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AUSTRALIAN WHALING 1963  
CATCH RESULTS AND RESEARCH

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## I. INTRODUCTION

On the cessation of humpback whaling, in 1963, the Australian programme of research upon that species was terminated. However, routine collection of data was continued at Australian whaling stations. Catch and effort statistics were reported by whaling companies and biological material was collected, mainly by State Fisheries Inspectors in the course of their routine work. This work related to sperm whales the catch of which, at Albany, had assumed major importance by 1962. In view of the importance of the Albany sperm whaling operations an aerial survey for sperm whales off the west and south-west coasts of Australia was initiated in April 1963. However Dr Chittlebrough, who planned this work, could hold only a watching brief with respect to it. Appointment of the present author as full-time Research Officer to work on sperm whales makes it possible to work up the accumulated material and data for this species more rapidly. The responsible authorities are now considering an expanded programme for 1964-65, in which the aerial survey would be increased, marking cruises would be made off the west coast in the autumn and off the south coast in the spring, and blood-typing would be done with the co-operation of the Bureau of Commercial Fisheries, Honolulu.

## II. SPERM WHALES

### (a) Commercial Operations

The Nor'-West Whaling Company, operating from Carnarvon ( $24^{\circ}53'S.$ ,  $113^{\circ}38'E.$ ) began sperm whaling on 2nd June, using two vessels, and ceased on 4th July when the vessels were directed to hunt for humpback whales.

Cheynes Beach Whaling Company, operating from Albany ( $35^{\circ}05'S.$ ,  $117^{\circ}56'E.$ ) began whaling on 10th March with two catchers and ceased on 6th December. During June and July a total of 18 catcher days were spent on humpback whaling.

During 1963 no limits were placed on sperm whale operations apart from the minimum legal length of 35 feet. The Nor'-West Whaling Company was granted special permission to take 140 undersized sperm whales for research purposes during 1963, and the Cheynes Beach Company was given a permit to take five undersized sperm whales in each month.

# AUSTRALIAN WHALING 1963

## CATCH RESULTS AND RESEARCH

By J.L. Bannister

### Summary

Catch and effort data obtained during sperm whaling operations off Western Australia during 1963 have been analysed and compared with the available data from previous years.

At Albany the catch per unit of effort during 1963 was less than in either of the two previous years. Data from aerial sightings confirm that this was probably due to a decrease in the availability of sperm whales off Albany in 1963.

An analysis of results from the first 13 months of an aerial survey off the Western Australian coast shows that sperm whales are found further offshore on the west coast while being concentrated near the continental shelf on the south-west coast. Provisional estimates of the density of sightings show a peak of abundance in November. An expanded programme of research on this species during 1964-65 is under consideration.

Catch and effort data for the small number of humpback whales caught during 1963 show that this species continued to decline in availability in 1963. The catchable stock is estimated at 568 humpbacks of which not more than 261 whales could have been adult. No further catches of humpbacks are expected for some years following the recent international agreement prohibiting their capture in the southern hemisphere, and no further programme of research on humpbacks is planned.

Total catches of sperm whales at each station during 1963 were as follows:

- Carnarvon - 57 sperm whales (24 males, 33 females; including 34 small whales taken under research permit)
- Albany - 596 sperm whales (574 males, 20 females; including 22 small whales taken under research permit; 2 whales lost at sea)

Length frequency distributions for these catches are given in Table 1a, and for comparison with respect to the final column similar details for years since 1955 are given in Table 1b.

#### (b) Catch and Effort

Details of catch and effort data are available for operations off Albany since 1961. (Catcher records are occasionally incomplete so that the catch referred to below, in Tables 2 and 3 for example, is that for which effort data are available). Log books of one of the two catchers hunting sperm whales off Albany from 1957 to 1960 are also available, and details of daily catch and effort have been extracted. These statistics have been summed for each month of each year. For the years 1957 to 1961 catcher data are available in terms of hours steaming, while for 1962 and 1963 the total hours at sea can be broken down to give the actual number of hunting hours. No effort statistics can be obtained for the one Albany catcher operating during 1955 and 1956 but relatively little effort was expended on sperm whales in those seasons (total catch 7 sperm in 1955 and 61 in 1956).

Tables 2 and 3, and also Figure 1, show that catchable sperm whales (mostly adult males) appear to increase in abundance off Albany after June, followed by a decrease towards the end of the year, from October or November. Any comparison of rates of catching from year to year should therefore be restricted to the same period of time in each year and data are available for each of the months September-November from 1957 to 1963 (summarized in Table 4).

There is no striking trend in the figures for catch per unit effort (in terms of steaming hours) over this period although there are apparent variations in the availability of sperm whales.

Larger, faster and better equipped vessels were employed in 1963 and their fishing power could have been expected to be greater than that of the vessels used previously. In this case the catch per unadjusted unit effort would be expected to have risen in 1963. That it was actually lower than in 1962 or 1961 might be attributed partly to limited experience in handling the newer vessels, as a result of which the fishing power might not have been greater; and partly to the fact that, while more effort (in terms of total hunting hours) was expended in 1963 than in 1962, some of the extra hours in 1963 were spent in weather poorer than could be used by the catchers that operated in 1962. From catcher records, 45 per cent of days spent hunting sperm whales in the period April-November were in wind conditions of force 5 or over in 1963 compared with 38 per cent in 1962. Thus the larger, more efficient catchers may have lost some of their advantage by attempting to operate in adverse weather which the smaller, older catchers would not have faced. We are not yet in a position to adjust the effort data to allow for weather.

Another interpretation of the lower catch per unit effort in 1963 is that there was an actual lower availability of (male) sperm whales. An independent measure of the availability of sperm whales off Albany can be obtained from records of sightings and effort of the whaling company's spotter aircraft. These data have been weighted for weather conditions by a percentage factor derived from records of sea state and visibility to give the total number of "effective" hours flown. From Tables 5 and 6 the values for the number of contacts, whales and bulls recorded per 10 "effective" (i.e. weather-corrected) hours of searching over the same period (April-December) in both years are all lower in 1963 than 1962. There has also been a slight decrease in the mean length of males (other than those under the research permit) taken at Albany since 1962, although the 1963 figure is the same as that for 1960 where the catch was half, that taken in 1963 (Table 1 b).

