MARINE FISHERIES OF THE BRITISH WEST INDIES

by

William H. Brown

University of California, Berkeley

Report on Field Work Carried Out
Under ONR Contract Nonr-3656 (83), Project NR 388 067
Department of Geography, University of California, Berkeley
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PREFACE

With the creation of a federation in the British West Indies in 1958, the "British" was officially dropped from the title, and the new union was known simply as The West Indies, or the West Indian Federation. With its subsequent dissolution, it became convenient to return to the old usage, even though several of the former colonies are now independent countries. I am, therefore, very much aware of the political unreality of the term, "British West Indies," but the recent experience of the island territories in attempting to create a single political and economic unit, and the corresponding effort to develop their marine fisheries, make these islands a natural unit of study, stamped as they are with the common mark of British culture.

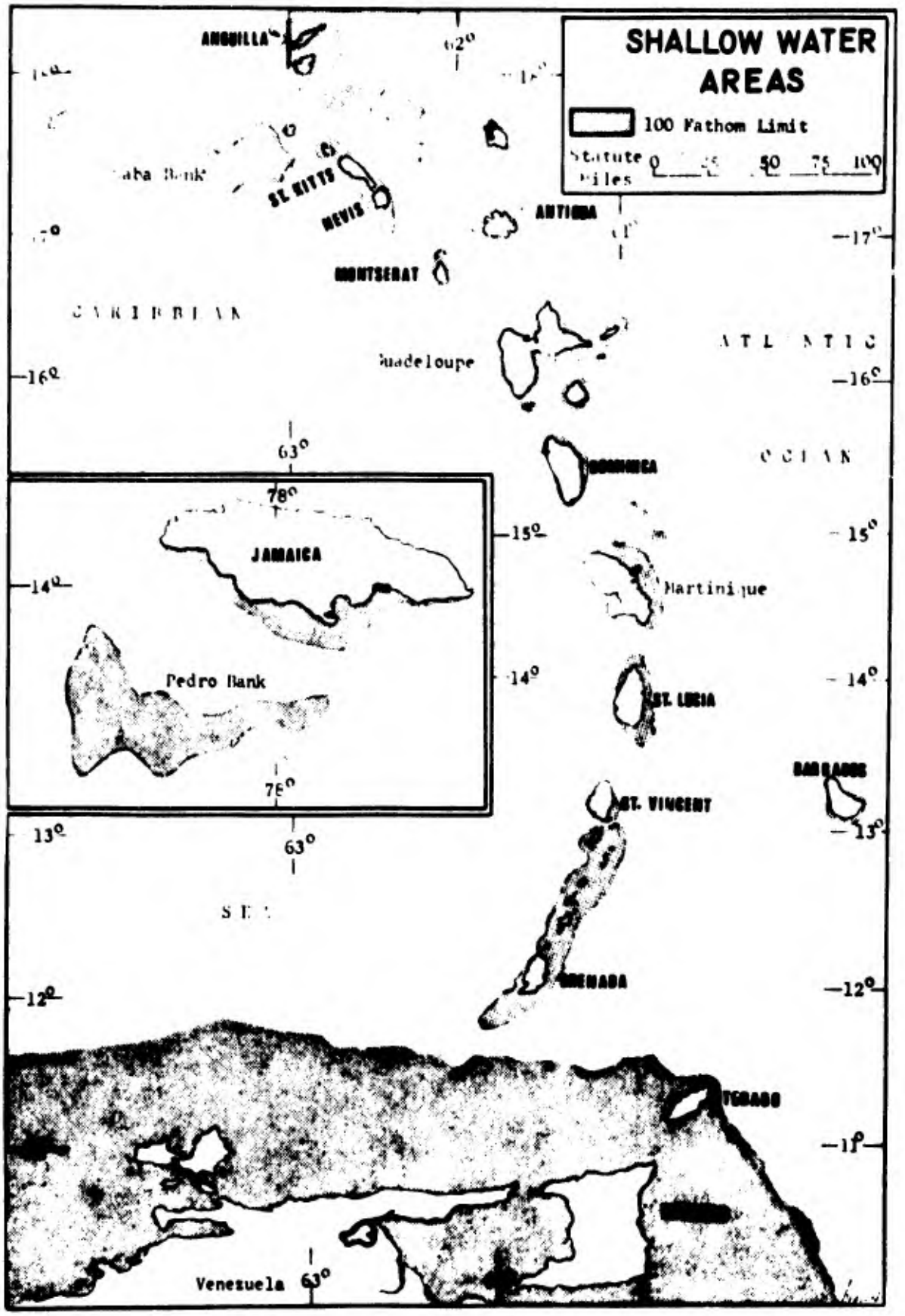
I first became interested in the development of the Caribbean marine fisheries in the spring of 1966. With the support of the Geography Branch, Office of Naval Research, I was able to visit the Caribbean that summer in order to study the problem at first hand. Barbados, which was known to have the most advanced of the local fisheries, was the subject of special attention and has been taken as the main focus of this paper. Although all of the islands were not visited, four of them were; Trinidad, the most prosperous; Jamaica, the largest and most populous; Antigua, a small Leewards island; St. Vincent, a small Windwards island.*

It was not possible to cover every aspect of the fishing industry, such as the sea-egg (sea-urchin) industry of Barbados, or (except in passing) the turtle or shrimp fisheries. Important as the American shrimping operations are and as they are likely to develop in the future, I have not dealt with them in any detail since I do not regard them as being part of the local development picture. In spite of such omissions I believe this report to be an accurate representation of the marine fisheries of the British West Indies as they are today.

W.H.B.

* The other federation territories in 1966 were: Grenada, St. Lucia, Dominica, St. Kitts-Nevis-Anguilla, and Montserrat.

Map I


SHALLOW WATER AREAS
100 Fathom Limit
Statute Miles 0 25 50 75 100
ANGUILLA
SABA BANK
ST KITTS
NEVIS
ANTIGUA
MONTSERRAT
CARIBBEAN
ATLANTIC
OCEAN
Guadeloupe
DOMINICA
Martinique
JAMAICA
Pedro Bank
ST. LUCIA
BARBADOS
ST. VINCENT
GRENADA
TOBAGO
Venezuela
62°
63°
64°
78°
76°
16°
15°
14°
13°
12°
17°
11°

Chapter I

INTRODUCTION

The western North Atlantic fishing banks between Cape Cod and Labrador have been exploited since their discovery by Europeans at the end of the 15th century. These incredibly productive waters are the major source of fish consumed by the majority of the people of the British West Indies. On the other hand, the productive capacity of the Caribbean Sea remains largely unknown to this day, although West Indians are some of the largest consumers of fish in the world, consuming, per capita, almost four times as much as Europeans or North Americans.[1] However, less than twenty-five percent of West Indian fish consumption is produced locally or by West Indians.[2]

The situation described above has, in general outline, existed since the second half of the 17th century, when West Indian sugar plantations began to take over agricultural lands to the extent that it became necessary to import food, especially great quantities of cheap salt cod, for the feeding to the slaves who worked the plantations. The New England cod-fishing industry was then regarded as "the key to the Indies,"[3] but it was "the refuse fish they put off at the Charib islands, Barbados, Jamaica, etc.," that fed the growing Negro population.

We are accustomed today to enjoying exotic food items from the remotest corners of the world, and even staple food items move in volume over an increasingly wide geographical range. But, for approximately three centuries, the majority of the island-bound people of the British West Indies have been, and remain to this day, dependent upon marine resources located some two thousand miles removed from their own shores as a basic source of dietary protein.

This apparently anomalous economic and geographic arrangement is, of course, a reflection of the colonial relationship which existed between Great Britain and its West Indies possessions--a plantation system which persisted with little modification even after the abolition of slavery.[4] As long as the system worked and proved measurably profitable, and as long as pressure for social and political changes remained small or unorganized, the apparent logic of seriously exploring and exploiting local fisheries as a supplementary food source received scant attention

from either private developers or the government. This was noted in 1891 by one government official who said:

> In spite of the abundance of good fish existing in the neighbourhood..., large quantities of salt and dried fish...are imported from the United States and Canada. It is probable that a good deal more might be made of the fishery productions of these seas if sufficient attention were devoted to them by persons possessed of capital.[5]

In 1897 the Caribbean Sea Fisheries Development Syndicate was formed in England with the aim of making Jamaica largely self-sufficient in its fish supply.[6] The syndicate employed a steam trawler which began operations in January of the following year. However, the destruction of trawls by coral growths, and of drift-net catches by sharks and barricudas, brought the project to an early end.

In 1930, the Colonial Fisheries Officer, after considering the needs and possibilities of colonial fisheries development, published a statement of his considerations on the matter, ending with the remark--"I do not wish at this point, however, to do much more than register the need of carefully thinking out the problems of organization, should it be decided to assist the fisheries."[7]

Within less than a decade Great Britain was compelled to concern herself with considerably more than just colonial fisheries. Wracked by labor unrest growing out of a deep and prolonged depression, the Caribbean colonies became the subject of an intensive investigation by a Royal Commission under the chairmanship of Lord Edwin Moyne.[8] Fisheries development was included in the commission's long list of considerations, but it was not among the most urgent problems which required immediate attention, such as public health, employment, housing, and education. The commission reported, however:

> It was difficult...to get significant information on the possibility of developing fisheries. The question is, in fact, one of a number of obviously important West Indian issues which have been from time to time timorously taken up locally, with no funds for the purpose, but never made the subject of a determined consideration by the Imperial Government. Fishery development will continue to create small unfructuous enquiries in the British West Indies unless energetically and comprehensively taken up.[9]

The onset of World War II brought about a sudden shift of emphasis as both the sources and supply routes of preserved fish imports to the

Caribbean were affected.[10] World production of salted fish rapidly declined from an annual average of 231,679 metric tons between 1935 and 1939, to 117,003 metric tons annual average between 1940 and 1944.[11] Increased production of fresh fish by West Indian fisheries became a matter of serious concern in order to compensate for the curtailed availability of imported preserved fish. A series of surveys was undertaken by both Great Britain and the United States in order to determine the state of local fisheries, and to assess possibilities for development.

