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DEVELOPMENT OF THE TUNA FISHERY OF BRAZIL AND PRELIMINARY ANALYSIS OF THE FIRST THREE YEARS' DATA (1)

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This report refers to the long-line tuna fishery of Brazil for the years 1957-1959, and the observations contained in it must be considered somewhat preliminary. Data collected in these three years were analysed for the following information:

1. Area of capture by statistical rectangles.
2. Development of relative indices of abundance in these areas.
3. Fluctuations of abundance, both annually and by seasons.
4. Indications of movements of the fish (as influenced probably by water temperature) based on fluctuations of abundance.
5. Indications of the results of fishing pressure on the stocks.

Before 1956, the tuna fishery of Brazil did not have a specific character. Although the tunas are abundant in waters off Brazil, they were little known and little studied. Small boats fishing with hook and line captured only small quantities, but large schools often were sighted, particularly in the waters of the Northeast, from September to March, every year. The small boats, some of them only rafts ("jangadas") or canoes, are able to fish only very close to the shore.

In 1956, work was started, directed at the possibilities of development of a major tuna fishery. Two studies were made, by Robert E. Lee, of the Food and Agriculture Organization of the United Nations (Lee, 1957), and by Hiroshi Nakamura, of the Fisheries Laboratory, Koshi, Japan. Nakamura used the Japanese research vessel *Toko Maru,* contracted from Japan by the Brazilian Government, and began his cruises in December 1956. He found tuna very abundant relative to his previous work in the Pacific.

Thanks to these researches, a commercial-scale fishery was begun, initially by a Japanese company based in Recife, State of Pernambuco. Later this fishery was partially taken over by Brazilian interests, and in 1958 another Japanese company began to fish from a base in Santos, State of São Paulo. The Japanese fleet based in Recife was originally four boats, augmented in 1958 by two more in Recife and two in Santos. In 1961, about a dozen vessels are fishing out of Recife and three out of Santos. All of these boats are of the Japanese long-line type.

This report is confined to the first three years of the fishery. During the last two years, 1960-61, there does not appear to have been any radical change in the fleet or the fishery.

For clarity, the only names used in this report are the English common names; members of the scombrid group are referred to as "tunas" and other fish captured by long-line are referred to separately or grouped as "others". Following is a list, in approximate order of importance, of the scientific names of these fishes, the common names in English, and the names used in Portuguese in the Northeast and in the South of Brazil (but not necessarily in other Portuguese-speaking regions of the world):

Scientific name	English common name	Portuguese common names Northeast	South
Scombrid group			
Thunnus albacares (Bonnaterre)	Yellowfin	Albacora de laje	Albacora de laje
Thunnus alalunga (Gmelin)	Albacore	Atum Albacora branca	Albacora branca
Thunnus obesus (Lowe)	Bigeye	Albacora ôlho grande	Atum cachorra
Thunnus thynnus (Linnaeus)	Bluefin	Albacora azul	Atum legítimo
Xiphiid and Istiophorid groups			
Xiphias gladius Linnaeus	Swordfish	Espadarte	Espadarte maca
Makaira ampla Poey	Blue marlin	Agulhão negro	Espadarte preto
Makaira albida Poey	White marlin	Agulhão de prata	Espadarte meca
Istiophorus americanus (Cuvier)	Sailfish	Agulhão de vela	Agulhão

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In addition to these species, others of lesser commercial importance are captured, including bonitos (*Katsuwonidae*) and mackerels; these are included in "others". Although it is not included in the list, *Thunnus atlanticus* (Lesson) ("Albacora preta"), is occasionally captured; it is grouped with "others". Please note that the scientific names given above and the grouping is solely for the sake of clarity and convenience; no position is taken on the complex problems of the taxonomy and nomenclature of the tunas and their relatives.

Table I shows the relative importance of each species in the capture for the three years. The production is given in numbers of fish captured in each year plus the totals for the three years. In this table, it may be seen that two species of tuna, Yellowfin and Albacore, contribute more than 75% of the catch, while the other dozen or so species contributing make up each only a small part. Yellowfin alone makes up more than 50% of the total capture of all fishes. Considering only the tunas, Yellowfin accounts for about 60%, Albacore about 30%, Bigeye about 6%, and Bluefin about 2%.

The species are not treated separately below because of the preliminary nature of this report. It is believed that a clearer picture can be given in this first analysis by avoiding prolongation and a large number of tables, figures, etc. In future works, the more important species will be dealt with separately.

ORIGIN AND NATURE OF THE DATA ANALYZED

The fishing data used in this report were originally taken by the captain of each vessel during fishing operations. In addition to recording the latitude and longitude, the captains took meteorological and hydrographic data, notably water temperatures. Numbers of hooks used were also recorded for analysis of units of fishing effort. Copies of the log books were made available to various Brazilian institutions. The number of boats whose data were available for this study was different in different years: 1957, 4; 1958, 8; 1959, 11.

Although the boats are not exactly comparable in size or fishing power, they all use standard Japanese long-line gear and analysis of the data on a basis of capture per hundred hooks eliminates discrepancies. The logs show that the time the gear is fished is remarkably constant, about six hours. Hence, the basic units used in the following analysis are two: the *number* of fish captured and the numbers (in hundreds) of hooks used multiplied by the numbers of settings of the fishing gear.

Discussions of the hydrography of the fishing areas are based on Sverdrup, Johnson and Fleming 1942, Fuglister 1957, Emilsson 1959, Metcalf 1960, and Miller 1960, plus unpublished data from the cruises of the *Toko Maru* and the Brazilian Navy's hydrographic vessel *Almirante Saldanha da Gama*.

ANALYSIS OF THE DATA

On the basis of the skippers' log books, monthly tabulations of the catch data and effort were made for each year. The data were divided in statistical rectangles of one degree of longitude by one degree of latitude. Each rectangle is numbered by the longitude on its Eastern edge and the latitude on its Northern edge when it is South of the Equator, on its Southern edge when it is North of the Equator. For example, rectangle 25-01S is limited by the meridians of 25 and 26 degrees W and the parallels of 01 and 02 degrees S, and rectangle 25-01N is limited by the same meridians but by 01 and 02 degrees N. In low latitudes these rectangles are almost exactly 60 by 60 nautical miles, but at the latitude of Santos they are approximately 60 by 55 nautical miles.

Although some longliners can span more than one statistical rectangle with a single setting of their gear, this causes no serious difficulty with this method of analysis. The rectangle to which each set was assigned was the rectangle which included most of the gear. However, in analysis of the data, the rectangles are grouped into three major regions: *North* (of the Equator); *Central*, between the Equator and 15°S; and *South*. The object of this division is for better understanding of the data; the divisions are more or less arbitrary.

The capture per rectangle, summed by year and region, is presented in Table II and Figure 1. The relative abundance index (capture per 100 hooks) was obtained by dividing the numbers of fishes captured by the numbers of hooks used and multiplying the result by 100, and is also presented in Table II and Figure 2. For Yellowfin, Albacore and Bigeye, the abundance indices were calculated separately and are shown in Table III and Figure 3. In interpretation of Figures 2 and 3, it should be borne in mind that rectangles without symbols indicate areas not fished and not necessarily areas of low abundance.

From Figure 1, it may be seen that the fishery was distributed between 13°N and 31°S. It has extended to the East as far as

2°E, and to the West as far as 53°W North of the Equator and as far as 48°W South of the Equator. However, the fishery has been concentrated from 15°S to 12°N between the meridians of 23°W and 40°W.

Figure 1a and Table IIA show that in 1957 the fishery was concentrated in the North, where about 70% of the fish were captured. The central region contributed the rest. Note further that the number of rectangles fished was greater in the North, even though the home port was in the central region. Also, the number of rectangles with high production was greater in the North.

In 1958, the fishery was concentrated more in the central region (Figure 1b). The production was higher in this region than in the others, although there was evidence of a small isolated area of high production in the South. Table IIB shows the same data in more detail — the Northern region accounted for about 30% of the total, the central for 57%, and the South for 13%.

By 1959 (Table IIC and Figure 1c), the production was about equal in the three regions, each producing 30-35% of the total.

The abundance indices shown in Table II show, however, a different picture:

For 1957 (Table IIA and Figure 2a), the abundance indices are distributed with the most dense region between 3°N and 5°N, and along the parallel of 6°S. The Northern region shows a general index of about 10 and the central about 8.5.

In 1958 (Table IIB and Figure 2b), the central region has the greater number of rectangles with high abundance. In the Northern region, although there are concentrations, the fishery was more disperse. In the Southern region, fished for the first time, there appears to be a belt of high abundance along the coast at a distance of about 150 miles, between 25°S and 31°S. All three regions show a value of about 11 fish per hundred hooks, none much superior to another.

In Figure 2c the highest abundance in the Northern region centers around 10°N by 30°W. In the central region there was a band of high abundance just below the Equator extending from Brazil almost to Africa, with the best fishing results obtained in this region. In the Southern region there appeared to be three more or less separate regions of high abundance, extending South of Santos. The general abundance indices were about 10 for the North, 11 for the central region, and 9 for the South.

Table III gives the capture per hundred hooks for Yellowfin, Albacore and Bigeye by quarters of the year in statistical rectangles. These species were isolated because of their relative importance to the fishery. It may be seen that for these species during these three years the number captured per hundred hooks varied generally between 1 and 17, with the exception of six rectangles in which more than 17 per hundred hooks were captured and the occasional one where less than one fish was captured per 100 hooks. The average was 8.3.

In the first quarter of 1957 the highest abundance were found in the central region, although the abundance were higher in the Northern region in the second quarter. In the last half of the year, the fishery was localized practically completely between the Equator and 5°N, in the Northern region.

In 1958, in the first half of the year the pattern was similar to 1957, although the number of rectangles fished was smaller. In the latter half of the year in the central region there were only three rectangles with yield higher than 13 per 100 hooks; in the North the centers of abundance seemed much more spread out. It was in this year that the first attempts were made in the Southern region, but the abundance figures were low.

In 1959, in the first and second quarters, there was no fishery in the Northern region. In the central region the highest abundance was just below the Equator. Abundance was still low in the Southern region. Toward the end of the year the fishery was concentrated in the North and toward the end of the year there was a concentration of good fishing in this area.