A catcher's chances of making contact with whales are greatly increased by information from the spotter aircraft, and catcher effort can be weighted by a factor which allows for this assistance in terms of the relative efficiency of sighting by the aircraft compared with the catcher. This follows a procedure employed by Chittleborough (1964) for humpback whaling operations. Thus, considering bulls only (i.e. virtually the whole catch), catcher

sightings extracted from catcher logs in 1962 and 1963 indicate that in 1962 the company aircraft saw 2.58 times as many bulls per hour as the two catchers did, while in 1963 the aircraft saw 4.06 times as many (aircraft hours unweighted for weather). Thus 1 hour's flying in 1962  $\equiv$  2.58 hours' hunting, while for 1963 one hour's flying  $\equiv$  4.06 hours' hunting.

In terms of hours steaming rather than hunting, for "combined data" in 1962 and 1963 we get values of 5.61 and 7.67 hours equivalent to one hour's searching by the aircraft, respectively. Figures for catch per 100 hours steaming are then - 1962: 7.10, 1963: 4.73. (We have no detailed data for aircraft operations in the years 1957-61 although spotting was carried out to a variable extent in those years). The drop of 33.4 per cent in 1963 compared with 1962 is relatively greater than shown by catch per unit effort for the same period (1962: 24.09, 1963: 17.39 whales per 100 hunting hours; a drop of 27.8%) and aircraft sightings per unit effort (1962: 3.17, 1963: 2.51 bulls per 10 effective hours searching; a drop of 20.8%).

If the catcher data were corrected for weather the catch per unit effort figures might show a difference rather closer to that shown by the spotter data for 1963 compared with 1962. The aircraft spotters are likely to give a better estimate of density than either catch or catcher sightings data alone, but at the same time it seems unlikely that the aircraft operations were more efficient in 1963 than in 1962 since a new pilot was being trained. The 1963 density obtained from aircraft sightings alone is therefore probably an underestimate, i.e. the real drop is likely to have been 20%, in bulls.

The conclusion is that there was a real drop in availability of sperm whales off Albany in 1963 at least in the period September-November, while at the same time catcher power was less than might have been expected. Results drawn mainly from two years' data cannot be fully conclusive, but the possibility that the beginning of a long-term trend has become apparent in these 1963 results cannot be ignored.

## (c) Biological Collections

Collections of biological material were made during the season at both whaling stations, mostly by State Fisheries Inspectors in the course of their normal work.

At Carnarvon 22 sperm whales (15 males, 7 females) (88 per cent of the catch above minimum length) were examined during 1963. In addition 32 whales were taken for research and examined.

At Albany the total number of sperm whales examined was 497 (492 males, 5 females) (86.6 per cent of the catch above minimum length). In addition 20 whales were taken for research and examined.

Total material obtained during 1963 from both stations was as follows:

Teeth - 519 mandibular, 5 maxillary  
 Testis samples - 94  
 Ovary pairs - 12

## (d) Age Determination

Since the November meeting of the Sperm Whale Sub-Committee in Seattle, correspondence has been exchanged with Japanese scientists who sent a photograph of the cut surface of a tooth from a marked sperm whale. The whale was estimated to have been 25 feet long at the time of marking, and was shot 11 years later (when 41 feet long). Counts of the major broad growth zones (as used by the Japanese) were consistent with a rate of deposition of one broad zone per year. If all the finer lines of growth were counted the rate of deposition of these would be close to two per year. Further material is needed, either from young whales or from sperm whales marked when very young.

The cutting and polishing of teeth from 1250 sperm whales taken at Australian whaling stations is in progress and a sample of these is being examined in an effort to determine the underlying pattern of laminations.



## (e) Aerial Survey

Details were given in the report to the November meeting of the I.W.C. Sperm Whale Sub-Committee describing aerial survey operations off Western Australia begun in April 1963. An Aero-Commander aircraft is flown along some 1,000 miles of coastline with transects extending 150 miles from the edge of the continental shelf (Fig. 2). The scheme is financed from the Fisheries Development Trust Account and the survey is scheduled to cover a two year period.

An analysis is being made of the results from the first 13 months of the survey. Figure 2 shows the location of sperm whale contacts during this period. We believe "contacts" to give the best indication of the pattern of distribution, one contact being taken to include any consecutive sightings of whales within ten miles along the flight path. Our observations suggest that groups of whales or individuals further apart than ten miles are likely to be behaving independently.

Weather data (wind speed, visibility and sea surface) recorded during the flight are used in the form of a percentage code to weight the actual number of searching hours in each month to give monthly totals of "effective" searching hours. Figures for the number of contacts per 10 effective hours have been calculated for each of the offshore transects and each of the six flight-legs along the edge of the continental shelf. (The leg from Perth to Albany is divided into two sections at a point south-west of Cape Leeuwin).

Statistical tests applied to the total figures for the first 13 months demonstrate quite clearly that whales were scattered further offshore in the northern section of the search area than off the south coast, where off Albany they were confined almost entirely to a narrow area along the edge of the continental shelf. The total number of sightings is too small to give any clear picture of the monthly pattern in distribution from one part of the area to another, although monthly sightings do show that there was some seasonal variation in the abundance of sperm whales over the area as a whole. Peak abundance occurred in November with a secondary peak apparently in April or May (Fig. 3). During November the majority of whales off the west coast were observed to be travelling southwards; off Albany they appeared to be moving westwards throughout the year.

The average density per survey flight during the 13 months period was 2.04 contacts per 10 effective hours of searching, i.e. in optimum weather. With a total searching time of 22.33 hours per survey, this gives a total of  $2.04 \times 2.233$  contacts per survey flight in ideal conditions. With optimum weather conditions an area extending approximately one mile on either side of the aircraft can be searched thoroughly giving a total of  $2241 \times 2$  square miles searched during each survey. An average of 9.00 whales per contact was obtained for the 41 contacts made during the 13 months. This compares with a higher figure of 16.75 whales per contact obtained from whaling company air sightings data for 1962 and 1963. The reason for this difference is most probably due to the method of searching employed. On the aerial survey a large area is searched at higher speed (100 knots compared with 75 knots) and an area of 5 miles radius can only be circled once after whales have been sighted. The spotter aircraft at Albany, on the other hand, can circle schools and their immediate neighbourhood while catchers are directed on to the whales, and this leads to the likelihood of a higher estimate of the number of whales per contact. In calculating the number of whales in the survey area, seasonal and regional differences in the composition of schools need to be taken into account and the small number of contacts obtained so far on the survey is inadequate for such a breakdown. (From the 4 contacts on the continental shelf east of Albany a rather unreliable figure of 16.75 whales per contact can be calculated).