Now, more than a quarter of a century later, in spite of numerous surveys, development schemes, and spasmodic manifestations of interest by the governments concerned, it is still fair to describe the general development of the marine fisheries of the British West Indies, in the words of the Royal Commission, as being "unfructuous." Continued heavy imports of salt fish are required to supply the need and demand for inexpensive protein, constituting a continuous drain on needed development capital. In 1961 the Federation territories imported $8 million worth of dried, salted, or smoked fish. Of this total Jamaica alone accounted for more than $5 million worth.[12] (See Table II.)

The picture of fisheries development has been very much affected by the great political changes which have taken place in the last two decades. The most important of these was, of course, the Federation period, 1958-1961. Indeed, it was during this period that marine fisheries development made its most impressive progress. With the Federation's collapse, however, there was a leveling off, if not an actual reversal, of some to the positive trends that had been set in motion.

It must not be forgotten that the West Indies generally are overpopulated (in the sense that population exceeds their needs and resources) and, in terms of per capita income, rank among the poorest areas in North America. It has been often noted that any study of the area is necessarily a study in poverty.[13] On the other hand, there is a great unevenness, even in poverty. Jamaica, with its enormous bauxite deposits and great agricultural potential, is in a much happier position than say, St. Vincent, which is one-thirtieth of Jamaica's size, with no known mineral resources, and a much higher density of population

(568 per square mile as compared to 360 for Jamaica). Table I conveys some idea of the basic similarities, as well as differences, between the different islands.

The political changes that have taken place within this decade have undoubtedly been the principal contributing factor in the continued neglect of fisheries development. First call on capital and development planning has necessarily gone to those enterprises which promise more immediate and greater returns on investment. It is not likely, however, that the success of Puerto Rico's famous "Operation Bootstrap" will be duplicated. Morely Ayearst points out the reasons:

> The Puerto Rican achievement is due in part to the large amount of American capital available, possibly also to a relatively larger number of skilled workers among the population, and, of key importance, the nearby continental market open to Puerto Rican products.[14]

The continued rapid increase of tourism in the islands has attracted the greatest attention as offering the best opportunities for local economic development. Special note will be taken later for the particular bearing on the fishing industry.

A second cause for the neglect of the fisheries is the cheapness of the imported product, combined with its keeping qualities in a tropical climate. Hopeton Gordon writes of Jamaica:

> It would be very difficult to persuade Jamaican, particularly those living in the country, to change from salted cod, mackerel and other imported fish to fresh fish. Whatever else is done this change will never be effected unless the consumers can be assured of regular supplies of fresh fish in good condition. To the consumer in a country village, without electricity and hence no refrigeration, salted cod and pickled mackerel have the advantage of always being available in the local shop. Further, when a ½ lb. or so is bought and put in the kitchen it does not spoil but can be kept almost indefinitely and eaten bit by bit until it is finished. ...Moreover, whatever the relative gastronomic merits may be, the taste for salted cod, for mackerel and for tinned sardines is already well established and traditional eating habits are notoriously difficult to change.[15]

It is difficult to assess yet another factor relative to fisheries development--namely, the attitude of the people themselves towards the sea and towards fishing activities. The fact that most fishermen are

Negro is due to the simple fact that the West Indies have been, as Gordon Merrill describes it, "biologically conquered by the black folk."[16] But the Negro was brought to the West Indies to labor in plantation agriculture, especially in sugar production, and to this day "one ineluctable fact remains: the central position of the sugar industry."[17] This means that where ever sugar is profitably produced, Negro labor has been overwhelmingly oriented towards agricultural life rather than to maritime activity. There is very little evidence that any fishing techniques that may have been brought from Africa survived slavery. The development of the fishing industry has been slow, and remains a pretty primitive business. One senses little if any great love for the sea among the fishermen, but rather a sense of resignation, if not apprehension, certainly justifiable in terms of the dangers that attend them at the present level of nautical development. Between 1944 and 1954, Barbados alone lost 111 fishermen at sea. This rate was drastically reduced, however, with mechanization and structural modification of the fishing boats.[18] Even so, Barbadian as well as most other West Indian fishermen, rarely take their small craft beyond the sight of land.[19] An important exception to this generalization concerns the turtle fishermen of the Cayman Islands, of which more is said in Chapter IX.

Finally, there is the question of the productivity of the Caribbean Sea itself. "I know not," wrote Hans Sloane, in 1725, "neither have heard of any Place where there are greater Plenty of fresh water & Sea Fishes than in the Island and on the Coasts of Jamaica, which is a great Providence & Contrivance for the Support of the Inhabitants,..."[20] Yet today, especially in view of the great and increasing population of this island, the small area of coastal shelf and the nearby banks furnish little of the demand for fish. Indeed, there appear to be few places in the Caribbean where the marine geography offers much prospect of extensive fisheries development along present lines of exploitation. (See Map I)

Table I

Area, Population, and Vital Statistics

	Area ($mi.^2$)	Population[a]	Density ($Per\ mi.^2$)	ARI[b]	Per Capita Income[c] $
Jamaica	4,411	1,795,000	407	1.8	368
Trinidad & Tobago	1,980	997,600	453	3.1	580
Barbados	166	244,536	1,476	1.0	256
Grenada	133	93,977	706	1.3	148
St. Vincent	150	91,072	607	1.7	156
St. Lucia	238	97,696	401	1.8	148
Dominica	305	64,555	216	1.8	169
Antigua	170	65,500	386	2.2	220
St. Kitts-Nevis-Anguilla	150	59,288	394	1.2	-
Montserrat	34	13,627	329	2.3	149
Latin America			26	1.6	
Caribbean Area			247	2.5	
World			63	1.8	

a. Estimated 1967 population based on rate of increase, 1960-64.

b. Annual rate of population increase for 1960-64 interval, U.N. Demographic Yearbook, 1965.

c. Caribbean Organization Annual Report, 1963. Per capita income is for year 1959, except Jamaica (1962) and Trinidad & Tobago (1961).

Table II. Preserved Fish Imports, West Indies, 1939-1962*
(Metric Tons)

	1939	1940	1941	1942	1943	1944	1945	1946	1948	1957	1958	1959	1960	1962
Jamaica	11660	99229	9797	6453	7681	9783	10978	8887	10400	12200	10600	12800	12500	12600
Trinidad & Tobago	3053	2671	2522	2461	1837	2842	3010	2566	--	2900	3000	3100	2900	3000
Barbados	1626	1429	951	722	839	1156	1144	1107	1400	1300	1100	1200	1100	1100
Grenada	512	383	360	166	194	441	228	504	500	500	500	400	700	800
St. Vincent	310	247	186	23	62	104	157	255	--	400	300	400	400	400
Dominica	158	134	142	35	108	121	113	72	200	500	400	400	400	400
Antigua	352	300	411	245	175	209	233	289	--	--	--	--	--	--
St. Kitts-Nevis, Anguilla	396	395	343	181	197	270	227	229	--	--	--	--	--	--
Montseratt	110	122	99	83	13	51	44	53	--	--	--	--	--	--

*Sources: 1939-1946, The Fish Trade of the Caribbean, 1948
1948-1962, F.A.O., Yearbook of Fisheries Statistics, v. 17, 1963.

NOTES

1. F.A.O., Report on the fisheries industry in the countries served by the Caribbean Commission (Rome, FAO, 1958), p. 60. This report was based on the work of Georges C. Salmon, Fisheries Expert.

2. Hess, Ernest, "Fish consumption in the West Indies in relation to production and external trade," West Indies Fisheries Bulletin, no. 2 (March-April, 1962), p. 10.

3. Innis, Harold A., The cod fisheries (Toronto, Univ. of Toronto Press, 1954), p. 117.

4. Joseph Sturges wondered if in fact Barbados should have received any compensation for alleged loss of property by the freeing of the slaves. (See: Joseph Sturges and Thomas Harvey, The West Indies in 1837.)

5. Morris, D., "The Colony of the Leeward Islands," Proceedings of the Royal Colonial Institute, Vol. XXII, 1890-91 (London), p. 231.

6. Aspinall, Algernon E., The British West Indies (London, Sir Isaac Pitman & Sons, Ltd., 1913), p. 236.

7. Great Britain. Colonial Office. Conference, 1930. Appendices to the summary of proceedings. Cmd. 3629 (London, H.M.S.O., 1930), p. 82.

8. Great Britain. West India Royal Commission Report. Cmd. 6607 (London, H.M.S.O., 1945).

9. Great Britain. West India Royal Commission. Report on agriculture, fisheries, forestry, and veterinary matters. Cmd. 6608 (H.M.S.O., 1945).

10. Although Canada and Newfoundland maintained high levels of salted cod production, exportable surpluses were allocated on a percentage basis to other regular consuming countries. All maritime shipping of course had to contend with widespread and intensive submarine activity.

