—	—	4·53	6·90	0·95	4·85	—	5·70
20 ,,	1664	Female	22·70	—	—	—	5·00	7·85	—	5·20	—	5·95
20 ,,	1665	Female	19·10	—	—	—	4·10	6·20	0·97	—	—	5·45
20 ,,	1666	Male	19·20	—	—	—	4·10	6·25	0·92	4·90	—	5·45
22 ,,	1668	Male	14·70	—	—	—	2·80	4·70	0·77	3·63	—	4·40
22 ,,	1669	Male	16·50	—	—	—	3·50	5·40	0·79	3·86	—	4·50
22 ,,	1670	Female	16·50	—	—	—	3·22	5·25	—	—	—	5·00
23 ,,	1674	Male	18·60	—	—	—	3·80	4·95	0·85	4·20	—	5·30

* Measurements to the axilla.

11	12	13	14	15	16	17	18	19	20	21	22	23	24
Notch of flukes to umbilicus	Notch of flukes to end of system of ventral grooves	Anus to reproductive aperture, centres	Dorsal fin, vertical height	Dorsal fin, length of base	Flipper, tip to axilla	Flipper, tip to anterior end of lower border	Flipper, length along curve of lower border	Flipper, greatest width	Severed head, condyle to tip	Skull, greatest width	Skull length, condyle to tip of premaxilla	Flipper, tip to head of humerus	Tail, depth at dorsal fin
9·40	—	1·50	—	—	—	—	—	—	5·67	2·15	—	—	—
8·80	—	0·35	—	—	1·58	—	—	0·52	4·50	1·85	—	—	—
8·55	—	0·45	0·47	—	—	—	—	0·55	5·10	2·15	—	—	—
9·60	—	1·45	0·50	—	—	—	—	—	—	—	—	—	—
9·00	—	1·00	—	—	1·84	—	—	0·59	5·50	2·30	—	—	—
9·90	—	0·65	0·55	—	1·90	—	—	0·59	—	—	—	—	—
9·35	—	1·35	—	—	1·84	—	—	0·58	5·40	2·35	—	—	—
8·75	—	1·40	0·40	—	1·64	—	—	0·54	4·85	2·15	—	—	—
9·20	—	1·45	0·50	—	1·70	—	—	0·59	5·00	2·55	—	—	—
7·60	—	1·20	0·35	—	1·20	—	—	0·47	3·40	1·70	—	—	—
9·15	—	1·40	0·56	—	1·90	—	—	—	5·47	2·04	—	—	—
9·70	—	0·58	0·51	—	—	—	—	—	—	—	—	—	—
8·70	—	0·55	0·37	—	—	—	—	—	—	—	—	—	—
8·60	—	1·45	0·39	—	1·57	—	—	—	—	—	—	—	—
7·05	—	0·80	0·40	—	1·22	—	—	0·42	3·45	1·20	—	—	—
7·40	—	1·40	0·52	—	1·50	—	—	0·45	4·28	1·84	—	—	—
7·95	—	0·30	—	—	1·33	—	—	0·46	3·95	1·75	—	—	—
8·60	—	1·50	0·45	—	1·65	—	—	0·54	4·65	2·10	—	—	2·00

INDEX

PLATES XXV–XLIV

PLATE XXV

Fig. 1. Blue whale, ♀, 25 m. From a coloured drawing by J. F. G. Wheeler based on measurements, notes and sketches made at South Georgia.

Fig. 2. Fin whale, ♀, 21 m. From a coloured drawing by J. F. G. Wheeler based on measurements, notes and sketches made at South Georgia.

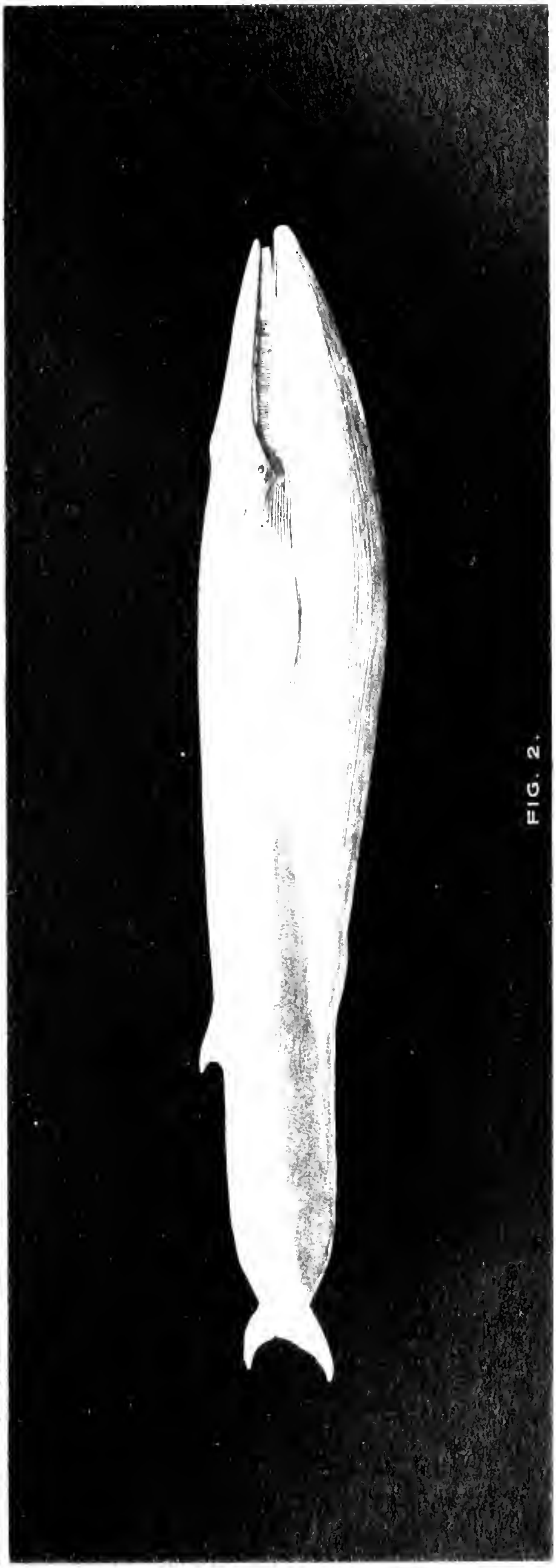


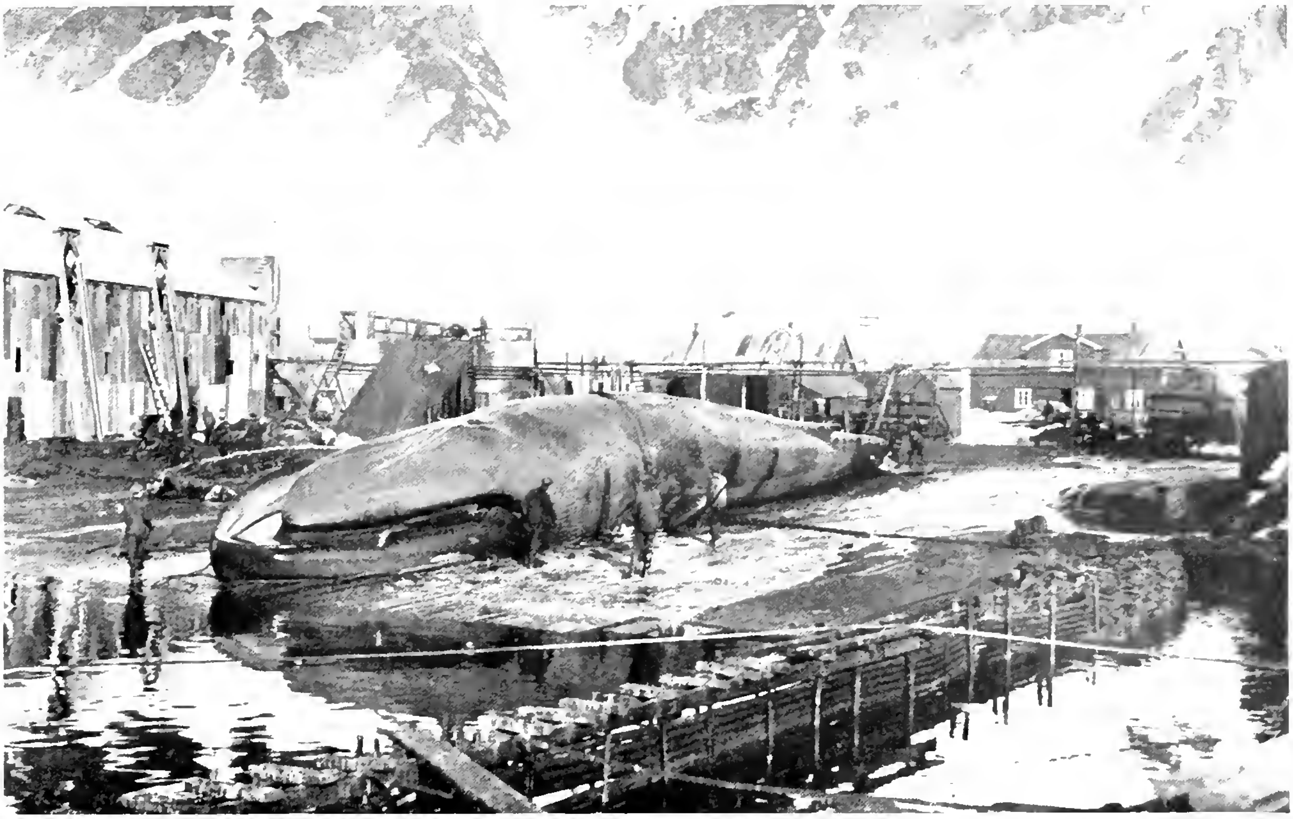
Fig. 1. Blue Whale, *Balaenoptera musculus.*

Fig. 2. Fin Whale, *Balaenoptera physalus.*

PLATE XXVI

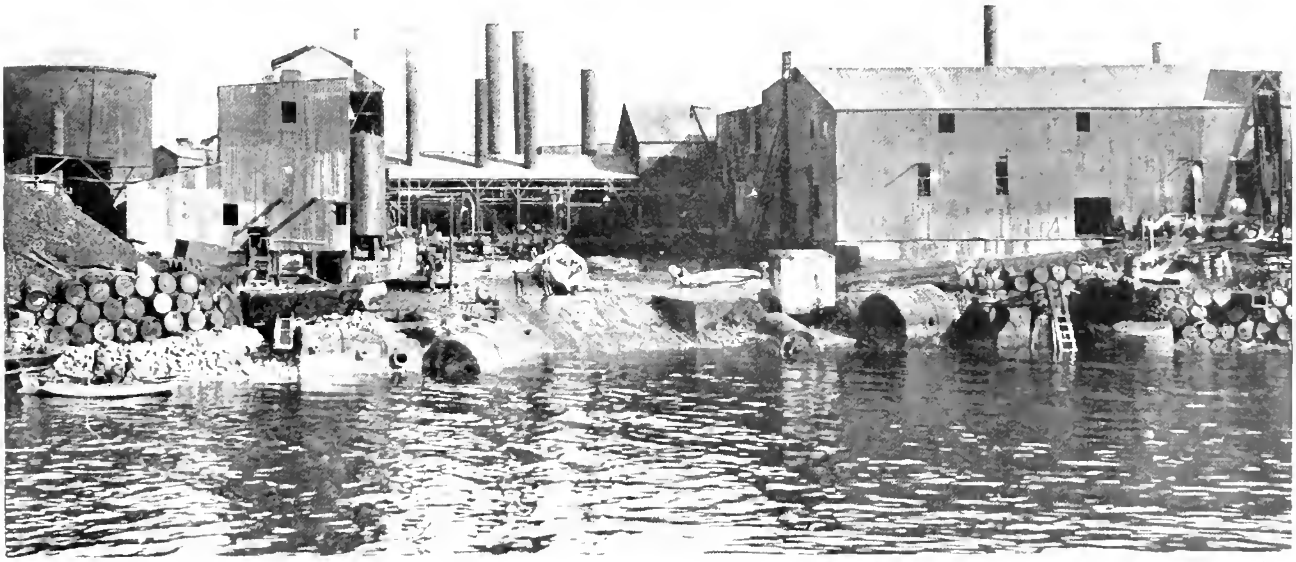
Fig. 1. Flensing platform of whaling station at Grytviken, South Georgia, showing large Blue whale (No. 250).

Fig. 2. Flensing platform at Saldanha Bay, Cape Colony, with partially dismembered carcass of a whale.