For an estimate of the total number of whales in the whole survey area we can use both figures, i.e. 9.00 and 16.75 for the number of whales per contact, to give possible upper and lower values for the total number of whales present during one survey.

In the area of approximately 1040 x 150 sq. miles covered by the survey, the lower estimate of the number present is thus given by

$$\frac{2.233 \times 2.04 \times 9.00}{4482} \times 156,000 = 1427 \text{ whales}$$

while the upper estimate = 2656 whales.

These figures can be regarded only as provisional estimates. With no knowledge at present of stock limits or the relationship

in which these whales stand to others in the east Indian Ocean it is impossible at the moment to say what is the true meaning of these figures in terms of whales contributing to the catchable stock(s) off the Western Australian coast. More spotting hours per month are required if significant results are to be obtained and a revised programme is being drawn up to cover a greater proportion of the northern section, and to give more intensive coverage of the southern section up to 50 miles from the edge of the continental shelf. An increased survey as part of an expansion of the whole sperm whale research programme is being considered.

#### (f) Marking

One hundred and twenty-nine small sperm whales were marked from catchers operating off Albany in the course of normal whaling operations during 1963. In addition 27 possible hits were recorded. Five small sperm whales (with an additional three possible hits) were marked off Carnarvon during the season. Twenty-four sperm whales (plus three possible hits) were marked from the catcher Kos VII during a marking charter off Albany in May-June 1963.

Six sperm whales were marked from whaling vessels on passage from Fremantle to Albany in March, before the opening of the season.

The total of sperm whales successfully marked during 1963 is thus 164, with possible hits recorded from 33 others. No recoveries of these or any other sperm whale marks were recorded during 1963.

Marking on the whaling grounds during the season is of limited immediate value since 'size' whales are liable to be caught immediately and therefore there can be effective marking only of small whales. Most recoveries are likely to be long-term and there is a need for increased effort on marking sperm whales of all sizes and classes outside the whaling season and away from the whaling grounds. With this in mind two marking cruises are planned for 1964-65; one off the west coast between Geraldton and Carnarvon, the other off Port Lincoln on the south coast.

## (g) Blood Typing

We hope to begin collection of blood samples at Albany within the next few months for analysis by Dr Sprague at Honolulu, along lines similar to those already successfully in operation in C.S.I.R.O's programme of research on the southern bluefin tuna. Samples both of erythrocytes and serum will be collected and transported by express air-freight from Australia to Hawaii. Dr Sprague has kindly offered to help with designs for suitable containers and advice on collecting methods. Blood samples will be taken from whales caught off Fremantle by Nor'-West Whaling early next year if that Company commences operations there, as it plans; we hope by this work to establish the relationship in which the whales off the west coast stand to those off the southern coast: some suggest that there are separate sub-stocks on these parts of the Western Australian coast. Arrangements are also being sought for collection of blood from South African sperm whales in an effort to establish the racial structure of Indian Ocean stocks as a whole.

## III. HUMPBACK WHALES

## (a) Commercial Operations

The Nor'-West Whaling Company, operating from Carnarvon (24°53'S., 113°38'E.) was allotted a quota of 400 humpbacks for 1963. Four catchers took a total of 68 humpback whales between July 5th and August 8th.

The Cheynes Beach Whaling Company, operating from Albany (35°05'S., 117°56'E.) was given a quota of 100 humpbacks for 1963 and between June 13th and July 17th a total of 19 humpbacks were taken by two catchers, concurrently with sperm whaling.

## (b) Catch and Effort

Details of effort expended in humpback whaling were recorded for two of the vessels operating from Carnarvon. A weighted component representing aircraft flying time was added to the effort of these vessels on the basis that one hour's flying by a spotter aircraft, operating in conjunction with the catchers, was equivalent

to five hours of steaming time by a whaling vessel (Chittleborough 1964). From these data the catch per unit effort was estimated to be 0.028 humpbacks per steaming hour, which is less than the corresponding value (0.051) for the 1962 season, indicating a continuation of the decline in availability of humpback whales.

Chittleborough (loc. cit.) has shown that a value of 0.1 humpbacks per steaming hour, attained under specified conditions, was equivalent to a catchable stock of 2,000 humpbacks. Using this relation, the catchable stock in 1963 is estimated as  $20,000 \times 0.0284 = 568$  humpback whales. This is consistent with the estimate by Chittleborough (loc. cit.) that the catchable stock at the end of 1962 contained 800 whales.

Effort data for humpback whaling were also recorded by the vessels at Albany. Although these operations were limited to only 18 catcher days, some of which were spent searching for humpbacks in sheltered coastal waters because the weather was unsuitable for offshore sperm whaling, the data from them support the Carnarvon result.

### (c) Catch Composition

Table 7 gives the length distributions and sex ratio of catches of humpbacks from the west coast of Australia during 1963.

The mean lengths of both males and females were less than those of corresponding catches from the west coast in 1962.

Using the criterion that males having testes weights exceeding 4 kg. are sexually mature, 52.8 per cent of the males taken in 1963 were mature. From examination of ovaries, 41.5 per cent of the females taken in 1963 were mature. In the total catch from the west coast in 1963, 46.0 per cent were mature. If this catch was representative of the catchable stock, and the size of the catchable stock at that time was 568 whales, then the total number of adult humpback whales remaining in the population did not exceed 261 whales.

## (d) Biological Collections

At Carnarvon a total of 67 humpback whales (99 per cent of the catch) were examined in 1963. The material obtained from these whales was as follows:

Earplugs	- 47
Ovary pairs	- 36
Testis samples	- 31

At Albany in 1963, 18 humpbacks (5 males, 13 females) were examined (90 per cent of the catch). The following biological material was collected:

Earplugs	- 13
Ovary pairs	- 13
Testis samples	- 5

## (e) Marking

Four small humpbacks were successfully marked and possible hits recorded from three others in the waters off Carnarvon.

Two marks recovered from humpback whales 35 feet long, killed off Albany on 22nd June, 1963, had been fired on 10th June, 1961, into small whales as they passed Albany.

