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Chairman—RICHARD G. BADER, *Institute of Marine Sciences, University of Miami, Miami, Florida*

Tropical Atlantic Tuna Investigations, 1968[1]

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Abstract

The major tuna fisheries in the tropical Atlantic Ocean are the surface fishery off West Africa and the longline fishery spread from Africa to South America. Both fisheries have developed mainly since the mid-1950s.

Stocks of yellowfin tuna and albacore in the Atlantic Ocean have been greatly reduced by fishing and the total catch will be increased only marginally by any increase in fishing effort. Increases in the total catch are possible for bigeye tuna and skipjack tuna.

The Atlantic Tuna Convention has been signed by several nations and probably will become effective shortly. In the meantime, a Working Party on Tuna Stock Assessment, sponsored by FAO in 1968, focused attention on scientific problems associated with the tuna fisheries.

THE ATLANTIC TUNA FISHERIES are of major importance among the world's marine fisheries. This paper is a review of the present state of the Atlantic fisheries and of their potential development.

Certain of the tuna fisheries of the Atlantic are as old as recorded history. The madrogue tuna traps, still used along the shores of the Mediterranean and the Atlantic coast of Spain and Northwest Africa, are essentially unchanged from early historical times (Thompson, 1960). On the other hand new fisheries, based on modern technology, have been established in the tropical Atlantic in recent years and their catches now surpass those of the older tuna fisheries.

Tuna production in the Atlantic Ocean increased from 180,000 metric tons (m.t.) in 1955 to 330,000 m.t. in 1964, or approximately 7% (compound) per year (FAO, 1966). The catch in other oceans increased from 630,000 m.t. to 920,000 m.t. in the same period, or approximately 4% per year. The Atlantic catch represented 20 to 26% of the world catch.

Among the most important of the Atlantic fisheries are two—the longline

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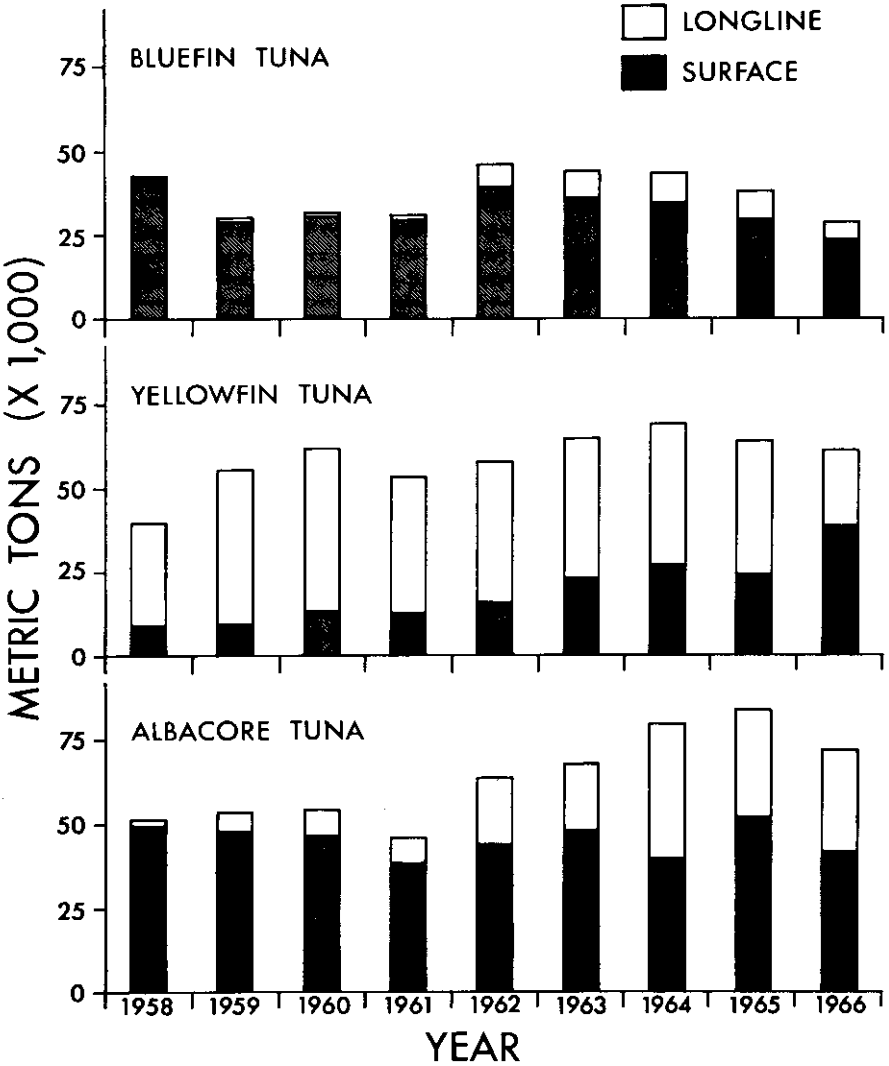