N. A. M. phot.

Fig. 1



N. A. M. phot.

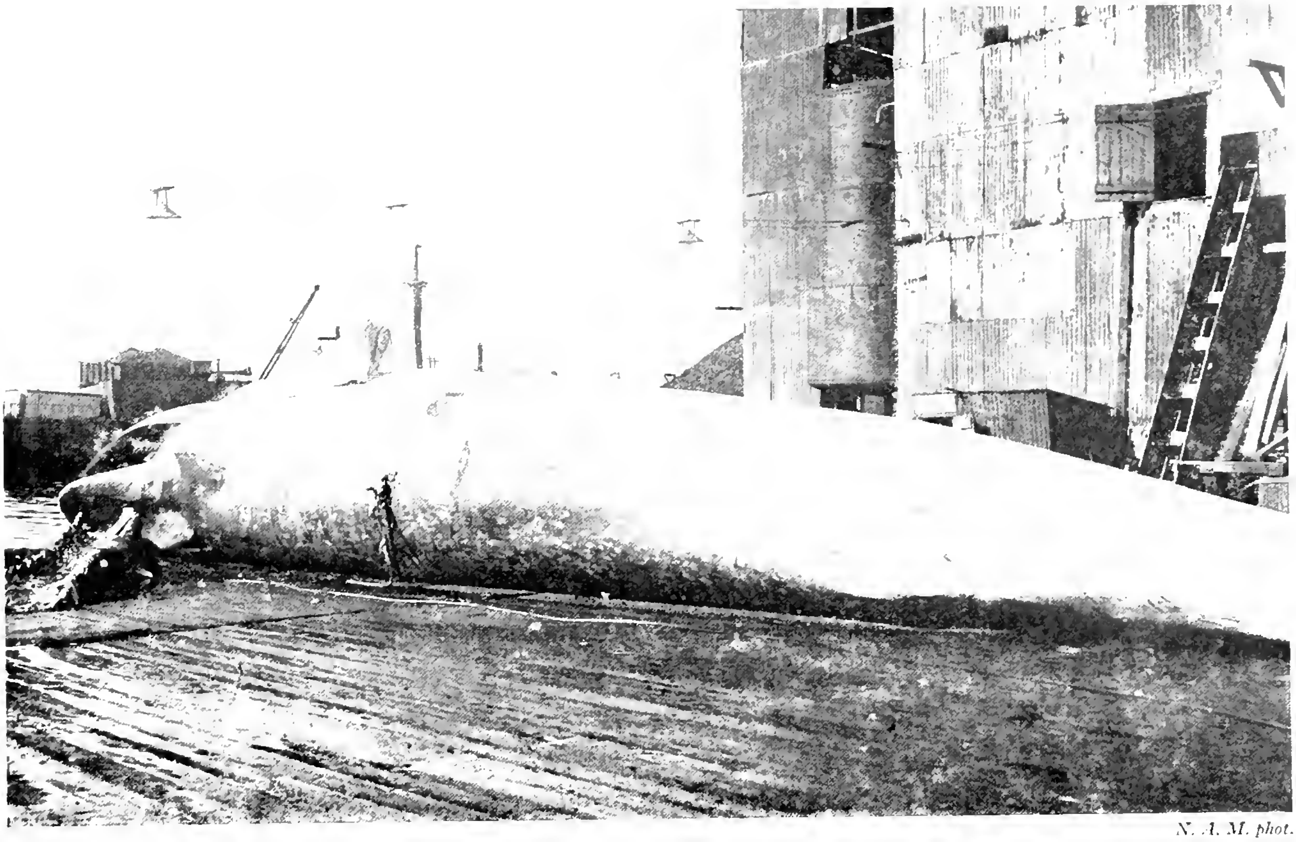
Fig. 2

SOUTHERN BLUE AND FIN WHALES

PLATE XXVII

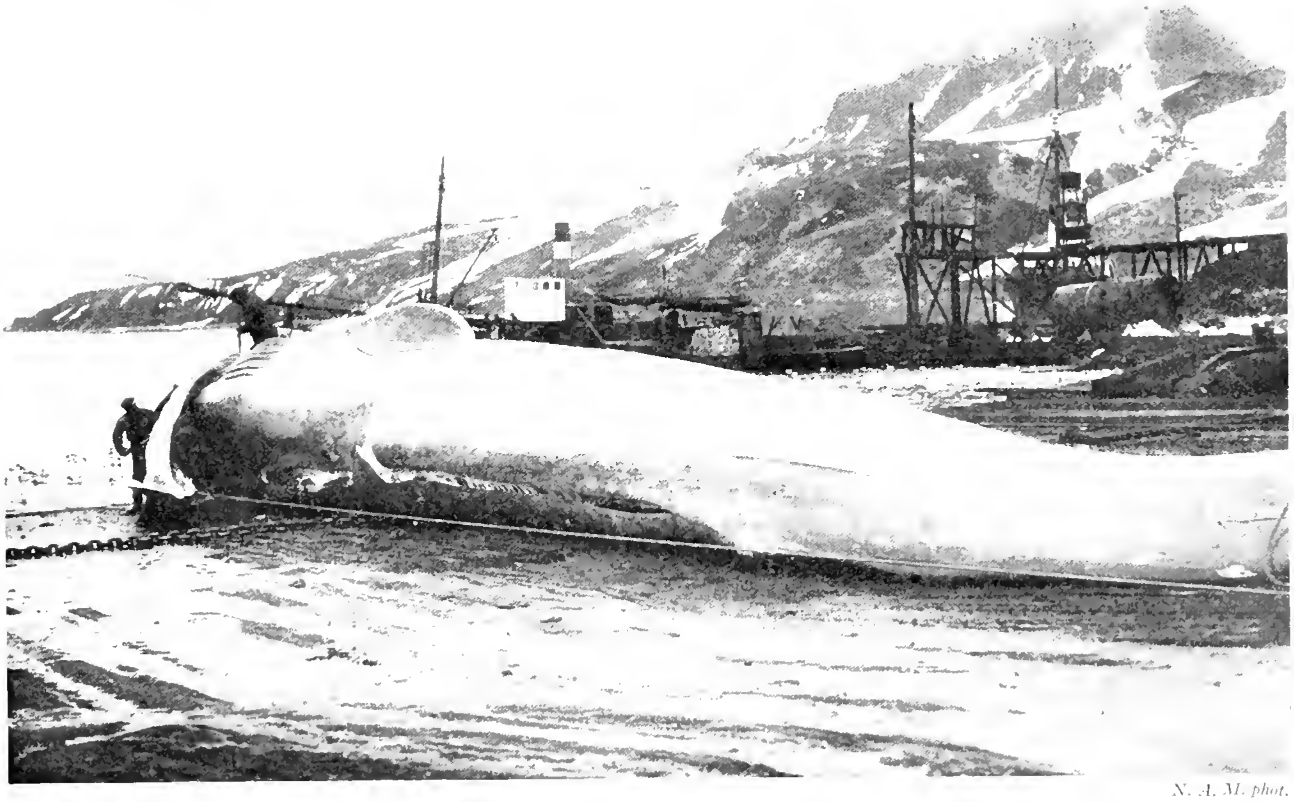
Fig. 1. Blue whale, ♀, No. 862. Dorsal view. Showing pale spots on back and flanks.

Fig. 2. Blue whale, ♀, No. 275. Dorsal view. Showing pale spots on back and flanks.



N. A. M. phot.

Fig. 1



N. A. M. phot.

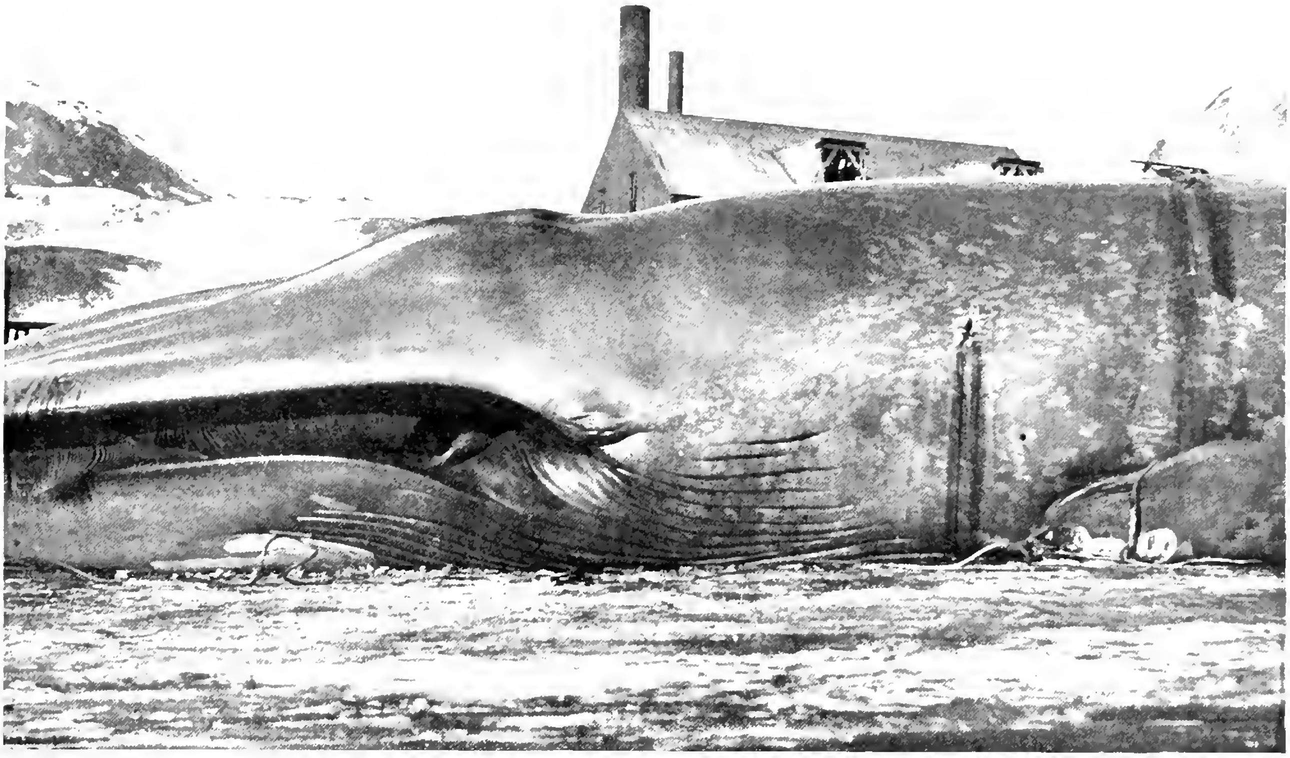
Fig. 2

SOUTHERN BLUE AND FIN WHALES

PLATE XXVIII

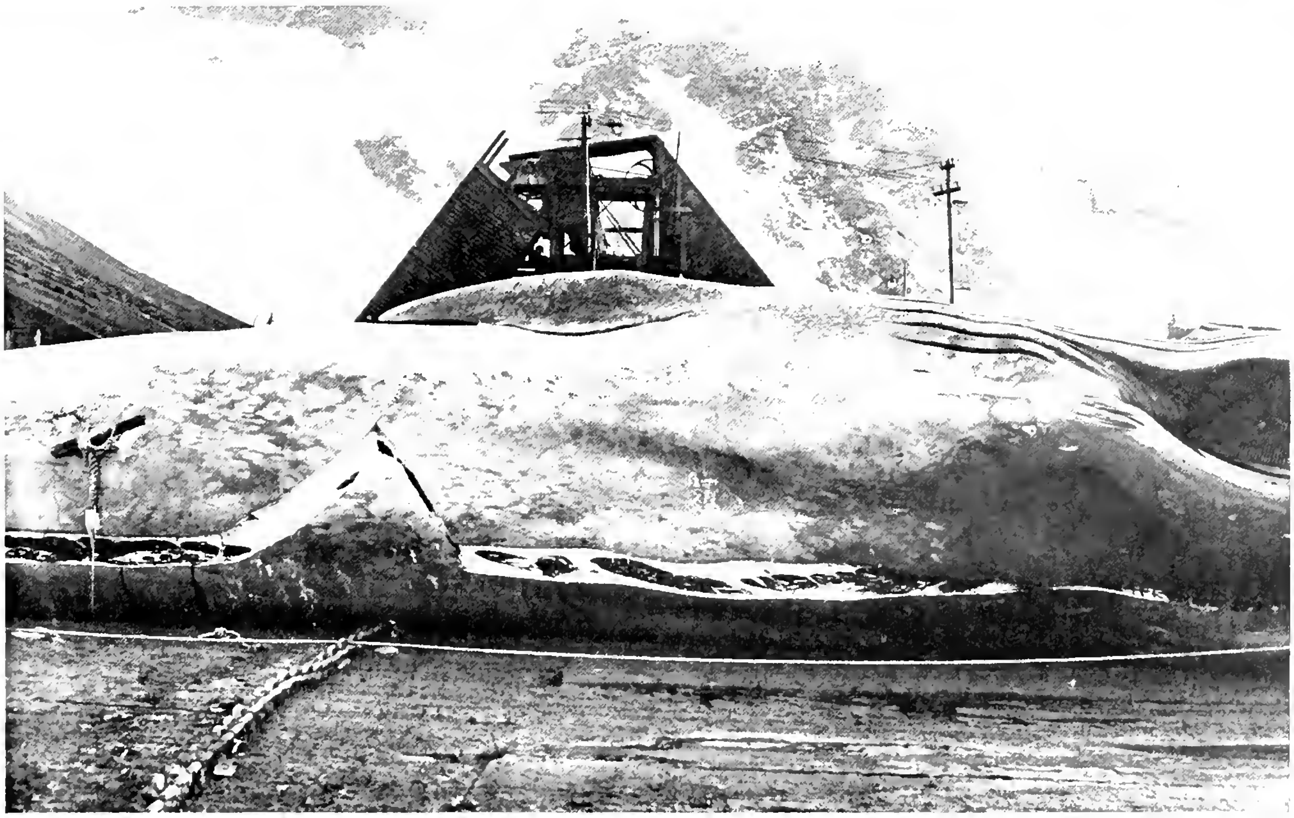
Fig. 1. Blue whale, ♀, No. 250. Showing pigmentation of head and shoulder.

Fig. 2. Blue whale, ♀, No. 265. Showing pigmentation of shoulder and flank.