Considering only the four tuna species, the abundance and effort data for the three years (Table III) are as follows:

Year	*Effort (100's of hooks)*	*Abundance*
1957	1704	7.3
1958	3624	8.8
1959	3792	6.5

While this is much too short a series of data on which to base firm conclusions, there does not appear to be a strong relation between effort and abundance, particularly when it is considered that up to 20 percent variation in tuna abundance figures can be normally expected in the same area from year to year (Nankai Regional Fisheries Laboratory, 1959). Thus, the effects of fishing pressure on the stocks may well be slight, or even negligible.

CONSIDERATION OF HYDROGRAPHIC CONDITIONS AND DISCUSSION

Thus it may be seen, the distribution of abundance varied widely, changing both in time and in space. One area is different from another, and in the same area there are large

differences in different periods of the year. Undoubtedly one of the influences causing these changes is change in the environment. To attempt to analyze this, hydrographic data were analyzed by quarters, roughly corresponding to the seasons of the year. (Of course seasonal changes in the Equatorial region are not as well marked as in higher latitudes.) Looking at these data, the following generalizations may be made:

First quarter (Summer) — In this period, the principal region of the fisheries was the central, with two concentrations, one near 6°S and the other just below the Equator. In both of these the surface temperatures taken by fishing boats were 27°-28° C (Figure 3a). In this region, the temperature never goes below about 25° to a depth of 100 meters (Emilsson 1959), and the hooks of the long-lines are confined to this water, usually fishing between 50 and 80 meters.

At the same time, the temperature in the Northern and Southern regions were between 24° and 28°, and the abundance of tunas was medium to low. Research vessel temperatures taken in the same period generally confirm the fishing boat temperatures, but outside of the fishing areas temperatures from 27° to 28° were found in all three regions. It should be noted that these data refer only to certain parts of the regions and that they were collected only in February and March.

Second quarter (Autumn) — Here, as in the first quarter, the highest abundances are found in the central region. Note that they now are concentrated further offshore corresponding, it appears, to a water mass with a temperature of 28°. The abundance in the Northern region is seen to increase and the temperature in the fishing areas varies between 27°-28°. In the South, where the temperatures are between 25°-27°, the abundances of tuna are much lower.

Third quarter (Winter) — During this period, the highest indices of abundance are in the Northern region, where the temperatures are 27°-28°. In the central region the abundance is lower and the temperatures as low as 26°. In the South, where the temperatures were generally 25°-26°, the abundance is low, but there are on record two exceptional causes of high capture per unit effort when the temperature was only 22°. In these areas at this time, however, Albacore was the predominant species, contrary to the usual pattern.

Fourth quarter (Spring) — The highest abundance of fish is found just North of the Equator (Figure 3d). In retrospect, it now seems that this corresponds to the same concentration which can be seen gradually moving North, probably in response to changing hydrographic conditions in the second and third quarters. Even now, the highest concentrations in the central region are in its Northern part. Where the high abundances of fish are found the temperatures are 27°-28° in the Northern region and 26°-27° in the central.

At the present stage of knowledge of the ecology of the tunas as revealed by the Brazilian fishery, a great deal remains to be investigated, particularly as regards the relations between the distribution of the fishes and hydrographic conditions. It is interesting to note, nonetheless, the rather close correspondence between the abundance of the tunas and the current pattern prevailing off Brazil's Easternmost bulge, Cape São Roque. At or near this cape, the Westerly flowing South Equatorial Current divides, part of it turning South to become the warm Brazil Current and extending in some years at least as far South as the River Plate estuary, and part of it flowing along Brazil's Northern coast and eventually into the Caribbean (Sverdrup, Johnson and Fleming 1942, Emilsson 1959). it was extended Eastward the extension was fishery took place almost, if not entirely, within this current system, and in 1959 when it was extended Eastward the extension was along the path of the South Equatorial Current.

Since the main contributor to the South Equatorial Current is the Benguela Current flowing Northerly along the West coast of Africa, and since the tuna fishery along the shores of Angola is dependent on the same species in approximately the same order of importance (Vilela and Monteiro 1959) there is more than a suggestion that the tuna fisheries of Western Africa and Eastern South America may be prosecuted on the same stocks of fish. Of course, special studies, such as marking experiments, would be required to establish this, but the question is important from the point of view of eventual management of either or both of these fisheries.

CONCLUSIONS

1. In the North and central regions, the best fishing occurs in the third quarter of the year.
2. In the Southern region, the best fishing occurs in the first and third quarters.
3. The average abundance for the whole area for the three years was 10 fishes per hundred hooks. This is a high value compared to Japanese captures in the Pacific, which run 7-8 fishes per hundred hooks (Nankai Regional Fisheries Laboratory, 1959; *Toko Maru* report unpub.). Even when all other

species are disregarded, the combined catches of Yellowfin, Albacore, Bigeye and Bluefin run over 8 fishes per 100 hooks.

4. For the four tuna species, the abundance and effort data show no clearcut effect of the fishery on the stocks.

5. Generally, the best catches correspond to the highest temperatures in the regions fished.

6. If the high temperature-high abundance relation holds up, there is reason to believe that the high temperatures recorded by research vessels outside the fishing areas, particularly in the first quarter, may be indications of rich unexploited fishing grounds.

7. The fishery is closely related to the current system of the Equatorial Atlantic.

8. Special studies, such as marking, are indicated to determine the relations, if any, of these tuna stocks to those of West Africa.

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RESUMO

O presente relatório tem como finalidade fazer uma apreciação dos primeiros dados coletados na pesca de *long-line* no Atlântico Sul entre as latitudes 15°N e 31°S, durante os anos de 1957 a 1959.

A produção é dada em têrmos de número de peixes capturados em cada área de um grau de lado.

Para cada uma destas áreas foi extraído também um número através da captura por centenas de anzóis empregados. Êste número, ou índice de densidade relativa, nos serviu para comparar áreas entre si e determinar os locais mais densos em cada região.

Para as espécies Albacora de laje, Albacora branca e Atum cachorra (ôlho grande), os dados de densidade são apreciados por trimestre de cada ano. Também estão todos englobados em períodos, a fim de se observar a relação entre temperatura da água e produtividade das áreas em cada período, que deve corresponder a uma estação do ano.

Portanto, as comparações têm por objetivo indicar em que época do ano, em que locais e a que temperaturas correspondem os melhores rendimentos.

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TABLE I — Summary of annual capture of tunas and other species (in numbers) by Brazilian long-liners, 1957 — 1959

Year	TUNAS				TOTAL	OTHER SPECIES						TOTAL	TOTALS		
	Yellowfin	Albacore	Big-eye	Bluefin	TUNAS	Blue Marlin	White Marlin	Sword-fish	Sail-fish	Sharks	Others		No. of fishes	No. of hooks	No. per 100 hooks
1957	25.206	15.732	2.134	—	43.072	2.527	133	—	980	—	1.101	4.741	47.813	5173,6	9.2
1958	26.192	14.265	2.846	29	43.332	1.212	740	2.747	618	2.147	1.960	9.424	52.756	4687,7	11.2
1959	31.058	11.960	2.737	224	45.979	1.800	1.418	5.668	493	3.097	1.847	14.323	60.302	6060,7	9.9
TOTAL	82.456	41.957	7.717	253	132.383	5.539	2.291	8.415	2.091	5.244	4.908	28.488	160.871	15922,0	10.1

TABLE II — Capture of fish (in numbers) by statistical rectangles, 1957-1959, number of hooks, capture per 100 hooks.
TABLE II-A — 1957

Rectangles	Number captured	Hundreds of hooks	Number per 100 hooks
NORTHERN REGION			
17—03N	71	15,0	4,7
17—04N	650	48,4	13,4
18—02N	803	78,2	10,3
20—03N	422	53,2	7,9
20—04N	696	58,4	11,9
23—03N	378	51,8	7,3
23—04N	94	10,7	8,8
24—03N	1067	113,8	9,4
24—04N	194	25,0	7,8
24—05N	252	26,2	9,6
25—02N	62	8,8	7,0
25—03N	741	72,4	10,2
26—02N	118	12,9	9,1
26—03N	542	62,4	8,7
26—05N	304	34,6	8,8
26—06N	134	15,6	8,6
27—03N	184	17,2	10,7
27—05N	563	54,8	10,3
28—00N	90	15,3	5,9
28—01N	93	15,3	6,1
28—02N	96	17,2	5,6
28—03N	1372	102,0	13,4
28—06N	179	19,0	9,4
29—00N	49	15,7	3,1
29—01N	104	17,2	6,0
29—03N	209	17,2	12,1
29—04N	234	32,8	7,1
30—03N	180	14,8	12,2
30—04N	84	14,0	6,0
31—01N	397	56,8	7,0
31—03N	194	29,2	6,6
31—04N	128	30,3	4,2
31—05N	54	16,5	3,3
32—01N	229	26,4	8,7
32—03N	321	34,2	9,4
32—04N	205	31,8	6,4
33—01N	162	29,3	5,5
33—02N	98	12,8	7,7
34—02N	101	16,0	6,3
34—03N	67	12,8	5,2
34—05N	173	33,0	5,2
35—01N	252	32,0	7,9
35—02N	1141	125,2	9,1
35—03N	741	55,2	13,4
35—04N	80	16,0	5,0
35—05N	129	16,5	7,8
36—00N	316	33,0	9,6
36—01N	1858	176,9	10,5
36—02N	1075	130,1	8,3
36—03N	3427	239,4	14,3
36—04N	2425	208,3	11,6
36—05N	345	48,0	7,2
37—02N	434	65,4	6,6
37—03N	1418	130,4	10,9
37—04N	1797	119,2	15,1
38—03N	690	77,6	8,9
39—02N	157	15,2	10,3
39—03N	579	58,3	9,9
39—04N	390	29,6	13,2
40—04N	545	68,3	8,0
41—04N	141	14,4	9,8
41—05N	358	45,7	7,8
NORTHERN REGION			
42—04N	93	15,8	5,9
42—05N	483	77,1	6,3
44—06N	68	14,0	4,8
47—07N	51	13,3	3,8
49—08N	101	14,0	7,2
49—09N	92	14,0	6,6
50—09N	132	28,0	4,7
19—02N	860	86,2	10,0
31—02N	646	64,4	10,0
33—03N	107	16,5	6,5
37—01N	261	36,6	7,1
38—04N	134	16,0	8,4
CENTRAL REGION			
26—05S	702	64,8	10,8
26—06S	1002	71,2	14,1
27—05S	388	32,0	12,1
27—06S	415	25,0	16,6
27—07S	121	17,9	6,8
27—11S	61	16,9	3,6
28—00S	87	20,5	4,2
28—04S	221	26,5	8,3
28—05S	204	39,9	5,1
28—06S	307	32,9	9,3
29—04S	313	46,6	6,7
29—05S	1424	191,7	7,4
30—04S	28	13,4	2,1
30—05S	153	9,8	15,6
30—06S	70	18,0	3,9
30—07S	1428	157,3	9,1
30—08S	859	122,4	7,0
30—09S	157	20,3	7,7
30—11S	673	62,2	10,8
30—12S	166	16,0	10,4
31—07S	228	35,5	6,4
31—09S	462	61,5	7,5
31—10S	1593	174,6	9,1
31—11S	508	60,0	8,5
31—12S	543	48,0	11,3
32—08S	446	81,0	5,5
32—09S	708	91,5	7,7
32—10S	522	70,8	7,4
32—11S	166	16,0	10,4
33—09S	152	16,0	9,5
33—10S	184	29,0	6,3
34—11S	102	14,5	7,0