11. F.A.O., Salted cod and related species (Washington, D.C., 1949), p. 101.

12. F.A.O., Yearbook of fisheries statistics, v. 17, 1963.

13. MacMillan, W. M., Warning from the West Indies (London, Penguin Books, 1938).

14. Ayearst, Morley, The British West Indies (George Allen & Unwin Ltd., London, 1960), p. 49.

15. Gordon, Hopeton, "A note on Jamaica's marine fisheries," Caribbean Quarterly, v. 10 (Sept., 1964), p. 46.

16. Merrill, Gordon, The historical geography of St. Kitts and Nevis, the West Indies. (Instituto panamericano de geographia e historia, Mexico, 1958), p. 121. Merrill calls fishing "an industry of long standing," but of interest "chiefly as examples of Negro activity and life." He also notes the survival of several families of poor white fishermen in St. Kitts, believed to be the descendants of 17th century Norman settlers.

17. Parry, J. H., and Sherlock, P. M., A short history of the West Indies (New York, St. Martin's Press, 1965), p. 278.

18. The old sailing vessels had no outboard ballast, but were internally stabilized by one ton of old iron. Considerable skill and strength was required to shift this iron ballast as the boat changed directions. A miscalculation could, and frequently did, cause the boat to capsize.

19. In his attempt to apply game theory analysis to Jamaican peasant fishing, William H. Davenport describes the risk involved in setting fish pots on the outside of the banks, some 20 miles from the land, where strong currents may damage or destroy the pots and, occasionally, may lead to the swamping of the canoe. Jamaican Fishing: A Game Theory Analysis. Yale Univ. Publications in Anthropology, no. 59 (New Haven, 1960).

20. Sloane, Hans, A voyage to the islands Madera, Barbados, Nieves, St. Christophers & Jamaica, v. 2 (London, 1725), p. 275.

Chapter II

HISTORICAL NOTES

The Caribbean Fishery Mission of 1942 (to be discussed more fully in the next chapter) observed the general condition of Caribbean fishermen as one of bleak and unrelieved poverty:

> With very few exceptions, they are poor, living from day to day on the sales of the catch of the day before. Their homes are usually of thatched grass, sunbaked clay, or unpainted wood. Their food is the cheapest and most simple that nature and world trade can deliver to their doors.[1]

The colonial economy of the British Caribbean islands stringently limited the possibilities for the development of fisheries. The plantation system was geared to the products of a tropical agriculture, particularly sugar. The unattended and impoverished state of its fisherfolk is not so surprising, and it is a matter of great interest just how the present day fishing communities came into existence out of a slavery which was devoted almost exclusively to agricultural production.

Several recent studies indicate a commonality of structure and place in society of Caribbean fishing communities.[2] Indeed, reference has been made recently to the idea of a "pan-Caribbean fishing culture."[3] The process or processes by which these communities evolved out of slavery is almost entirely unknown. Most of the work that has been done on this subject has been restricted to the French Caribbean. How, or in what manner, analogous developments took place in the British Caribbean has yet to be demonstrated. If scant attention is given by early writers and visitors to the subject of fishing in these territories it is probably due to the simple fact that fishing was not widely practiced. Nonetheless, in order to develop some sense of historical continuity, it seems worthwhile to explore briefly what little information is available, borrowing from the French experience any information that appears relevant.

The plantation owner's primary interest in fishing appears to have been recreational. Pitman describes 18th century fishing in Jamaica with "angles, nets, and pots"[4] as sporting exercises in imitation of the English rural gentry, "as nearly as the climate would permit."[5] On the other hand, Long describes a "poor but peacable" group living at

Paratee Bay, Jamaica, who lived by "fishing and breeding poultry."[6] "This part is swampy," he writes, "and principally inhabitated by Mulattoes, Quaterons, and other Casts..."[7] It is not clear whether this is a Maroon village, a legitimate settlement (or settlements), or a general refuge for runaways. (One receives the impression that the last seems the most probable.)

Other brief and equally casual references of individuals or small groups (all Negroes) engaged in fishing appear in Sturge's and Harvey's[8] account of life in the West Indies in the 1830's. Again it is not clear whether the Negroes are working for themselves or for others. It should be emphasized, however, that fishing was necessarily a peripheral economic activity, even after emancipation, since most ex-slaves, in one way or another, were still compelled to work the land.

Historians of the 18th and early 19th centuries record little commercial activity or interest in local fisheries. Schomburgk does, however, mention in passing that "coveeched" fish (cut, fried, and potted with vinegar and spices) was traded in "considerable quantity" from the Leeward Islands and Barbados to Guiana.[9] But the main interest was personal--sometimes scientific, as in the case of the precise cataloging of species by Schomburgk (with the assistance of two ichthyologists, Müller and Troschel), or else "romantic," as in the case of Oldmixon, who was, as were so many others, utterly fascinated with tales of the predations of sharks, barracudas, and giant mantas. Even Bryan Edwards' scrupulous accounting of the economic activities of the islands fails to reveal any economic or social interest in fishing. (Only once did he deal with the subject, and then only with extended quotes from Du Tertre and Oviedo on native Indian fishing methods.)

Regardless of the personal interest of the writers, most conveyed the impression of being no mean connoisseurs of local varieties of edible fish. It seems certain that the pre-emancipation story of fishing is to be found in the social history of the islands. Observed one writer: "The Mullets are reckoned extraordinarily good of their kind, and so are the lobsters and crabs. As for...other kinds of fish,...We are told that they are excellent meat, and are often served up to the Gentlemen's table of the land."[10]

On the subject of preserved fish there was general agreement on the "commodious situation"[11] created by the geographical proximity of the colonies to America in order that they might be supplied with "those essential articles, lumber, fish, flour, and grain."[12] Barbados continued dependence "for the common necessaries of life upon the United States of America"[13] even after the end of slavery was described as follows:

> The importance of this trade rests upon the supply of one of the most essential articles of the common necessaries of life, namely salted and dried fish, which had become an indispensable article of food, not only among the labouring classes, but we may almost say generally. The value of the whole imports from the British colonies of North America amounted in 1845 to £ 39,343 12s 7d sterling; of this sum imports to the value of £ 29,637 17s 6d consisted of fish.[14]

This kind of evidence would seem to indicate that there was little if any change in the dietary habits of the freed Negroes. By inference, the production and consumption of fresh fish must have been negligible, at least in the early years after emancipation, and the origins of the fisheries of today remain obscure.

Fishing slaves of the French islands appear to have formed the nuclei of the later fishing communities in these areas, according to Price,[15] but the extent to which any Negro slaves were permitted to work and live as fishermen in the British Islands, and, more importantly, the role that they must have played in the formation of fishing communities in the post slavery period is only speculative. The necessarily greater degree of freedom involved in fishing activities makes this development rather unlikely, for, as Robert Southey wrote on his observations of slavery in Brazil, "(it) has mitigations...which are unknown in the British Columbian islands."[16] Nor can one read accounts of slavery in the British Islands without being struck by its harshness and single-minded devotion to the production of sugar. If, however, fish were desired, there was apparently no need of large numbers of slaves for the effort. A contemporary observer in the French islands alleged that it took "no more than a single...slave in a house to furnish the master's table at all times with game and fish."[17] A similar observation was made of the Leeward Islands.[18]

It seems safe to conclude that the economic importance of fishing during slavery was practically nil, and that the technical backwardness of the industry today is due in part to just this lack of attention and concern. Another partial explanation is that the main source of innovations was Europe, and, "as there were virtually no changes in small scale inshore fishing in Europe between the 16th and 19th centuries,"[19] technology in the West Indies necessarily stagnated also. In summary, then, the ex-slaves who took up fishing were hampered not only by their ignorance and an out of date technology, but by a very limited development of what available knowledge there was. The typical craft became the dugout canoe which ranged no more than ten or fifteen miles from shore, and the most common method of catching the fish was the "pot," or trap. (See Appendix I for notes on fishing methods.)

As we have noted, the islands continued into the post-emancipation period largely unaffected in their economic and social structure, geared to plantation labor, but supported now by peasant labor. It is difficult to accept Price's speculation that, with the end of slavery "large numbers of predial...slaves flocked to the seashore, where former fishing slaves were waiting to initiate them into the art."[20] The ex-slave generally engaged in whatever activity he had the skills to employ, and by law or necessity this was usually agriculture. More than likely fishing developed very slowly as a mainly seasonal activity engaged upon to supplement the poor living of agricultural laborers and peasant farmers. Such is the broad pattern of fishing in the Caribbean even today. "It is difficult to draw a line between the fisherman who is incidentally a farmer, and the peasant farmer who is occasionally a fisherman," wrote Herbert Brown[21] in 1942. Lambros Comitas, in a thoroughgoing study of Jamaican fishing communities (1962),[22] demonstrates that fishing is chiefly a dependent variable in the employment pattern, fluctuating inversely with the availability of work on land. Taxi drivers in Antigua inform me that they supplement their income by fishing. Others employed in the trades as well as on the land, doubtless do likewise.