## (f) Future Programme

The resolution of the International Whaling Commission passed in July 1963 which prohibits the taking of humpback whales in the southern hemisphere means that there is little likelihood of further Australian catches for some years.

Humpbacks will be recorded if sighted on survey flights (Fig. 4 records the positions of sightings during the aerial survey 1963-64) and a few may be marked from sperm whaling vessels if the opportunities arise, but no further specific programme of research upon this species is planned.

## IV. OTHER SPECIES

Blue, fin, sei and Bryde's whales are sighted from ships and aircraft off the Australian coast each year, but the individual species cannot always be identified accurately from brief sightings of these whales at sea.

Sightings of rorquals (Fig. 4) during the recent sperm whale aerial survey programme off the west coast indicate that they may be more common off the northern part of the survey area than off the south-west coast.

One blue whale was taken (under a research permit) at Carnarvon on July 8th, 1963. From morphometric measurements this specimen was identified as a pigmy blue whale similar to the 21 other specimens which have been taken on the Australian coast since 1954.

Two whales identified as sei whales and one identified as a Bryde's whale, were taken at Carnarvon during June 1963. There have now been four sei whales and eight Bryde's whales taken at Australian stations since Bryde's whales were first taken on this coast in 1958 (Chittleborough 1959). Material and data from these specimens do not conform precisely with the published descriptions of specimens from other parts of the world. Further material from the west coast of Australia, where these whales are common but not sought commercially at present, might show that localized populations differ in their morphology.

## V. ACKNOWLEDGMENTS

The co-operation of the whaling companies, enabling data to be collected at their respective whaling stations and from their catchers, is gratefully acknowledged.

Inspectors of the western Australian Fisheries Department assisted greatly in the collection of the material.

## VI. REFERENCES

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TABLE 1a Lengths of sperm whales captured at Albany - 1963 (including whales taken for research)

MALES

Length (ft)	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
23											
32				1						1	1
33					2						1
34			1	1							2
35	1										2
36	1	3				2	1	5			9
37	2	5	3	1	2	6	1	2	2		13
38		1	5	4	3	7	1	2	9		31
39		8	6	4	7	5	2	1	3		26
40	4	7	6	1	7	8	5	5	3		43
41	2	6	3	4	7	8	6	4	1		44
42	4	2	4	2	8	6	11	2	9		51
43	5	3	2		4	7	8	6	4		39
44	7	4	5	3	5	13	8	6	2		37
45	6	5	4	3	6	8	8	7	2		53
46	3	2	4	2	4	5	8	7	6	1	54
47	6	4	1	3	2	2	3	7	9		39
48	2	11	1	3	2	2	9	3	5		35
49	3	3		4	2	3	2	9	2		34
50	2	1		1	2	2	5	2	6		25
51	1	1				2	4	2	1		15
52			1		1	3	4	1	1		11
56	1					3		2	1		8
Total	50	66	46	36	60	90	87	71	66	2	574
Mean length*	44.36	43.02	41.84	43.38	42.53	42.66	43.79	43.68	43.17	45.00	43.16
(Total)	(48)	(68)	(44)	(31)	(46)	(74)	(82)	(86)	(61)	(14)	(154)
(Mean length*)	(42.23)	(43.72)	(44.61)	(43.35)	(43.39)	(42.88)	(44.63)	(43.45)	(44.19)	(43.50)	(43.63)

\* Excluding whales < 35'



TABLE 1 a (Cont'd...)

Lengths of sperm whales captured at  
Albany - 1963 (Cont'd...)

Lengths of sperm whales captured at  
Carnarvon - 1963

Length (ft)	Females	Length (ft)	Males	Females
29	2	24	1	
30	0	27		1
31	0	28	1	1
32	3	29	2	2
33	3	30		
34	6	31	1	6
35	4	32	1	5
36	1	33	2	8
37	1	34		3
38	0	35		4
Total	20	36	2	3
		37		
		38		
		39		
		40	2	
		41	1	
		42	2	
		43	2	
		44	2	
		45	3	
		46		
		47	2	
		48		
		49		
		50		
		51		
		52	1	
		56		
		Total	25	33

Body Length (ft)	Males									Total	
	1955	1956	1957	1958	1959	1960	1961	1962	1963		
23										1	1
32										1	1
33										2	2
34							1			2	3
35			1	4		6	5	7	9		32
36		2	7	5	4	11	11	16	13		69
37			7	10	8	6	11	14	31		87
38		1	3	12	9	20	16	20	26		107
39		3	11	6	4	17	17	25	43		126
40		3	1	17	10	26	30	34	44		165
41	1	5	5	6	1	19	36	46	51		170
42		2	10	26	8	15	43	49	39		192
43		5	14	25	11	22	52	59	37		225
44	1	8	7	26	16	33	52	56	53		252
45		6	9	25	14	13	34	55	54		210
46	1	5	13	11	12	16	39	50	39		186
47		5	7	21	11	16	35	31	35		161
48		3	4	11	8	19	28	25	34		132
49		4	5	8	5	16	15	16	25		94
50		3	7	7	6	7	11	32	15		88
51		4	5	4	4	6	8	15	11		57
52		2	3	2	5	4	6	2	8		32
53			2	1	1	1	1	1			7
54	2		1					1			4
55	1			1							2
56									1		1
Total Catch	6	61	122	228	137	273	451	554	574	*	2406
Mean Length †	49.00	44.85	43.89	43.51	44.07	43.16	43.61	43.63	43.16		43.50

\* Including 7 small whales taken for research purposes

† Not including whales < 35' in length

TABLE 1 b  
(Cont'd...)