N. A. M. phot.

Fig. 1



N. A. M. phot.

Fig. 2

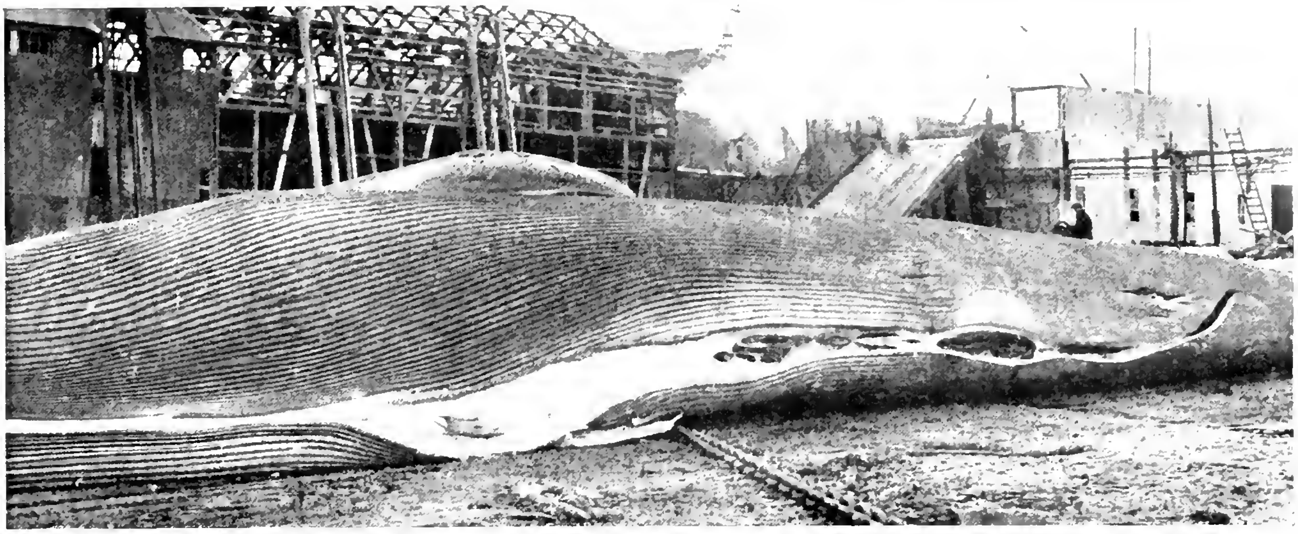
SOUTHERN BLUE AND FIN WHALES

PLATE XXIX

Fig. 1. Blue whale, ♀, No. 248. Ventral view. Note absence of white flecks on the ventral grooves.

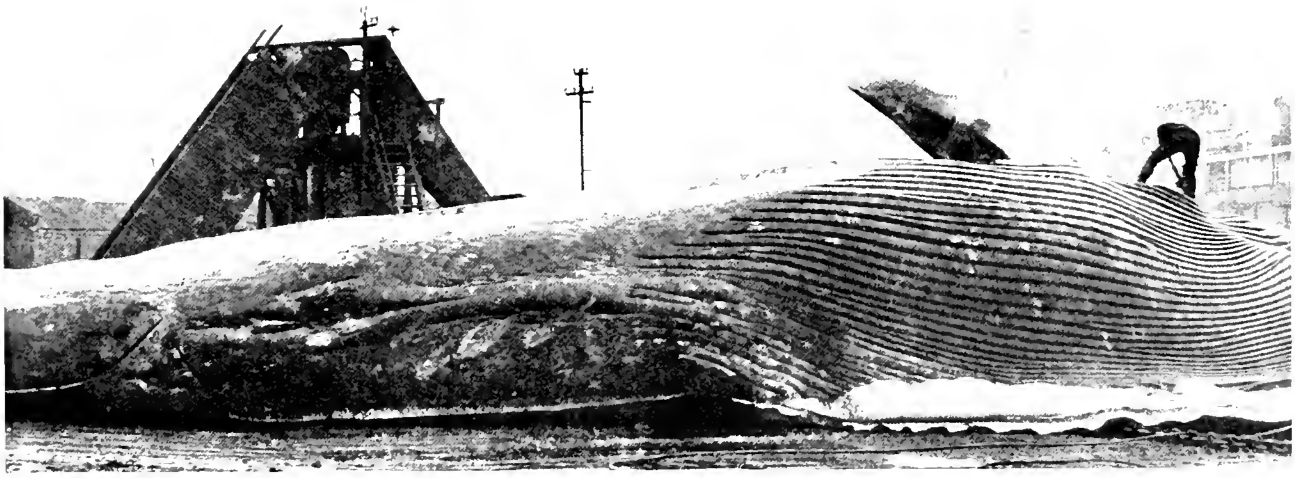
Fig. 2. Blue whale, ♀, No. 261. Ventral view. Note small number of white flecks.

Fig. 3. Blue whale, ♂, No. 256. Ventral view. Note white flecks grouped well forward.



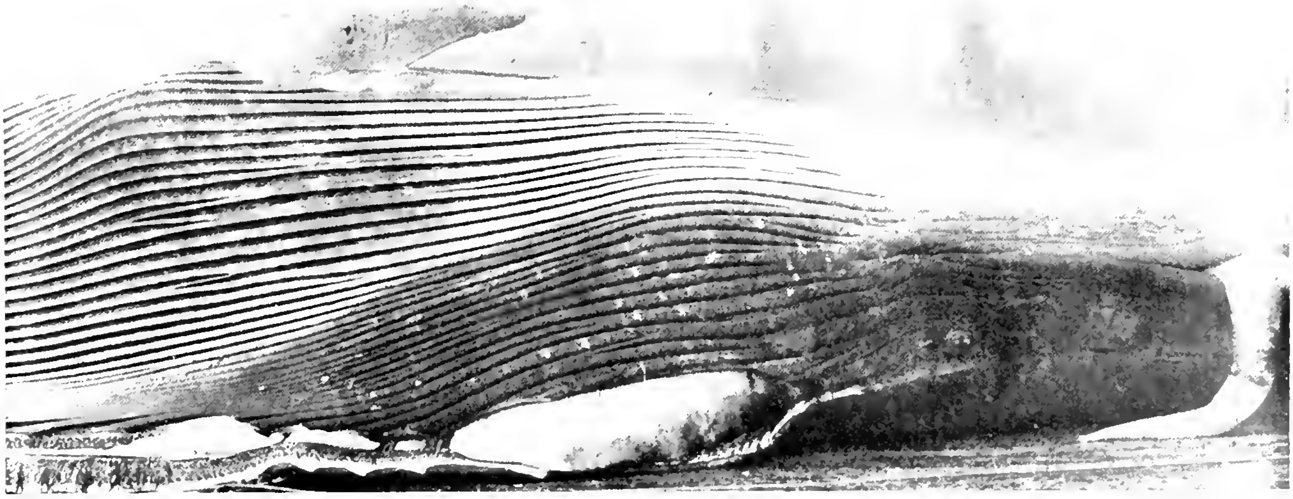
N. A. M. phot.

Fig. 1



N. A. M. phot.

Fig. 2



N. A. M. phot.

Fig. 3

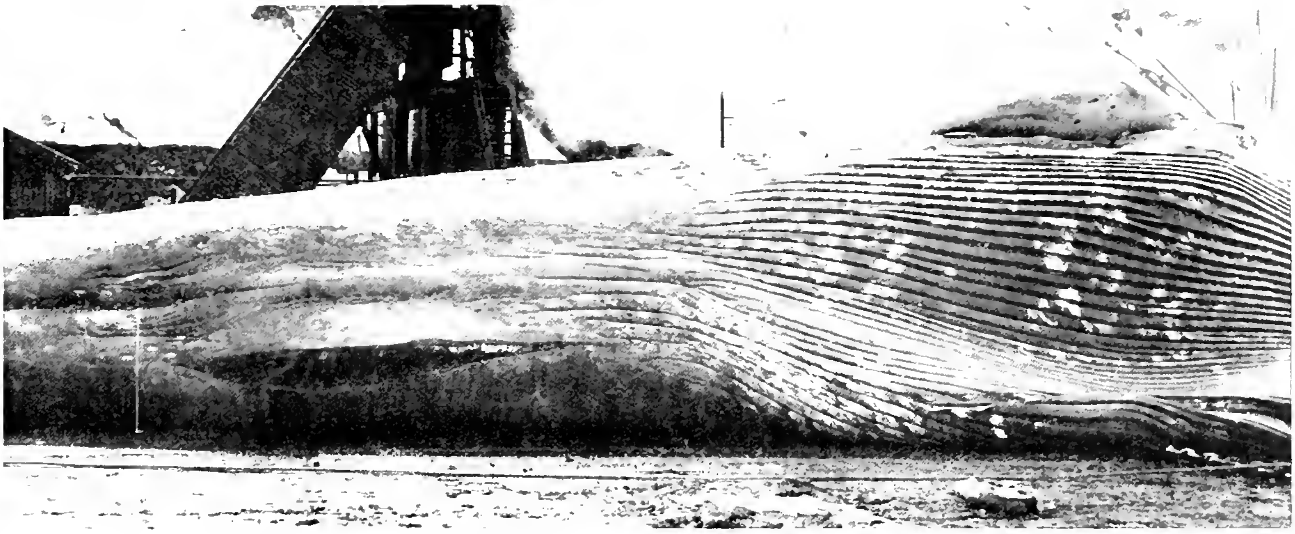
SOUTHERN BLUE AND FIN WHALES

PLATE XXX

Fig. 1. Blue whale, ♀, No. 244. Ventral view. Typical arrangement of white flecks on the ventral grooves. Note the swollen condition of the mammary glands. Cf. Plate XXXV, fig. 3.

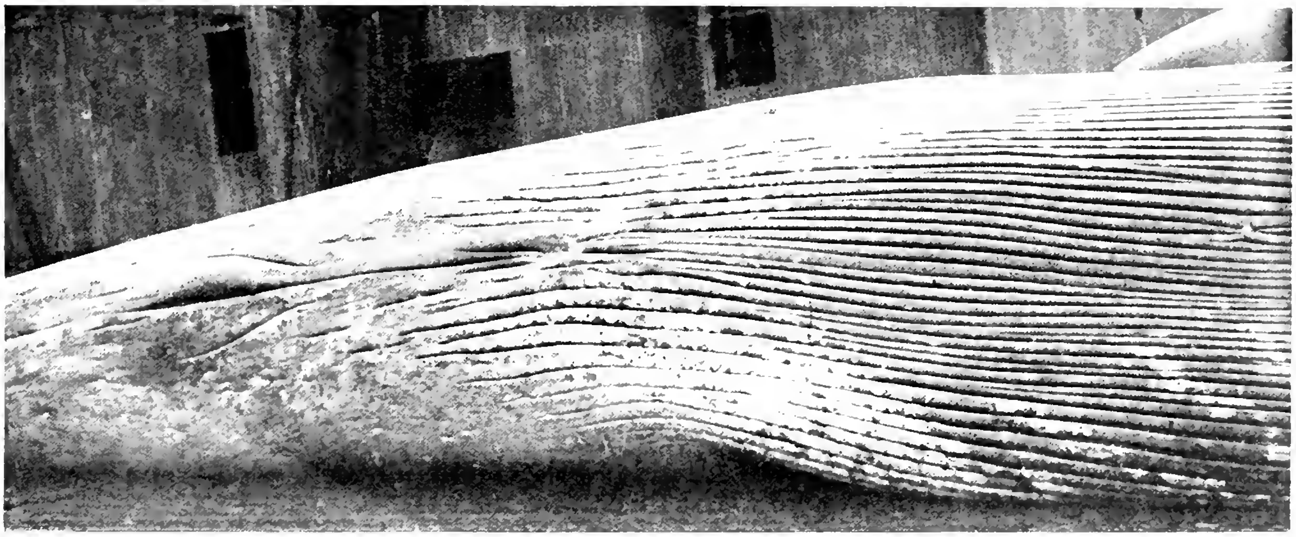
Fig. 2. Blue whale, ♂, No. 907. Ventral view. Note numerous white flecks.

Fig. 3. Blue whale, ♀, No. 253. Ventral view. Note very numerous white flecks and white splash over the umbilicus.



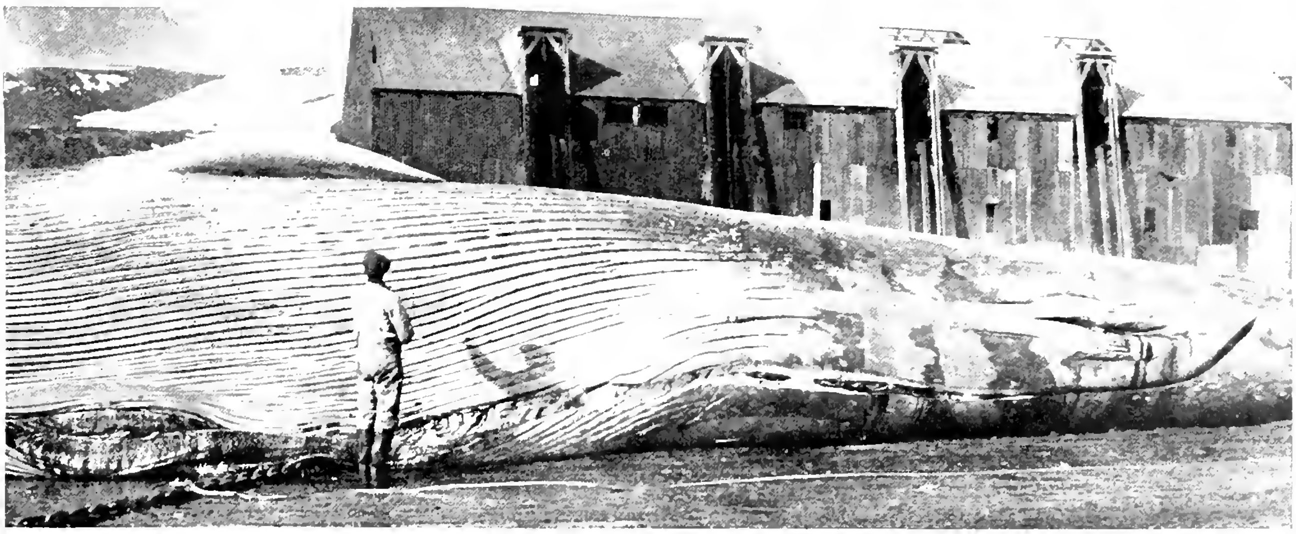
N. A. M. phot.

Fig. 1



N. A. M. phot.

Fig. 2



N. A. M. phot.

Fig. 3

SOUTHERN BLUE AND FIN WHALES

PLATE XXXI

Fig. 1. Blue whale, ♀, No. 1299. Ventral view. Showing transverse white patches just behind the umbilicus in the centre of the photograph.