RECAPITULATION

Northern:	Number captured	33420
	Hundreds of hooks	3469,7
	Nº per 100 hooks	9,6
Central :	Number captured	14393
	Hundreds of hooks	1703,8
	Nº per 100 hooks	8,4

TABLE II — Capture of fish (in numbers) by statistical rectangles, 1957-1959, number of hooks, capture per 100 hooks.
TABLE II-B — 1958

Rectangles	Number captured	Hundreds of hooks	Number per 100 hooks
NORTHERN REGION			
28—03N	111	18,0	6,2
28—08N	207	24,7	8,4
34—03N	1.116	112,0	9,9
29—03N	492	54,0	9,1
30—02N	112	36,0	3,1
31—04N	113	10,4	10,9
35—02N	115	16,0	7,2
36—01N	145	16,0	9,1
36—03N	238	31,0	7,7
38—02N	1.020	79,0	12,9
38—03N	1.254	119,7	10,5
38—04N	590	74,5	7,9
38—05N	674	49,0	13,7
37—02N	208	32,0	6,5
29—09N	1.024	53,5	19,1
27—09N	554	44,6	12,4
28—09N	1.602	97,1	16,5
33—03N	274	32,0	8,6
37—01N	74	13,2	5,6
37—03N	160	16,0	10,0
37—04N	1.430	96,0	14,9
37—05N	135	7,5	18,0
39—01N	280	16,0	17,5
39—02N	333	32,0	10,4
39—04N	95	13,2	7,2
40—08N	180	16,8	10,7
43—06N	57	8,4	6,8
46—05N	248	24,3	10,2
51—08N	162	8,4	19,3
52—08N	484	31,8	15,2
52—09N	114	7,9	14,4
CENTRAL REGION			
24—01S	339	33,0	10,3
24—05S	176	16,0	11,0
25—00S	364	34,0	10,7
25—01S	168	17,0	9,9
26—05S	109	17,0	6,4
27—03S	121	13,2	9,2
27—04S	299	26,4	11,3
27—05S	99	17,0	5,8
27—06S	126	11,0	11,4
28—01S	104	13,2	7,9
28—02S	103	13,2	7,8
28—03S	682	67,2	10,1
28—04S	152	17,0	8,9
28—05S	398	39,6	10,0
28—06S	845	75,7	11,2
28—07S	177	16,0	11,1
28—08S	284	16,0	9,3
29—02S	168	18,0	8,9
29—03S	319	36,0	7,8
29—05S	125	16,0	13,3
29—06S	511	38,5	13,3
29—07S	1.053	79,1	12,0
29—08S	586	48,9	12,6
29—09S	482	38,3	14,7
30—02S	530	36,0	16,0
30—04S	999	62,4	13,8
30—05S	5.779	419,5	13,2
30—06S	3.330	251,9	10,9
30—07S	136	12,5	8,0
30—08S	104	13,0	12,8
30—09S	168	13,1	7,7
30—12S	97	12,6	5,2
31—04S	83	17,7	18,4
31—05S	590	32,0	16,0
31—06S	1.631	123,9	13,2
CENTRAL REGION			
31—07S	227	25,8	8,8
31—08S	140	12,9	10,8
31—09S	91	15,9	5,7
31—10S	245	29,5	8,3
31—11S	112	13,2	8,5
32—02S	73	13,2	5,5
32—05S	91	13,2	6,9
32—06S	83	13,2	6,3
32—08S	1.057	113,4	9,3
32—09S	689	92,4	7,4
32—10S	292	39,9	7,3
33—00S	198	26,4	7,5
33—08S	91	13,6	6,7
33—09S	228	26,4	8,6
33—10S	121	26,1	4,6
34—00S	94	10,0	9,4
34—02S	228	25,0	9,1
34—03S	94	25,0	3,8
35—00S	181	25,6	7,1
35—02S	1.119	131,0	8,5
35—03S	209	37,5	5,6
35—12S	73	12,5	5,8
36—00S	1.426	117,2	12,2
36—01S	167	13,9	12,0
36—03S	52	12,5	4,2
36—12S	67	13,8	4,8
37—00S	2.112	178,5	11,8
37—02S	946	69,5	13,6
SOUTHERN REGION			
34—20S	175	17,0	10,3
35—20S	165	18,0	9,2
36—16S	152	16,0	9,5
41—27S	52	11,2	4,6
42—27S	261	32,0	8,1
43—27S	274	33,2	8,2
43—28S	63	11,0	5,7
44—25S	2.013	121,0	16,6
44—26S	2.467	204,2	12,1
44—28S	127	10,2	12,4
45—26S	721	80,0	9,0
45—27S	324	32,8	9,9
45—28S	91	9,6	9,5
46—28S	114	8,6	13,2
46—30S	109	8,6	12,7
47—29S	105	8,6	12,2
47—30S	199	17,2	11,6

RECAPITULATION

NORTHERN REGION

Number captured	13.601
Hundreds of hooks	1.191,0
Number per 100 hooks	11,4

CENTRAL REGION

Number captured	31.743
Hundreds of hooks	2.857,3
Number per 100 hooks	11,1

SOUTHER REGION

Number captured	7.412
Hundreds of hooks	639,2
Number per 100 hooks	11,6

TABLE II — Capture of fish (in numbers) by statistical rectangles, 1957-1959, number of hooks, capture per 100 hooks.
TABLE II-C — 1959

Rectangles	Number captured	Hundreds of hooks	Number per 100 hooks
NORTHERN REGION			
23—09N	110	17,0	6,5
23—10N	525	72,0	7,3
24—10N	330	36,0	9,2
25—10N	105	17,0	6,2
26—08N	700	48,8	14,3
26—09N	474	32,4	14,6
26—10N	480	49,0	9,8
26—12N	174	16,0	10,9
27—09N	187	16,0	11,7
27—10N	191	16,0	11,9
27—11N	1.143	80,8	14,1
27—12N	3.118	220,6	14,1
28—10N	1.103	80,8	13,6
28—11N	1.185	78,8	15,0
28—12N	1.376	95,4	14,4
29—00N	35	19,0	1,8
29—05N	130	18,0	7,2
29—06N	86	18,0	4,8
29—08N	210	18,0	11,7
29—09N	190	18,0	10,5
29—11N	736	68,8	10,7
30—00N	200	36,0	5,5
30—01N	160	18,0	8,9
30—05N	610	72,0	8,5
31—02N	220	56,0	3,9
31—08N	295	18,0	16,4
31—09N	1.203	118,0	10,2
32—01N	50	19,0	2,6
32—05N	484	72,0	6,7
32—08N	170	18,0	9,4
32—09N	2.091	157,6	13,3
33—03N	70	18,0	3,9
33—04N	80	18,0	4,4
33—05N	80	18,0	4,4
33—07N	67	18,0	3,7
33—08N	575	54,0	10,6
33—09N	305	36,0	8,5
34—04N	60	18,0	3,3
34—05N	410	54,0	7,6
34—06N	65	18,0	3,6
35—05N	160	36,0	4,4
36—03N	51	18,0	2,8
35—07N	71	15,8	4,5
34—09N	183	15,6	11,7
32—10N	983	85,6	11,5
38—03N	60	16,0	3,7
39—04N	84	16,0	5,2
40—03N	55	18,0	3,0
40—04N	125	36,0	3,5
40—05N	15	18,0	0,8
CENTRAL REGION			
02—00S	303	15,2	19,9
02—01S	380	32,0	11,9
03—00S	615	62,4	9,8
03—01S	657	48,0	13,7
04—00S	156	16,0	9,7
04—01S	219	16,0	13,7
05—00S	287	24,0	11,9
05—01S	590	46,0	12,8
05—02S	298	15,2	19,6
16—00S	57	16,0	3,6
18—00S	1.617	115,0	14,1
18—01S	1.194	102,5	11,6
18—02S	440	33,5	13,1
18—03S	55	7,8	7,0
20—03S	90	11,0	8,2
23—02S	955	47,4	20,1
23—03S	2.192	130,6	16,8
24—03S	260	15,4	16,9
25—10S	55	10,4	5,3
25—11S	53	9,6	2,4
26—10S	288	48,4	5,9
26—11S	118	18,4	6,4
27—08S	120	17,0	7,0
27—10S	211	29,6	7,1
29—01S	59	10,0	5,9
CENTRAL REGION			
30—03S	191	38,6	4,9
30—04S	18	9,6	1,9
30—07S	110	10,8	1,0
30—08S	69	10,0	6,9
31—02S	41	9,6	4,3
31—03S	375	56,0	6,7
31—04S	90	14,0	6,4
31—08S	629	43,2	14,6
32—04S	1.077	84,6	12,7
32—05S	166	24,0	6,9
32—06S	309	41,2	7,5
32—07S	686	57,4	11,9
32—08S	234	31,4	7,4
33—02S	45	10,0	4,5
33—03S	69	10,0	6,9
33—04S	260	26,0	10,0
33—06S	1.708	191,0	8,9
33—07S	1.549	137,4	11,3
34—03S	164	22,2	7,4
34—04S	118	25,6	4,6
35—01S	59	9,6	6,1
35—02S	43	9,6	4,5
35—03S	131	29,2	4,5
40—00S	41	10,4	3,9
SOUTHERN REGION			
30—22S	28	10,5	2,7
31—19S	132	12,0	11,0
32—18S	996	84,0	11,8
32—19S	630	48,0	13,1
35—19S	167	20,0	8,3
35—20S	45	12,2	3,7
35—21S	136	21,2	6,4
36—17S	527	84,2	6,2
36—18S	247	36,6	6,7
36—19S	90	11,0	8,2
36—20S	591	79,4	7,4
36—21S	289	46,3	6,2
37—20S	184	23,4	7,9
37—21S	204	33,3	6,1
38—21S	128	24,0	5,3
38—22S	77	10,2	7,5
39—21S	46	11,0	4,2
39—23S	66	10,2	6,5
39—24S	122	20,0	6,1
39—25S	52	10,2	5,1
40—23S	575	92,3	6,2
40—24S	2.355	320,6	7,3
40—25S	265	75,6	3,5
41—24S	649	45,0	14,4
41—25S	56	10,0	5,6
42—25S	65	11,6	5,6
43—25S	49	11,4	4,3
44—25S	8.469	723,9	11,7
44—26S	1.571	140,6	11,2
44—27S	81	14,9	5,4
45—25S	116	19,2	6,0
45—26S	257	20,8	12,3
45—27S	46	10,2	4,5

