Biological Study on Humpback Whales in the Antarctic Whaling Areas IV and V.

By

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Introduction

Humpbacks in the southern hemisphere tend to be separated into distinct five populations. The divisions between populations are not of course between the tropics and the Antarctic, but between different sectors of the southern hemisphere which include both the Antarctic and the tropics as shown in Fig. 1. For a rational limitation of the catches it is therefore necessary to consider separately the separate populations, and their condition from time to time (IWC. 1951). Our biological knowledge on these populations, however, are at present rather very scarce. Matthews (1937) made investigations on Humpbacks around South Georgia and off South Africa and recently Australian scientists had inaugurated the scientific work at the whaling landstations on the coast of West Australia (IWC. 1952).

Japanese whaling expeditions had operated in the antarctic whaling areas IV and V in the pre-war days and operating mainly in the area V in the post-war days. Humpbacks were also taken by Japanese expeditions and biological observations were made by inspectors or biologists. Based on such observations some reports were already published by Matsuura (1940), Omura (1944), Mizue and Murata (1951), Ohno and Fujino (1952) and Kawakami and others (1952).

The present account deals with the data collected during the seasons 1950–52 by Japanese inspectors or biologists, comparing with the reports listed above, in order to give some light to the problem of these populations.

Material

Numbers and sex ratio of Humpbacks taken by Japanese whaling expeditions after the war are shown in Table 1. All Humpbacks were caught in the area V and all of them were examined biologically by usual method of investigation.

The data of three seasons were treated together instead of splitting into each season, because the number of Humpbacks taken in each season is rather small. However, though the Humpback whaling was operated in the period from 22 December 1949 to 4 January 1950 in the 1950 season, in the latter two seasons catch of Humpbacks was only permitted in the

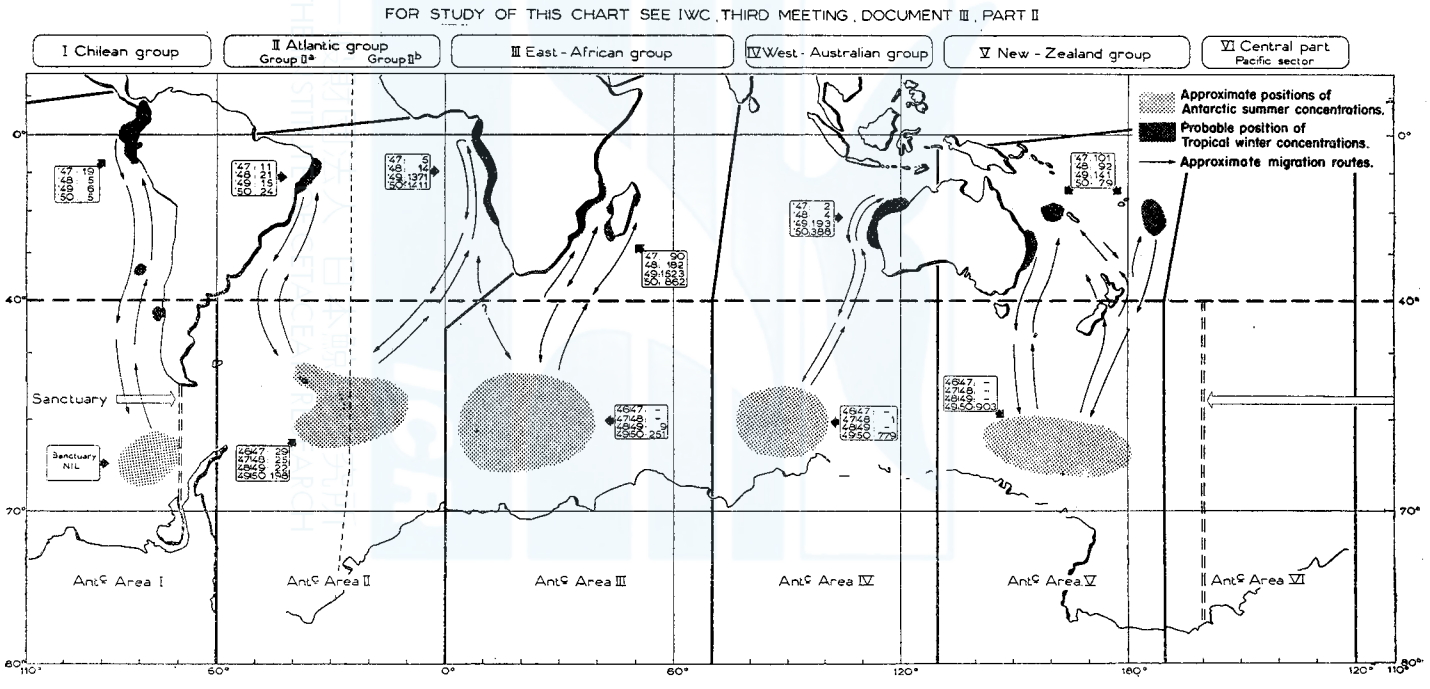

Fig. 1. Distribution of Humpback populations in the Southern Hemisphere.

begining of February, so the data was treated in two groups of different months when such is deemed necessary.

Table 1. Number and Sex Ratio of Humpbacks taken by Japanese Antarctic Whaling Expeditions in the Post-war Seasons.

Seasons	Number of			Sex Ratio		
	Males	Females	Total	Male	Female	Total
1950 (22 Dec. '49—4 Jan. '50)	24	43	67	35.82	64.18	100
1951 (2 Feb. '51—7 Feb. '51)	2	7	9	22.22	77.78	100
1952 (1 Feb. '52—5 Feb. '52)	16	21	37	43.24	56.76	100
Total	42	71	113	37.17	62.83	100

Sex Ratio

Females were most abundant in each season than males as shown in Table 1. It can be said that the whales taken were not a representative sample of the population, but such tendency is seen also in total Antarctic.

Table 2 shows the sex ratio of humpbacks taken in various grounds in the southern hemisphere, based on the figures of the International Whaling Statistics. Fig. 2 was drawn based on the same data with figures of Table 1.

As shown clearly in Table 2 and Fig. 2, females are always preponderant over males in the Antarctic and converse in the case of outside Antarctic with some exceptions. Though it is impossible for each population in the southern hemisphere to compare the sex ratio of those in the Antarctic and those of in its northern migratory areas situated along the shores of the southern continents in the neighbourhood of the tropics, because the sex ratio of humpbacks in the Antarctic is not shown separately to each Antarctic whaling area in the above mentioned statistics, but our catch results in the area V were more females were caught than males against more males were caught in the seas off New Zealand, which is deemed northern migrating area of the same population. We have no recent data concerning the population in area IV, but according to Matsuura (1940) 70.17 per cent of the total 248 humpbacks examined by him in the season 1938/39 were females. On the contrary nearly the same per cent of the total catch are males in the seas off West Australia. The reason for the preponderance of females in the south and of males in the north, therefore, is probably to be sought in the whales' habits of breeding and migration, suggesting that the females go north for parturition and paring,

Table 2. Sex Ratio of Humpbacks taken in various Grounds in the Southern Hemisphere in the recent three Seasons.