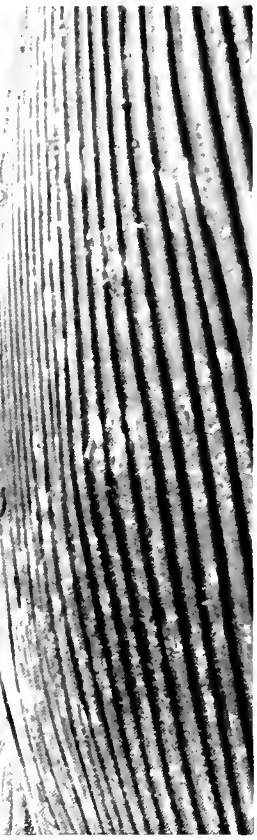
Fig. 2. Blue whale, ♂, No. 1345. Under surface of flipper, showing heavy pigment.

Fig. 3. Blue whale, ♂, 1350. Ventral view of tail showing striations on the under surface of the flukes.

Fig. 4. Blue whale, ♂, No. 157. Ventral view showing genital aperture and ventral grooves.

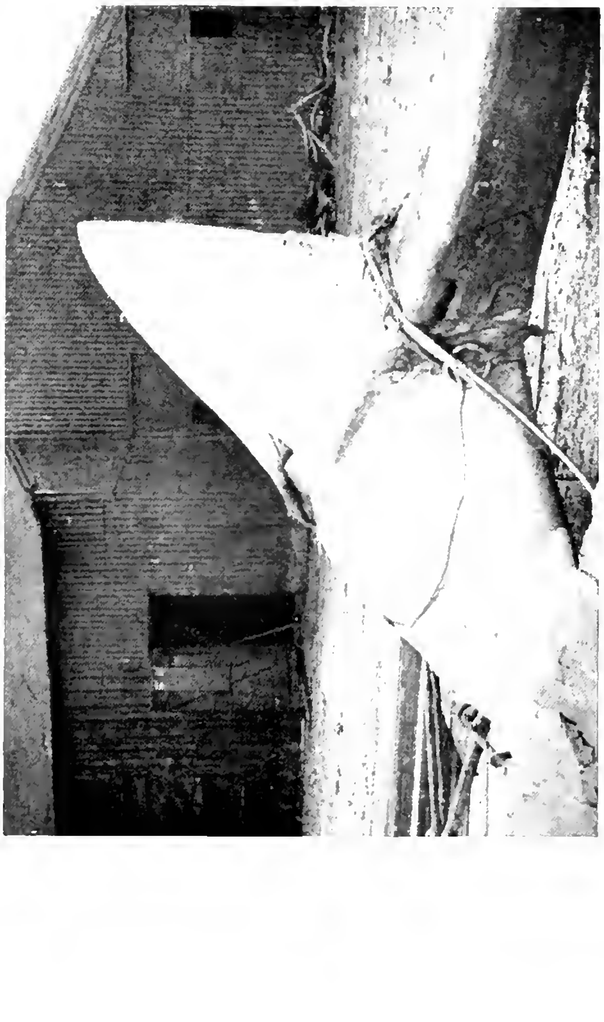
N. A. M. phot.

Fig. 1



N. A. M. phot.

Fig. 2



N. A. M. phot.

Fig. 3

N. A. M. phot.

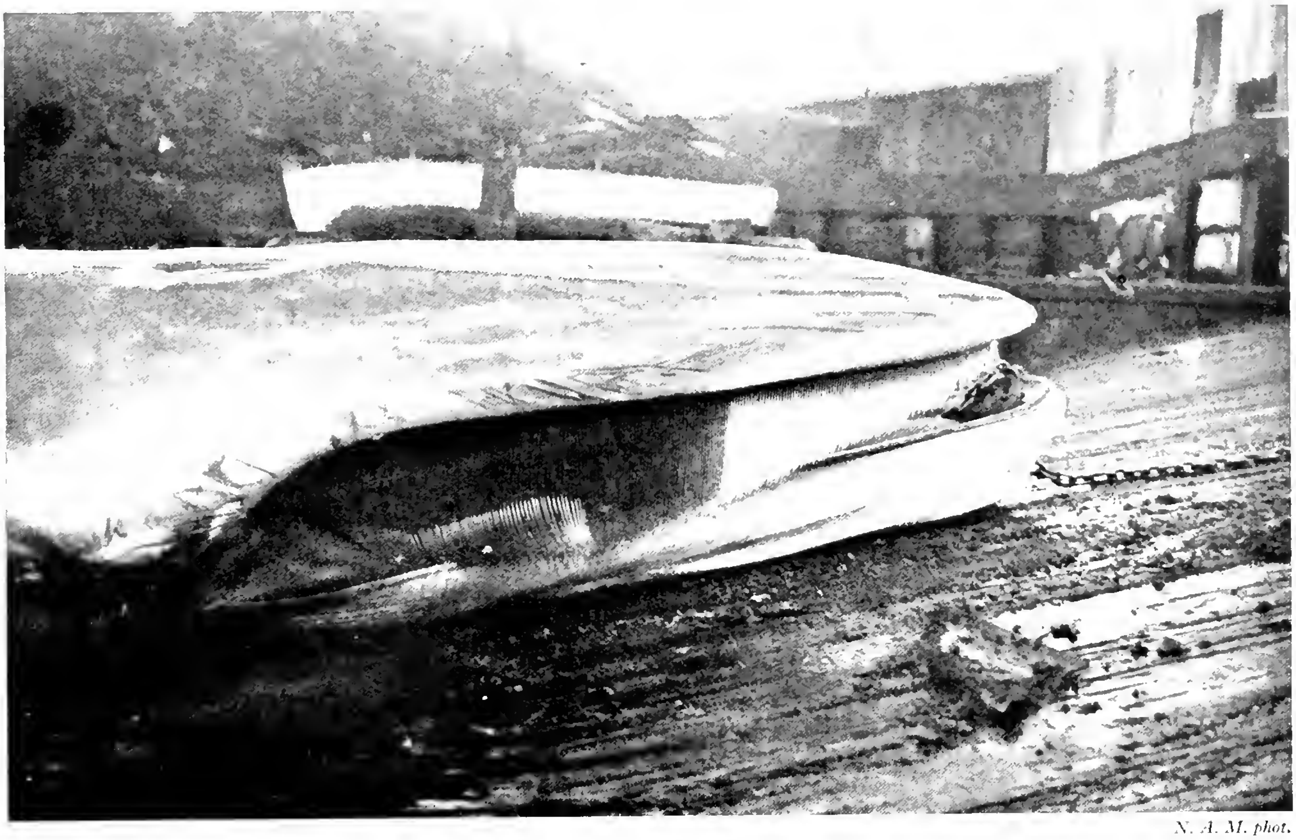
Fig. 4

SOUTHERN BLUE AND FIN WHALES

PLATE XXXII

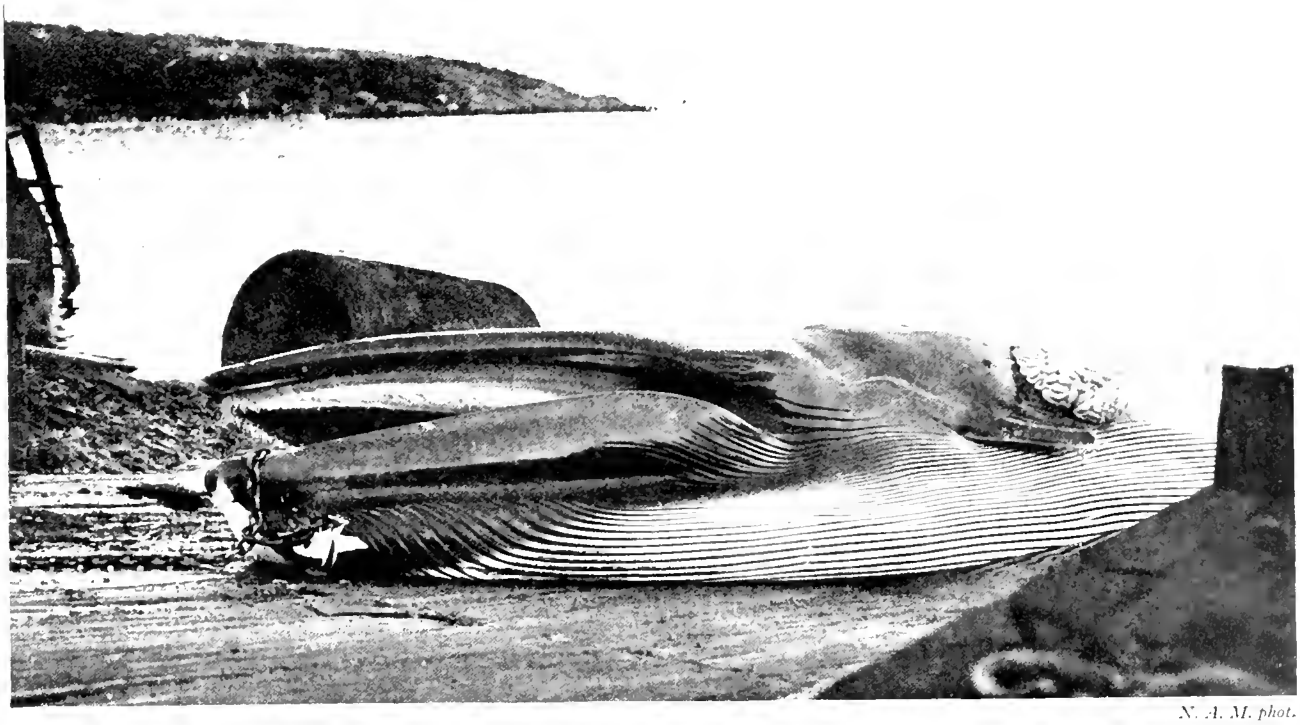
Fig. 1. Fin whale, ♀, No. 865. Right side of head. Note the sharp distinction between the dark and light baleen plates, the unpigmented lower jaw and the unpigmented part of the upper jaw opposite the white baleen plates.

Fig. 2. The same whale. Left side of head. Here the baleen plates are all dark and the upper and lower jaws are both pigmented. Note the thin pale streak running back from the very small aperture of the ear.



N. A. M. phot.

Fig. 1



N. A. M. phot.

Fig. 2

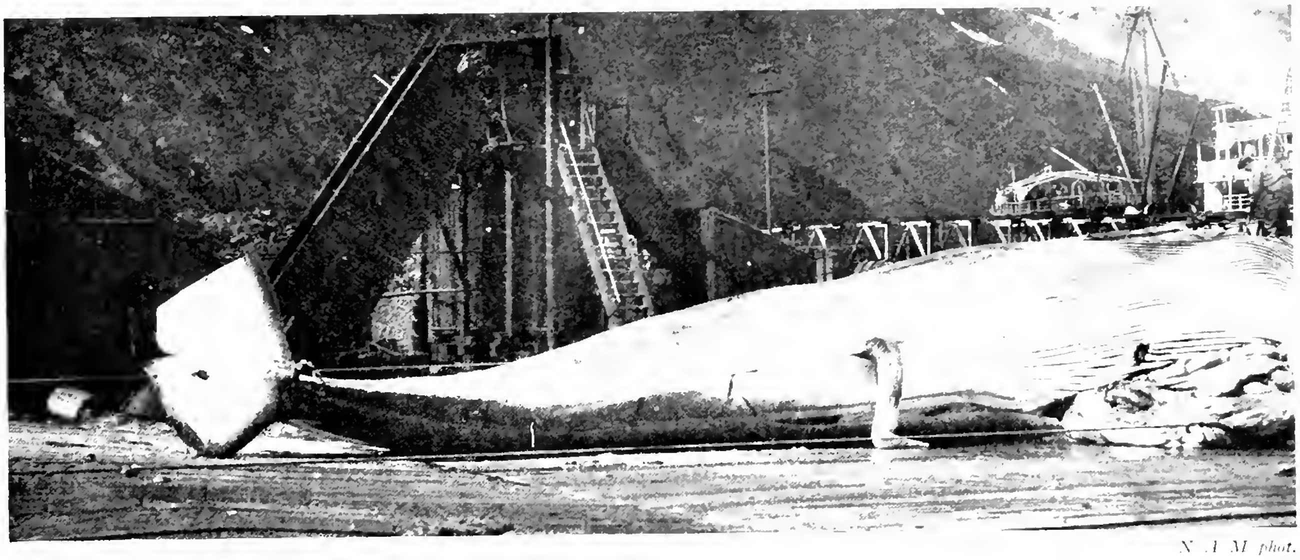
SOUTHERN BLUE AND FIN WHALES

PLATE XXXIII

Fig. 1. Fin whale, ♂, No. 320 (?). Ventral view. Showing heavy pigmentation in the tail region.

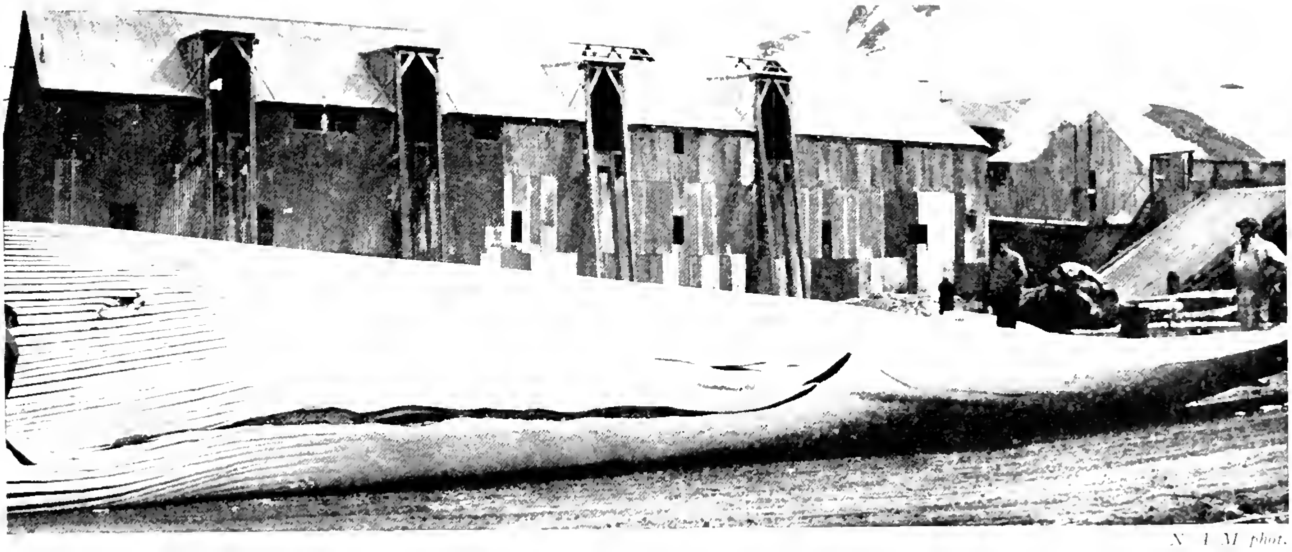
Fig. 2. Fin whale, ♀, No. 263. Ventral view. Showing tongues of pigment behind anus.