Distribution of lengths of sperm whales taken at Albany  
S.W. Australia - 1955 to 1963

Body Length (ft)	Females									Total
	1955	1956	1957	1958	1959	1960	1961	1962	1963	
20										
21										
22										
23										
24										
25										
26										
27										
28										
29									2	2
30										
31				1						1
32				2					3	5
33				1				1	3	5
34				1			1	1	6	9
35	1		11	8		3	1	5	4	33
36			4	19		5		3	1	32
37			1	2		1			1	5
38			1				1	2		4
39										
40										
Total Catch	1	0	17	34*	0	9	3	12x	20 $\phi$	96
Mean Length	35.00	0	35.53	33.12	0	35.78	35.67	35.5	33.5	35.04

\* Includes 4 research whales

x Includes 3 research whales

TABLE 2

Catch and effort in each month of sperm  
whaling operations, 1962

Cheynes Beach Whaling Co. (Albany)

Month	Vessel	Tonnage	No. of Catcher Days	Total Steaming Hours	Total Hunting Hours	Sperm Catch (Nos.)	Catch per 100 Hours Steaming	Catch per 100 Hours Hunting
March	Kos 7	253	-	-	-	-	-	-
	Minilya	248	14	251.20	141.15	27	10.75	19.13
	Total		14	251.20	141.15	27	10.75	19.13
April	Kos 7		18	292.75	156.17	22	7.51	14.09
	Minilya		25	399.75	197.48	36	9.01	18.23
	Total		43	692.50	353.65	58	8.38	16.40
May	Kos 7		17	265.91	120.00	24	9.03	20.00
	Minilya		22	291.45	130.91	22	7.55	16.81
	Total		39	557.36	250.91	46	8.25	18.33
June	Kos 7		16	228.58	106.36	16	7.00	15.04
	Minilya		21	315.02	165.75	15	4.76	9.05
	Total		37	543.60	272.11	31	5.70	11.39
July	Kos 7		11	184.58	086.08	25	13.54	29.04
	Minilya		10	170.17	083.38	22	12.93	26.39
	Total		21	354.75	169.46	47	13.25	27.74
August	Kos 7		21	304.00	144.00	39	12.83	27.08
	Minilya		18	267.33	122.78	35	13.09	28.51
	Total		39	571.33	266.78	74	12.95	27.74
September	Kos 7		23	350.33	153.17	42	11.99	27.42
	Minilya		20	360.44	160.15	41	11.37	25.60
	Total		43	710.77	313.32	83	11.68	26.49
October	Kos 7		21	330.91	138.75	44	13.30	31.71
	Minilya		22	334.25	154.12	43	12.86	27.90
	Total		43	665.16	292.87	87	13.08	29.71
November	Kos 7		21	329.17	168.33	30	9.11	17.82
	Minilya		24	348.38	180.42	30	8.61	16.63
	Total		45	677.55	348.75	60	8.86	17.20
December	Kos 7		10	154.58	77.17	8	5.18	10.37
	Minilya		-	-	-	-	-	-
	Total		10	154.58	77.17	8	5.18	10.37
Season			334	5178.80	2486.17	521	10.06	20.96

TABLE 3

Catch and effort in each month of sperm  
whaling operations, 1963\*

## Cheynes Beach Whaling Co. (Albany)

Month	Vessel	Tonnage	No. of Catcher Days	Total Steaming Hours	Total Hunting Hours	Sperm Catch (Nos.)	Catch per 100 Hours Steaming	Catch per 100 Hours Hunting
March	Cheyne II	440	19	313.25	181.45	21	6.70	11.57
	" III	440	19	314.91	175.33	25	7.94	14.26
	Total		38	628.16	356.78	46	7.32	12.89
April	Cheyne II		26	408.53	250.78	34	8.32	13.56
	" III		26	396.83	238.42	32	8.06	13.42
	Total		52	805.36	489.20	66	8.20	13.49
May	Cheyne II		21	295.00	152.03	30	10.17	19.73
	" III		22	265.91	138.83	19	7.15	13.69
	Total		43	560.91	290.86	49	8.74	16.85
June	Cheyne II		19	255.00	130.89	16	6.27	12.22
	" III		18	257.75	127.50	22	8.54	17.25
	Total		37	512.75	258.39	38	7.41	14.71
July	Cheyne II		17	246.58	129.08	33	13.38	25.57
	" III		10	141.58	64.42	12	8.48	18.63
	Total		27	388.16	193.50	45	11.59	23.26
August	Cheyne II		23	331.79	171.81	44	13.26	25.61
	" III		25	330.00	155.75	40	12.12	25.68
	Total		48	661.79	327.56	84	12.69	25.64
September	Cheyne II		23	345.76	188.61	46	13.30	24.39
	" III		22	319.42	162.91	40	12.52	24.55
	Total		45	665.18	351.52	86	12.93	24.47
October	Cheyne II		25	423.12	242.42	41	9.69	16.91
	" III		29	465.66	268.50	31	6.66	11.55
	Total		54	888.78	510.92	72	8.10	14.09
November	Cheyne II		25	380.28	215.96	31	8.15	14.35
	" III		25	373.58	209.50	35	9.37	16.71
	Total		50	753.86	425.46	66	8.75	15.51
December	Cheyne II		5	67.66	37.33	2	2.96	5.36
	" III		7	74.50	36.75	4	5.37	10.88
	Total		12	142.16	74.08	6	4.22	8.10
Season			406	6007.11	3278.27	558	9.29	17.02

\* Not including a total of 19 days whaling by the catcher Kos VII during June-August.

TABLE 3 Cont'd....

Catch and effort in each month of sperm  
whaling operations, 1963

Nor'-West Whaling Co. (Carnarvon)

Month	Vessel	Tonnage	No. of Catcher Days	Total Steaming Hours	Total Hunting Hours	Sperm Catch (Nos.)	Catch per 100 Hours Steaming	Catch per 100 Hours Hunting
June	R. Moore	374	21	370.08	134.42	24	6.49	17.85
	Gascoyne	344	28	413.33	194.17	23	5.56	11.85
	Total		49	783.41	328.59	47	6.00	14.30

TABLE 4

Catch and effort by catchers on sperm whales  
off Albany during period September-November  
each year, 1957-1963

Year	Catcher	Tonnage	Total Steaming Hours	Total Catcher Days	Steaming Hours per Day	Total Catch (Sperm)	Catch per 100 Hours Steaming	Catch per Catcher Day
1957	Kos 7	253	974.7	59	16.5	78	8.00	1.32
1958	Kos 7		746.3	46	16.2	75	10.05	1.63
1959	Kos 7		727.9	48	15.2	60	8.24	1.25
1960	Kos 7		786.2	48	16.4	61	7.76	1.27
1961	Kos 7	248	958.3	61	15.7	107	11.17	1.75
	Minilya		1122.8	70	16.0	114	10.15	1.63
			2081.1	131		221	10.62	1.69
1962	Kos 7		1010.4	65	15.5	116	11.48	1.78
	Minilya		1043.1	72	14.5	114	10.93	1.58
			2053.5	137		230	11.20	1.68
1963	Cheyne II	440	1149.2	73	15.7	118	10.27	1.62
	" III	440	1158.7	76	15.2	106	9.15	1.39
			2307.9	149		224	9.71	1.50