(Source: International Whaling Statistics)

Season / Sex Ratio / Ground	1951 or 1950/51						1950 or 1949/50						1949 or 1948/49					
	Actual number			Per cent			Actual number			Per cent			Actual number			Per cent		
	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total
Antarctic	685	947	1,632	41.97	58.03	100	984	1,147	2,131	46.18	53.82	100	9	22	31	29.03	70.97	100
Natal	54	49	103	52.43	47.57	100	71	80	151	47.02	52.98	100	118	72	190	62.10	37.90	100
Cape Province	5	4	9	55.56	44.44	100	3	4	7	42.86	57.14	100	7	8	15	46.67	53.33	104
Madagascar	0	0	0	0	0	0	239	468	707	33.80	66.20	100	818	515	1,333	61.37	38.63	100
French Congo	536	568	1,104	48.55	51.45	100	803	600	1,403	57.23	42.77	100	872	484	1,356	64.31	35.69	100
West Australia	908	309	1,217	74.61	25.39	100	250	137	387	64.60	35.40	100	135	58	193	69.95	30.05	100
New Zealand	72	39	111	64.86	35.14	100	52	27	79	65.82	34.18	100	89	52	141	63.12	36.88	100
Brazil	18	10	28	64.29	35.71	100			(24)						(15)			
Peru	0	1	1	0	100	100	0	0	0	0	0	0	0	0	0	0	0	0
Chile	1	2	3	33.33	66.67	100	4	1	5	80.00	20.00	100	2	1	3	66.67	33.33	100
Total of outside Antarctic	1,594	982	2,576	61.88	38.12	100	1,422	1,317	2,739	51.92	48.08	100	2,041	1,190	3,231	63.17	36.83	100

and immediately proceed south again towards the feeding grounds when these are accomplished. The males, on the other hand, probably linger on the breeding grounds as already stated by Matthews (1937) and Mackintosh (1942). The sex ratio of foetuses is 28 males and 25 females against total of 53 foetuses of three seasons. In the total Antarctic, of the 408 foetuses in the season 1950/51 for which sex was stated, 53.43 per cent were males and 46.57 per cent females. We can not conclude from above facts that there might be any significant difference in numbers between males and females consisting of the populations.

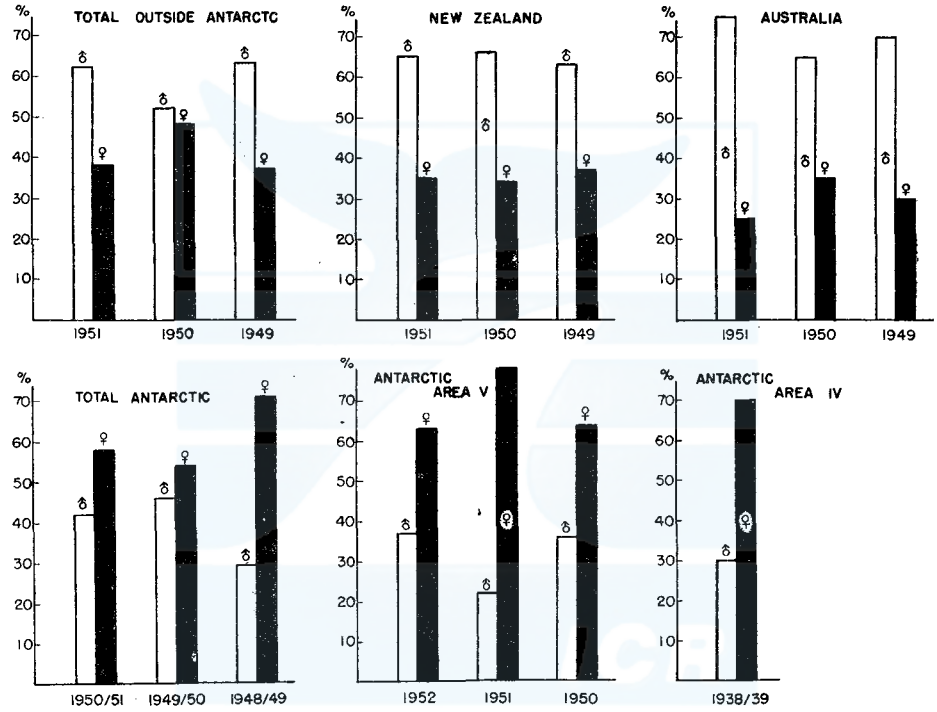

Fig. 2. Sex Ratio of Humpbacks in the Southern Hemisphere.

Thus, the sex ratios of humpbacks are different according to various grounds and very high percentage of pregnant females are caught in the Antarctic areas IV and V, as will be mentioned later. Such facts should be born in mind when contemplating the ways of protection of the humpbacks in the southern hemisphere.

Colour

Observation on the colour of humpbacks based on the types of colouration used by Matthews (1937) were made. Also in pre-war days such observation

were made by Matsuura (1940) and Omura (1944). Table 3 shows the results of such observation together with the figures listed in the Matthews' report (1937).

Table 3. Percentage Occurrence of Colour Groups of Southern Humpbacks by different Authors.

Geographical Areas \ Colour Group		1	1—2	2	2—3	3	3—4	4
South Georgia and South Africa	(1)							
Males	(25)	4.0	0.0	12.0	4.0	8.0	12.0	60.0
Females	(28)	0.0	0.0	3.6	0.0	3.6	32.0	61.0
Total	(53)	1.8	0.0	7.5	1.8	5.6	22.6	60.2
Antarctic Area IV, 1938/39	(2)							
Males	(65)	1.4	0.0	27.7	38.5	12.3	16.9	3.1
Females	(141)	0.1	0.0	29.1	38.3	19.1	11.4	1.4
Total	(206)	1.0	0.0	28.6	38.3	17.0	13.1	1.9
New Zealand	(3)							
Males	(17)	5.9	23.5	17.6	17.6	11.8	11.8	11.8
Females	(13)	0.0	23.0	7.7	7.7	30.5	30.5	0.0
Total	(30)	3.3	23.2	13.3	13.3	20.0	20.0	6.6
Antarctic Area V, 1940/41	(4)							
Males	(78)	3.8	3.8	17.9	5.2	43.6	16.7	9.0
Females	(123)	13.8	0.7	13.8	11.4	35.0	15.5	9.8
Total	(201)	10.0	2.0	15.4	8.9	38.3	15.9	9.5
Antarctic Area V, 1950—1952	(5)							
Males	(42)	14.3	11.9	9.5	52.4	2.4	2.4	7.1
Females	(69)	10.1	17.4	10.1	36.2	8.7	13.1	4.4
Total	(111)	11.7	15.3	9.9	42.4	6.3	9.0	5.4

(1); Matthews (1937) (2); Matsuura (1940) (3); Lillie (Cited from Matthews 1937).
(4); Omura (1944) (5); Total of 1950—1952.