Fig. 3. Fin whale, ♀, No. 260. Ventral view. Also showing tongues of pigment behind anus.



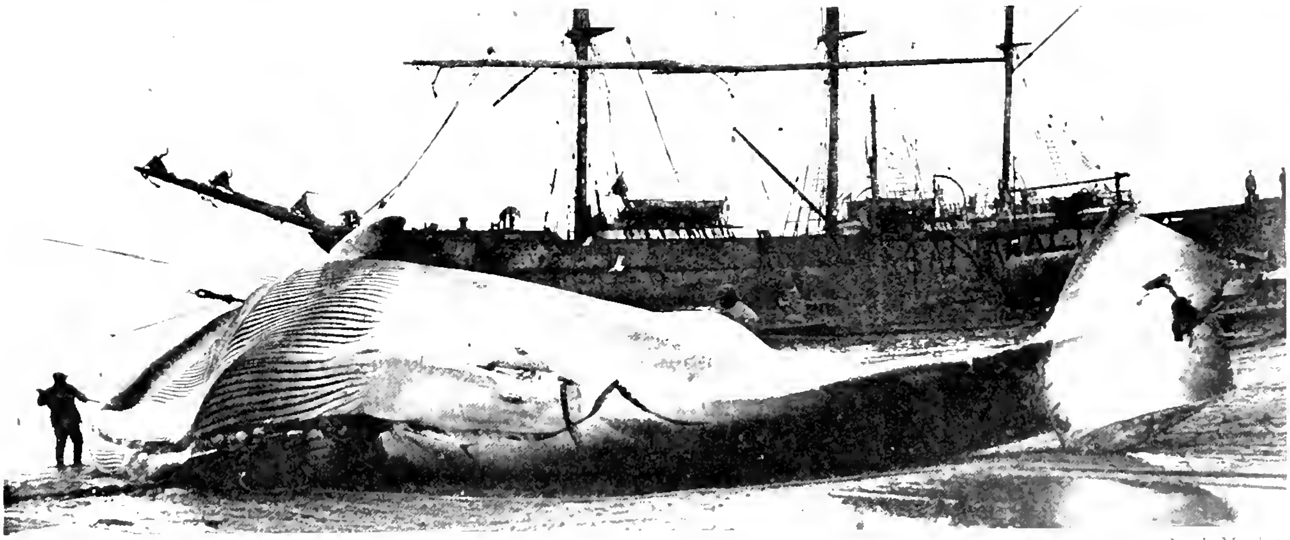
N. A. M. phot.

Fig. 1



N. A. M. phot.

Fig. 2



N. A. M. phot.

Fig. 3

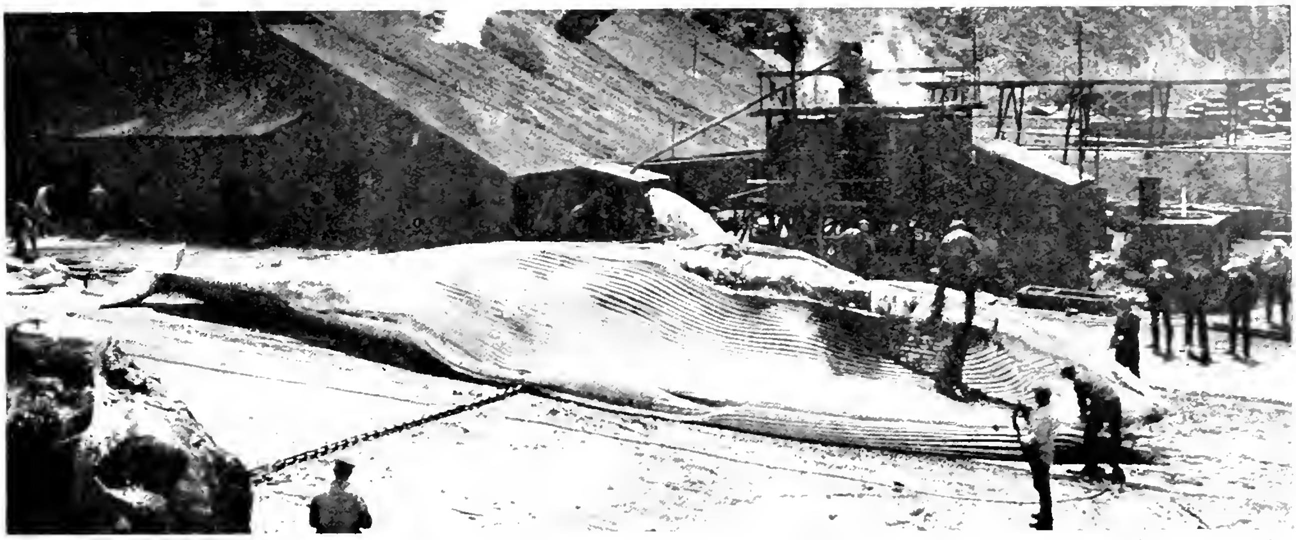
SOUTHERN BLUE AND FIN WHALES

PLATE XXXIV

Fig. 1. Fin whale, ♀, No. 1357. Ventral view. Showing pigmentation of the ventral grooves.

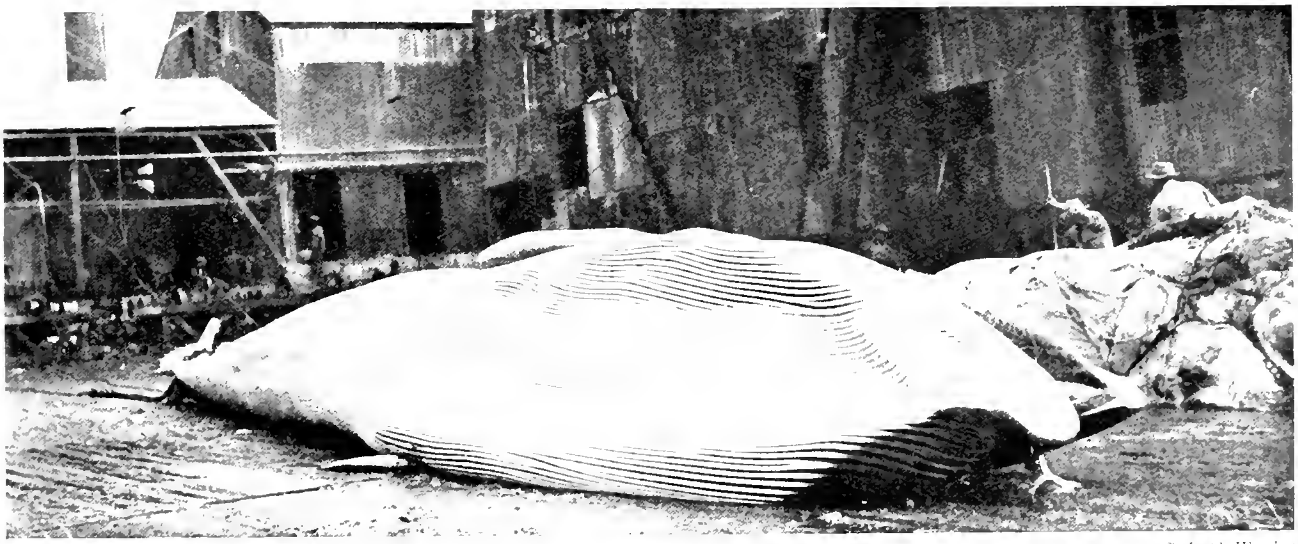
Fig. 2. Fin whale, ♀, No. ?. Ventral view. Showing asymmetry of anterior pigmentation.

Fig. 3. Fin whale, ♂, 607. View of right side of head and shoulder. Note dark streak running back from the eye. The whale is lying almost on its back.



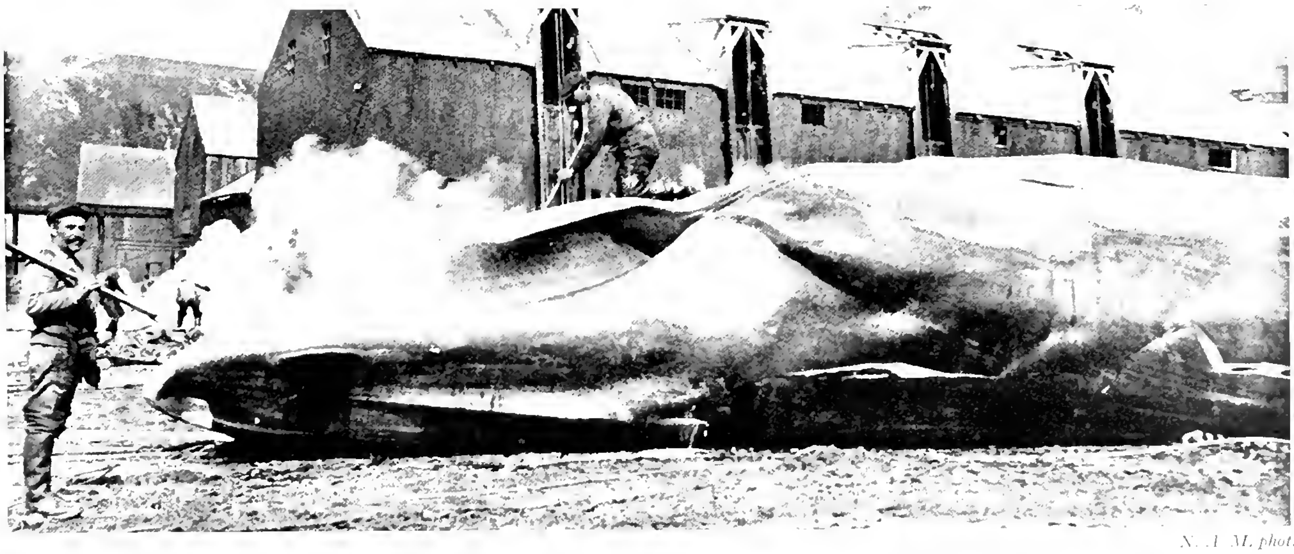
J. F. Hamilton phot.

Fig. 1



J. F. G. W. phot.

Fig. 2



N. A. M. phot.

Fig. 3

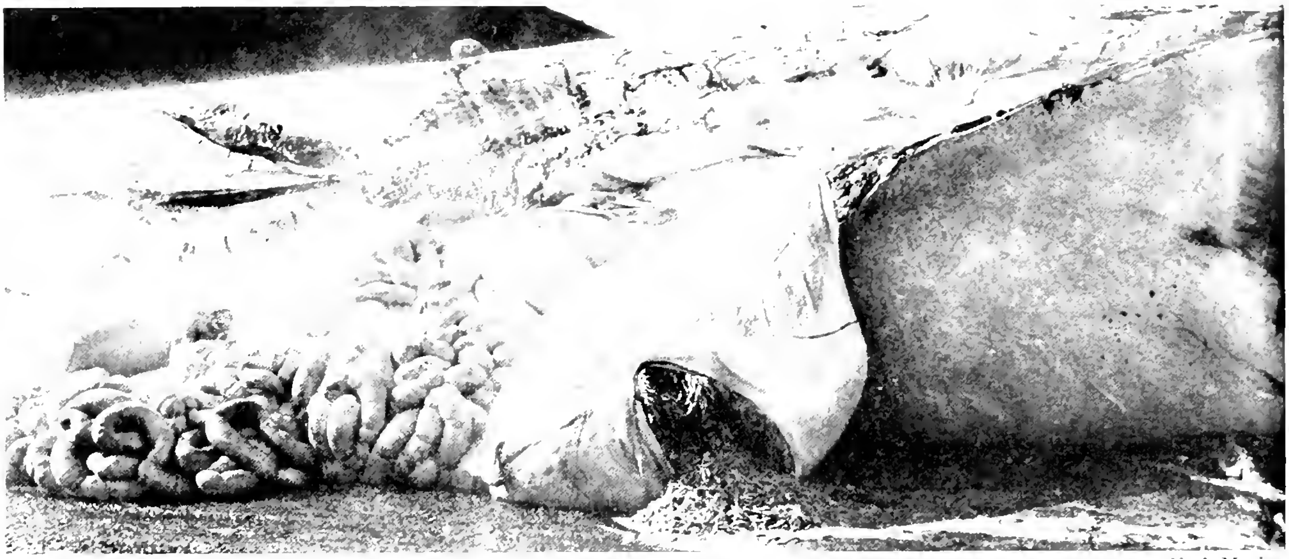
SOUTHERN BLUE AND FIN WHALES

PLATE XXXV

Fig. 1. Fin whale, ♂, No. 255. Stomach, containing a large quantity of *Euphausia superba*. Only a part of the stomach is visible.