In 1939, the report of the Moyne commission presented the following general comments on the island fisheries:

> In Jamaica there is no organized commercial fishing, though this is carried on by individuals all round the coast, using canoes and baited pots or lines....Fish may change hands several times between fisherman and consumer. Canoes (from the cays, 50, 60 miles distant) could not regularly return to Kingston before the fish had gone bad.
>
> In parts of the Leeward and the Windward Islands a considerable fraction of the population engages in fishing. Though some are expert and adopt it as their primary occupation, many take it up intermittently when seasons are specially favourable or work on the land is hard to get.
>
> Fisheries in Barbados are considerable, though unorganized, and the population uses large fish imports.
>
> In Trinidad, a few launches and schooners are engaged, but fishing is mainly an enterprise of individuals.[23]

The Commission then went on to present some "general facts" relating to the fishing industry, of which a partial list is given below.

a) In most of the islands fishing is a purely individual enterprise, often in the hands of unskilled men who follow it intermittently.
b) Men who make fishing their primary occupation are in many cases badly equipped with boats and gear.
c) There are in general no storage facilities for fish. In consequence the tendency is to catch no more than can be sold immediately on landing, i.e., before it becomes unfit to eat.
d) Agriculture Departments having cold stores and marketing organization under their control could assist in fishery development. The creation of a special Department for this purpose would be a mistake.[24] (Author's emphasis)

As would be expected under the circumstances described, supplementary aspects of the industry such as marketing and distributing facilities were non-existent. The Commission report concludes this part of its investigation with the following:

> Although difficulties will be encountered, and ultimate prospects may be limited, fishery development ought to be pressed forward energetically, for in the Colonies supply of animal protein to a growing population is a matter of urgent importance.[25]

In the same year, 1939, Great Britain was at war with Germany, even before the Moyne Commission could publish its report. The "matter of urgent importance" quickly became critical.

NOTES

1. U.S. Fish and Wildlife Service. The fisheries and fishery resources of the Caribbean area (Washington, D.C., 1947), p. 24.

2. Price, Richard, "Caribbean fishing and fishermen: a historical sketch." American Anthropologist, v. 68 (Dec., 1966) 1363.

3. Ibid.

4. Pitman, F. W., The development of the British West Indies, 1700-1763 (New Haven, Yale Univ. Press, 1917), p. 22.

5. Ibid.

6. Long, Edward, The history of Jamaica (London, T. Lowndes, 1744), v. 2, p. 186.

7. Ibid.

8. Sturge, Joseph, and Thomas Harvey, The West Indies in 1837 (London, Hamilton, Adams, and Co., 1838).

9. Schomburgk, Robert H., History of Barbados (London, Longmans, Brown, Green and Longmans, 1848), p. 669.

10. Oldmixon, John, The British Empire in America (London, 1741), p. 123.

11. Edwards, Bryan, History of the West Indies, v. 2 (London, 1794), p. 396.

12. Ibid.

13. Schomburgk, op. cit., p. 163.

14. Ibid.

15. Price, op. cit., p. 1370.

16. Southey, Robert, The history of Brazil (London, 1817-22) v. 3, p. 784.

17. Dutertre, R. P. Jean-Baptiste, Histoire generale des Antilles habitee par les Francois (Paris, Thomas Iolly, 1667) v. 2, p. 484, as quoted by Price, op. cit., p. 1368.

18. Barclay, Alexander, A Practical View of the Present State of Slavery in the West Indies (London, 1827), as quoted by Gordon Merrill, The Historical Geography of St. Kitts and Nevis in the West Indies.

19. F.A.O. Report on the fisheries industry in the countries served by the Caribbean Commission (Rome, FAO, 1958);. 18. Report based on work of Georges C. Salmon, Fisheries Expert.

20. Price, op. cit., p. 1379.

21. Brown, Herbert H., The fisheries of the Windward and Leeward Islands (Bridgetown, Barbados, Advocate Co., 1942), p. 17. Development and Welfare in the West Indies, Bull. no. 20.

22. Comitas, Lambros, Fishermen and Cooperation in rural Jamaica. (Unpubl. Ph.D. thesis, Columbia University, 1962.)

23. Great Britain. West India Royal Commission. Report on agriculture, fisheries, forestry, and veterinary matters. Cm. 6608 (London, H.M.S.O., 1945), p. 183.

24. Ibid.

25. Ibid.

Chapter III

THE FIRST SURVEYS

The United States' involvement in World War II began well before she became one of the belligerents in December, 1941. Earlier in that same year an agreement was reached with Great Britain for the establishment of U.S. military bases in some of the British islands in the Caribbean. The immediate result was a decline in the level of local fisheries production wherever these bases were established since the fishermen were attracted to the higher pay that was offered. In Trinidad, a "social problem of some magnitude"[1] was created when a naval base displaced a large number of fishermen from the highly productive waters of the northwest peninsula, particularly around Chaguaramas Bay. This initiated a seasonal movement of "squatters" on the southwest peninsula, at Cedros, during the fishing season who established temporary fishing communities serviced by no sanitary or storage facilities whatever.

In 1942 the American government, concerned by the overall food shortage in the Caribbean area occasioned by the war, arranged with the U.S. Fish and Wildlife Service to conduct a survey of the Caribbean fisheries and fishery resources "to determine where possibilities for increased production of fishery products existed."[2] The British had established already a field office in Barbados for this purpose. Under the provisions of the Colonial Development and Welfare Act (CDW), passed by Parliament in 1940, £ 8,070 had been allocated immediately "for appointment of a fishing expert for the purposes of a survey, and finance for investigation."[3] At the instance of the Anglo-American Caribbean Commission, a joint effort was undertaken by the United States and Great Britain for the investigation of the Eastern group of the British West Indies.

The Caribbean Fishery Mission of 1942 thus began as a joint enterprise. Herbert H. Brown, Director of Fisheries Investigation, was the British Colonial office representative, and the entire survey party was under the direction of Reginald H. Fielder of the U.S. Fish and Wildlife Service. The group began its tour on April 24, 1942, at St. John's, Antigua, and made a brief three-week survey of the Leeward and Windward

Islands, Barbados, and Trinidad. At the end of this part of the study, Dr. Brown left the party which was to continue its work in studying the fisheries of the entire Caribbean area.[4] A preliminary report for the Eastern Caribbean was submitted immediately, in May. A month later he published a detailed study of the Barbados fisheries.[5]

The findings of the mission and of Dr. Brown, and the recommendations which it made concerning them, were attuned first of all to emergency wartime conditions. Chief among these was the growing shortage of food. The supply of available fish, both imported and locally produced, had been cut in half since the beginning of the war. In fact, "an entire cessation of local production"[6] was feared. Shortage of gear replacements, the attraction of fishermen to the more remunerative work at military bases and related activities, interruption of usual transport routes, and inflationary pressures were all mentioned as factors which threatened to virtually eliminate the fishing industry. The decline of the industry could be countered, the mission asserted, by providing gear to the fishermen, and by controlling prices to provide a greater incentive. In addition, a long range development and management program should be instituted by Colonial governments for "a) collection of adequate fisheries statistics, b) stimulation of production, c) adequate conservation measures, and d) elimination of uneconomic and unhygenic marketing practices."[7] In conclusion, the report recommended that "every possible means of increasing the supply of locally produced foods, and particularly of animal protein"[8] be undertaken:

> The demand for such food is not now satisfied and cannot be satisfied by local initiative alone. For this reason, it is essential that the fisheries...be stimulated by the governments concerned.[9]

Brown's report on Barbados repeated his general finding as given in the Preliminary Report, parts of which are given below. In addition, his report gave a detailed descriptive account of the industry which will be discussed more fully in the chapter on Barbados. The following gives some of the basic findings of the mission for selected islands: Barbados-

> Fish is a staple article of diet for all classes in Barbados, and imported salt fish has been the basic protein food of the labouring classes.

> There has not yet been a reduction in the supply of fresh fish because of war emergency conditions, but shortages of supply of fishing gear will make themselves felt in the near future.
>
> The present fishing fleet is capable of producing more fish...
>
> Experimental fishing operations should be undertaken for the development of new techniques and application of methods not now in use;[10]

Trinidad-

> The supply of fresh fish in Trinidad has been more seriously affected by war-emergency activities than that of any other of the British West Indies of the Eastern Group. The fishery industry has been disrupted by (a) the loss of fishermen to more remunerative work, (b) the inclusion of the principal areas within military reservations, and (c) the closure of several sea and land routes by which fish are normally carried to market.[11]

St. Vincent-

> The scarcity of fish has not approached an acute condition in St. Vincent,...
>
> Since St. Vincent is primarily an agricultural community, the number of regular fishermen is relatively small,... The amount of available fishing bottom around St. Vincent proper is small,... Therefore, no considerable expansion of the fisheries...may be expected.[12]

...

In August, 1942, three months after the Barbados report, Brown published his second important study, The Sea Fisheries of Trinidad and Tobago.[13] The food shortage in Trinidad was serious. "It is important," he wrote, "that every local source of food should be utilized to contribute to the relief of the situation."[14] His most urgent recommendations were: 1) the creation of an Anglo-American Fisheries Commission to execute immediate fisheries research in the West Indies, and 2) the immediate acquisition of a fishing vessel "of the type known as Pacific Coast purse seiner"[15] to undertake commercial exploratory fishing operations and to provide practical demonstration. He also emphasized the need to resettle the great number of displaced fishermen from the Northwest peninsula.