RECAPITULATION

NORTHERN REGION

Number captured	21.570
Hundreds of hooks	2.148,0
Number per 100 hooks	10,0

CENTRAL REGION

Number captured	19.421
Hundreds of hooks	1.808,8
Number per 100 hooks	10,7

SOUTHERN REGION

Number captured	19.311
Hundreds of hooks	2.103,8
Number per 100 hooks	9,2

TABLE III-A — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1957.
North Latitude

Quarters	Rectangles / Catch data	17—03	17—04	18—02	19—02	20—03	20—04	23—03	23—04	24—03	24—04	24—05	25—02	25—03	26—02	26—03	26—05
First	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	293
	Hundreds of hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	34,6
	Index of abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8,5
Second	Fishes	—	—	778	835	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of hooks	—	—	78,2	86,2	—	—	—	—	—	—	—	—	—	—	—	—
	Index of abundance	—	—	9,9	9,7	—	—	—	—	—	—	—	—	—	—	—	—
Third	Fishes	51	587	—	—	357	625	239	83	784	99	236	—	—	—	—	—
	Hundreds of hooks	15,0	48,4	—	—	53,2	58,4	38,8	10,7	89,6	13,0	26,2	—	—	—	—	—
	Index of abundance	3,4	12,1	—	—	6,7	10,7	6,1	7,7	8,7	7,6	9,0	—	—	—	—	—
Fourth	Fishes	—	—	—	—	—	—	75	—	176	85	—	61	618	114	488	—
	Hundreds of hooks	—	—	—	—	—	—	13,0	—	24,2	12,0	—	8,8	72,4	12,9	62,4	—
	Index of abundance	—	—	—	—	—	—	5,8	—	7,3	7,1	—	6,9	8,5	8,8	7,8	—
Annual total per rectangle	Number of fish	51	587	778	835	357	625	314	83	960	184	236	61	618	114	488	293
	Hundreds of hooks	15,0	48,4	78,2	86,2	53,2	58,4	51,8	10,7	113,8	25,0	26,2	8,8	72,4	12,9	62,4	34,6
	Average	3,4	12,1	9,9	9,7	6,7	10,7	6,1	7,7	8,4	7,4	9,0	6,9	8,5	8,8	7,8	8,5

TABLE III-A — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1957. (continued)
North Latitude

26—06	27—03	27—05	28—00	28—01	28—02	28—03	28—06	29—00	29—01	29—03	29—04	30—03	30—04	31—01	31—02	31—03	31—04	31—05	32—01
124	—	529	88	88	—	—	168	49	—	—	75	—	—	—	—	—	68	—	—
15,6	—	54,8	15,3	15,3	—	—	19,0	15,7	—	—	15,6	—	—	—	—	—	13,8	—	—
7,9	—	9,6	5,7	5,7	—	—	8,8	3,1	—	—	4,8	—	—	—	—	—	4,9	—	—
—	170	—	—	—	85	1289	—	—	75	200	144	171	80	105	—	—	—	—	—
—	17,2	—	—	—	17,2	102,0	—	—	17,2	17,2	17,2	14,8	14,0	17,2	—	—	—	—	—
—	9,9	—	—	—	4,9	12,6	—	—	4,4	11,6	8,4	11,5	5,7	6,1	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	—	48	52	49	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	13,2	—	13,2	16,5	16,5	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,8	—	3,6	3,1	3,0	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	223	531	141	—	—	212
—	—	—	—	—	—	—	—	—	—	—	—	—	—	26,4	64,4	16,0	—	—	26,4
—	—	—	—	—	—	—	—	—	—	—	—	—	—	8,4	8,2	8,8	—	—	8,0
124	170	529	88	88	85	1289	168	49	75	200	219	171	80	352	531	189	120	49	212
15,6	17,2	54,8	15,3	15,3	17,2	102,0	19,0	15,7	17,2	17,2	32,8	14,8	14,0	56,8	64,4	29,2	30,3	16,5	26,4
7,9	9,9	9,6	5,7	5,7	4,9	12,6	8,8	3,1	4,4	11,6	6,7	11,5	5,7	6,2	8,2	6,5	4,0	3,0	8,0

TABLE III-A — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1957. (continued)
North Latitude

32—03	32—04	33—01	33—02	33—05	34—02	34—03	34—05	35—01	35—02	35—03	35—04	35—05	36—00	36—01	36—02	36—03	36—04	36—05	37—01
—	87	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	175	—	—
—	15,3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	43,1	—	—
—	5,7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4,1	—	—
—	—	61	—	—	—	—	—	—	—	—	—	—	102	1014	—	—	432	—	—
—	—	16,5	—	—	—	—	—	—	—	—	—	—	16,5	97,3	—	—	33,2	—	—
—	—	3,7	—	—	—	—	—	—	—	—	—	—	6,2	10,4	—	—	13,0	—	—
—	109	—	—	95	—	—	151	112	166	—	76	121	211	—	194	1334	1470	295	—
—	16,5	—	—	16,5	—	—	33,0	16,0	32,0	—	16,0	16,5	16,5	—	16,5	116,2	116,0	48,0	—
—	6,6	—	—	5,7	—	—	4,6	7,0	5,2	—	4,7	7,3	12,8	—	11,7	11,5	12,7	6,1	—
201	—	96	96	—	96	66	—	134	927	725	—	—	—	605	752	2009	168	—	193
34,2	—	12,8	12,8	—	16,0	12,8	—	16,0	93,2	55,2	—	—	—	79,6	113,6	123,2	16,0	—	36,6
5,9	—	7,5	7,5	—	6,0	5,1	—	8,4	9,9	13,1	—	—	—	7,6	6,6	16,3	10,5	—	5,3
201	196	157	96	95	96	66	151	246	1093	725	76	121	313	1619	946	3343	2245	295	193
34,2	31,8	29,3	12,8	16,5	16,0	12,8	33,0	32,0	125,2	55,2	16,0	16,5	33,0	176,9	130,1	239,4	208,3	48,0	36,6
5,9	6,2	5,3	7,5	5,7	6,0	5,1	4,6	7,7	8,7	13,1	4,7	7,3	9,5	9,1	7,3	14,0	10,8	6,1	5,3

TABLE III-A — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1957. (continued)
North Latitude

37—02	37—03	37—04	38—03	38—04	39—02	39—03	39—04	40—04	41—04	41—05	42—04	42—05	44—06	47—07	49—08	49—09	50—09	T O T A L
—	—	—	23	—	—	—	—	37	—	195	90	378	—	—	—	—	—	2.467
—	—	—	14,0	—	—	—	—	14,0	—	31,3	15,8	63,2	—	—	—	—	—	396,4
—	—	—	1,6	—	—	—	—	2,6	—	6,2	5,7	6,0	—	—	—	—	—	6,2
—	—	—	120	—	—	314	—	100	129	142	—	84	59	—	91	87	84	6.751
—	—	—	14,4	—	—	43,1	—	14,2	14,4	14,4	—	13,9	14,0	—	14,0	14,0	14,0	732,3
—	—	—	8,3	—	—	7,3	—	7,0	8,9	9,9	—	6,0	4,2	—	6,5	6,2	6,0	9,2
190	371	1619	190	—	—	—	—	361	—	—	—	—	—	46	—	—	39	10.384
33,0	34,4	119,2	17,2	—	—	—	—	40,1	—	—	—	—	—	13,3	—	—	14,0	1.143,6
5,7	10,8	13,6	11,0	—	—	—	—	9,0	—	—	—	—	—	3,4	—	—	2,8	9,1
173	923	—	236	123	140	199	361	—	—	—	—	—	—	—	—	—	—	10.947
32,4	96,0	—	32,0	16,0	15,2	15,2	29,6	—	—	—	—	—	—	—	—	—	—	1.197,3
5,3	9,6	—	7,4	7,7	9,2	13,1	12,2	—	—	—	—	—	—	—	—	—	—	9,1
363	1294	1619	569	123	140	513	361	498	129	337	90	462	59	46	91	87	123	30.549
65,4	130,4	119,2	77,6	16,0	15,2	58,3	29,6	68,3	14,4	45,7	15,8	77,1	14,0	13,3	14,0	14,0	28,0	3.469,6
5,5	9,9	13,6	7,3	7,7	9,2	8,8	12,2	7,3	8,9	7,4	5,7	6,0	4,2	3,4	6,5	6,2	4,4	8,8

TABLE III-A — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1957. (continued)
South Latitude