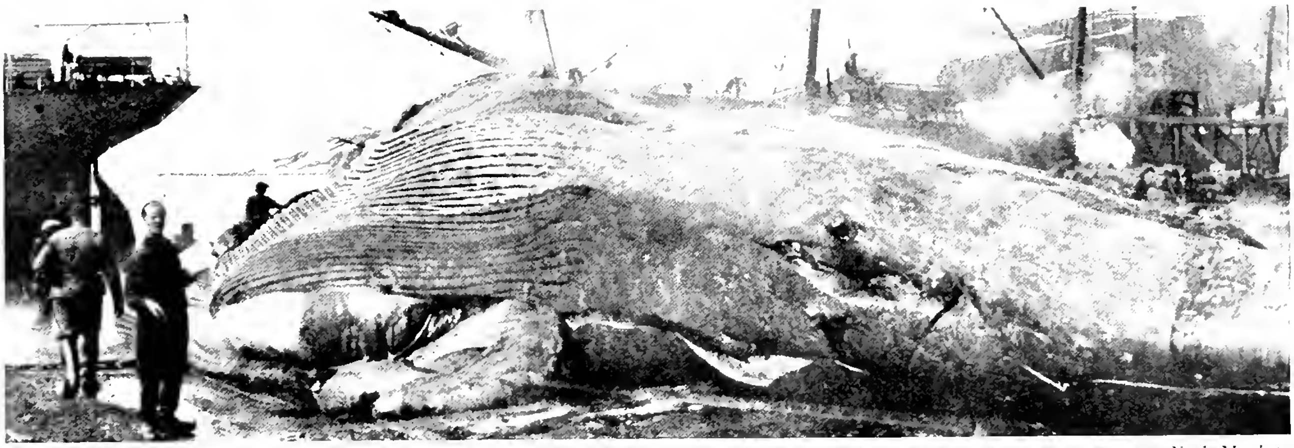
Fig. 2. Blue whale, ♀, No. 254. Ventral view. Showing projecting nipples on either side of the genital aperture. The nipples are in an unnaturally swollen condition owing to decomposition of the carcass.

Fig. 3. Blue whale, ♀, No. 244. Ventral view. Mammary glands after removal of the blubber.



N. A. M. phot.

Fig. 1



N. A. M. phot.

Fig. 2

N. A. M. phot.

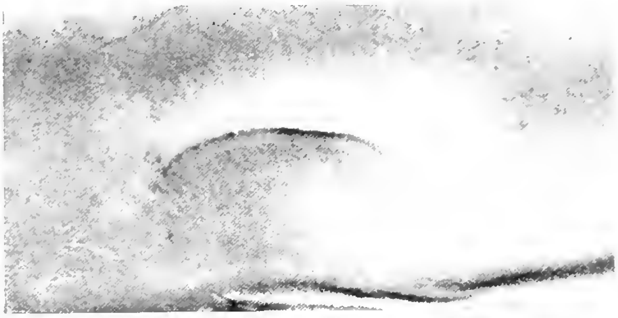
Fig. 3

SOUTHERN BLUE AND FIN WHALES

PLATE XXXVI

Figs. 1–10. Successive stages in the formation and healing of pits in the skin and blubber.

Fig. 1



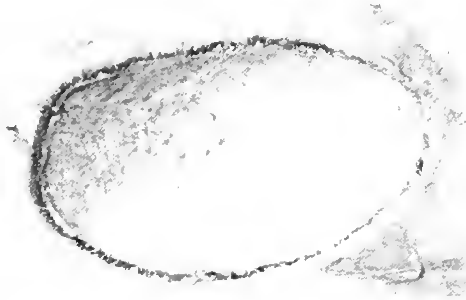
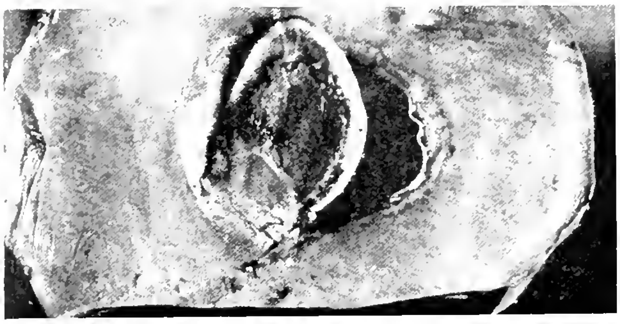


Fig. 6

Fig. 2



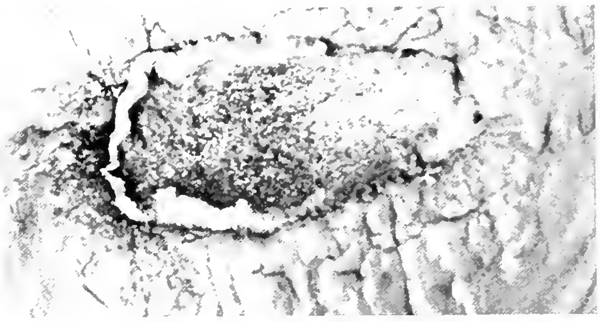


Fig. 7

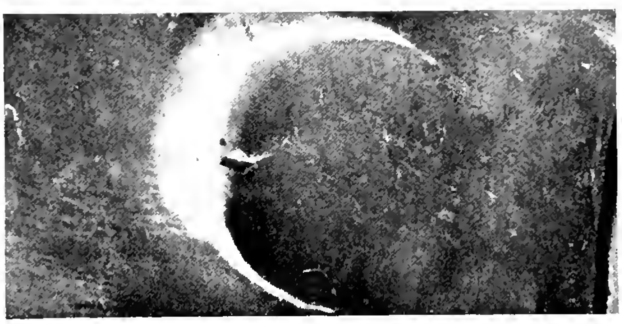
Fig. 3

Fig. 8

Fig. 4

Fig. 9

Fig. 5



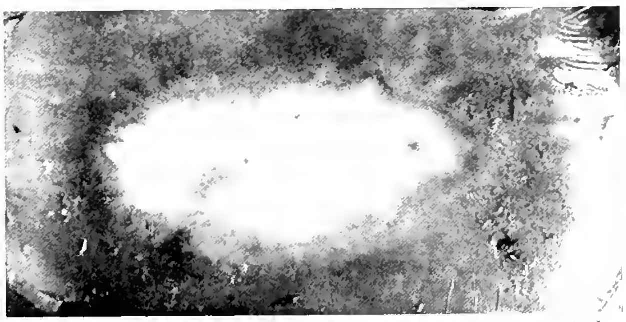


Fig. 10

J. F. G. W. phot.

SOUTHERN BLUE AND FIN WHALES

PLATE XXXVII

Fig. 1. Fresh scar left on the skin by *Coronula* sp.

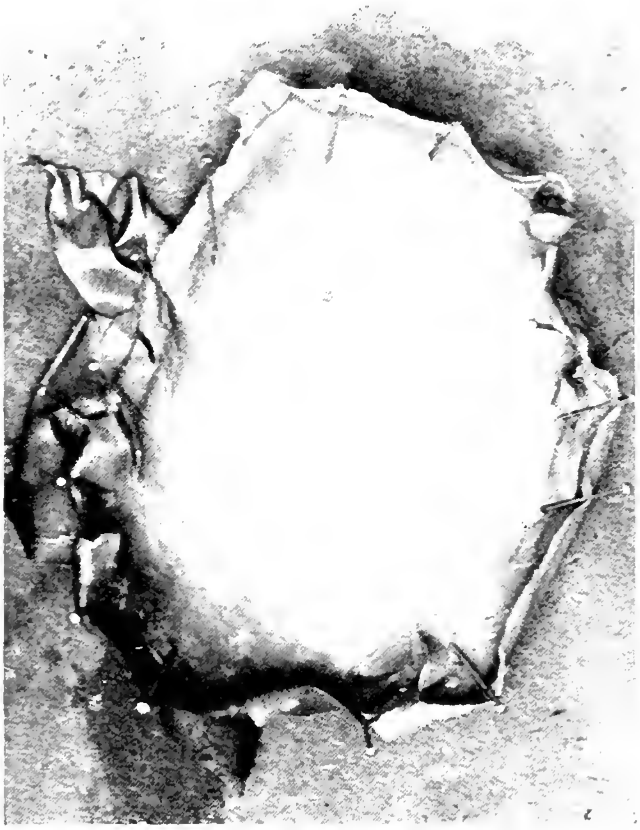
Fig. 2. Old impression left on the skin by *Coronula* sp.

Fig. 3. Section of blubber through scar, stained with Sudan III, and showing radiating fibres.

Fig. 4. Close view of pale marks on skin of Blue whale. About $\frac{1}{8}$ natural size.

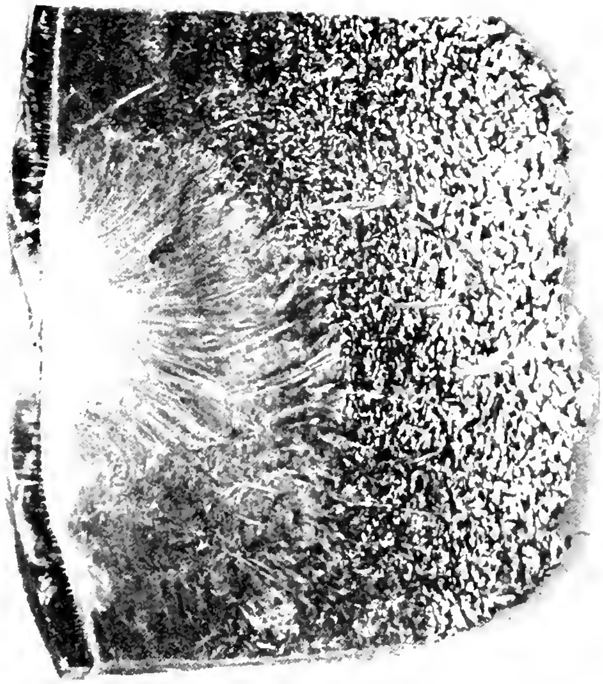
J. F. G. W. phot.

Fig. 1



J. F. G. W. phot.

Fig. 2



J. F. G. W. phot.

Fig. 3

N. A. M. phot.

Fig. 4

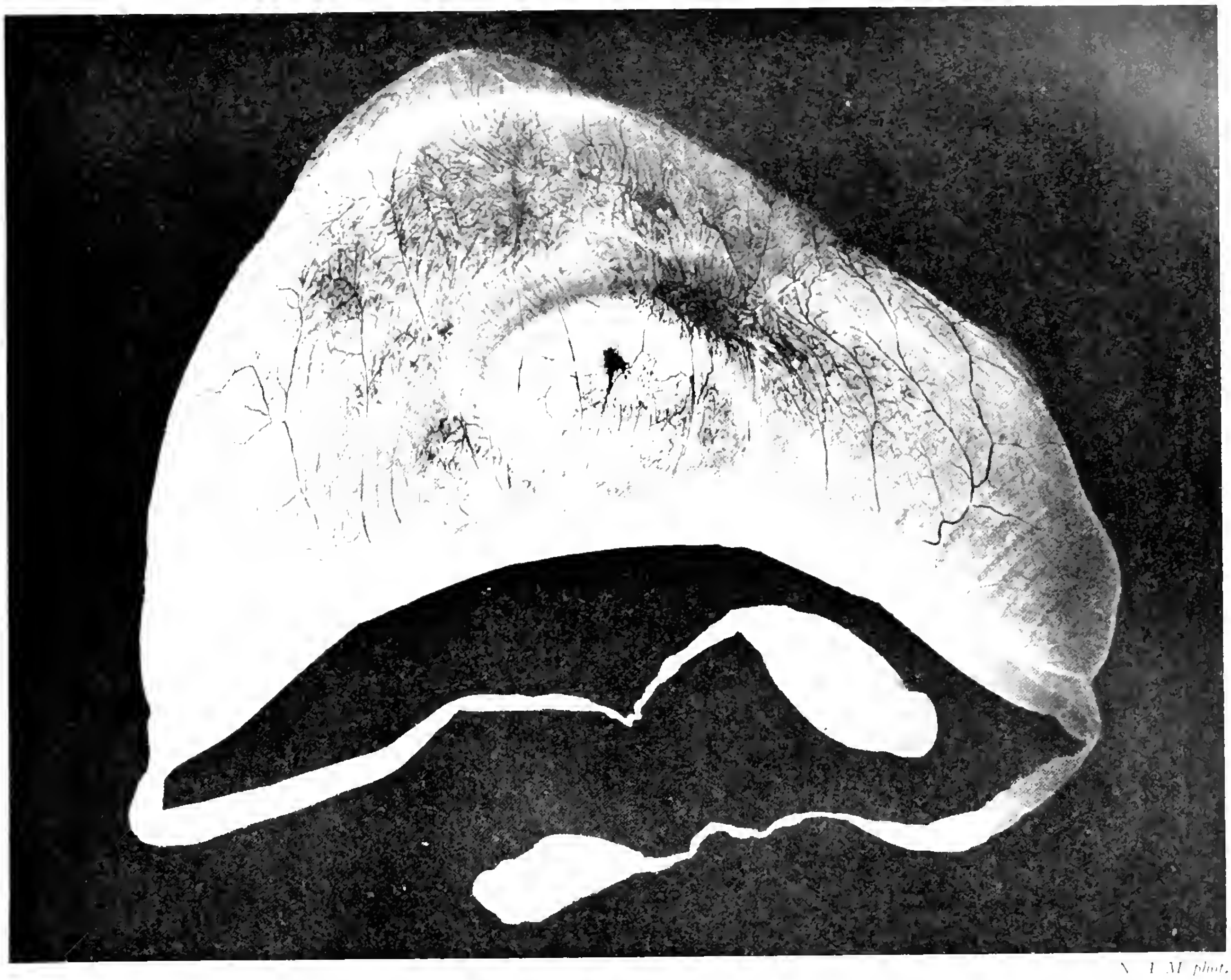
SOUTHERN BLUE AND FIN WHALES

PLATE XXXVIII

Fig. 1. Embryo and foetal membranes of Fin whale, No. 949. Natural size.