FIG. 1. Estimated catch of bluefin tuna, yellowfin tuna and albacore in the Atlantic Ocean, 1958-66, by longline and surface fisheries. Data provided by FAO.

fishery and the West African surface fishery—which began about 1955.

Initially longline fisheries were conducted by the Japanese on an exploratory basis in the tropical Atlantic. Fishing expanded rapidly and by 1965 about 150 Japanese vessels were fishing over 97 million hooks (Wise and Fox, in press). In 1965, the estimated total catch by longline in the Atlantic was 30,000 m.t. of yellowfin tuna and 31,900 m.t. of albacore (Fig. 1). Smaller

amounts of bigeye tuna (no data available) and bluefin tuna (8,400 m.t.) were caught. The number of Japanese fishing vessels in the Atlantic decreased after 1965, but the decrease was offset partially by the addition of vessels from South Korea and Taiwan.

The surface fisheries along the West African coast are prosecuted primarily for yellowfin tuna by French and Spanish vessels. In 1965 the landings of yellowfin tuna from the surface fishery were 23,700 m.t. In 1966, landings increased to 28,000 m.t. and exceeded the 22,500 m.t. caught by the longline fishery. The surface fisheries for bluefin tuna and albacore are primarily in temperate regions and are not discussed in detail in this report.

The longline fisheries, which extend oceanwide, provide data for the study of tuna distribution. From 1956 to 1965 Japanese vessels fished in the Atlantic in nearly every 5° rectangle of latitude and longitude within the 40°