Quarters	Rectangles / Catch data	26—05	26—06	27—05	27—06	27—07	27—11	28—00	28—04	28—05	28—06	29—04	29—05	30—04	30—05	30—06	30—07
First	Fishes	668	995	367	412	—	—	—	—	—	216	—	—	—	—	62	1114
	Hundreds of hooks	64,8	71,2	32,0	25,0	—	—	—	—	—	15,0	—	—	—	—	18,0	136,8
	Index of abundance	10,3	14,0	11,5	16,5	—	—	—	—	—	14,4	—	—	—	—	3,4	8,1
Second	Fishes	—	—	—	—	109	52	80	208	187	85	303	1357	23	151	—	104
	Hundreds of hooks	—	—	—	—	17,9	16,9	20,5	26,5	39,9	17,9	46,6	191,7	13,4	9,8	—	20,5
	Index of abundance	—	—	—	—	6,1	3,1	3,9	7,8	4,7	4,7	6,5	7,1	1,7	15,4	—	5,1
Third	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fourth	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual total per rectangle	Number of fish	668	995	367	412	109	52	80	208	187	301	303	1357	23	151	62	1218
	Hundreds of hooks	64,8	71,2	32,0	25,0	17,9	16,9	20,5	26,5	39,9	32,9	46,6	191,7	13,4	9,8	18,0	157,3
	Average	10,3	14,0	11,5	16,5	6,1	3,1	3,9	7,8	4,7	9,1	6,5	7,1	1,7	15,4	3,4	7,7

TABLE III-A — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1957. (continued)
South Latitude

30—08	30—09	30—11	31—07	31—09	31—10	31—11	31—12	32—00	32—08	32—09	32—10	32—11	32—12	33—09	33—10	34—11	TOTAL
424	—	520	183	408	228	374	506	—	198	380	119	132	135	129	—	—	7.570
61,1	—	62,2	35,5	61,5	20,5	42,5	48,0	—	41,0	57,0	20,5	16,0	16,0	16,0	—	—	860,6
6,9	—	8,4	5,1	6,6	11,1	8,8	10,5	—	4,8	6,7	5,8	8,2	8,4	8,1	—	—	8,8
236	119	—	—	—	968	37	—	—	170	194	310	—	—	—	169	91	4.953
61,3	20,3	—	—	—	154,1	17,5	—	—	40,0	34,5	50,3	—	—	—	29,0	14,5	843,1
3,8	5,9	—	—	—	6,3	2,1	—	—	4,2	5,6	6,2	—	—	—	5,8	6,3	5,9
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
660	119	520	183	408	1196	411	506	—	368	574	429	132	135	129	169	91	12.523
122,4	20,3	62,2	35,5	61,5	174,6	60,0	48,0	—	81,0	91,5	70,8	16,0	16,0	16,0	29,0	14,5	1.703,7
5,4	5,9	8,4	5,1	6,6	6,8	6,8	10,5	—	4,5	6,3	6,0	8,2	8,4	8,1	5,8	6,3	7,3

TABLE III-B — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1958.
North Latitude

Quarters	Rectangles / Catch data	27—09	28—03	28—08	28—09	29—03	29—09	30—02	31—04	33—03	34—03	35—02	36—01	36—03	37—01	37—02	37—03
First	Fishes	—	—	—	—	—	—	—	—	263	1116	115	145	—	—	208	—
	Hundreds of hooks	—	—	—	—	—	—	—	—	32,0	112,0	16,0	16,0	—	—	32,0	—
	Index of abundance	—	—	—	—	—	—	—	—	8,2	9,9	7,2	9,0	—	—	6,5	—
Second	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Third	Fishes	471	—	192	1434	—	943	—	103	—	—	—	—	85	67	—	—
	Hundreds of hooks	44,6	—	24,7	97,1	—	53,5	—	10,4	—	—	—	—	15,0	13,2	—	—
	Index of abundance	10,6	—	7,8	14,8	—	17,6	—	9,9	—	—	—	—	5,7	5,1	—	—
Fourth	Fishes	—	111	—	—	415	—	105	—	—	—	—	—	134	—	—	142
	Hundreds of hooks	—	18,0	—	—	54,0	—	36,0	—	—	—	—	—	16,0	—	—	16,0
	Index of abundance	—	6,2	—	—	7,7	—	2,9	—	—	—	—	—	8,4	—	—	8,9
Annual total per rectangle	Number of fish	471	111	192	1434	415	943	105	103	263	1116	115	145	219	67	208	142
	Hundreds of hooks	44,6	18,0	24,7	97,1	54,0	53,5	36,0	10,4	32,0	112,0	16,0	16,0	31,0	13,2	32,0	16,0
	Average	10,6	6,2	7,8	14,8	7,7	17,6	2,9	9,9	8,2	9,9	7,2	9,0	5,7	5,1	6,5	8,9

TABLE III-B — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, statistical rectangles, 1958. (continued)
North Latitude

37—04	37—05	38—02	38—03	38—04	38—05	39—01	39—02	39—04	40—08	43—06	46—05	51—08	52—08	52—09	TOTAL
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.847
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	208,0
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8,9
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	126	66	346	542	632	—	—	84	180	57	248	162	124	—	5.862
—	7,5	15,0	39,7	74,5	49,0	—	—	13,2	16,8	8,4	24,3	8,4	7,9	—	523,2
—	16,8	4,4	8,7	7,3	12,9	—	—	6,4	10,7	6,7	10,2	19,2	15,7	—	11,2
1220	—	954	759	—	—	250	256	—	—	—	—	—	360	114	4.820
96,0	—	64,0	80,0	—	—	16,0	32,0	—	—	—	—	—	23,8	7,9	459,7
12,7	—	14,9	9,5	—	—	15,6	8,0	—	—	—	—	—	15,1	14,4	10,5
1220	126	1020	1105	542	632	250	256	84	180	57	248	162	484	114	12.529
96,0	7,5	79,0	119,7	74,5	49,0	16,0	32,0	13,2	16,8	8,4	24,3	8,4	31,8	7,9	1.190,9
12,7	16,8	12,9	9,2	7,3	12,9	15,6	8,0	6,4	10,7	6,7	10,2	19,2	15,2	14,4	11,3

TABLE III-B — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1958. (continued)
South Latitude

Quarters	Rectangles / Catch data	24—01	24—03	24—05	25—00	25—01	26—05	27—03	27—04	27—05	27—06	28—01	28—02	28—03	28—04	28—05	28—06
First	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Second	Fishes	—	—	—	—	—	—	117	279	—	—	100	99	130	—	382	733
	Hundreds of hooks	—	—	—	—	—	—	13,2	26,4	—	—	13,2	13,2	13,2	—	39,6	65,2
	Index of abundance	—	—	—	—	—	—	8,9	10,6	—	—	7,6	7,5	9,8	—	9,6	11,2
Third	Fishes	—	—	—	—	—	—	—	—	—	126	—	—	—	—	—	90
	Hundreds of hooks	—	—	—	—	—	—	—	—	—	11,0	—	—	—	—	—	10,5
	Index of abundance	—	—	—	—	—	—	—	—	—	11,4	—	—	—	—	—	8,6
Fourth	Fishes	256	—	138	284	129	94	—	—	82	—	—	—	445	132	—	—
	Hundreds of hooks	33,0	—	16,0	34,0	17,0	17,0	—	—	17,0	—	—	—	54,0	17,0	—	—
	Index of abundance	7,7	—	8,6	8,3	7,6	5,5	—	—	4,8	—	—	—	8,2	7,8	—	—
Annual total per rectangles	Number of fish	256	—	138	284	129	94	117	279	82	126	100	99	575	132	382	823
	Hundreds of hooks	33,0	—	16,0	34,0	17,0	17,0	13,2	26,4	17,0	11,0	13,2	13,2	67,2	17,0	39,6	75,7
	Average	7,7	—	8,6	8,3	7,6	5,5	8,9	10,6	4,8	11,4	7,6	7,5	8,8	7,8	9,6	10,2

TABLE III-B — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1958. (continued)
South Latitude

28—07	28—08	29—02	29—03	29—05	29—06	29—07	29—08	30—02	30—04	30—05	30—06	30—07	30—08	30—09	30—12	31—04	31—05	31—06	31—07
—	—	—	—	—	—	—	—	—	654	4698	2789	—	—	—	—	—	533	1432	—
—	—	—	—	—	—	—	—	—	49,2	403,5	251,9	—	—	—	—	—	32,0	123,9	—
—	—	—	—	—	—	—	—	—	13,3	11,6	11,1	—	—	—	—	—	16,6	11,5	—
—	—	—	—	—	—	—	—	—	186	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	13,2	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	14,1	—	—	—	—	—	—	—	—	—	—
175	170	—	—	122	504	1046	272	—	—	87	—	117	37	91	48	82	—	—	161
16,0	16,0	—	—	16,0	38,5	79,1	48,9	—	—	16,0	—	12,5	13,0	13,1	12,6	16,0	—	—	25,8
10,9	10,6	—	—	7,6	13,1	13,2	5,5	—	—	5,4	—	9,4	2,8	6,9	3,8	5,1	—	—	6,2
—	—	156	272	—	—	—	—	483	—	—	—	—	—	—	—	—	—	—	—
—	—	18,0	36,0	—	—	—	—	36,0	—	—	—	—	—	—	—	—	—	—	—
—	—	8,7	7,5	—	—	—	—	13,4	—	—	—	—	—	—	—	—	—	—	—
175	170	156	272	122	504	1046	272	483	840	4785	2789	117	37	91	48	82	533	1432	161
16,0	16,0	18,0	36,0	16,0	38,5	79,1	48,9	36,0	62,4	419,5	251,9	12,5	13,0	13,1	12,6	16,0	32,0	123,9	25,8
10,9	10,6	8,7	7,5	7,6	13,1	13,2	5,5	13,4	13,5	11,4	11,1	9,4	2,8	6,9	3,8	5,1	16,6	11,5	6,2

TABLE III-B — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1958. (continued)
South Latitude