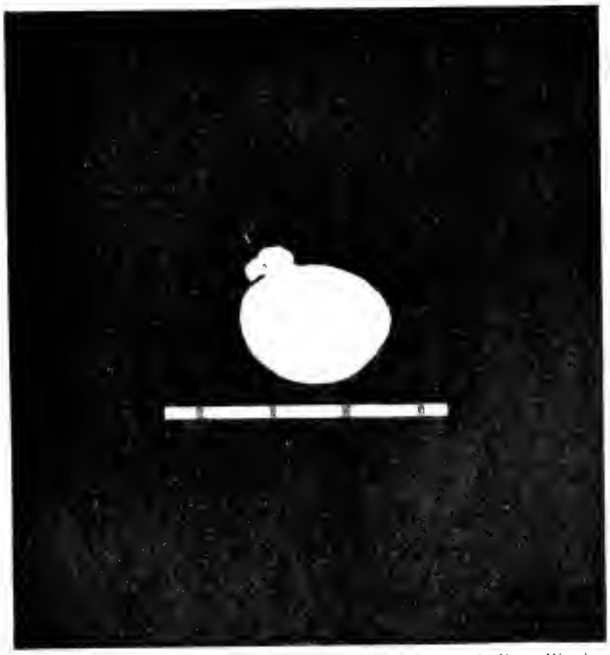
Fig. 2. Embryo and foetal membranes of Sei whale, No. 1074. Natural size.

Fig. 3. Embryo and foetal membranes of Blue whale, No. 900. Natural size.



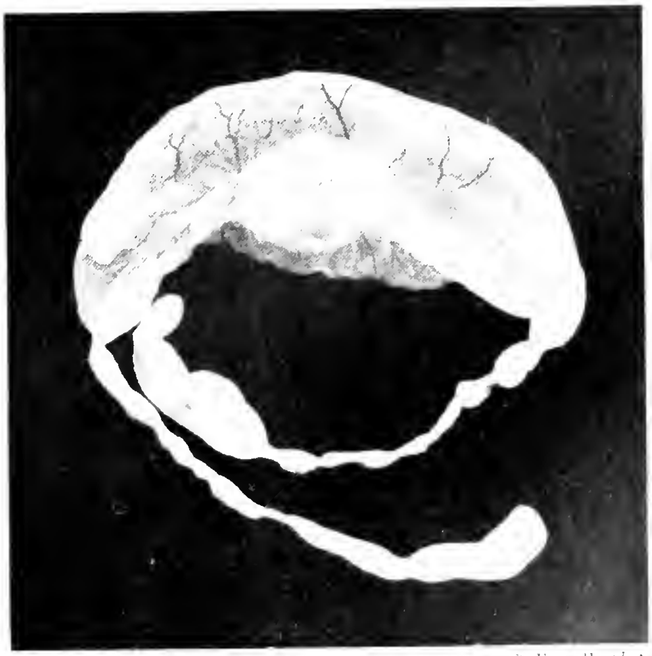
N. A. M. phot.

Fig. 1



J. F. G. W. phot.

Fig. 2



J. F. G. W. phot.

Fig. 3

SOUTHERN BLUE AND FIN WHALES

PLATE XXXIX

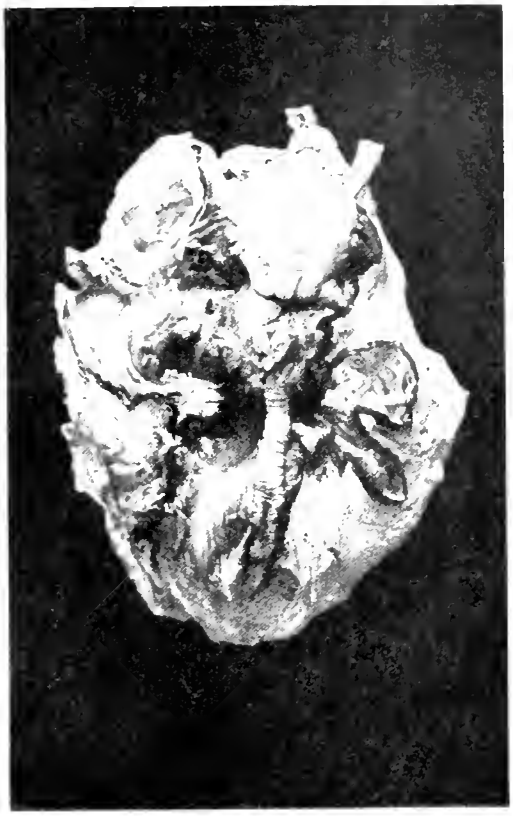
Fig. 1. Genital aperture of young female Fin whale showing the vaginal band. (After flensing.)

Fig. 2. Similar photograph taken before flensing.

In both these photographs the clitoris is the lobed structure with the vaginal band lying in line with and below it.

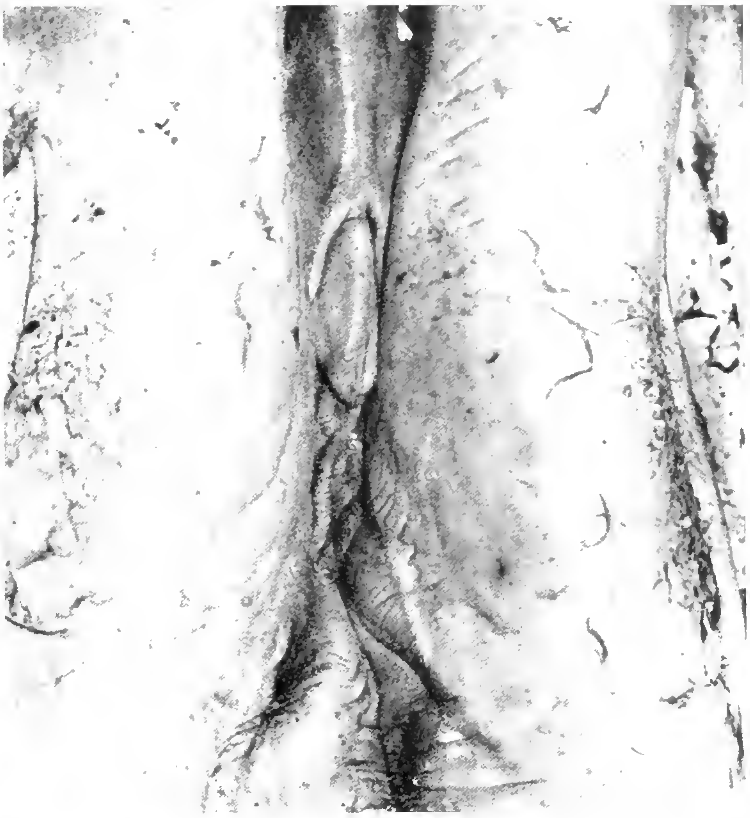
Fig. 3. Genital aperture, uterus, and one ovary of 2·76 m. foetus of Fin whale No. 173. Vaginal band present.

Fig. 4. Ovaries of 6·3 m. foetus of Blue whale, No. 154.



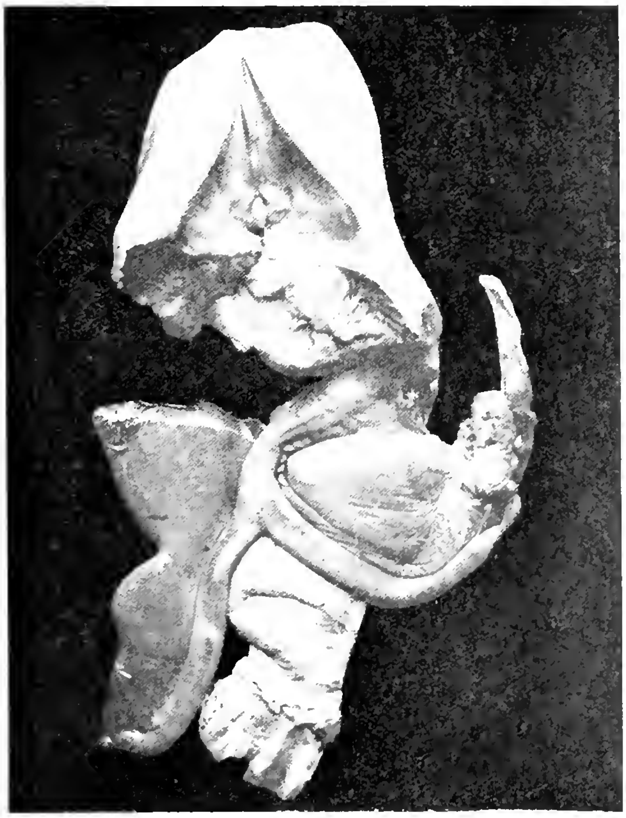
J. F. G. W. phot.

Fig. 1



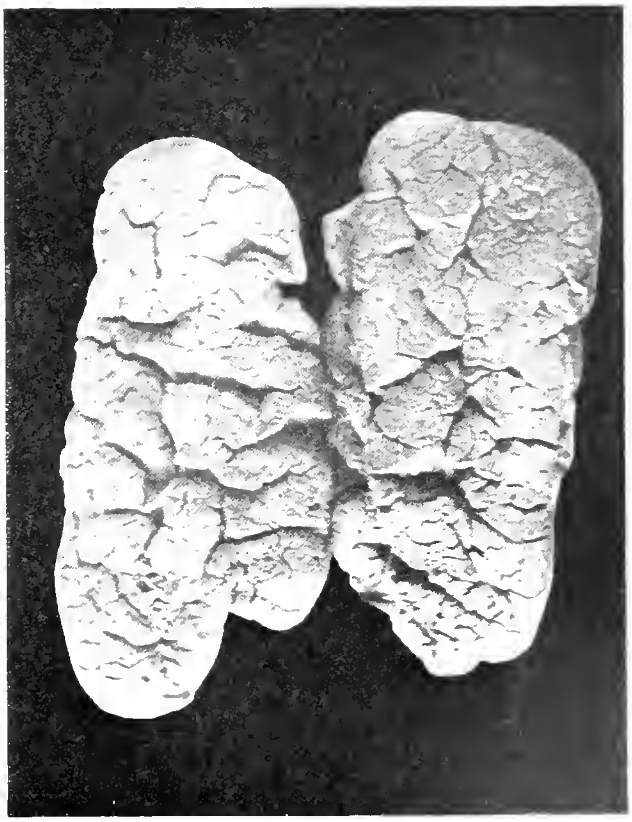
J. F. G. W. phot.

Fig. 2



J. F. G. W. phot.

Fig. 3



J. F. G. W. phot.

Fig. 4

SOUTHERN BLUE AND FIN WHALES

PLATE XL

(Photographs about $\frac{1}{3}$ natural size.)

Fig. 1. Ovaries of immature Blue whale, No. 48.

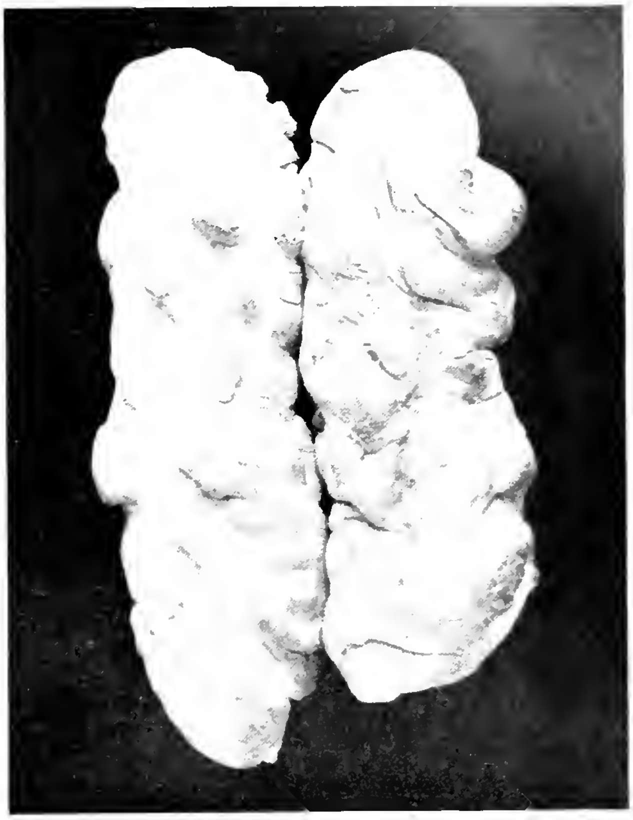
Fig. 2. Ovaries of adult Fin whale, No. 111. Many old corpora lutea are present and a large follicle is seen bulging from the lower left-hand side of the left ovary.

Fig. 3. Ovaries of pregnant Fin whale, No. 173. The huge swelling on the left-hand ovary is the corpus luteum of pregnancy. Both ovaries have many old corpora lutea.

Fig. 4. Ovaries of pregnant Fin whale, No. 175. The functional corpus luteum here has a very pronounced neck.

J. F. G. W. phot.

Fig. 1



J. F. G. W. phot.

Fig. 2

J. F. G. W. phot.

Fig. 3

J. F. G. W. phot.

Fig. 4

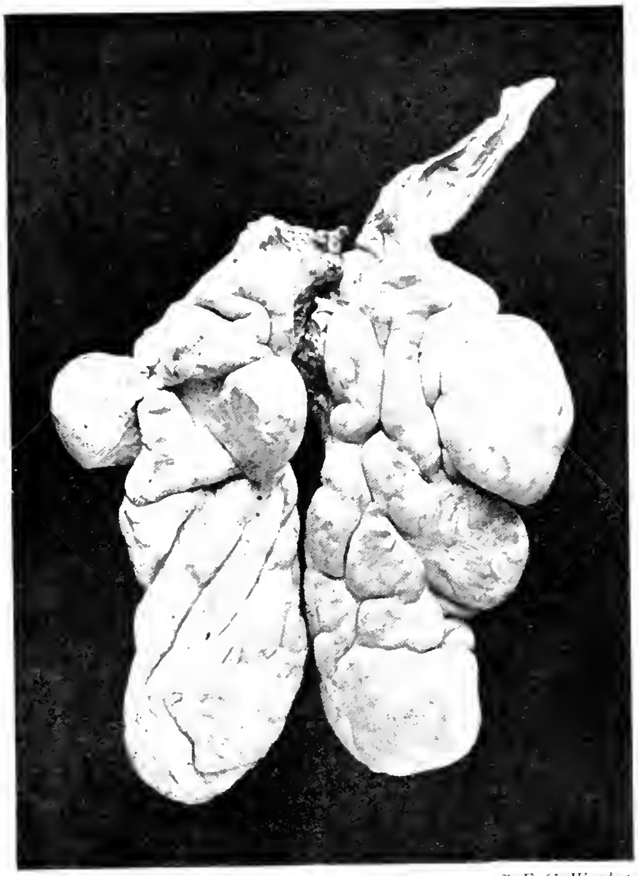
SOUTHERN BLUE AND FIN WHALES

PLATE XLI

Fig. 1. Ovaries of a lactating Fin whale, No. 168. The body on the side of the right-hand ovary is the recent corpus luteum of pregnancy.