TABLE 6

Flying operations for sperm whales by Cheynes Beach Whaling Co.  
off Albany during 1963

Month	Total Days Flying	Total Hours Flying	Total Hours Searching	Total Effective Hours Searching (Weather-corrected)	Sperm Sightings					Total Contacts per 10 Effective Hrs Searching	Total Bulls per 10 Effective Hrs Searching	Total Whales per 10 Effective Hrs Searching
					Bulls (No.)	Cows and Juveniles	Not Spec.	Total Sightings	Total Contacts			
March	18	117.92	86.92	75.19	112	429	0	541	31	4.12	14.90	71.95
April	20	128.83	90.58	70.21	176	540	0	716	39	5.55	25.07	101.98
May	12	79.75	56.00	40.78	150	567	1	718	41	10.05	36.78	176.07
June	15	91.42	64.75	49.76	75	458	1	534	32	6.43	15.07	107.32
July	15	97.08	70.33	59.82	175	60	0	235	29	4.85	29.25	39.28
Aug.	17	114.58	80.83	59.75	203	557	0	760	44	7.36	33.97	127.20
Sept.	17	115.83	83.58	62.78	239	554	0	793	40	6.37	38.07	126.31
Oct.	23	172.75	123.58	95.38	186	180	0	366	43	4.51	19.50	38.37
Nov.	19	147.17	109.33	72.82	155	274	0	429	35	4.81	21.29	58.91
Dec.	5	29.33	20.91	12.90	11	65	0	76	5	3.88	8.53	5.89
Total	161	1094.66	786.81	599.39	1482	3684	2	5168	339	5.66	24.73	86.22
Apr.-Dec.	143	976.74	699.89	524.20	1368	3255	2	4627	308	5.88	26.10	88.27



TABLE 6 (Cont'd....)

Flying operations for sperm whales by Nor'-West Whaling Co.  
off Carnarvon during 1963

Month	Total Days Flying	Total Hours Flying	Sperm Sightings		Total Sightings per 100 Hours Flying*	Total Contacts per 100 Hours Flying*
			Total No.	Total Contacts		
April	10	53.33	91	5	171	9.4
June	21	137.67	163	13	118	9.4

\* Insufficient weather data available for weather corrections to be applied

TABLE 7

Lengths of humpback whales captured on the west  
coast of Australia in 1963

Length (ft)	Males		Total	Females		Total
	Carnarvon	Albany		Carnarvon	Albany	
29	1		1			
30						
31	1		1			
32						
33		1	1	1		1
34						
35	3	2	5	5	3	8
36	3		3	9	1	10
37	8		8	6	1	7
38	4		4	1	1	2
39	6		6	2	1	3
40	4	1	5	2	2	4
41		1	1	2		2
42	1		1	3	2	5
43				2	2	4
44				1		1
45				2	1	3
46				1		1
47						
Total	31	5	36	37	14	51
Mean length			37.25			38.73
1961 (Total			304			239
1962 (Mean length)			37.60			39.18

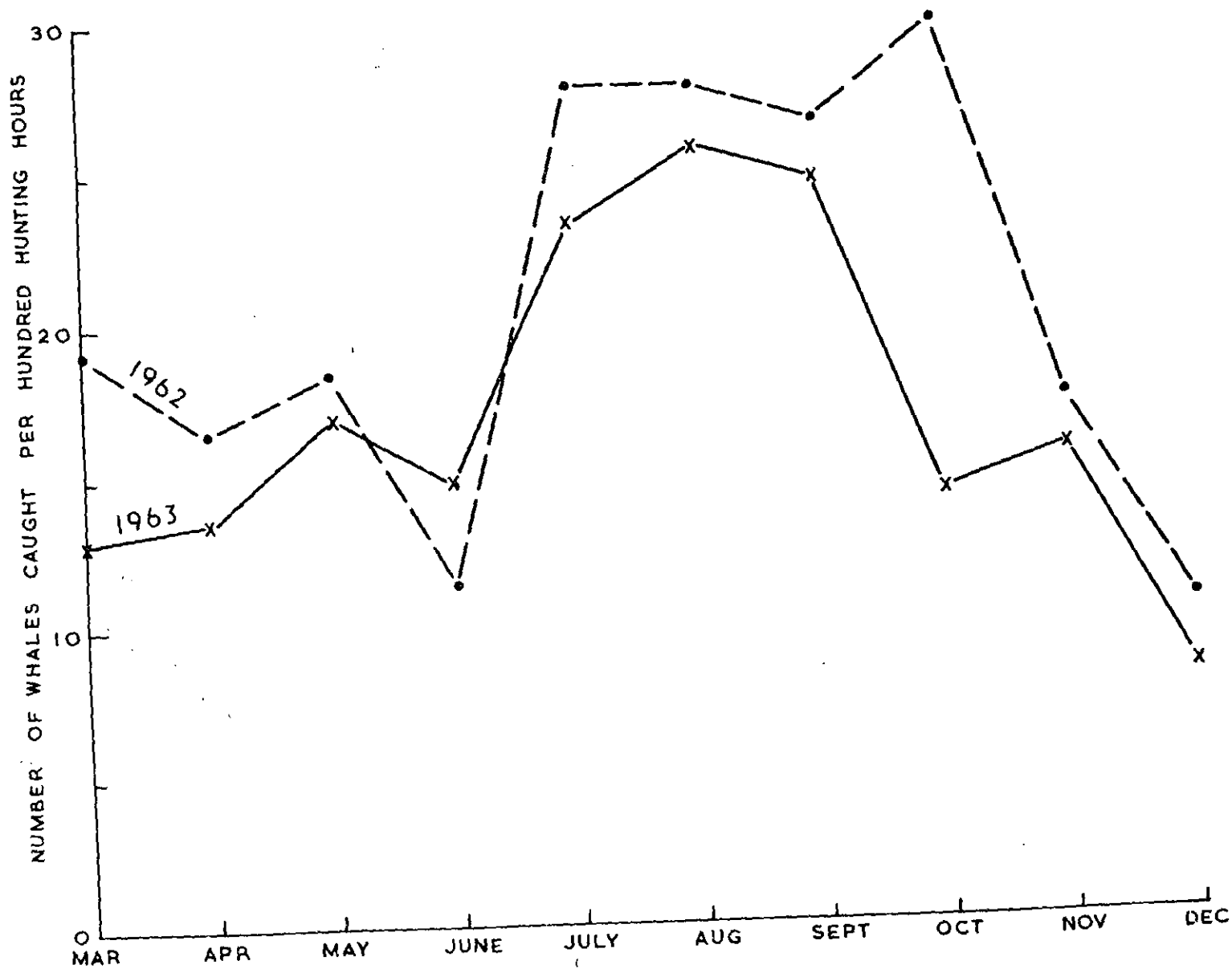


Fig. 1.- Seasonal changes in sperm whale catch per 100 hunting hours, Albany, 1962 and 1963.