31—08	31—09	31—10	31—11	32—02	32—05	32—06	32—08	32—09	32—10	33—00	33—08	33—09	33—10	34—00	34—02	34—03	34—20	35—00	35—02
—	—	—	—	—	—	—	209	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	31,8	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	6,6	—	—	—	—	—	—	—	—	—	—	—	—
—	74	110	—	69	76	66	714	552	—	99	79	201	39	—	—	—	—	—	—
—	15,9	15,8	—	13,2	13,2	13,2	81,6	92,4	—	13,2	13,6	26,4	13,2	—	—	—	—	—	—
—	4,6	7,0	—	5,2	5,7	5,0	8,7	6,0	—	7,5	5,8	7,6	2,9	—	—	—	—	—	—
99	—	75	67	—	—	—	—	—	177	88	—	—	36	92	185	64	—	173	926
12,9	—	13,7	13,2	—	—	—	—	—	39,9	13,2	—	—	12,9	10,0	25,0	25,0	—	25,6	131,0
7,7	—	5,5	5,1	—	—	—	—	—	4,4	6,7	—	—	2,8	9,2	7,4	2,6	—	6,7	7,1
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	98	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17,0	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5,8	—	—
99	74	185	67	69	76	66	923	552	177	187	79	201	75	92	185	64	98	173	926
12,9	15,9	29,5	13,2	13,2	13,2	13,2	113,4	92,4	39,9	26,4	13,6	26,4	26,1	10,0	25,0	25,0	17,0	25,6	131,0
7,7	4,6	6,3	5,1	5,2	5,7	5,0	8,1	6,0	4,4	7,1	5,8	7,6	2,9	9,2	7,4	2,6	5,8	6,7	7,1

TABLE III-B — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1958. (continued)
South Latitude

35—03	35—12	35—19	35—20	36—00	36—01	36—03	36—12	36—16	37—00	37—02	40—23	40—24	40—25	41—24	41—25	41—27	42—27	43—27	43—28
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
183	72	—	—	1248	122	33	43	—	1754	834	—	—	—	—	—	40	186	171	31
37,5	12,5	—	—	117,2	13,9	12,5	13,8	—	178,5	69,5	—	—	—	—	—	11,2	32,0	33,2	11,0
4,9	5,8	—	—	10,6	8,8	2,6	3,1	—	9,8	12,0	—	—	—	—	—	3,6	5,8	5,1	2,8
—	—	85	—	—	—	—	—	113	—	—	—	—	—	—	—	—	—	—	—
—	—	18,0	—	—	—	—	—	16,0	—	—	—	—	—	—	—	—	—	—	—
—	—	4,7	—	—	—	—	—	7,1	—	—	—	—	—	—	—	—	—	—	—
183	72	85	—	1248	122	33	43	113	1754	834	—	—	—	—	—	40	186	171	31
37,5	12,5	18,0	—	117,2	13,9	12,5	13,8	16,0	178,5	69,5	—	—	—	—	—	11,2	32,0	33,2	11,0
4,9	5,8	4,7	—	10,6	8,8	2,6	3,1	7,1	9,8	12,0	—	—	—	—	—	3,6	5,8	5,1	2,8

TABLE III-B — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1958. (continued)

South Latitude

44—25	44—26	44—28	45—26	45—27	45—28	46—28	46—30	47—29	47—30	29—09	TOTAL
—	—	—	—	—	—	—	—	—	—	—	10315
—	—	—	—	—	—	—	—	—	—	—	892,3
—	—	—	—	—	—	—	—	—	—	—	11,6
—	—	—	—	—	—	—	—	—	—	—	4105
—	—	—	—	—	—	—	—	—	—	—	508,9
—	—	—	—	—	—	—	—	—	—	—	8,0
65	474	74	197	—	—	—	—	—	—	287	10924
12,6	67,0	10,2	34,6	—	—	—	—	—	—	38,3	1372,9
5,1	7,1	7,2	5,7	—	—	—	—	—	—	7,5	7,9
799	989	—	303	209	52	75	48	77	111	—	5430
108,4	137,2	—	45,4	32,8	9,6	8,6	8,6	8,6	17,2	—	735,0
7,4	7,2	—	6,7	6,4	5,4	8,7	5,6	8,9	6,4	—	7,5
864	1463	74	500	209	52	75	48	77	111	287	30774
121,0	204,2	10,2	80,0	32,8	9,6	8,6	8,6	8,6	17,2	38,3	3509,1
7,1	7,2	7,2	6,2	6,4	5,4	8,7	5,6	8,9	6,4	7,5	8,8

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959

North Latitude

Quarters	Rectangles / Catch Data	23—09	23—10	24—10	25—10	26—08	26—09	26—10	26—12	27—09	27—10	27—11	27—12	28—03	28—10	28—11	28—12
First	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of Hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of Abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Second	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of Hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of Abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Third	Fishes	95	480	324	97	683	466	452	163	178	184	1103	3009	—	1074	1160	1331
	Hundreds of Hooks	17,0	72,0	36,0	17,0	48,8	32,4	49,0	16,0	16,0	16,0	80,8	220,6	—	80,8	78,8	95,4
	Index of Abundance	5,5	6,6	9,0	5,7	14,0	14,4	9,2	10,2	11,1	11,5	13,6	11,6	—	13,3	14,7	13,9
Fourth	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of Hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of Abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	Number of fish	95	480	324	97	683	466	452	163	178	184	1103	3009	—	1074	1160	1331
Total Per	Hundreds of Hooks	17,0	72,0	36,0	17,0	48,8	32,4	49,0	16,0	16,0	16,0	80,8	220,6	—	80,8	78,8	95,4
Rectangle	Average	5,5	6,6	9,0	5,7	14,0	14,4	9,2	10,2	11,1	11,5	13,6	13,6	—	13,3	14,7	13,9

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959 (continued)
North Latitude

29—00	29—03	20—05	29—06	29—08	29—09	29—11	30—00	30—01	30—02	30—05	31—07	31—08	31—09	32—01	32—05	32—08	32—09	32—10	33—03
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	118	73	205	189	732	172	151	—	543	—	288	1140	—	—	162	2039	951	—
—	—	18,0	18,0	18,0	18,0	68,8	36,0	18,0	—	72,0	—	18,0	118,0	—	—	18,0	157,6	85,6	—
—	—	6,5	4,0	11,4	10,5	10,6	4,8	8,4	—	7,5	—	16,0	9,7	—	—	9,0	12,9	11,1	—
24	—	—	—	—	—	—	—	—	—	—	140	—	—	44	415	—	—	—	63
19,0	—	—	—	—	—	—	—	—	—	—	56,0	—	—	19,0	72,0	—	—	—	18,0
1,2	—	—	—	—	—	—	—	—	—	—	2,5	—	—	2,3	5,8	—	—	—	3,5
24	—	118	73	205	189	732	172	151	—	543	140	288	1140	44	415	162	2039	951	63
19,0	—	18,0	18,0	18,0	18,0	68,8	36,8	18,0	—	72,0	56,0	18,0	118,0	19,0	72,0	18,0	157,6	85,6	18,0
1,2	—	6,5	4,0	11,4	10,5	10,6	4,8	8,4	—	7,5	2,5	16,0	9,7	2,3	5,8	9,0	12,9	11,1	3,5

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959 (continued)
North Latitude

33—04	33—05	33—07	33—08	33—09	34—00	34—05	34—06	34—09	35—05	35—07	36—03	38—03	39—01	39—04	40—03	40—04	40—05	TOTAL
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	518	274	—	—	—	176	—	66	—	—	—	—	—	—	—	18596
—	—	—	54,0	36,0	—	—	—	15,6	—	15,8	—	—	—	—	—	—	—	1662,0
—	—	—	9,6	7,6	—	—	—	11,3	—	4,2	—	—	—	—	—	—	—	11,2
63	64	58	—	—	50	364	60	—	134	—	49	55	—	78	34	98	1	1794
18,0	18,0	18,0	—	—	18,0	54,0	18,0	—	36,0	—	18,0	16,0	—	16,0	18,0	36,0	18,0	486,0
3,5	3,5	3,2	—	—	2,8	6,7	3,3	—	3,7	—	2,7	3,4	—	4,9	1,9	2,7	0,0	3,7
63	64	58	518	274	50	364	60	176	134	66	49	55	—	78	34	98	1	20390
18,0	18,0	18,0	54,0	36,0	18,0	54,0	18,0	15,6	36,0	15,8	18,0	16,0	—	16,0	18,0	36,0	18,0	2184,0
3,5	3,5	3,2	9,6	7,6	2,8	6,7	3,3	11,3	3,7	4,2	2,7	3,4	—	4,9	1,9	2.7	0,0	9,5

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959 (continued)
South Latitude

Quarters	Rectangles / Catch data	02—00	02—01	03—00	03—01	04—00	04—01	05—00	05—01	05—02	16—00	18—00	18—01	18—02	18—03	20—03	23—01
First	Fishes	273	368	575	626	—	198	137	569	294	—	—	—	—	—	—	—
	Hundreds of hooks	15,2	32,0	62,4	48,0	—	16,0	8,0	46,0	15,2	—	—	—	—	—	—	—
	Index of abundance	18,0	11,5	9,2	13,0	—	12,4	17,1	12,4	19,3	—	—	—	—	—	—	—
Second	Fishes	—	—	—	—	154	—	146	—	—	35	1538	1103	426	48	47	901
	Hundreds of hooks	—	—	—	—	16,0	—	16,0	—	—	16,0	115,0	102,5	33,5	7,8	11,0	47,4
	Index of abundance	—	—	—	—	9,6	—	9,1	—	—	2,2	13,4	10,8	12,7	6,1	4,3	19,0
Third	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fourth	Fishes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hundreds of hooks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Index of abundance	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	Number of fish	273	368	575	626	154	198	283	569	294	35	1538	1103	426	48	47	901
Total per	Hundreds of hooks	15,2	32,0	62,4	48,0	16,0	16,0	24,0	46,0	15,2	16,0	115,0	102,5	33,5	7,8	11,0	47,4
Rectangle	Average	18,0	11,5	9,2	13,0	9,6	12,4	11,8	12,4	19,3	2,2	13,4	10,8	12,7	6,1	4,3	19,0

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959 (continued)
South Latitude