The first recommendation made to the Caribbean Commission was adopted accordingly, and arrangements were made with the U.S. Fish and

Wildlife Service to obtain the needed vessel to commence the survey. The United States detailed fishery engineer, Richard T. Whiteleather, to the project, and provided a purse seiner (Appendix I). The government of Great Britain, in addition to the services of Dr. Brown, provided funds for the purchasing of the bulk of the fishing equipment as well as all other operating expenses. A crew of West Indian fishermen was engaged, the plan being to work over "well known grounds and also in more remote areas seldom resorted to by local fishermen, in order to establish information on the efficiency of the gear in tropical fisheries."[16]

The project met with only limited success due to a variety of reasons: the late arrival of fishing gear (delayed because of wartime transport problems), the necessity of going into dry-dock for cleaning and repairs, and the delays caused by the need for training an inexperienced crew in the use of unfamiliar equipment. Wartime regulations and navigational restrictions completed the list of obstacles encountered. After nine months, in November, 1944, the survey came to an inconclusive end, the results being published as An Experimental Fishery Survey in Trinidad, Tobago, and British Guiana.[17]

The remarkable Dr. Brown continued his investigations in 1945 with a detailed study of the fisheries of the Windward and Leeward Islands.[18] This study, delayed from earlier completion by the period of German submarine activity in the Caribbean area, was based on a four month study, from May until September:

> In every larger island, travelling by road or sea, all leeward coast villages were visited as well as a number of windward coast villages, and as many fishermen as possible were interviewed.[19]

A survey of Jamaica and its former dependencies, neglected in the first general survey of 1942, was undertaken in 1943 with the appointment of Ernest Thompson as Fisheries Officer for the Western Caribbean. As with the other British islands, fishing here existed only on a peasant level. The industry had been under the supervision of a private angling club since 1933. This organization had confined its activities to patrols in order to prevent the use of dynamite or poisons by local fishermen. Dr. Thompson believed that exploitation of marine sea resources on the continental shelf of Jamaica had already been carried

to the limit, with expansion possible only by the exploitation of migratory pelagic species. Even in this last direction, he "was unable to record any evidence for optimism..."[20]

The Anglo-American Caribbean Commission, with the assistance of Dr. Thompson and others, including the U.S. Fish and Wildlife Service, added one other survey with the publication in 1945 of Guide to Commercial Shark Fishing in the Caribbean Area.[21] By the end of the year it could be said that "Dr. Brown and Dr. Thompson had between them examined and reported on the fisheries of every part of the British West Indies."[22]

One of the more difficult tasks of the Caribbean Fishery Mission was the making of a numerical assessment of the industry in terms of men, craft, and equipment used. Although such a count was made, it was obviously impossible to do other than rely on available official records. There were, consequently, substantial discrepancies between units enumerated in the mission's reports and the more thoroughgoing reports published later. Nonetheless it is possible to combine these as sources for the following chart describing the approximate conditions of the fishery industries between 1940 and 1945. A more graphic picture of the situation was described by Brown:

> The economic condition of fishermen has probably not improved during the war emergency anywhere in the area. (Author's emphasis) The price of fish, although higher than before the war, is controlled; the cost of living has risen by anything from 60 to 80 points; and the price of fishing gear, although subject to standard mark-up, has increased very considerably due to marked increases in landed costs of imported fishing materials. The incentive, therefore, for fishermen to increase production, or even to continue to pursue their calling, is certainly no greater than it was before the war and is probably in many cases less. Not until the fisherman's economic position is bettered will he be in any position to increase production by investing in new boats or where necessary...by extending his operations further afield.[23]

Table III

	Types of Fishing Boats	No.	Fishermen	Pots	Seines
Trinidad-Tobago	Motorized Pirogues	400	2,100	10,000	10
	Unmotorized Pirogues	200			
	Sail-boats	371			
Barbados	Canoes	11	1,200	1,500	10
	Row-boats	165			
Grenada	Whaler-type Sail-boats	11	640	400	16
	Open Sail/Row-boats	178			
St. Vincent	Miscellaneous	285	897	150	42
St. Lucia	22'-30' Canoes	205	1,736	500	20
	19'-24' Canoes	363			
Dominica	8'+ Canoes	464	2,119	400	30
	18' Canoes	535			
Antigua	Open Motor-boats	4	496	3,000	3
	Row-boats & Skiffs	177			
St. Kitts-Nevis Anguilla	Miscellaneous	370	1,021	3,000	8
Montserrat	Miscellaneous	69	285	1,000	12

Fishery Industries Operating Units: 1940-44 approximately. (Source: 1942 Anglo-American Caribbean Fishery Mission; H. H. Brown, Fisheries of the Windward & Leeward Islands.

Note: The earliest numerical assessment of Jamaica available (1955) suggests an estimated 5,000 to 9,000 fishermen. The number of canoes is not given, nor is it likely that a reliable estimate can be made for early forties.

NOTES

1. Hickling, C. F., The fisheries of the British West Indies, report of a visit in 1949 (Bridgetown, Barbados, Cole's Printery, 1949), p. 11.

2. U.S. Fish and Wildlife Service. The fisheries and fishery resources of the Caribbean area (Washington, D.C., 1947), p. 1.

3. Great Britain. Development and Welfare in the West Indies, 1940-42, Colonial, no. 184 (London, H.M.S.O., 1943), p. 42.

4. The survey was not originally planned to include the British West Indies. This was done at the request of the Anglo-American Caribbean Commission.

5. Brown, Herbert H., The sea fisheries of Barbados (Bridgetown, Barbados, 1942). Development and Welfare in the West Indies, Bull. no., 1.

6. U.S. Fish and Wildlife Service, op. cit., p. 199.

7. Ibid.

8. Ibid.

9. Ibid.

10. Ibid., p. 210.

11. Ibid., p. 207.

12. Ibid.

13. Brown, Herbert H., The sea fisheries of Trinidad and Tobago (Bridgetown, Barbados, Advocate Printing Co., Ltd., 1942), p. 1. Development and Welfare in the West Indies, Bull. no., 2.

14. Ibid.

15. Ibid., p. 5.

16. Caribbean Commission. An experimental fishery survey of Trinidad, Tobago and British Guiana (Washington, D.C., G.P.O., 1945), p. 3.

17. Ibid.

18. Brown, Herbert H., The fisheries of the Windward and Leeward Islands (Bridgetown, Barbados, Advocate Co., 1942). Development and Welfare in the West Indies, Bull. no. 20.

19. Ibid., p. 66.

20. Great Britain. Colonial development and welfare in the West Indies, 1943-44 (London, H.M.S.O., 1944), p. 37.

21. Caribbean Commission. Guide to commercial shark fishing in the Caribbean area (Washington, D.C., Anglo-American Caribbean Organization, 1945).

22. Great Britain. Colonial development and welfare, 1945-46. (London, H.M.S.O., 1946), p. 82.

23. Brown, H. H., The fisheries of the Windward, op. cit., p. 44.

Chapter IV

THE PROBLEM OF PRODUCTIVITY IN TROPICAL FISHERIES

The question of the relative productivity of tropical seas as opposed to colder waters of higher latitudes is not yet settled.[1] There has been little serious dispute, however, with the findings of the 1942 Caribbean Fishery Mission's conclusion that the possibilities of developing marine fisheries are distinctly limited.[2] Certainly the expressed hope of the Anglo-American Caribbean Commission that it might be possible to locate within the Caribbean Sea new fishing grounds that would prove to be a "new Grand Banks"[3] was unrealistic. The characteristics of the sea itself determine whether or not it can be used by man to successfully establish extractive industries utilizing marine fauna, flora, or even chemicals. The results of the mission's studies led them to the sober conclusion "the Caribbean is not generally rich in fishery resources."[4]

The basic food supply of the sea is phytoplankton which synthesizes organic nutrients from chemicals supplied to it by processes which continually replenish the euphotic zone, usually from lower layers. Sufficient light energy for photosynthesis penetrates only a relatively shallow layer. It is therefore necessary that some means of regular recruitment of nutrient salts from lower depths be present in order for the primary plant life to flourish. A series of life chains is thus initiated, beginning next with zooplankton who are, in turn, eaten by more active carnivorous forms.

There are several means by which nutrient salts are brought into the surface waters: 1) upwelling, 2) seasonal overturn and vertical mixing, 3) oceans currents, and 4) river outwash. For the area with which we are concerned the first two methods are automatically ruled out. The Caribbean Sea lies approximately between 8° and 24° north latitude. The prevailing winds are therefore easterly and thus onshore, excluding the development of significant upwelling.[5] Seasonal overturn, caused by severe cooling of surface waters is also absent in tropical waters. We must therefore look to ocean currents and river outwash as the means by which nutrients are supplied to the Caribbean waters. First, however, it will be worthwhile to briefly describe the physical geography of the Caribbean Sea.

The Caribbean Sea contains about 800,000 square nautical miles. Its greatest east-west extent is approximately 160 miles, and varies in width (north-south) from 400 to 800 miles. The sea is itself divided into two great natural basins, the eastern Caribbean Sea, and to the west, the Cayman Sea, separated from the Caribbean proper by the Jamaica rise, manifested by a series of banks and cays. On the east the Caribbean is separated from the greater depths of the Atlantic by the Antillean arc which continues as a submarine ridge between the islands.