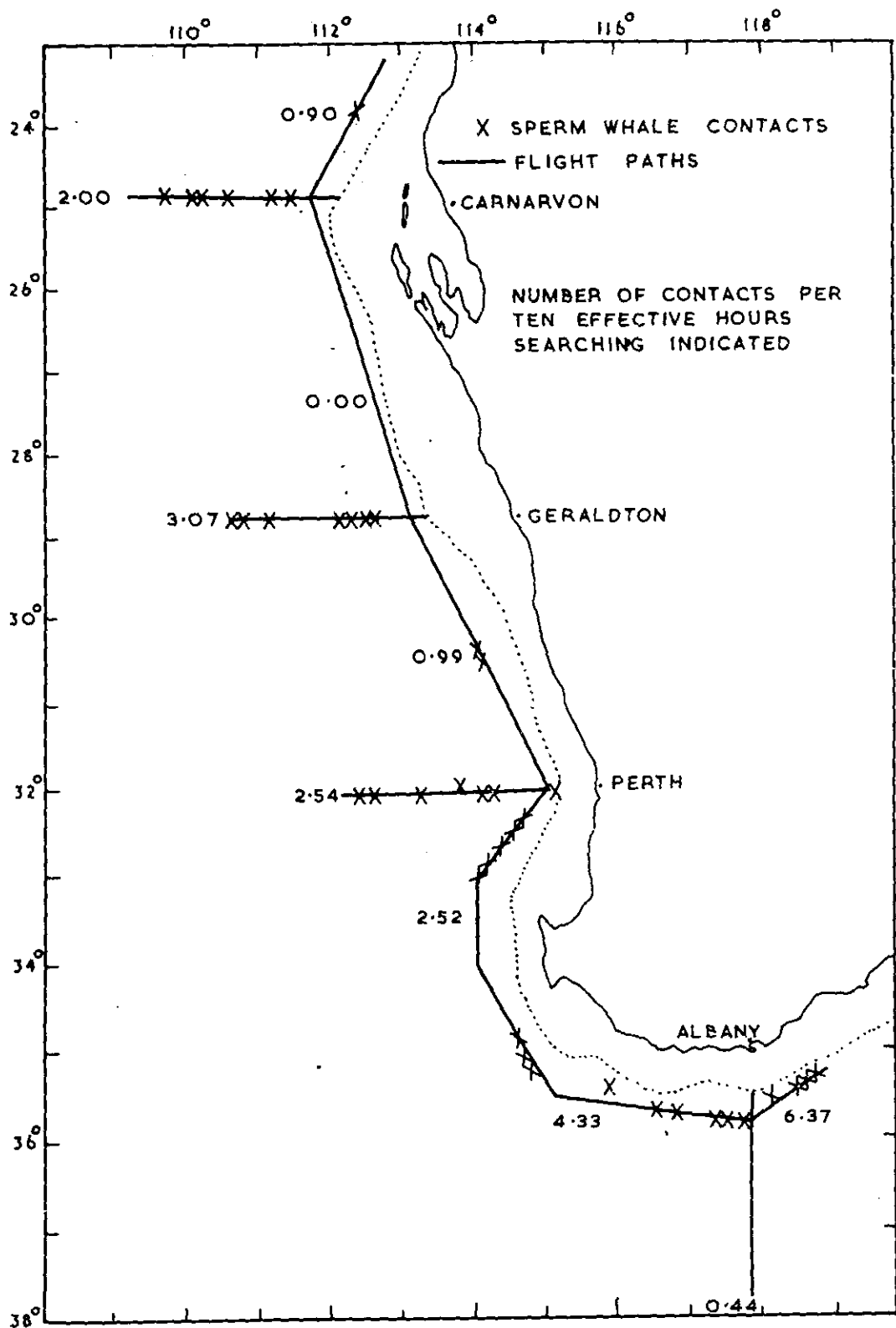


Fig. 2.- Whale survey flights April 1963 - April 1964 (incl.).