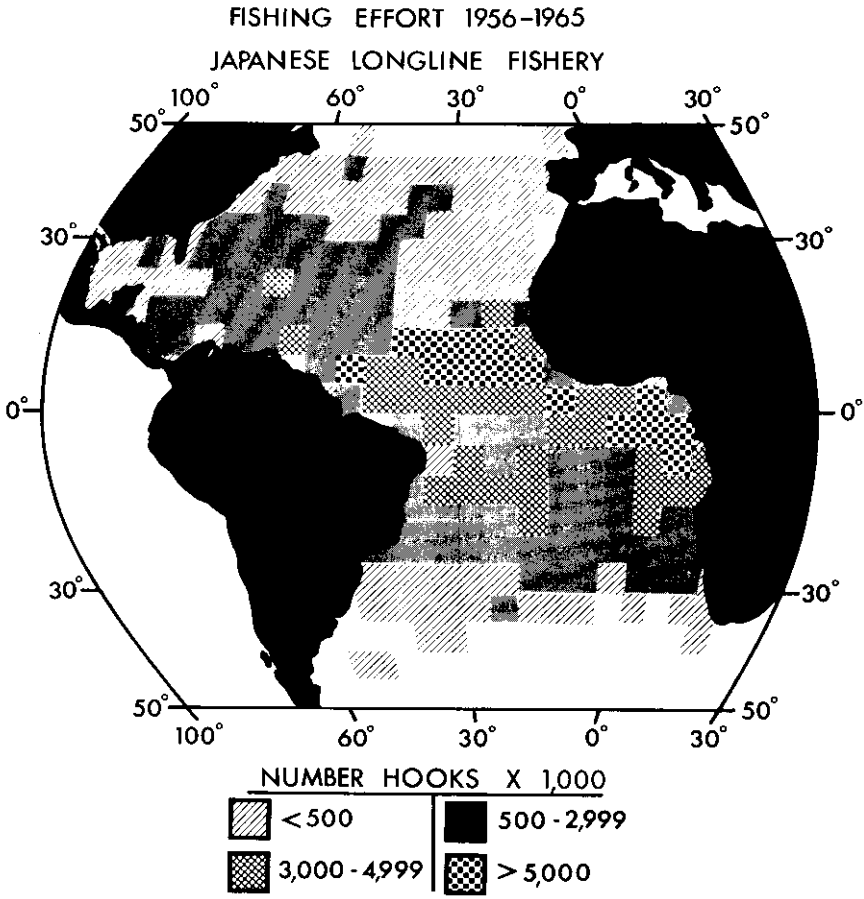

FIG. 2. Estimated fishing effort by Japanese longline vessels in the Atlantic Ocean, 1956-65.

parallels (Fig. 2). On the basis of Japanese records, the distribution of yellowfin tuna and albacore was determined. Data were used to plot average abundance of yellowfin tuna and albacore in rectangles in which total estimated fishing effort in the 10-year period exceeded 500,000 hooks (Figs. 3 and 4). Rectangles excluded from the analysis (because fishing effort was less than 500,000 hooks) were mainly in the poleward areas of the fishery and in a part of the northeast Atlantic which was only lightly fished. Figs. 3 and 4 indicate the general distribution, based on total catch and effort in each rectangle in the 10-year period. In spite of the exclusion of rectangles which were only lightly fished, the seasonal variations and long-term trends in fishing effort affect the calculated catch rates and need to be considered in a detailed treatment of distribution.