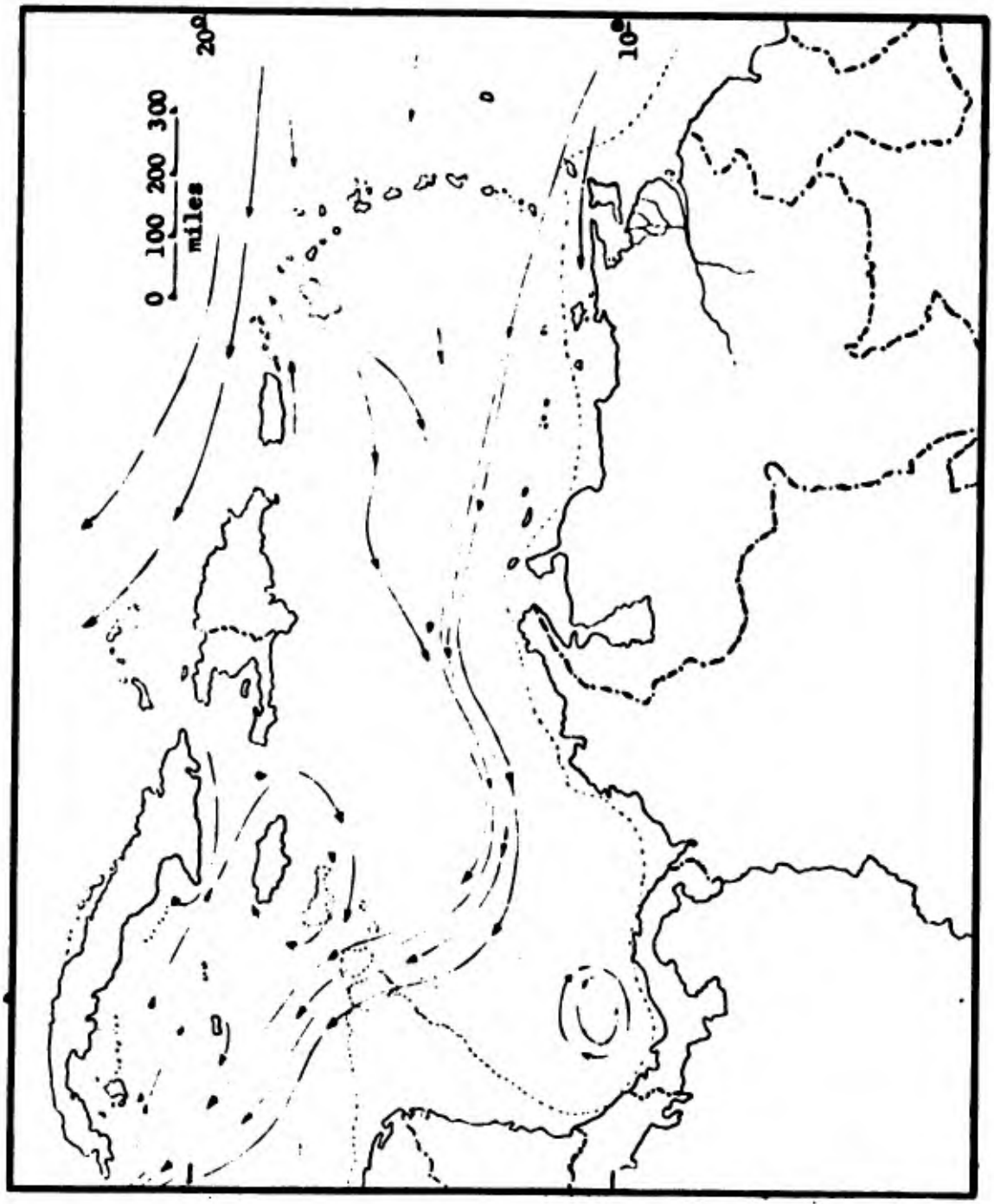
The waters of the Caribbean originate mainly in the North and South Equatorial Currents flowing eastward across the Atlantic. During this long and steady flow there is no replenishment of the nutrients as dead animal and plant tissue gradually drop out of the upper layers. As a result, most of the water which does enter the Caribbean, chiefly from the north equatorial current, is minerally impoverished. However, as part of the south current passes along the Brazilian and Guiana coasts, effluent from the rivers pouring off of the South American continent, the Amazon and Orinoco in particular, add a certain quantity of land derived minerals to the current. This explains, at least in part, the greater productivity of the waters flowing through the Serpent's Mouth (the narrows between Venezuela and the southwestern tip of Trinidad) into the shallow Gulf of Paria. Other streams enter the Gulf of Paria directly, and its bright green color in places indicates a rich supply of phytoplankton. Warren Rathjen, a fisheries expert presently with the F.A.O. Caribbean Fisheries Development Project, attests to the striking color and apparent abundance of marine life.[6] The main part of the current enters the Caribbean too far north to benefit by any recharging effect of the continental drainage of South America. Even these transient benefits are lost by the time the currents reach the central Caribbean Sea.

There is, however, at least one other factor influencing productivity in the southern part of the Caribbean. Although the waters which enter from the Atlantic are relatively shallow (from 300 to 1000 fathoms), layering does occur, with the cool, dense, and nutrient-rich lower layer beneath the surface waters. The peculiar physics of fluid motion with respect to adjacent currents of uneven density (related to the Coriolis

effect) cause the layers to slope upwards from north to south. The result is that the boundary between the two zones emerges in the southern Caribbean off the coast of Venezuela, thus bringing mineral-rich, and potentially more productive waters to the surface there.

Even where sufficient nutrient material is available, the most productive waters of the world are generally limited to the shallow areas within the 100 fathom curve, the zone with the greatest abundance of organisms upon which the fish feed. Map I shows the shallow waters of the Caribbean adjacent to the islands of the British West Indies. It is evident that most of these islands are significantly lacking in exploitable waters of this nature.

Map II



Generalized pattern of surface and near surface currents in the Caribbean Sea. (After Parr/White-leather & Brown)

NOTES

1. "Sea water fertility," McGraw-Hill Encyclopedia of Science and Technology, XII (1960), p. 118-122.

2. U.S. Fish and Wildlife Service, The fisheries and fishery resources of the Caribbean area (Washington, D.C., 1947), p. 58.

3. Caribbean Commission. Caribbean cooperation, a series of articles by A. D. Emmart (Washington, D.C., Publ. by Anglo-American Caribbean Commission, 1943).

4. U.S. Fish and Wildlife Service, op. cit., p. 50.

5. But note that upwelling has been described off the coast of British Honduras by Donald E. Vermeer in his study, The Cays of British Honduras (Office of Naval Research, Contract 222(11) Nr 388 067), Dept. of Geography, Univ. of California, Berkeley, 1959, p. 121.

Chapter V

COLONIAL DEVELOPMENT AND WELFARE

The Royal Commission of 1938-39, under the chairmanship of Lord Moyne, revealed conditions so serious in the British West Indies as to warrant the establishment of a special organization to deal with the entire welfare problem of these islands. Pursuant upon a recommendation to this effect by the commission, Parliament passed in 1940 the Colonial Development and Welfare Act by which "the Secretary of State (for the colonies) is authorized to make schemes for any purpose likely to promote the development of the resources of any colony or the welfare of its people." Britain was at war, and chose to release only a preliminary report of the commission's findings lest it be used by the Germans for propaganda purposes. The new organization, CD&W, felt obliged however to at least act a little more boldly since it was being said, especially by local politicians in the West Indies, that suppression of the report was primarily to mislead West Indians. In any event, a statement of policy was issued which read in part:

> It has been assumed in some quarters that action on the recommendations (of the Moyne Commission) would be postponed until after the war, but the Government propose no such delay..., ...the Government propose at once to provide a special sum of £ 350,000 for such schemes as can be begun immediately in certain of these colonies.
>
> They propose to introduce legislation to replace the Colonial Development Fund, which is limited to a maximum of £ 1,000,000 a year...providing for assistance to colonial governments up to as much as £ 5,000,000 a year for ten years.[1]

A comptroller for Development and Welfare in the British West Indies was established with offices in Barbados. His recommendations were advisory only. It was up to each government to draw up and submit its own development schemes. We have already seen how CD&W funds were employed by the Home Office to underwrite the costs of surveys by Dr. Brown. We have also seen that the desirability, if not the urgency, of developing the fisheries seemed to be fully accepted. Yet the report of the Caribbean Commission's fisheries expert, Georges C. Salmon, after a year's investigation of Caribbean fisheries in 1958, would lead one to believe that things had changed little in the intervening years. His words differ little from those of others the early and mid-forties:

> The existence of a large number of comparatively unskilled fishermen, the consumption of fish immediately on landing, the virtual absence of distribution facilities inland and the almost complete lack of any method of ensuring a steady supply (thus enabling housewives to buy fish when they want), all combine to give the impression that there is no fish, because it can only be bought at the very moment when the fishermen arrive back from sea.[2]

What had happened to the fisheries under CD&W? Let us list some of the developments for the decade following the completion of Brown and Thompson's surveys.

Barbados

1944 - Appointment of Fishery Officer...responsible for general supervision of fisheries work...including loans to fishermen to improve boats and gear.

1945 - Grant approved to enable Fisheries Officer to visit United Kingdom in order to undergo a special course in training and fishery work.

1945 - Grant for construction of fish market in Bridgetown.

1947 - Grant to send Fishery Officer to United Kingdom for further study; Fishery Officer also visited Norway for practical work in fisheries.

1947 - Acceptance of recommendations by Barbados Fishery Officer for construction of research vessel modelled on Norwegian lines.

1947 - Grant for construction of fish market at Oistins.

Trinidad and Tobago

1945 - Introduction of carp fingerlings for experiments in fresh water ponds.

Note: In 1953 the Trinidad-Tobago colonial report states--"the industry (fishing) is financed almost entirely by private enterprise. Boats and gear are owned by small traders and fish dealers.... The fishermen themselves own few boats and are employed on a share basis. ...the year was devoted more to taking stock of position and formulating policy than to actual development."[3]

Jamaica

1949 - Creation of a Fishery Division in the Forestry Department, with appointment of Fishery Officer. Fishery Officer sent to Africa and Far East to study fresh water fish culture. Grant to establish experimental pools for fresh water fish.

1954 - Post of Fisheries Advisor created by government.

(The Kingston Daily Gleaner of December 18, 1950 noted upon the anniversary of the establishment of the Fisheries Department that "the creation of this organization arose from sheer economic necessity, occasioned by the heavy dollar drain to pay for imports of codfish."[4])

St. Vincent

1945 - Grant approved for appointment of Jr. Fishery Officer.

1945 - Grant approved to assist expansion of shark and blackfishing at Barouallie.

1951 - Grant approved for pilot scheme to improve blackfish industry.