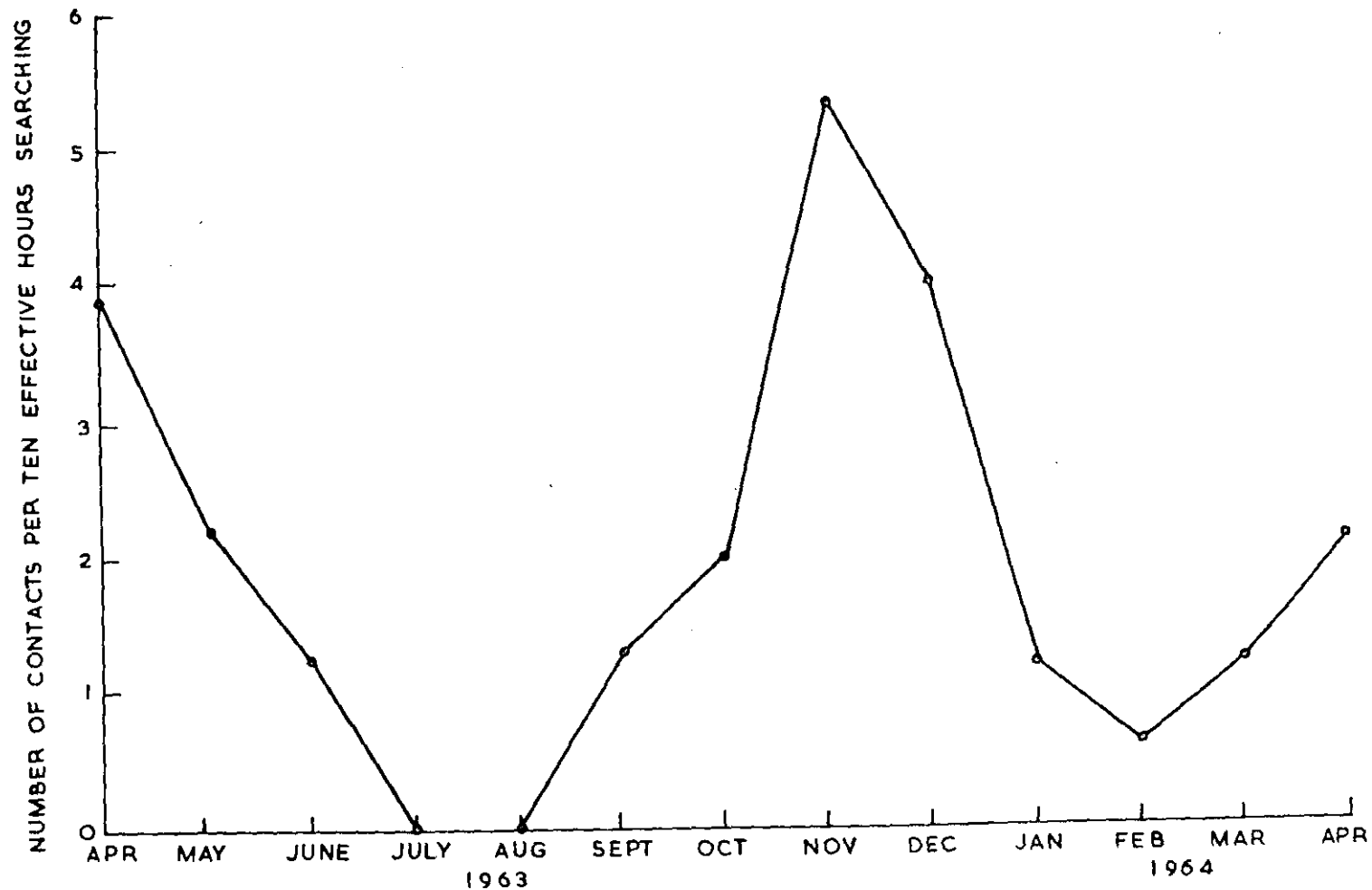


Fig. 3.- Monthly changes in density of sperm whale contacts, aerial survey, April 1963 - April 1964.

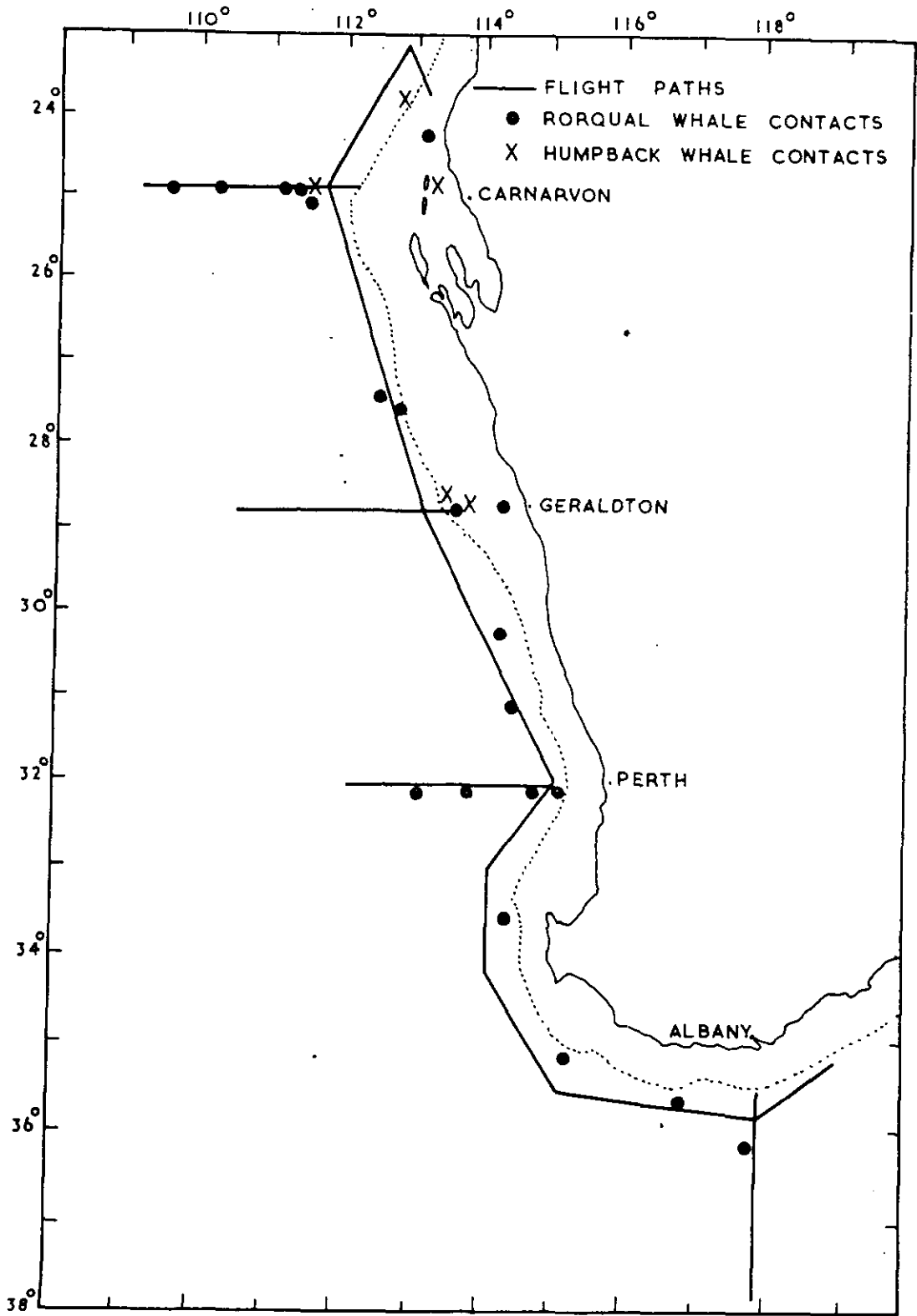


Fig. 4.- Whale survey flights April 1963 - April 1964 (incl.).

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