23—03	23—09	23—10	24—01	24—03	24—10	25—10	25—11	26—10	26—11	27—00	27—10	27—11	27—12	28—12	29—00	29—01	29—05	29—06	29—08
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2003	—	—	—	245	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
130,6	—	—	—	15,4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15,3	—	—	—	15,9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	45	16	239	96	—	188	—	—	—	—	35	—	—	—
—	—	—	—	—	—	10,4	9,6	48,4	18,4	—	29,6	—	—	—	—	10,0	—	—	—
—	—	—	—	—	—	4,3	1,7	4,9	5,2	—	6,3	—	—	—	—	3,5	—	—	—
—	—	—	—	—	—	—	—	—	86	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	17,0	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	5,0	—	—	—	—	—	—	—	—	—	—
2003	—	—	—	245	—	45	16	239	182	—	188	—	—	—	—	35	—	—	—
130,6	—	—	—	15,4	—	10,4	9,6	48,4	35,4	—	29,6	—	—	—	—	10,0	—	—	—
15,3	—	—	—	15,9	—	4,3	1,7	4,9	5,1	—	6,3	—	—	—	—	3,5	—	—	—

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959 (continued)
South Latitude

29—09	30—00	30—01	30—03	30—04	30—05	30—07	30—08	30—22	31—02	31—03	31—04	31—08	31—09	31—19	32—01	32—04	32—05	32—06	32—07
—	—	—	—	—	—	91	521	—	—	—	—	—	—	85	—	160	—	272	606
—	—	—	—	—	—	10,8	43,2	—	—	—	—	—	—	12,0	—	20,0	—	41,2	57,4
—	—	—	—	—	—	8,4	12,1	—	—	—	—	—	—	7,1	—	8,0	—	6,6	10,5
—	—	—	—	—	—	—	—	—	—	145	—	—	—	—	—	630	153	—	—
—	—	—	—	—	—	—	—	—	—	17,6	—	—	—	—	—	64,6	24,0	—	—
—	—	—	—	—	—	—	—	—	—	8,2	—	—	—	—	—	9,7	6,4	—	—
—	—	—	—	—	—	—	26	18	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	10,0	10,5	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	2,6	1,7	—	—	—	—	—	—	—	—	—	—	—
—	—	—	167	9	—	—	—	—	38	117	41	—	—	—	—	—	—	—	—
—	—	—	38,6	9,6	—	—	—	—	9,6	38,4	14,0	—	—	—	—	—	—	—	—
—	—	—	4,3	0,9	—	—	—	—	3,9	3,0	2,9	—	—	—	—	—	—	—	—
—	—	—	167	9	—	91	547	18	38	262	41	—	—	85	—	790	153	272	606
—	—	—	38,6	9,6	—	10,8	53,2	10,5	9,6	56,0	14,0	—	—	12,0	—	84,6	24,0	41,2	57,4
—	—	—	4,3	0,9	—	8,4	10,3	1,7	3,9	4,7	2,9	—	—	7,1	—	9,3	6,4	6,6	10,5

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959 (continued)
South Latitude

32—08	32—09	32—10	32—18	32—19	33—02	33—03	33—04	33—06	33—07	33—08	33—09	34—03	34—04	34—05	34—06	34—09	35—01	35—02	35—03
174	—	—	554	386	—	—	114	249	1328	—	—	—	—	—	—	—	—	—	—
31,4	—	—	84,0	48,0	—	—	13,0	39,0	137,4	—	—	—	—	—	—	—	—	—	—
5,5	—	—	6,6	8,0	—	—	8,8	6,4	9,7	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	93	—	—	—	—	61	—	—	—	—	51	31	44
—	—	—	—	—	—	—	13,0	—	—	—	—	13,0	—	—	—	—	9,6	9,6	9,6
—	—	—	—	—	—	—	7,1	—	—	—	—	4,7	—	—	—	—	5,3	3,2	4,6
—	—	—	—	—	39	—	—	—	—	—	—	52	—	—	—	—	—	—	—
—	—	—	—	—	10,0	—	—	—	—	—	—	9,2	—	—	—	—	—	—	—
—	—	—	—	—	3,9	—	—	—	—	—	—	5,6	—	—	—	—	—	—	—
—	—	—	—	—	—	46	70	1074	—	—	—	—	—	—	—	—	—	—	54
—	—	—	—	—	—	10,0	25,6	152,0	—	—	—	—	—	—	—	—	—	—	19,6
—	—	—	—	—	—	4,6	2,7	7,1	—	—	—	—	—	—	—	—	—	—	2,7
174	—	—	554	386	39	46	277	1323	1328	—	—	113	—	—	—	—	51	31	98
31,4	—	—	84,0	48,0	10,0	10,0	51,6	191,0	137,4	—	—	22,2	—	—	—	—	9,6	9,6	29,2
5,5	—	—	6,6	8,0	3,9	4,6	5,4	6,9	9,7	—	—	5,1	—	—	—	—	5,3	3,2	3,3

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959 (continued)
South Latitude

35—07	35—19	35—20	35—21	36—03	36—17	36—18	36—19	36—20	36—21	37—20	37—21	38—03	38—21	38—22	39—21	39—23	39—24	39—25	40—00
—	—	—	—	—	—	—	—	30	72	—	—	—	—	—	—	—	—	22	—
—	—	—	—	—	—	—	—	12,0	12,0	—	—	—	—	—	—	—	—	10,2	—
—	—	—	—	—	—	—	—	2,5	6,0	—	—	—	—	—	—	—	—	2,1	—
—	28	—	55	—	—	—	37	20	—	—	—	—	—	37	—	27	70	—	38
—	11,0	—	21,2	—	—	—	11,0	11,0	—	—	—	—	—	10,2	—	10,2	20,0	—	10,4
—	2,5	—	2,6	—	—	—	3,4	1,8	—	—	—	—	—	3,6	—	2,6	3,5	—	3,6
—	30	17	—	—	217	138	—	215	164	121	110	—	39	—	21	—	—	—	—
—	9,0	12,2	—	—	84,2	36,6	—	56,4	34,3	23,4	33,3	—	24,0	—	11,0	—	—	—	—
—	3,3	1,4	—	—	2,6	3,8	—	3,8	4,8	5,1	3,3	—	1,6	—	1,9	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	58	17	55	—	217	138	37	265	236	121	110	—	39	37	21	27	70	22	38
—	20,0	12,2	21,2	—	84,2	36,6	11,0	79,4	46,3	23,4	33,3	—	24,0	10,2	11,0	10,2	20,0	10,2	10,4
—	2,9	1,4	2,6	—	2,6	3,8	3,4	3,3	5,1	5,1	3,3	—	1,6	3,6	1,9	2,6	3,5	2,1	3,6

TABLE III-C — Relative abundance (as capture per 100 hooks) of Yellowfin, Albacore, and Big-eye, by quarters, by statistical rectangles, 1959 (continued)
South Latitude

40—03	40—04	40—05	40—23	40—24	40—25	41—24	41—25	42—25	43—25	44—25	44—26	44—27	45—25	45—26	45—27	TOTAL
—	—	—	—	14	32	126	—	—	—	2090	427	43	64	193	15	10753
—	—	—	—	9,0	9,0	24,3	—	—	—	284,0	70,8	14,9	19,2	20,9	10,2	1276,6
—	—	—	—	1,5	3,5	5,2	—	—	—	7,3	6,7	2,9	3,3	9,3	1,5	8,4
—	—	—	213	962	190	33	42	32	24	—	—	—	—	—	—	9662
—	—	—	92,3	311,6	66,6	20,7	10,0	11,6	11,4	—	—	—	—	—	—	1301,4
—	—	—	2,3	3,1	2,8	1,6	4,2	2,7	2,1	—	—	—	—	—	—	7,4
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1826
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	490,5
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,7
—	—	—	—	—	—	—	—	—	—	1212	210	—	—	—	—	3124
—	—	—	—	—	—	—	—	—	—	439,9	69,9	—	—	—	—	844,2
—	—	—	—	—	—	—	—	—	—	2,7	3,0	—	—	—	—	3,7
—	—	—	213	976	222	159	42	32	24	3302	682	43	64	193	15	25365
—	—	—	92,3	320,6	75,6	45,0	10,0	11,6	11,4	723,9	140,7	14,9	19,2	20,9	10,2	3912,7
—	—	—	2,3	3,0	2,9	3,5	4,2	2,7	2,1	4,6	4,8	2,9	3,3	9,3	1,5	6,5