Antigua

1950 - Introduction of fresh water fish. Appointment of Fishery Officer.

1953 - Approval of scheme to develop flying fish industry.

St. Lucia

1945 - Grant approved for appointment of Fisheries Officer.

1953 - Grant approved to effect improvements in lobster pond.

1954 - "Small grant" approved for maintenance of fish farm.

Dominica

1950 - Introduction of fresh water fish.

Grenada

1952 - Scheme approved for development of fisheries in Grenada.

General

1949 - Visit to the islands by C. F. Hickling, Colonial Fisheries officer. Hickling noted that the "possibilities of pond culture...(were) particularly attractive," requiring "a relatively small capital outlay for substantial and quick return."[5]

1954 - Dr. Hickling visits islands again. Issued reports which "have proved of great assistance to governments in drawing up their plans for fisheries development in the next five-year development period."[6]

It is more than apparent that fisheries development, with the one exception of Barbados, was being almost totally neglected. That the fisheries development program had failed in its major purpose of supplying fresh fish in place of imported preserved fish is well indicated by the fact that by 1950[7] the imports of preserved fish into the British West Indies had regained their 1939 pre-war high (see Table II), and by 1958 imports had exceeded this amount by a small percentage.[8] What is the reason for this neglect?

During the war years it was to be expected that funds would be in short supply for development schemes. This might explain the minimal development during those years. The average CD&W expenditure for

fisheries development in all of the British West Indies between 1940 and 1946 was less than one half of one percent of expenditure for all schemes.[9] Yet for the 1946 to 1956 period there was almost no change in this amount rising from .41 to .45 percent. At the same time the development in Barbados accelerated, while other islands stagnated. As mentioned earlier, the CD&W comptroller's powers were only advisory. As for the Secretary of State for the Colonies, his position was set forth in the following dispatch:

> In determining the territorial allocations the main consideration to which I have had regard has, of course, been the relative financial needs of the various territories. I have carefully considered these needs and have taken account of factors such as the physical capacity of said territory to carry out development, its ability to bear the residual recurrent charges, and the finances which, by the full mobilization of all local resources and the utilization of all other external sources, each government can reasonably be expected to have over the next five years. I have also taken into account the unspent balance which each territory will have of its previous allocation. I am satisfied that the allocations made represent the most equitable distribution of the funds provided by the new Act.[10]

Table IV indicates first and foremost the vast discrepancies per capita of CD&W expenditures for the various colonies. It seems to correspond to little except individual interests on the part of the different colonial governments. Most striking is the low figure for Trinidad & Tobago, whose government was even operating at a deficit at the end of the 1946-56 period. The CD&W grants were, of course, available ostensibly without prejudice to any colony, according to their needs, as well as the presumed soundness of their schemes.

Edwina Clarke, in her analysis of CD&W fund allocations, points out that the grants and loans were not fully expended, but that there was in fact an extremely high rate of underspending of funds.[11] That is, grants were frequently made but not completely used. Considering the incredibly impoverished state of the West Indian people, especially with a view to the findings of the Moyne Commission, such a situation seems almost incredible. Yet underspending was clearly one of the salient features of the CD&W program in the West Indies. Between 1940 and 1946, forty-nine percent of allocated funds were unspent. This could well have been attributed to the effects of the war. Between 1946 and 1956, underspending averaged only twenty-four percent, still a very large figure. This is attributable, according to Miss Clarke,

largely to the lack of trained personnel. It was impossible to carry out many schemes, no matter how worthy or sound in their conception, simply because there were no trained people to carry them out:

> The underspending that has existed in the Caribbean area proves that the advancing of capital to a country is not a sufficient condition for development.[12]

One can hardly disagree with this conclusion, but the colonial status of the islands must certainly be considered as being basic to its difficulties. With respect to the problem at hand, lack of trained personnel hardly seems to weigh heavily. It is recalled that the Fisheries Officer in Barbados was sent abroad twice in the immediate post-war period for special training, and, as we shall see, the Barbados fisheries were developed continuously and rapidly. Inasmuch as development funds were available with few restrictions, one is inclined to look for political differences in the structures of the different territories as the reason for the very different handling of the program. It is worth noting that two years before the establishment of a special fisheries division in Barbados with the help of CD&W funds, the local government initiated its own loan scheme designed to rehabilitate the fishing industry. We note on the other hand, however, that Trinidad made little use of the welfare funds, while other islands, such as Jamaica and St. Lucia availed themselves of substantial amounts. The pre-war political and social ferment in the islands had become even more intense after the war. The changes which it was to bring about significantly affected fisheries development as well.

Table IV

Colonial Development and Welfare Grants and Loans
(£ 1000 sterling)

April 1946 to March 1957	Grants	Loans	Research Grants	Total	£ L. sterling Per Capita
Jamaica	6,747	293	128	7,169	4.5
Trinidad-Tobago	563	nil	240	803	1.
Barbados	1,335	1,335	11	1,346	6.
Grenada	858	nil	1	859	9.5
St. Vincent	831	29	1	861	11.
St. Lucia	2,191	26	nil	2,217	25.
Dominica	511	nil	10	521	8.
Antigua	1,147	33	nil	1,180	34.
St. Kitts-Nevis-Anguilla	318	7	nil	325	6.
Montserrat	272	nil	nil	272	19.5

Information courtesy Central Office of Information, London.

NOTES

1. Great Britain. Colonial Development and Welfare Act, Cmd. 6427. (London, H.M.S.O., 1941), p. 10.

2. F.A.O. Report on the fisheries industry in the countries served by the Caribbean Commission. (Rome, FAO, 1958), p. 10. Report based on the work of Georges C. Salmon, Fisheries Expert.

3. Great Britain. Trinidad and Tobago colonial report, 1953 (London, H.M.S.O., 1954), p. 59.

4. Daily Gleaner (Jamaica), December 18, 1950.

5. Hickling, C. F., The fisheries of the British West Indies, report of a visit in 1949 (Bridgetown, Barbados, Cole's Printer, 1949, 1949), Development and Welfare in the West Indies, Bull. no. 29.

6. Great Britain. Colonial development and welfare, 1954 (London, H.M.S.O., 1955), p. 47.

7. Caribbean Commission. Fisheries in the Caribbean, report of the fisheries conference held at Kent House, Trinidad, 1952 (Port-of-Spain, Trinidad, Kent House, 1952).

8. Ibid.

9. Clarke, Edwina M., Colonial development and welfare funds in the Caribbean (Unpubl. M.S. thesis, University of London, 1960), p. 43.

10. Great Britain. Dispatch from the Secretary of State for the colonies to the colonial governments, April 26, 1955. Cmd. 9462 (London, H.M.S.O., 1955).

11. Clarke, op. cit., p. 135.

12. Ibid., p. 137.

Chapter VI

THE NEED FOR FISHERIES RESEARCH

Before Dr. Herbert Brown returned to the United Kingdom in 1945, he pointed out the need for continued fisheries research. This was to be something more than the surveys and inventories, important as they were, which had been carried out earlier. "If the fullest use is to be made of the potential resources of the British West Indies, research will be necessary,"[1] he wrote. He proceeded to indicate the important areas of study: pelagic fish populations, fish-catching techniques, marketing, distribution, preservation of gear in tropical climates, and even fresh water fishery management. Anticipating the increased availability of money and trained technicians with the end of the war, he went on to suggest:

> At a later stage, if fuller research facilities and staff become available, fundamental research should be undertaken, in marine biology to ascertain the overall productivity of the Caribbean Seas, the productivity in different ecological environments, and the fluctuations in abundance and migrations of dominant species of food fish; and in oceanography to examine the factors which underlie the frequency and abundance of good fish.
>
> It is therefore hoped that a Fishery Research Institute will be established in the south-east Caribbean to undertake, in the first place, a programme of development research in the marine fisheries, and in the fresh water fisheries to investigate the management of the natural and artificial water systems and pond culture. ... This Institute should be sited in Trinidad, where a greater variety of marine environments are available than perhaps in any other Caribbean Colony,...[2]

When the Colonial Fisheries Adviser, Dr. Hickling, visited the West Indies four years later, no work or planning had been undertaken for any research development. He reiterated the need for a research station and expressed agreement that the facility should be located in Trinidad, but he rejected the proposed Maracas Bay site despite its relative seclusion and superior location for making shore-based observations. Hickling preferred a laboratory and research vessel at Port-of-Spain, facing the Gulf of Paria. In any event neither of these ideas bore fruit. The first British West Indian marine research

station of this kind was to be established in Barbados in 1954 by Commander C. W. Bellairs.

First Caribbean Fisheries Conference

Mention has been made earlier (see Chapter V) of the comparatively greater progress of the fisheries of Barbados. The Barbados development program, though not intended as such, thus became, de facto, a broad pilot research project. Funds had been allocated for the construction of a research vessel as well as for a research project on flying fish. A loan scheme for the improvement of Barbados fishing boats, initiated as early as 1942, also led the way in this area of development, concerning which one investigator wrote, "The progress made by Barbados should be held up as an example throughout the Caribbean."[3] When, therefore, the Caribbean Commission convened the first Fisheries Conference in Trinidad, 1952,[4] the Director was able to present two important papers, Government Assistance in the Development of the Fishing Industry of Barbados,[5] and Flying Fish Research in Barbados.[6] His reputation had quite preceded him, and he was chosen conference chairman.