Most striking point in Table 3 is the fact that the South Georgian and South African whales are more commonly darkly coloured than otherwise. Australian scientists (IWC. 1952) state that an analysis of their observations taken in 1949 and 1950 show the West Australian humpbacks to be a little lighter in colouration than the South Georgian and South African humpbacks, but lacking the lightest coloured types given by

Lillie for New Zealand humpbacks. Their data are not published yet, but their statement seems to be the case judged from our data. Matthews (1937) describes that the females tend to be darker than the males, but such is not clear from the data obtained. Fig. 3 was drawn based on Table 3, but more simplified. In Fig. 3 "White", "Intermediate" "Black" include the Lillie's groups of 1 and 1–2, 2 to 3, 3–4 and 4 respectively. From Fig. 3 we may say that the South Georgian and South African whales are most darkly coloured. "White" group is very scarce in the area IV as South Georgia and South Africa and mostly belong to "Intermediate". Those in the area V, most of them belong to "Intermediate" as those in area IV, but they contain each about 20 per cent of "White" and "Black" groups.

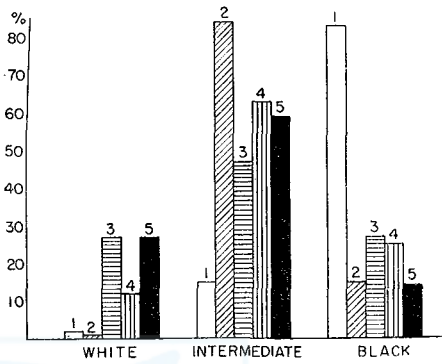

Fig. 3. Occurrence of Colour Groups.
1. South Georgia and South Africa.
2. Antarctic Area IV, 1938/39.
3. New Zealand.
4. Antarctic Area V, 1940/41.
5. Antarctic Area V, 1950—1952.

Weight of testes

The weight of each testes of male humpbacks was measured and the result is tabulated in Table 4. Fig. 4 shows the geometric mean in kilograms against each body length group. As shown in Fig. 4 the mean weight of testes increases up to 45 feet, but drops at 46 feet. However, as the

Table 4. Mean Weight of Testes calculated according to each Body Length.

Body Length in Feet	Number of Measurements	Range (kg.)	Geometric Mean (kg.)	Standard Deviation	Coefficient of Variation
38	6	0.8— 3.1	1.35	1.026	76.0
39	14	1.1— 4.2	2.21	1.057	47.8
40	8	1.4— 4.2	2.35	0.998	42.5
41	6	2.8— 4.7	3.42	0.789	23.1
42	12	1.3— 5.7	4.05	1.439	35.5
43	10	3.9— 6.1	4.67	0.690	14.8
44	18	3.5— 7.1	4.93	1.155	23.4
45	6	3.8—11.1	6.04	3.082	51.0
46	4	3.3— 6.6	4.68	1.481	31.6

numbers measured of 45 feet are few and the coefficient of variation is rather large, so it might be safe to say that the weight of testes increases according to body length until about 44 feet attained and thereafter the weight differs individually. The coefficient of variation against 38 and 39 feet are also rather large. It's cause may be lying in the fact that they include both immature and mature whales, whose testes weight differ considerably. We do not know the difference of testes weight according to mature and immature whales, because the histological examination is not completed yet, but the Australian scientists (IWC. 1952) state that the whales with a testes weight above 2000 grams were considered mature. This figure of 2 kilograms may be used here as index of sexual maturity. There is one whale of 42 feet whose testes weight is 1.3 kilograms, but such may be exceptional case. Other whales of same body length all have the testes weight of over 2 kilograms. Mizue and Murata (1951), Ohno and Fujino (1952), Kawakami and others (1952) deem a whale attains sexual maturity when the sum of both testes weight reach 2 kilograms. This figure, however, may be too low as the index of sexual maturity.

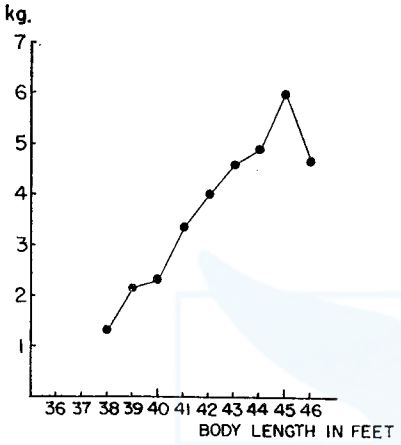

Fig. 4. Geometric Mean Weight of Testes.

Number of corpora lutea in the ovaries

Numbers of corpora lutea in both ovaries of each whale were calculated. Fig. 5 shows the occurrence of the number of corpora lutea against to each body length. Fig. 6 shows the frequency of number of corpora lutea together with the data by Matsuura (1940) for comparison. In most cases the number of corpora lutea is up to 10, with some exceptions. There is a whale with 32 corpora lutea in the ovaries, including one functional corpus luteum. As no foetus was found from the uterus of this whale, it may be on the very early stage of pregnancy or ovulating. No more such case was observed, but Matsuura (1940) reports three such examples among 89 matured females. Numbers of corpora lutea are, in general speaking, increase with the increasement of body length. Larger whales than 45 feet have mostly five or more corpora lutea in the ovaries, as is the case in Matsuura's report. As shown in Fig. 6, the peak lying between three and five, but in Matsuura's case the occurrence of one corpus luteum

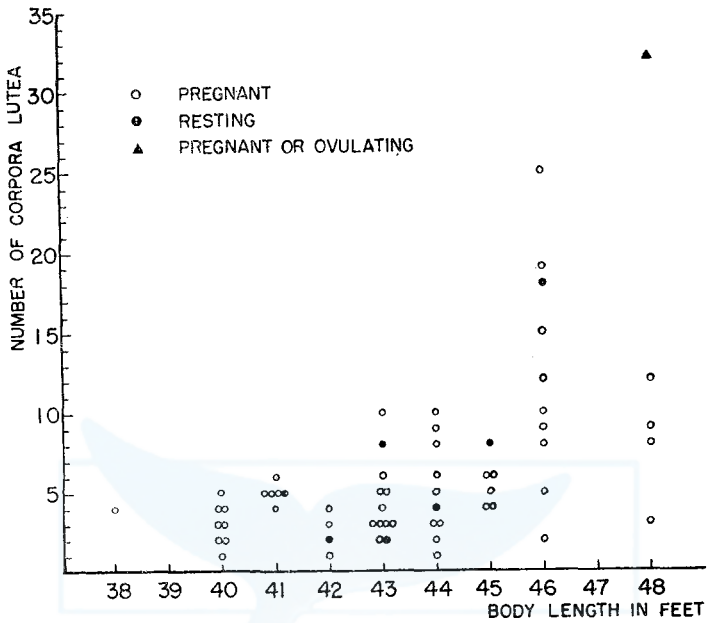

Fig. 5. Occurrence of Numbers of Corpora lutea in each Body Length Group.