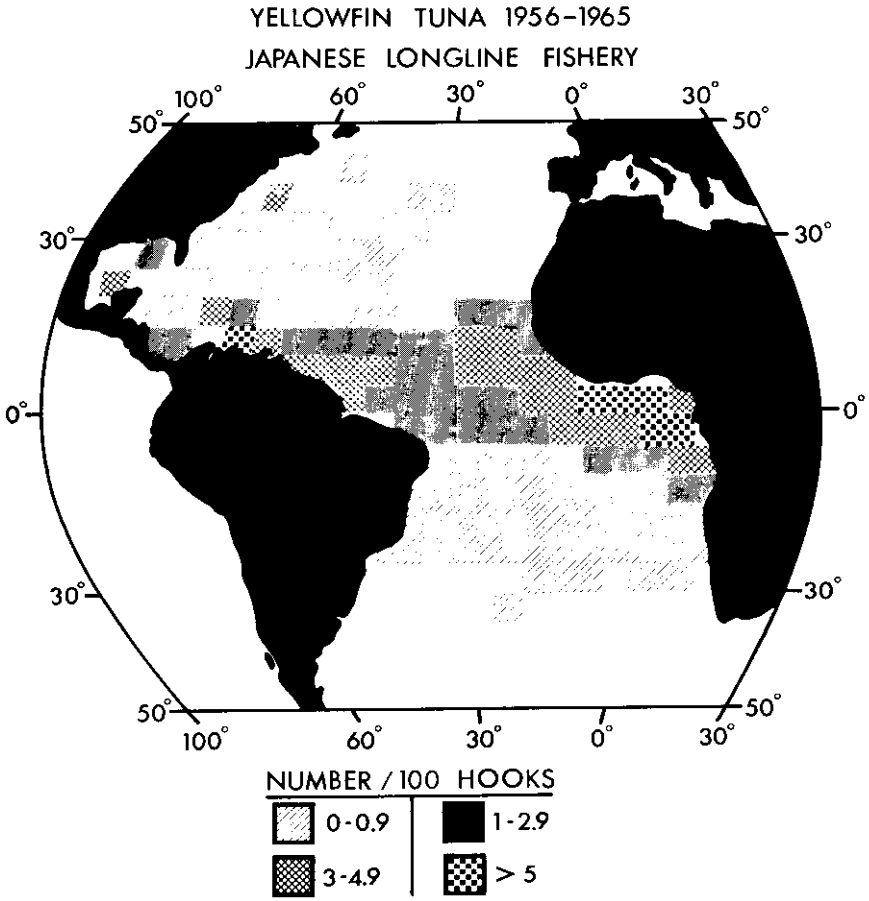

FIG. 3. Catch of yellowfin tuna per 100 hooks by the Japanese longline fishery in the Atlantic Ocean, 1956-65. Catch is shown only in the rectangles with more than 500,000 hooks recorded fishing effort.

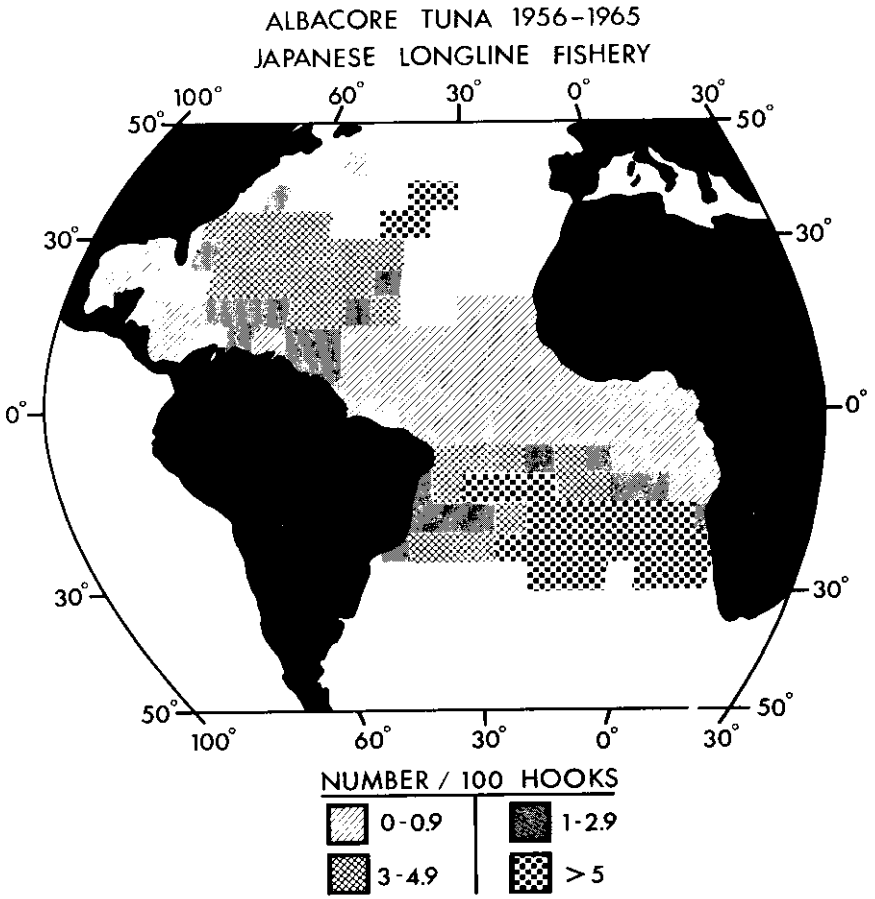

FIG. 4. Catch of albacore per 100 hooks by the Japanese longline fishery in the Atlantic Ocean, 1956-65. Catch is shown only in the rectangles with more than 500,000 hooks recorded fishing effort.