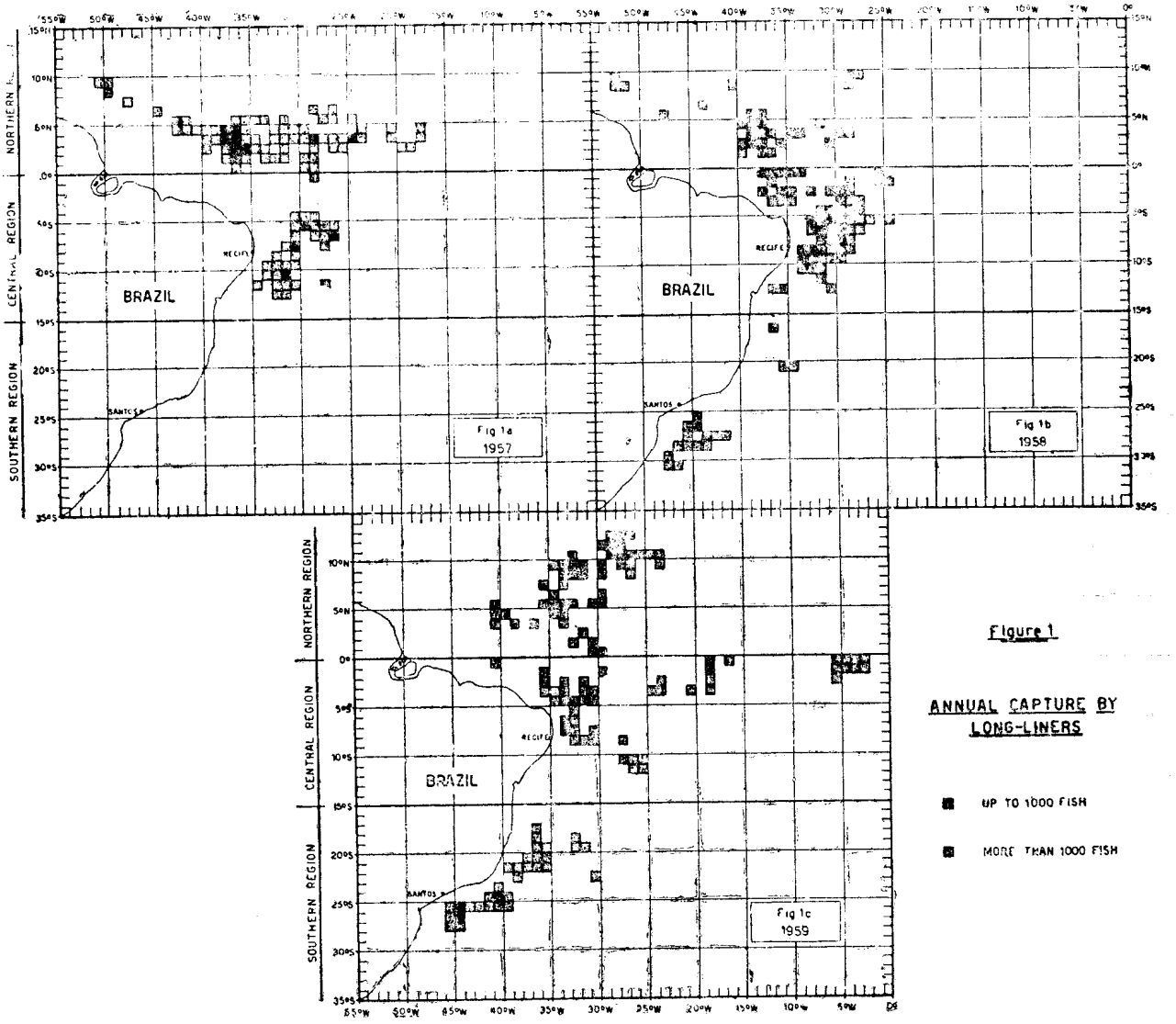
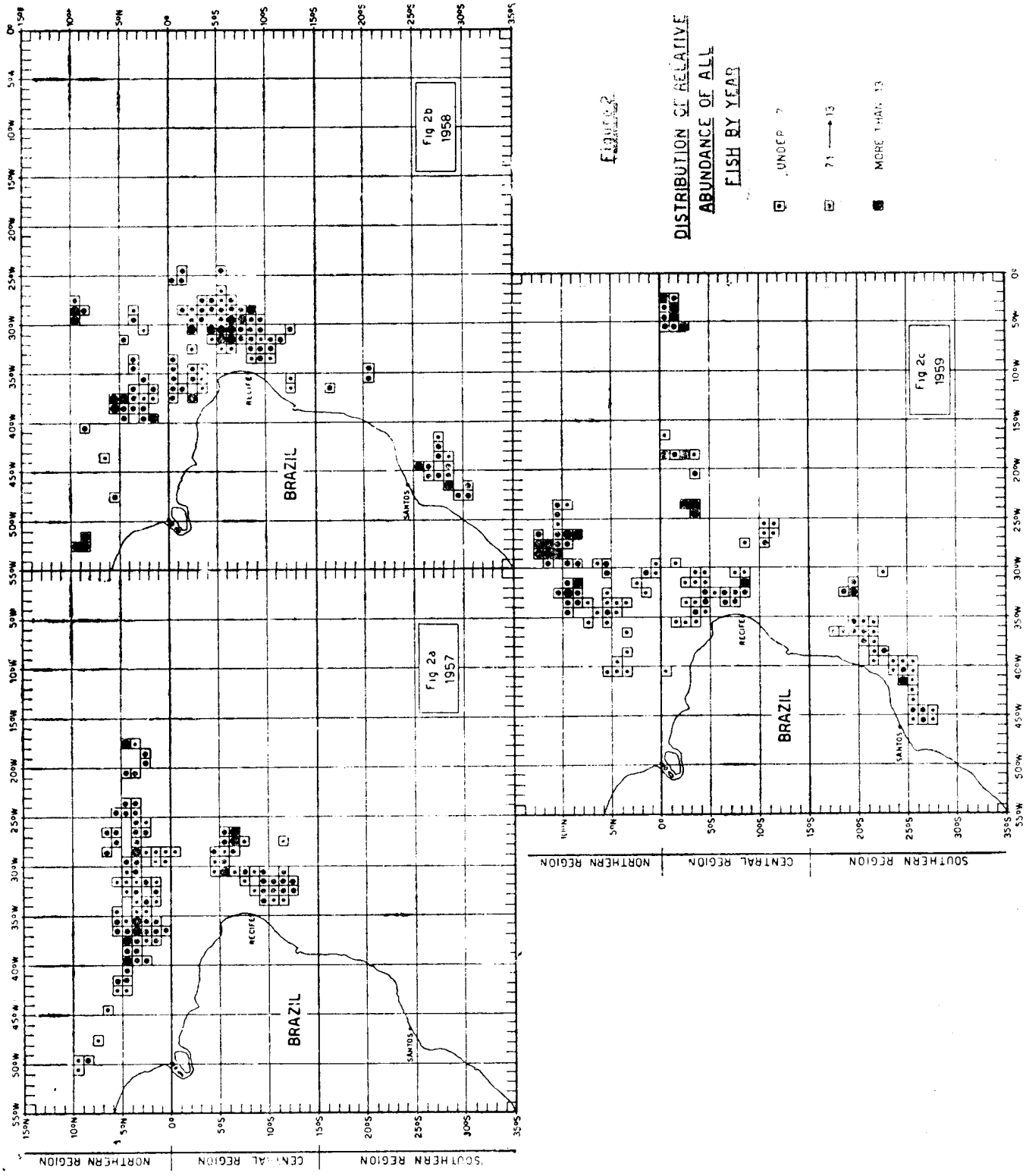


Figure 1

ANNUAL CAPTURE BY LONG-LINERS


DISTRIBUTION OF RELATIVE ABUNDANCE OF ALL FISH BY YEAR
UNDER 7
7 1 ——→ 13
MORE THAN 13
Fig 2a 1957
Fig 2b 1958
Fig 2c 1959
BRAZIL
RECIFE
SANTOS
NORTHERN REGION
CENTRAL REGION
SOUTHERN REGION

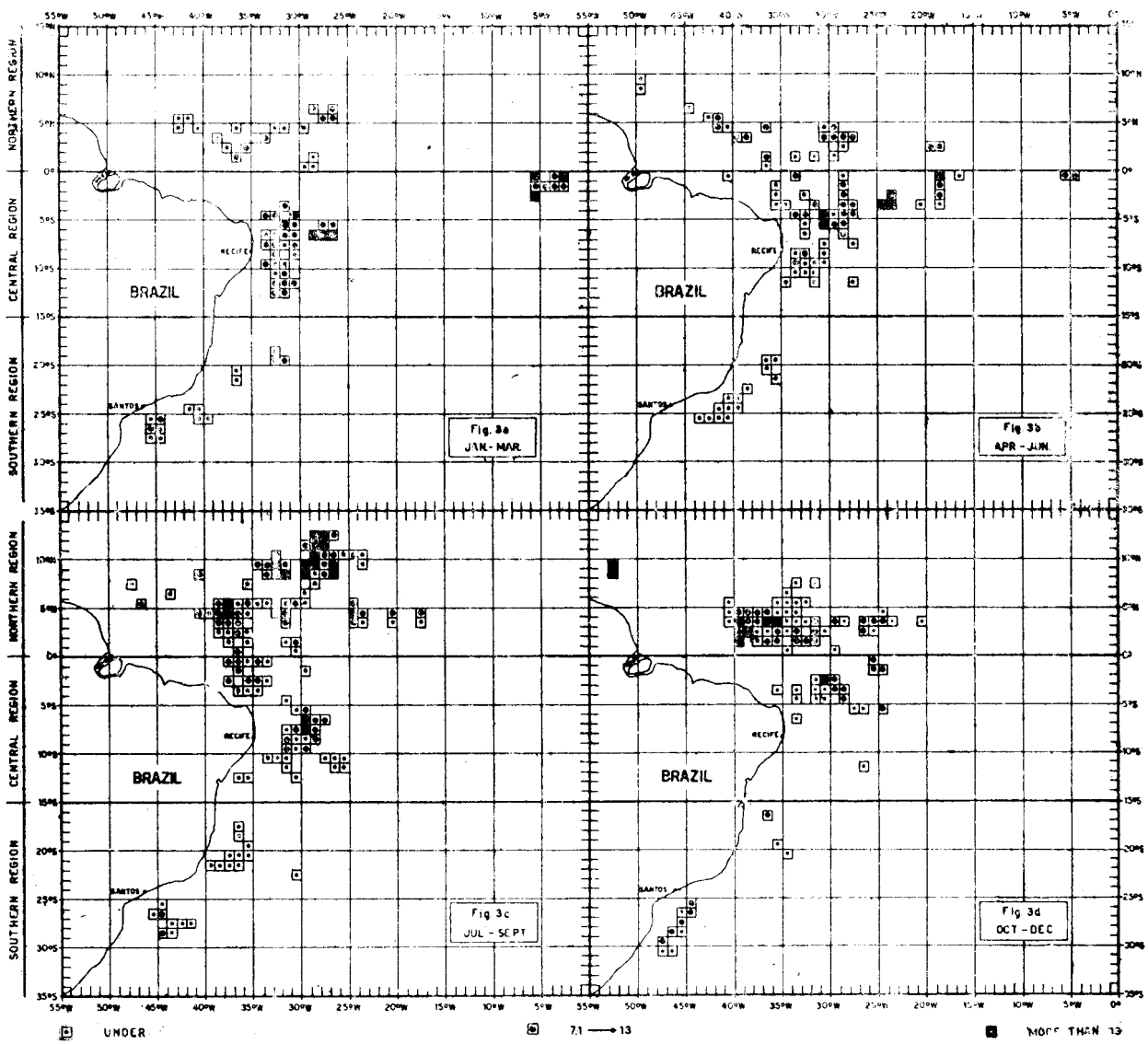


Figure 3 — Distribution of Relative Abundance of Yellowfin, Albacore, and Big-eye by Quarters, in Years, 1957 — 1959.

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