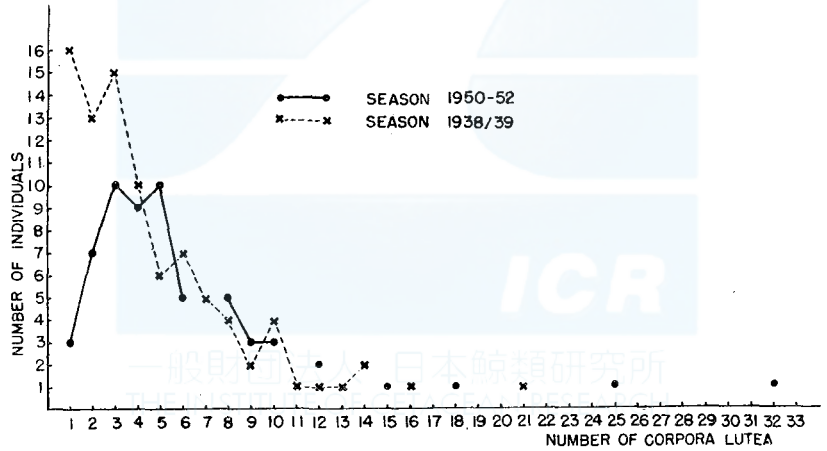

Fig. 6. Frequency of Number of Corpora lutea.

is most frequent. It can not be concluded, however, from this fact that the constitutions of populations in areas IV and V are different from each other. It should be explained from the fact that in the post-war seasons the selection of larger whales has been done better than before, consequently the whales taken were not a representative sample of the population.

Fig. 7 shows the size distribution of the females taken. The figures of the season 1938/39, which are based on Matsuura's reports, does not show the size distribution of all whales taken by Japanese expeditions in that season, but only those taken by Kyokuyo-maru. It is clearly shown in Fig. 7 that more smaller whales were taken in the season 1938/39 than post-war seasons. Considerable number of immature whales were taken, and it seems to represent the population more correctly than post-war seasons. Anyhow, only few whales with one or two corpora lutea are taken recently and it seems good for propagation of the stock, because such whales can contribute for maintenance or increasement of the stock of the population.

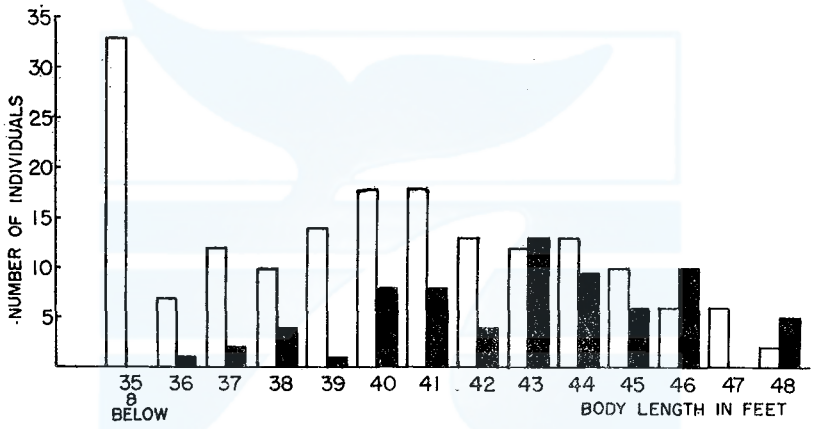

Fig. 7. Size Distribution of Female Humpbacks.
White: Antarctic 1938/39
Black: Antarctic 1950—52.

Table 5. Numbers of Immature and Mature Male Humpbacks in each Body Length Group.

Body Length in Feet	Immature	Mature	Total
38	2	1	3
39	2	5	7
40	1	3	4
41	0	3	3
42	1	5	6
43	0	5	5
44	0	9	9
45	0	3	3
46	0	2	2

Sexual maturity

Table 5 was made classifying the male humpbacks taken to mature and immature whales according to the weight of testes, using 2 kilograms as the index of the sexual maturity. As shown in this table, the biggest immature male was 42 feet, which seems to be an exceptional one. The smallest mature male is 38 feet. Matthews (1937) describes that the male humpbacks reach sexual maturity at a body length of 12 meters

(39 feet 4 inches). It seems that Table 5 confirms this, but owing to the scantiness of the whales examined, it is difficult to get the final conclusion. Female humpbacks are, as will be stated later, reach sexual maturity in average at a body length of 39–40 feet, which is smaller than figures stated by Matthews, it can be assumed that the male humpbacks also reach sexual maturity at a body length smaller than Matthews' figure, though there is no evidence to confirm this at present. According to Australian scientists (IWC. 1952), the minimum body length of the sexually mature male humpbacks examined was 35′9″, whilst a number were still immature at 38′0″ in the seas west of Australia.

Female whales with one or more corpora lutea in the ovaries were deemed as sexually mature and those without any corpus luteum sexually immature. In table 6 the results of examination were tabulated with the data gained by different authors for comparison. Fig. 8 was drawn based on these data.

In table 6 the body lengths in which the sexual maturity deemed to be attained in average were shown with thick numerals. The smallest body length is 37 feet in the Antarctic seasons 1940/41, the biggest is 40 feet in

Table 6. Numbers of Immature and Mature Female Humpbacks in each Body Length Group by different Authors.

Body Length in Feet	(1) Carnarvon 1951			(2) Antarctic 1938/39			(3) Antarctic 1940/41			(4) Antarctic 1950—52		
	Immature	Mature	Total	Immature	Mature	Total	Immature	Mature	Total	Immature	Mature	Total
32	1	0	1		0		0	0	0	0	0	0
33	1	0	1		0		1	0	1	0	0	0
34	2	0	2	33	0	33	1	0	1	0	0	0
35	3	0	3		0		9	1	10	0	0	0
36	1	0	1	6	1	7	5	1	6	1	0	1
37	3	3	6	11	1	12	**4**	**6**	10	2	0	2
38	**3**	**6**	9	7	3	10	3	9	12	3	1	4
39	1	11	12	8	6	14	1	14	15	1	0	1
40	1	11	12	**5**	**13**	18	1	18	19	**0**	**8**	8
41	0	7	7	1	17	18	0	24	24	0	7	7
42	0	13	13	0	13	13	1	24	25	0	4	4
43	0	11	11	0	12	12	0			0	13	13
44	0	7	7	0	13	13	0			0	9	9
45	0	5	5	0	10	10	0			0	6	6
46	0	0	0	0	6	6	0			0	10	10
47	0	1	1	0	6	6	0			0	0	0
48	0	0	0	0	2	2	0			0	5	5
49	0	1	1	0	0	0	0			0	0	0

(1) West Coast of Australia. (IWC 1952) (2) Antarctic Area IV. (Matsuura 1940)
(3) Antarctic Area V. (Omura 1944) (4) Antarctic Area V.