The distribution of yellowfin tuna extended from the equator poleward to about 40° or 45° latitude. Catch rates in temperate regions were low (Fig. 3) and the catches were made primarily in summer: May to August in the Northern Hemisphere and October to February in the Southern Hemisphere. Catch rates of yellowfin tuna were highest in the tropics, especially in the Gulf of Guinea and the adjacent Atlantic, off the northeast coast of South America, and to a lesser extent in the Caribbean and the Gulf of Mexico. Yellowfin tuna were less concentrated in the central Atlantic than along the African or the South American coasts, but at present we lack supporting data to indicate a division between discrete eastern and western Atlantic stocks.

Albacore, the second most important species in the longline fishery, were

distributed from the equator poleward to about 40° to 45° latitude (Fig. 4). Their distribution is complementary to that of yellowfin tuna. As indicated by catch rates, albacore were most abundant in the north and south temperate zones; few fish were caught in equatorial waters. Evidence is lacking for discrete eastern and western groups within each temperate zone; indeed east-west seasonal migrations have been described on the basis of the Japanese fishery data by Beardsley (in press).

The catch records of the Japanese longline fishery enable us to examine changes in the stock sizes of Atlantic tunas. Although we have little information about the stock structure of tunas in the Atlantic, the widespread longline fishery samples fish throughout practically their entire range.

Catch rates and the stock levels of yellowfin tuna available to the Atlantic longline fishing fleet have declined drastically in recent years. The catch of

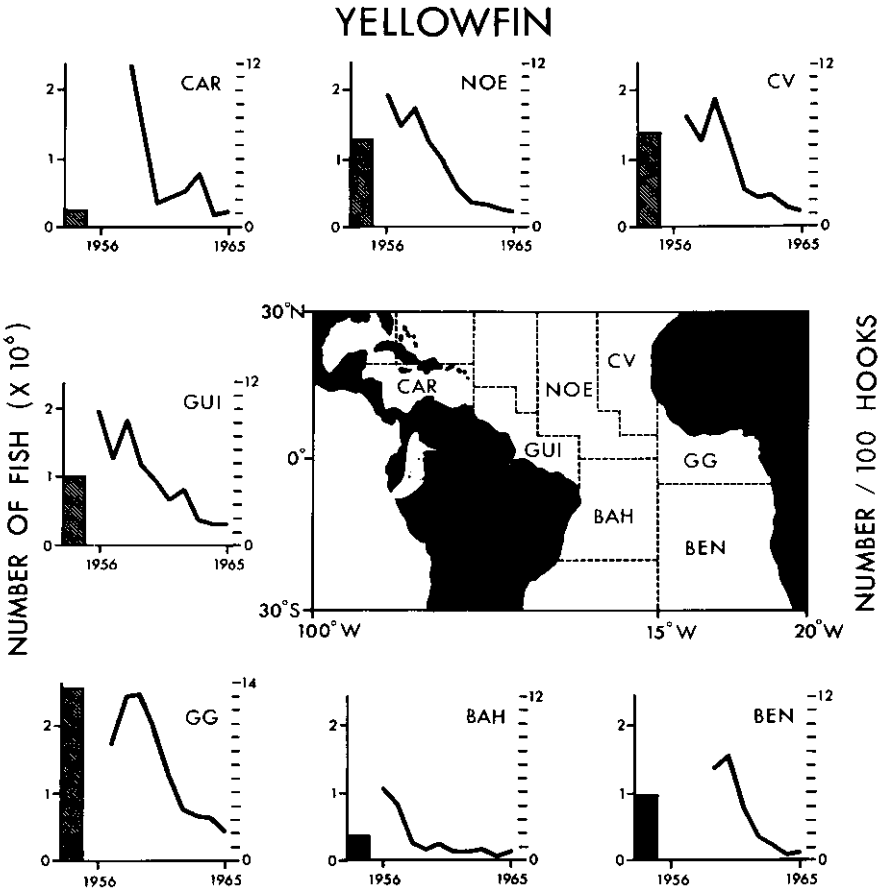

FIG. 5. Annual catch of yellowfin tuna per 100 hooks in various regions of the Atlantic Ocean, 1956-65.