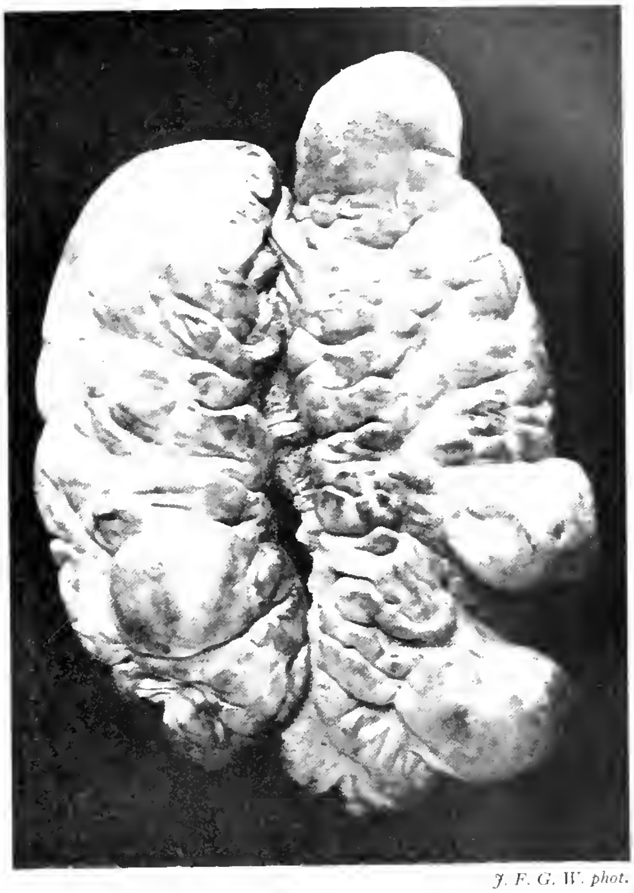
Fig. 2. Ovaries of Blue whale, No. 106, with only four old corpora lutea which have not undergone much retrogression.

Fig. 3. Series of old corpora lutea from one pair of Fin whale ovaries, seen in section.



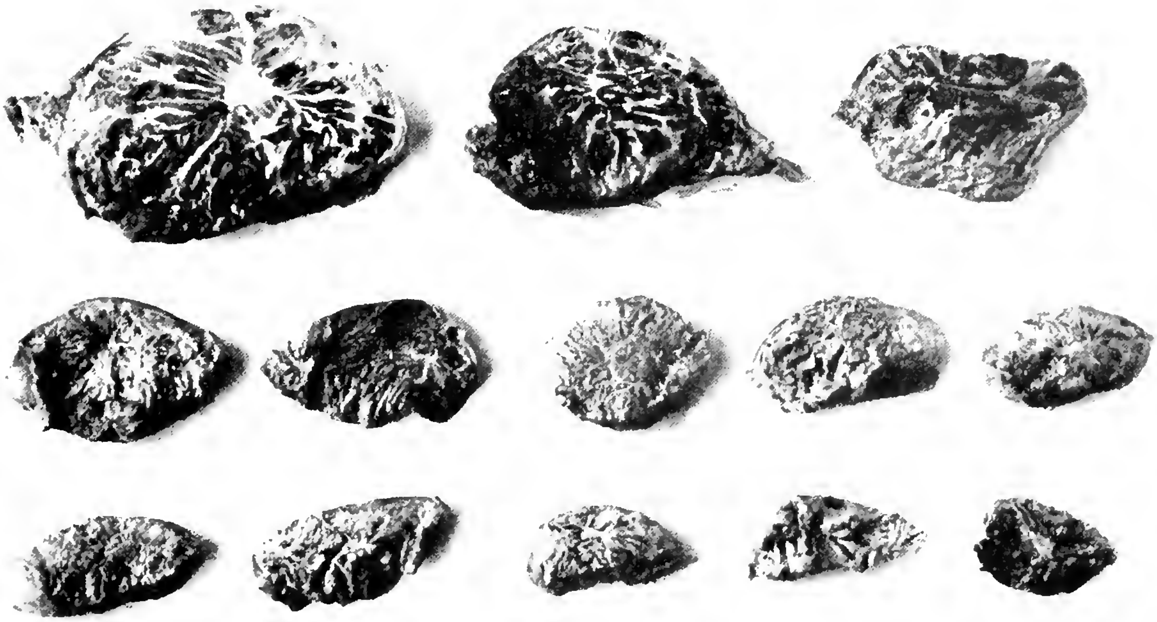
J. F. G. W. phot.

Fig. 1



J. F. G. W. phot.

Fig. 2



J. F. G. W. phot.

Fig. 3

SOUTHERN BLUE AND FIN WHALES

PLATE XLII

Fig. 1. Uterine mucosa of immature whale.

Fig. 2. Uterine mucosa of adult whale neither pregnant nor lactating.

Fig. 3. Uterine mucosa during early pregnancy.

Fig. 4. Uterine mucosa during early lactation.

Fig. 5. Uterine mucosa of whale in which ovulation had recently taken place.

1

2

3

4

5

J. F. G. W. del.

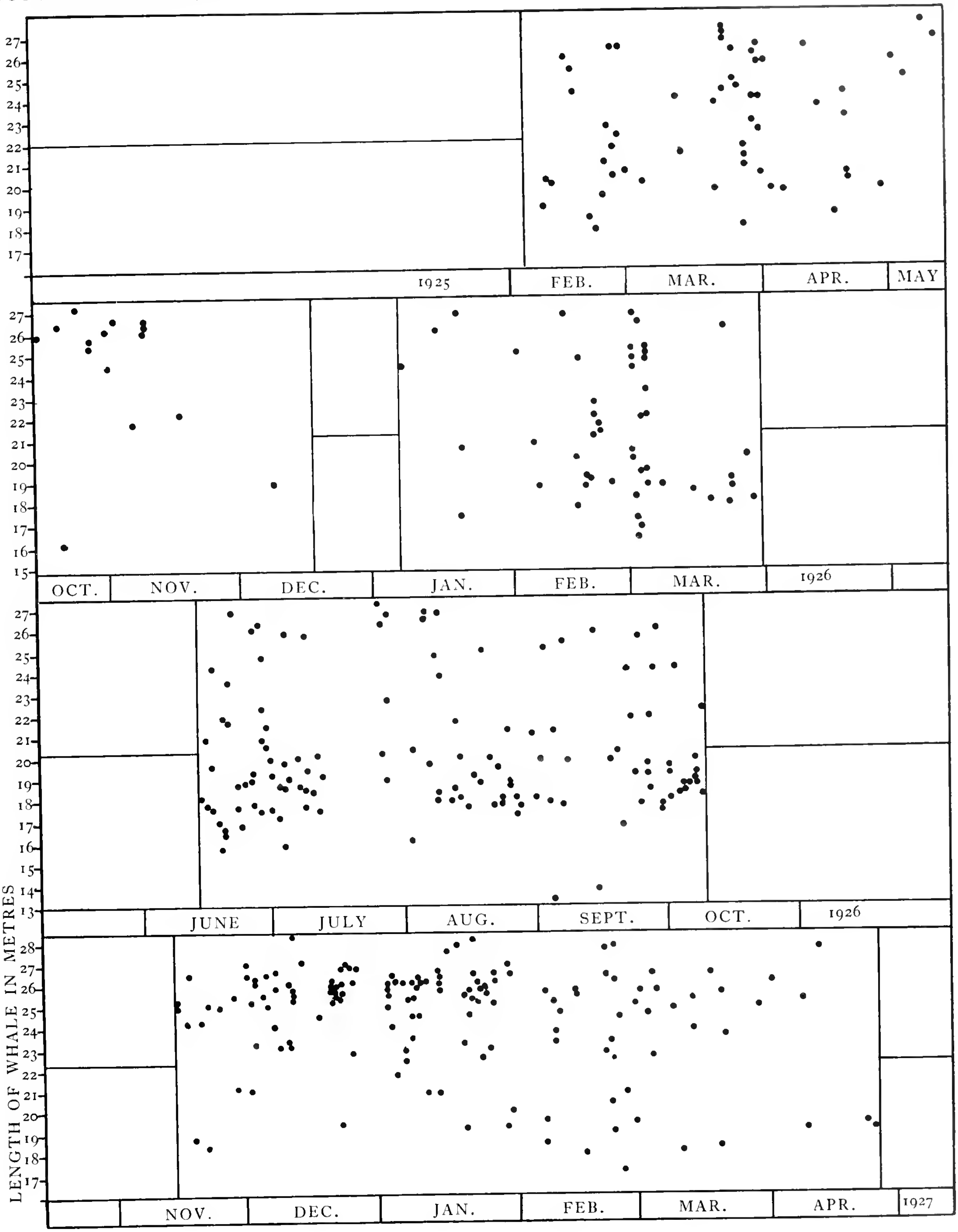
SOUTHERN BLUE AND FIN WHALES

PLATE XLIII

Blue Whales

Chart showing the lengths and date of capture of all Blue whales examined.

Males in red, females in black.



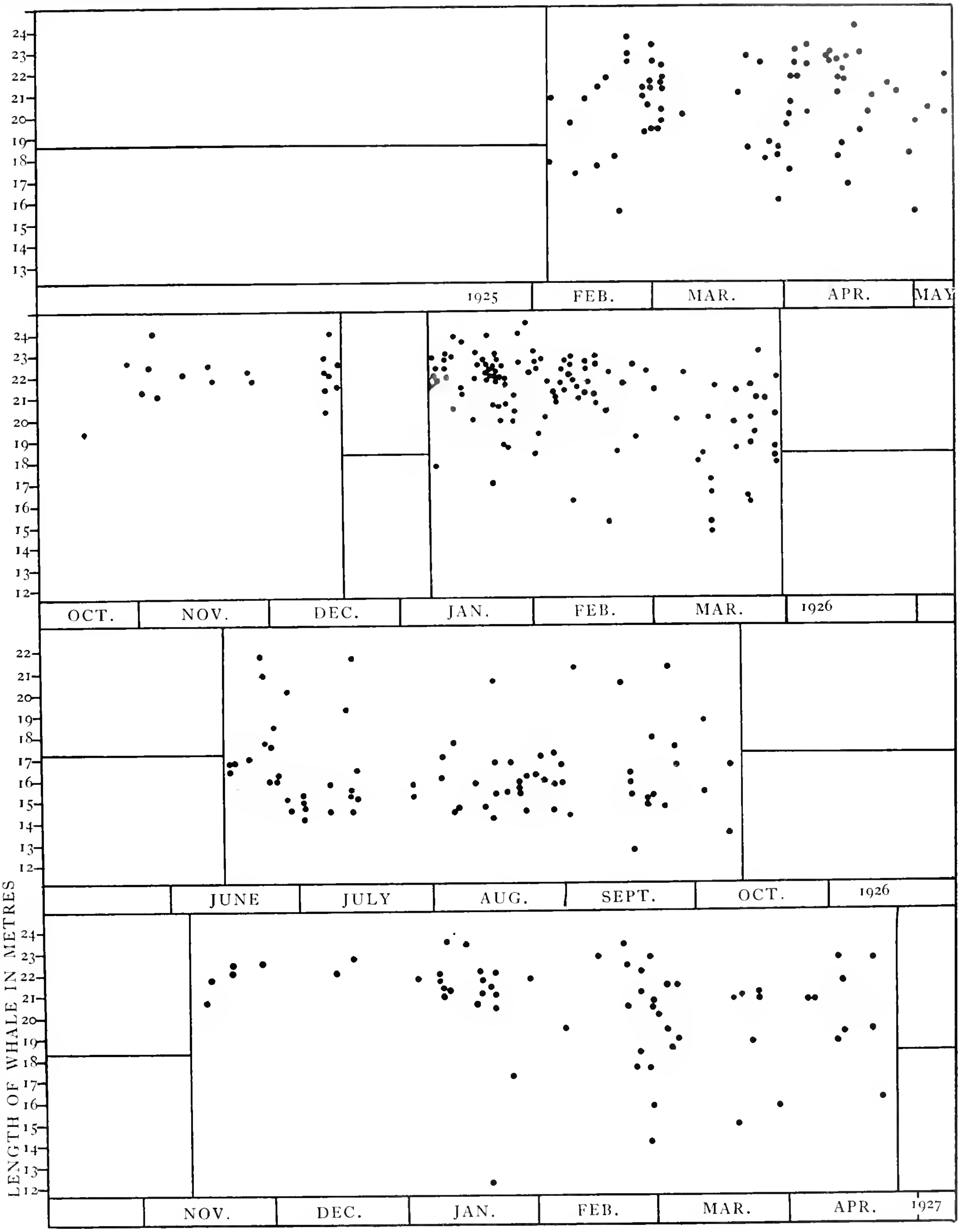
SOUTHERN BLUE AND FIN WHALES

PLATE XLIV

Fin Whales

Chart showing the lengths and date of capture of all Fin whales examined.

Males in red, females in black.



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