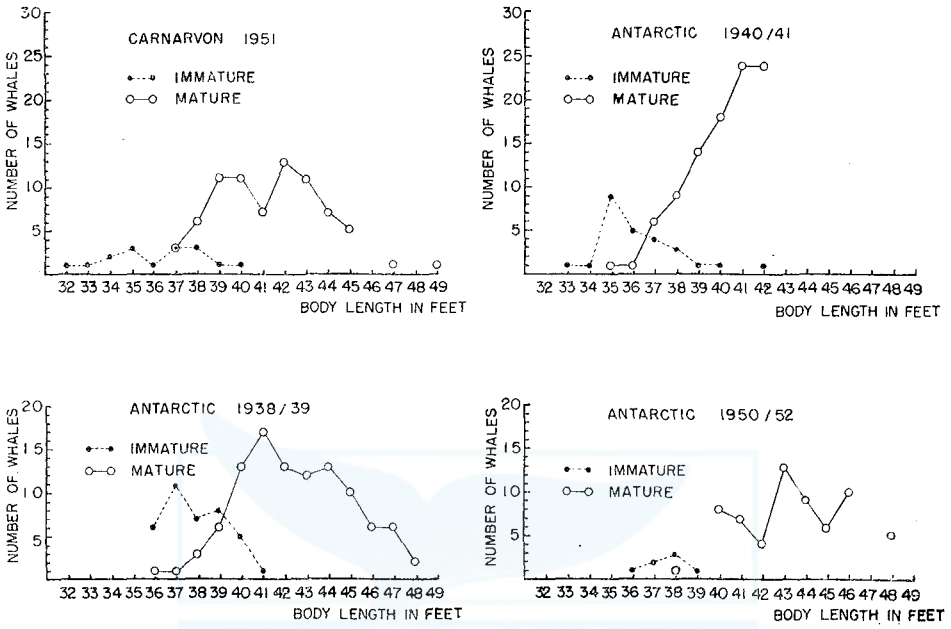

Fig. 8. Numbers of Immature and Mature Humpbacks in each Body Length Group.

the Antarctic seasons 1938/39 and 1950–52. Matthews (1937) states that the female humpbacks reach sexual maturity at a length of 12.5 meters (41 feet), but Australian scientists (IWC. 1952) describes that the mean length at which female humpback of the West Australian stock reach sexual maturity would appear to be less than the figure of 41 feet given by Matthews for the South Georgian and South African humpbacks and to be rather about 39 ft–40 ft. This latter statement is well supported by table 6. There seems no difference about this body length between whales in the areas IV and V.

Pregnancy

Female humpbacks observed may classified as Table 7 according to their sexual state.

Table 7. Biological State of female Humpbacks observed.

Seasons	Immature	Mature					Remarks
		Pregnant	Lactating	Resting	Pregnant or Ovulating	Total	
1950—52	7	54	0	8	1	63	
1938/39	71	73	13	14	3	103	Matsuura 1940

As shown clearly in this table the proportion of pregnancies against total mature females is very high, contrary to the data obtained by the Discovery staff as reported by Matthews (1937). About 86 per cent of the mature females are pregnant, and even in Matsuura's case the figure is about 70 percent. Though the figures in table 7 can not be said as representatives of the population, because it is forbidden to take or kill female whales which are accompanied by calves or suckling whales by the International Convention for the Regulation of Whaling, nevertheless we can not deny the high percentage of pregnancy in the Antarctic areas IV and V. According to the International Whaling Statistics XXVIII, 410 foetuses were reported in the Antarctic season 1950/51. As it includes one case of twin, 409 pregnant female were taken in the said season. If we assume a female below 39 feet as immature and others as mature, we can calculate the total 947 female humpbacks caught in that season should include 771 mature females, of which 409 whales were pregnant. That means about 53 per cent of pregnancy, which is deemed to be reasonable. There might be some cases of overlooking, if the whale were in a very early stage of pregnancy. Humpback whaling in that season, however, were conducted 1–7 February and on these dates the foetus is generally grown up big enough to be overlooked. So, such case of overlooking may be exceptional one, if any.

Regarding of the high percentage of pregnancy in the areas IV and V, one might imagine the case of two pregnancy in each three years or the case in which the pregnant whale are likely go down to the Antarctic, while the resting one would linger in the northern warm waters. Conclusions, however, should be drawn from more data in future combind with similar data in the northern migratory areas in the neighbourhood of tropics.

It should be born in mind when considering the problems of protection of the humpbacks the fact that in the Antarctic areas IV and V the females consist of very high percentage of the catch, and moreover, most females are pregnant.

54 foetuses were obtained in the three seasons of 1950–52, in which one was too small to distinguish the sex. Of other 53 foetuses, 28 were males and 25 were females. Mean length of these foetuses are calculated in table 8, separately those obtained in the period from the end of December to beginning of January and those obtained in the beginning of February.

Comparing the mean value in table 8 to the figures of Matthews (1937) and of Matsuura (1938), we can conclude that there are no marked difference among those figures.

Table 8. Mean Length of Humpback Foetuses.

Season	Number	Range (cm)	Mean Value (cm.)	Standard Deviation	Coefficient of Variation
1950 (22 Dec. '49—4 Jan. '50)	36	26.7—116.8	56.2	17.45	31.05
1951 (2 Feb. '51—7 Feb. '51)	17	48.3—152.4	100.6	30.23	30.05
1952 (1 Feb. '52—5 Feb. '52)					

Distribution

Japan Association of Whaling presents us a good data concerning the distribution of humpbacks in the areas IV and V. That is the "Whaling Ground in the Antarctic", in which the number of humpbacks taken in each square of two degrees of Longitude and one degree of Latitude by Japanese expeditions are shown separately by months for six seasons from 1935/36 to 1940/41. Unfortunately, the numbers of whales taken in each square are not given by actual number, but by discs of different diameters classifying into 7 classes, namely 1–5, 6–15, 16–25, 26–40, 40–60, 61–100 and over 100 whales. We do not have any way to know the actual number, which based these charts, bacause all such data were burned during the war.