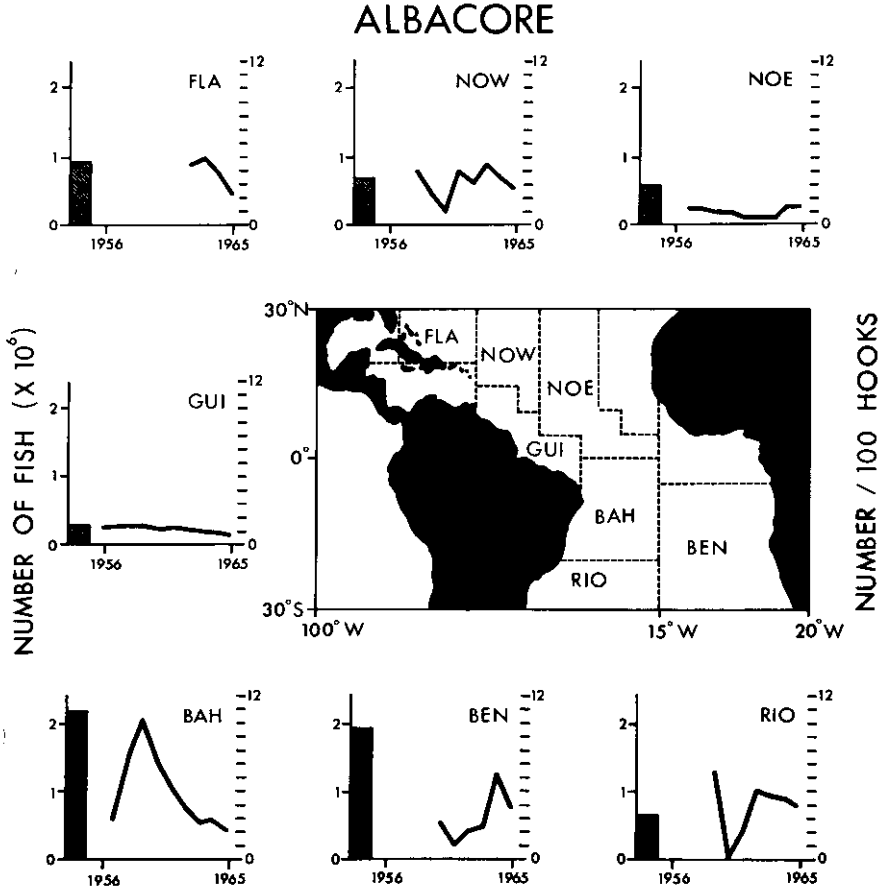

FIG. 6. Annual catch of albacore per 100 hooks in various regions of the Atlantic Ocean, 1956-65.

yellowfin tuna per hundred hooks fell from nine fish in 1956 to one in 1965. The decline was partly the result of a shift of fishing effort in the 1960s away from the best yellowfin tuna areas, but even in these areas catch rates declined sharply. For example, in the Gulf of Guinea, the rate declined from nine fish per hundred hooks in 1957 to two fish in 1965 (Fig. 5). Downward trends also appeared in most other areas, including the important yellowfin tuna areas designated as North Oceanic East, Guinea, Cape Verde, and Benguela. LeGuen and Wise (1967) suggested that a further increase in fishing for yellowfin tuna would not increase the total catch significantly and might, in fact, decrease it.

The catch rate for albacore increased from less than one fish per hundred hooks in 1956 to just under two in 1965. The increase resulted from a shift from tropical to temperate areas as the fishery became increasingly concentrated

on albacore. Catch rates in certain good albacore areas did not rise (Fig. 6). In Bahia, for instance, catch rates dropped from 10 fish per hundred hooks in 1950 to 2 fish in 1965. Evidence of a decline since 1963 or 1964 is also apparent in the Florida and Benguela areas. The declining catch rates suggest that the fishery has reduced the stock size, and it is possible that increased fishing for albacore will not lead to a proportional increase in catch.