Figs. 9–14 are drawn based on these charts, but assuming the actual numbers taken for each class were 3, 10, 20, 33, 50, 89 and 110, respectively. The actual numbers taken in post-war seasons were added to these figures. Consequently, the figures written in these charts are not to be relied on in detail. But, we can get, I believe, the general idea of distribution and concentration of the humpback whales in the Antarctic areas IV and V.

As shown in Fig. 9, the most abundant region in the area IV lying in the neighbourhood of 100 degree of East Longitude, having its center around Long. 102°–104°E., and Lat. 61°–62°S.. There are also good concentrations in Long. 82°–88°E., and Long. 110°–116°E.. In the area V big concentrations are seen in the North-West regions of Balleny Is., but there is also a good ground in Long. 172°–178°E. The boundary between the distribution of the two populations seems lying Long. 130°–142°E., but it is not so evident that we can say definitely there is no intermingling of the two populations. Figs. 10–14 show such distribution and concentration monthly, from November until March. We can see the movement of the concentrations by months from these charts, though numbers of whales

taken are not so enough in February and in March to get any concreat ideas in these months.

In the area V and also in the area IV the centers of the concentrations move in December south-eastward as compared in November. In November the boundary between areas IV and V lying Long. 120°–130°E., but it seems to move in December also eastward to eastside of Long. 140°E., though the catch in Long. 120°–140°E. are rather few and we can not judge to which populations these whales belong. In January this boundary is very evident, lying Long. 120°–140°E., but we can not recognize the eastward movements of the concentrations, except those in area V and southward one. Such movements are, of course, in accordance with the ice conditions in the sea. Big herds in the north-west region of Balleny Is. approach to these islands with the melting of the pack ice, which hampered their course before.

In February, the boundary of the distribution of the two populations is again obscure, being the center of the concentrations seems located Long. 120°–130°E..

Conclusions

Data of the biological observations on the humpback whales taken by Japanese antarctic whaling expeditions in the areas IV and V were analysed, comparing with other data of different authors, and the following conclusions were reached.

1. Few black coloured group were seen compared with South Georgian and South African humpbacks as reported by Matthews. No definite conclusions could be reached regarding of body colour between the two populations in the areas IV and V, though there is some minute difference in the data analysed. No difference were seen between males and females regarding of colour.
2. Average body length at which female humpbacks reach sexual maturity is deemed 39–40 feet, which is smaller than the figure given by Matthews. No difference between the two populations in the areas IV and V were observed.
3. Most humpbacks taken in the areas IV and V are females, in which pregnant is most dominant.
4. Mean weight of testes increases according to body length until about 44 feet is attained.
5. Regarding of the distribution and concentration the centers in the areas IV and V are lying in the neighbourhood of Long. 100°E. and

North-West side of Balleny Is., respectively, with slight variations according to the month.

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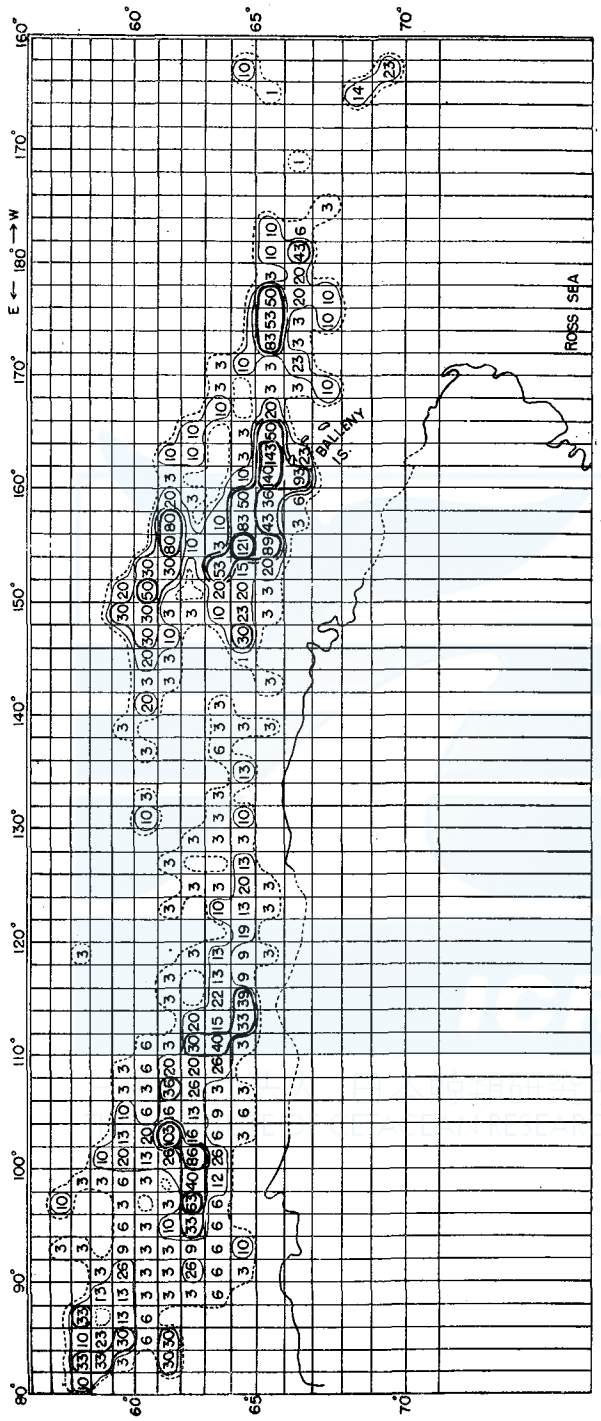

Fig. 9. Distribution and Concentration of Humpback Whales in the Antarctic areas IV and V. Grand Total. Each figure shows number of whales taken by Japanese expeditions in each square of two degrees of Longitude and one degree of Latitude during the seasons from 1935/36 to 1951/52. These figures are not to be relied on in detail.