Two species of tuna offer a possibility for expansion of the Atlantic fisheries. Some increase in the catch of bigeye tuna may be possible, since the catch rates for this species decreased less rapidly than those for yellowfin tuna. Stocks of skipjack tuna in the Atlantic are more abundant than is indicated by the present relatively insignificant catches; the fishery for this species could also be expanded. Larvae of skipjack tuna are plentiful and distributed widely in tropical waters (Richards, in press), and the species apparently spawns throughout the year in the tropical Atlantic (Simmons, in press). Sightings of schools of skipjack tuna on research cruises in the eastern and western Atlantic have been more numerous than those of yellowfin tuna. Occasional catches of skipjack tuna in the longline fishery also indicate that adult skipjack tuna are widely distributed.

The Atlantic tuna fisheries are important to U. S. industry. Tuna represented about 48% of the fishery products canned for human consumption in the United States in 1966. U.S. packers began canning Atlantic tuna in Puerto Rico in 1953 (Juhl, 1959), and in 1966 production rose to about 2.7 million cases (Lyles, 1968).

Until recently, fishing for tuna by U.S. vessels in the Atlantic has been limited to the New England summer fishery for bluefin and skipjack tunas and to occasional participation in the West African surface fishery. In 1967 and 1968, U.S. vessels increased their participation in the West African surface fishery. In the latter part of 1967, after closure of the yellowfin tuna fishery in the eastern Pacific, three U.S. purse-seine vessels made trips from Puerto Rico to West Africa that lasted approximately 65 days, and caught about 1,400 m.t. of tuna. In 1968, again late in the year, eight U.S. vessels caught about 9,200 m.t. of tuna off West Africa. Expected future closure of the yellowfin tuna fishery in the eastern Pacific in mid-year will probably result in a greater commitment of vessels and time to the Atlantic.

Because of the importance of the Atlantic fisheries to U.S. fishermen and canners, the Bureau of Commercial Fisheries has undertaken a major research program on tropical Atlantic tunas to increase knowledge of the fisheries and the biology of tuna species. The research is carried out at the Tropical Atlantic Biological Laboratory, Miami, Florida.

Declining catch rates of the longline fishery in recent years brought about concern for the Atlantic tuna fisheries and the status of the stocks. In May 1966, the FAO (Food and Agriculture Organization of the United Nations) sponsored a meeting in Rio de Janeiro to draw up a convention for the Conservation of Atlantic Tunas. Delegates from 17 nations attended the meeting. To date, six of the seven ratifications required, if the Convention is to be put in force, have been received—the United States, Japan, Brazil, Ghana, South Africa, and Canada. It is expected that other governments will ratify in the near future.

One of the first actions of the new Atlantic Tuna Commission to be formed by the Convention will be to request a report of scientific information concern-

ing the Atlantic tuna fisheries. To make this information available to the Commission, the FAO convened a group of scientists in August 1968 at the Tropical Atlantic Biological Laboratory, Miami, Florida, to review the knowledge of tunas of the Atlantic Ocean. The report of this meeting, which is scheduled for publication in 1969, brings together all available information on the tuna stocks and represents an important cooperative effort on an international basis towards scientific study of the fisheries.

CONCLUSION

The Atlantic tuna fisheries have kindled increasing interest among members of the U.S. tuna industry because of the importance of tunas to U.S. processors and, more recently, to U.S. producers. The present restrictions on fishing in the eastern Pacific yellowfin tuna fishery and recent success by U.S. vessels fishing off West Africa indicate that the Atlantic fisheries will continue to attract part of the U.S. fleet, at least on a seasonal basis. The new Atlantic Tuna Commission will have a vital part in the maintenance of U.S. interest in the Atlantic fisheries. We in the fishery community must—with all possible efficiency—obtain the scientific facts that will be necessary for the successful operation of the Commission and for the continuation of U.S. fishing in the Atlantic.

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