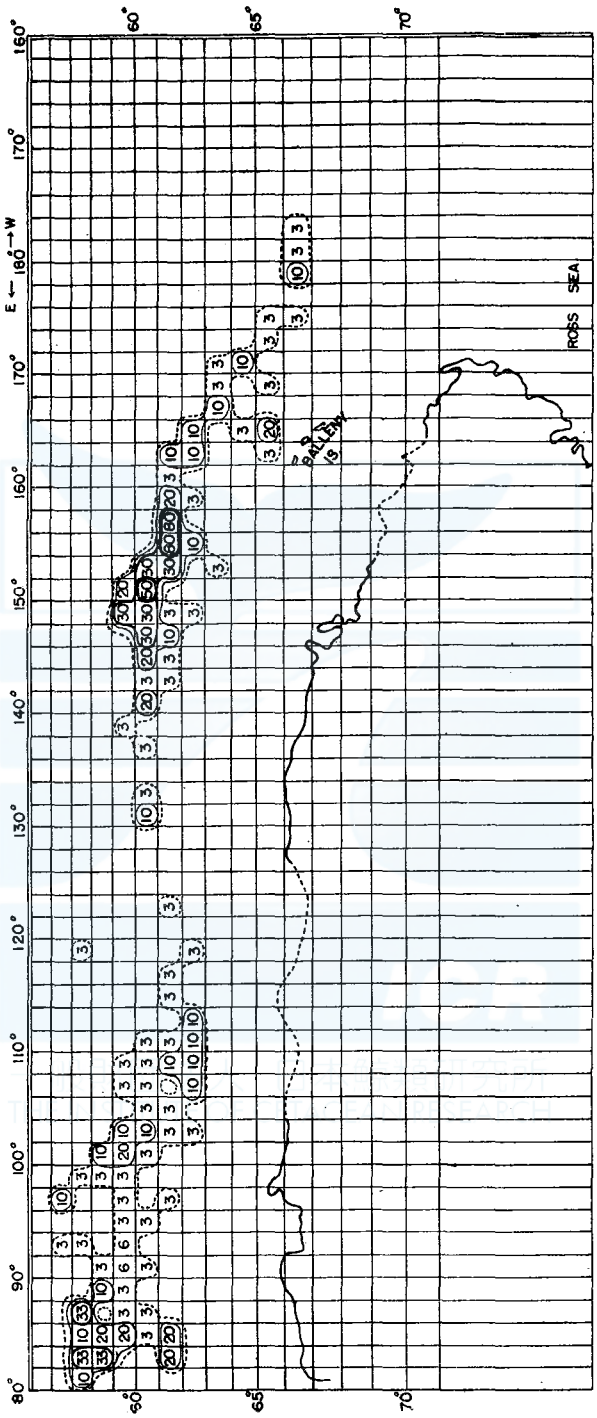

Fig. 10. Distribution and Concentration of Humpback whales in the Antarctic areas IV and V. November.

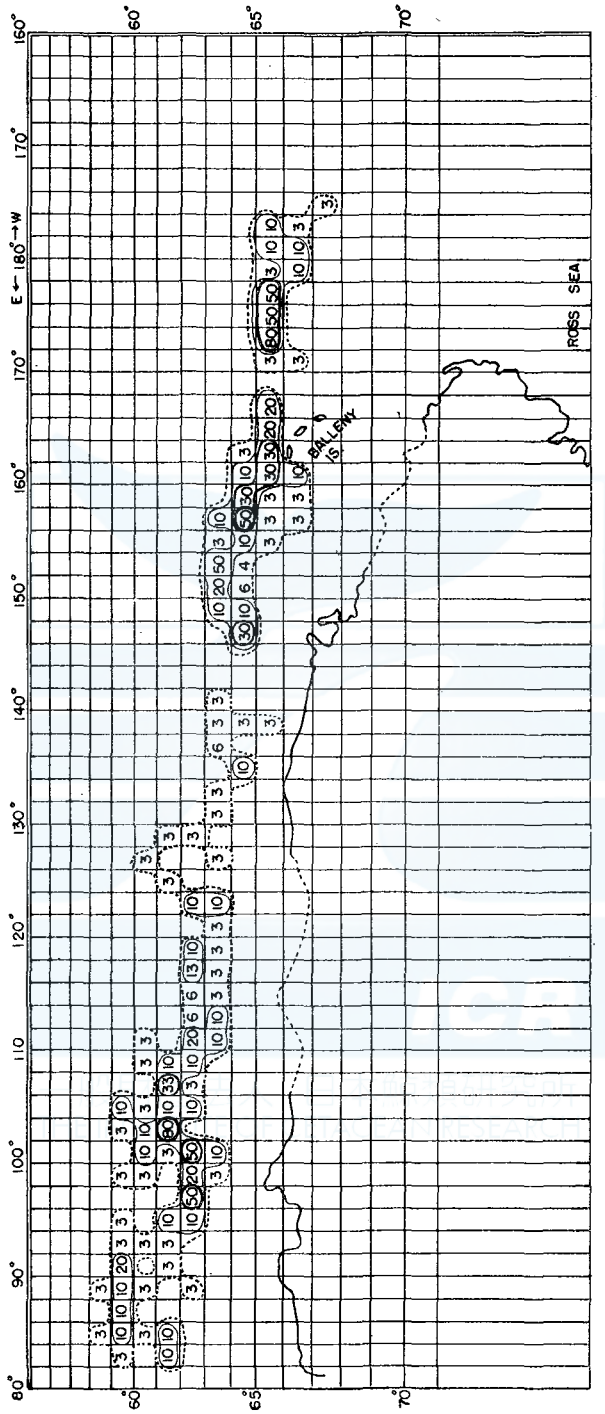

Fig. 11. Distribution and Concentration of Humpback Whales in the Antarctic Areas IV and V. December.

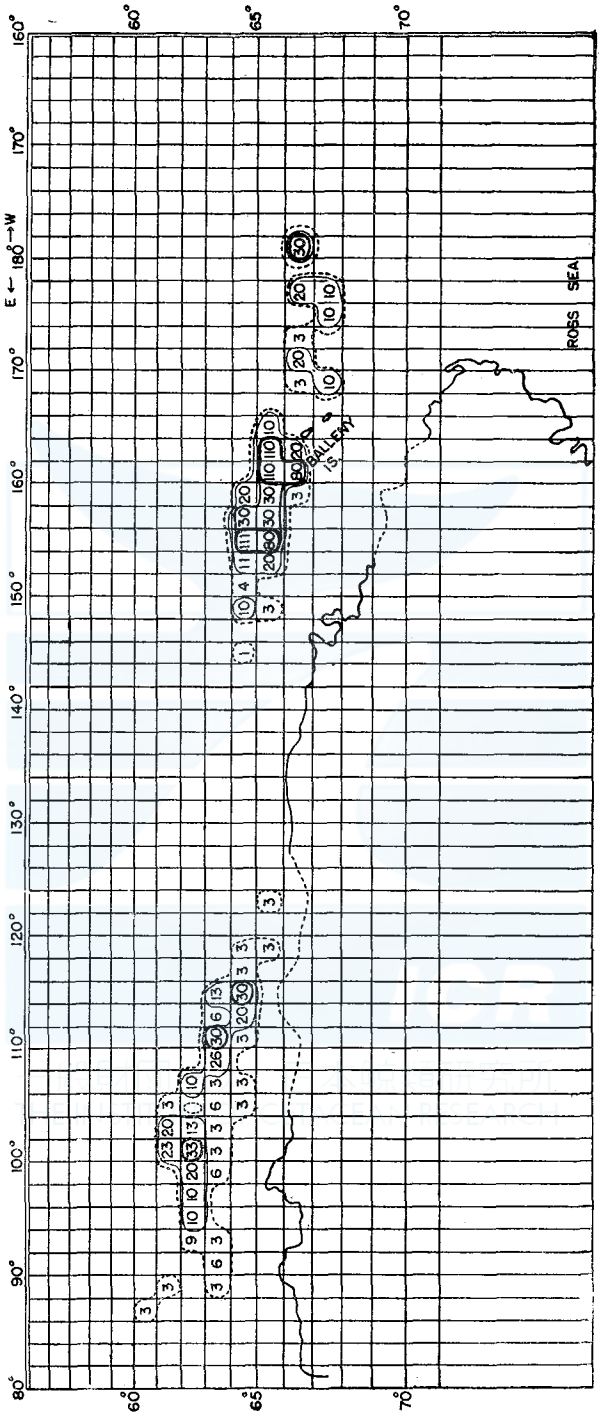

Fig. 12. Distribution and Concentration of Humpback whales in the Antarctic Areas V. January.

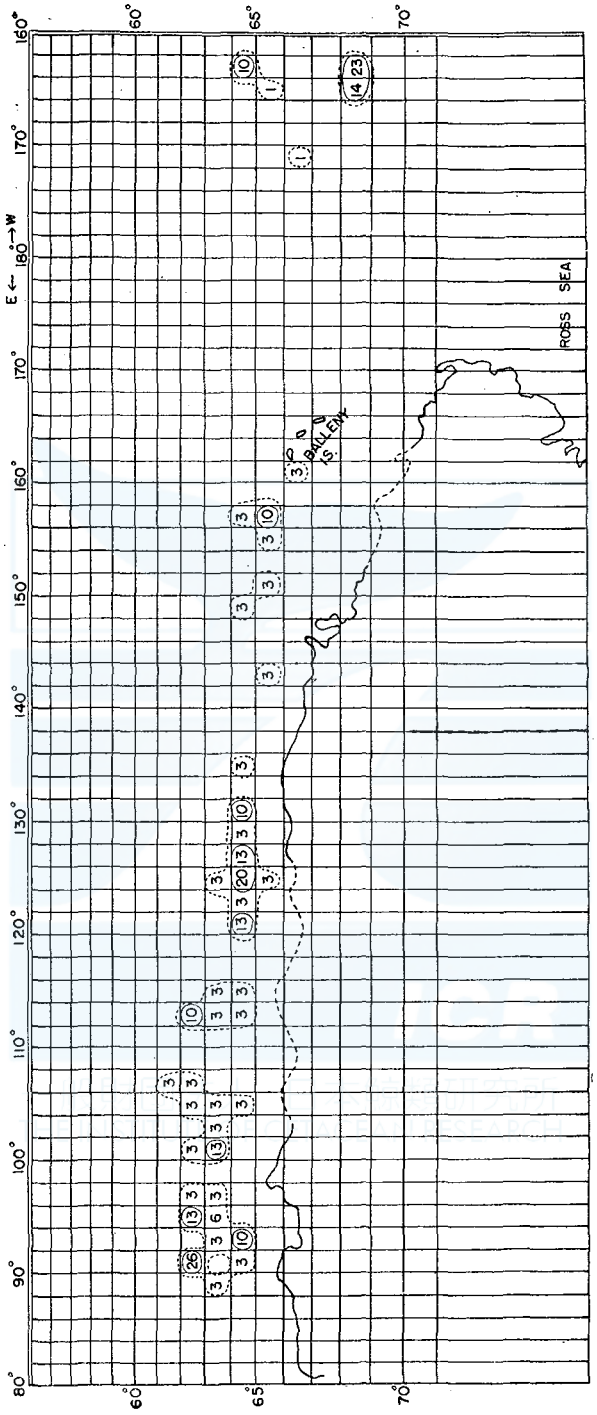

Fig. 13. Distribution and Concentration of Humpback whales in the Antarctic Areas IV and V. February.

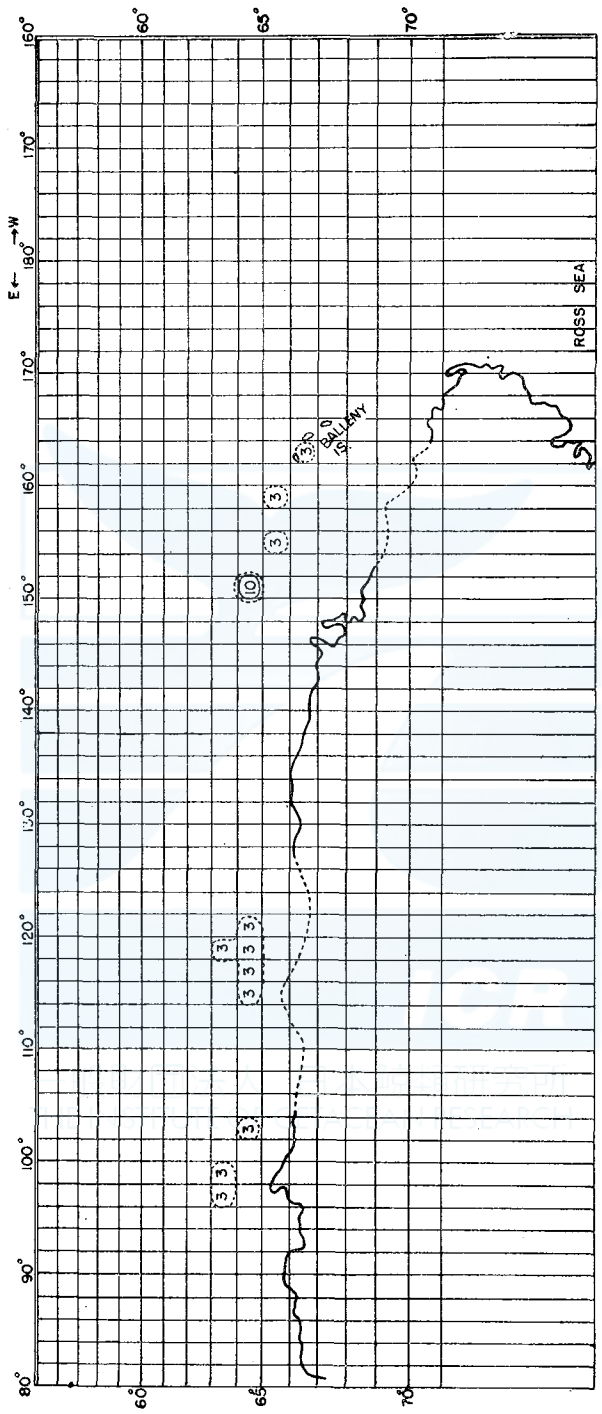

Fig. 14. Distribution and Concentration of Humpback Whales in the Antarctic Areas IV and V. March.