Another important research paper was presented to the conference by Richard T. Whiteleather of the U. S. Fish and Wildlife Service, who had participated, it will be remembered, in the earlier surveys of the Caribbean. In his paper, The Application of Recent Technical Knowledge to Exploration and Development of New Fisheries,[7] the stress was placed on the lack of research in the locating of migratory pelagic species passing through the impoverished Caribbean waters:

> Although several expeditions have studied the oceanography of the Caribbean and their results may furnish clues as to its productivity, there has been little done in the way of actual offshore fisheries exploration... Time itself, in the manner of progress during the past decade, has brought forth new instruments, new facts, new ideas, and new methods of fishing which can be adapted to deep sea exploration to make such work a great deal more accurate and effective.[8]

He was referring to the possibilities opened up by new electronic developments, particularly sonar and radar.

Another subject of potential importance in fisheries research was dealt with by the conference: an expanded aid program. In 1944 the

West Indian Conference (periodic meetings of West Indian political leaders under the auspices of the Caribbean Commission), first session, recommended that "the Fishery Experiment Station at Mayaguez, Puerto Rico, be the center for technological research and information services for the Caribbean area, and for biological research relevant to its own area."[9] It recommended further "the establishment of a Fishery Research Institute in the British West Indies."[10] Two years later, in 1946, the U. S. Fish and Wildlife Service closed down its operation at Mayaguez, leaving no available alternative research facility. The conference recommended, therefore, that the Caribbean Commission request funds:

> to undertake fisheries exploration in Caribbean offshore waters, in view of the recent developments and new biological and oceanographic knowledge concerning ocean waters. The Commission should investigate the possibility of sponsoring this work of exploration through combined efforts of the Caribbean Territorial governments; the Mutual Security Administration of the United States; the Expanded technical assistance program of the Food and Agricultural Organization of the U. N.; the Development and Welfare Organization of the United Kingdom; the Monnet Plan of the Republic of France; the Welfare Fund for Surinam of the Netherlands; or established private foundations that offer aid in development works.[11]

This was indeed a call for aid from all quarters--except the least expected, a private individual. Ironically enough, within two years, the British West Indies received its marine research laboratory from a local resident, Commander C. W. Bellairs, R.N. "for the purpose of providing...research facilities in marine biology in the tropics."[12]

> It was his intention that such a centre should play a part in the scientific, economic and cultural development of Barbados and the West Indies. Because of Commander Bellairs' own deep interest in the sea and of Barbados' advantageous position as an oceanic island, the initial activities of the institute have been directed primarily towards the Marine Sciences.[13]

The Bellairs Research Institute is administered by McGill University in cooperation with its Geography Department. Its director, Dr. John Lewis, has described the work of the Institute with respect to fisheries development, as well as its limitations:

> The development of improved fishing techniques and the design of new types of gear are more properly the task of the unit Fisheries Officers. The rational planning of any fishery should be on a sound knowledge of the biology of the species concerned and in this the work of the biologist is an important adjunct to the work of the fisheries technologist.[14]

Specifically:

> emphasis has been placed on research in the applied biology of such edible species as flying fish, dolphin, kingfish, and sea urchins.[15]

There was quite naturally close cooperation between the Barbados Fisheries Division and the Bellairs Institute, particularly in studies of the flying fish. But there is no evidence that the Institute has had any substantial effect on fisheries development in the rest of the British West Indies.

Fig. 1. Site of Bellairs Research Institute, St. James, Barbados.

Fig. 2. Bellairs research laboratories building. (J. B. Lewis)

NOTES

1. Brown, Herbert H., The fisheries of the Windward and Leeward Islands (Bridgetown, Barbados, Advocate Co., 1942), p. 64.

2. Ibid.

3. F.A.O., Report on the fisheries industry in the countries served by the Caribbean Commission (Rome, F.A.O., 1958), p. 21. Report based on the work of Georges C. Salmon, Fisheries expert.

4. Caribbean Commission. Fisheries in the Caribbean, report of the fisheries conference held at Kent House, Trinidad, March ... 1952 (Port-of-Spain, Trinidad, Kent House, 1952).

5. Ibid., p. 75.

6. Ibid., p. 93.

7. Ibid., p. 84.

8. Ibid.

9. Ibid., p. 40.

10. Ibid.

11. Ibid.

12. Lewis, John B., "The Bellairs Research Institute," West Indies Fisheries Bulletin, no. 6 (Nov.-Dec., 1959), 6.

13. McGill University, Bellairs Research Institute of McGill University (St. James, Barbados, n.d.) p. 1.

14. Lewis, op. cit., p. 8.

15. McGill University, op. cit., p. 6.

Chapter VII

THE COMING OF FEDERATION

Much had been written on the prospects of the new West Indian Federation, and hopes were revived once more for fisheries development when it was installed in January, 1958. An optimistic note was sounded in an article entitled "West Indies Fishing Industry--Help for Federal Economy,"[1] which surveyed the recent history of West Indies fisheries development. The authors observed that after each of the two visits by the Colonial Fisheries Adviser, record catches of fish were made. No further assistance from the Adviser was received on either occasion! The truth regarding development was later assessed by Gordon Merrill:

> Enthusiasm for the development of the fishery has been revived from time to time, but the thought has never been translated into action. With few exceptions, poor fishermen with poor gear continue to make a poor living from the sea.[2]

The kind of development that had been chiefly resorted to was simply the mechanization of primitive crafts such as the pirogue and the canoe. This was not without its hazards since most of the fishermen were untrained in the maintenance of the new motors which, in turn, frequently proved undependable. There were complaints of "motors shutting off thirty miles from shore,"[3] the operator of the craft having no idea as to how to effect minor repairs or adjustments. In 1956, in fact, one craft simply ran out of gas and drifted for three days before running ashore with one of its two-man crew dead.[4] This was most probably due to navigation problems since West Indian fishermen were not accustomed to taking craft beyond the sight of land. generally ten to fifteen miles at the most. With mechanization, the geographical limit of its operations was determined mainly by time factors, particularly the timing of arrival at the market, and distances were probably less carefully considered though navigation was still roughly determined by some terrestrial point. Even in Barbados, where development had proceeded the furthest, fishermen still do not like to leave sight of land, usually limiting their range to the limit of land observation. This, of course, imposes certain restrictions on development since possible new fishing

grounds go undiscovered or, if discovered, go unexploited. This situation reduces mechanization to a means whereby 1) fishing in already overfished areas is intensified, and 2) old techniques are perpetuated by making them somewhat more productive, at least temporarily. This increase in production then intensifies problems in storage and in distribution. The need eventually arises for a comprehensive program of development which takes into account all aspects of the industry which are affected by changes in any of the others. It was this comprehensive approach above all which marked fisheries development during the brief period of Federation.

The Canadian Aid Program

When the West Indies Federation came into being on January 3, 1958, Lord Hailes, in closing his inaugural address, spoke of "the great Dominion of Canada, to which our growing Federation will never look in vain for encouragement and support."[5] Trade relations between Canada and the British West Indies were of long standing, second only to Great Britain itself in commonwealth trade. It was natural enough, therefore, that Canada should have assumed the particular interest she did in the development of the new nation. There was also quick and unmistakable sympathy and concern beyond the call of international or commonwealth responsibility. In October of 1958 the Canadian Prime Minister, John Diefenbaker, and the West Indies Prime Minister, Grantley Adams, exchanged notes giving formal effect to a statement of principles regarding co-operative economic development of the West Indies.[6] An initial ten million dollar sum, to be allocated over a five year period was proposed "to cover specific schemes and projects, including the terms of service for technical and administrative personnel provided by Canada."[7] Among the many projects undertaken by the Canadian government were a deep water wharf for St. Vincent, an aerial survey of Trinidad and Tobago, and the "major project," undertaken at the Federation's request, of providing two 3,200 ton passenger/cargo ships for inter-island transportation. As for goods and services, the statement of principle reads:

> Goods and services supplied by the Government of Canada to the Government of The West Indies will be designed to strengthen and support The Federation. To that end priority will be given to projects which make the most effective contribution to The Federation as a whole.[8]

Evidently the development of fisheries was considered a vital factor in support of Federation, for one of the first programs underwritten by the Canadian government was technical aid to the fisheries. In August, 1958, Dr. Ernest Hess, a Swiss-born citizen of Canada, was appointed by the government to assume the office of Federal Fisheries Adviser to the West Indies.

Dr. Hess's responsibility was to assist in the promotion and revision of the various fisheries development schemes of the territories. He was also to represent the federal government at international conferences and seminars.

One of the first acts of the new Federal Fisheries Adviser was to initiate publication of a bi-monthly magazine called the "West Indies Fisheries Bulletin." It contained feature articles and news items of interest to the local fishing industry. Many of the most important articles were written by Dr. Hess himself. The first issue appeared in February, 1959. Through this method, and by repeated visits to the different islands, he was quickly able to establish an overall sense of unity and purpose to the Federation's fisheries development program.

1959--Progress and Appraisal

One of the powers of the new federal government was the administration of Colonial Development and Welfare funds. Possessed of a greater sense of local self-determination, the territorial fisheries administrators drew freely on this source to accelerate development, chiefly through boat mechanization schemes. Jamaica, which had begun mechanization in 1956, concentrated at first on expanding the number of motorized canoes. By mid-year she had approximately four-hundred of them, but this was still only between fifteen and twenty percent of the estimated size of the total fishing fleet. Trinidad, without government assistance, continued to mechanize her fleet so that by mid-1959 she had motorized 830 of her 1,500 canoes and pirogues. There were also 126

powered launches. But this preoccupation with mechanization was disturbing, and had distinct limits, as Dr. Hess made clear:

> It must be realized, of course, that the mechanization of dugouts and pirogues does not produce more seaworthy boats as such, does not increase their range of action very much, nor does it enable such boats to carry more gear, more fish or ice boxes.[9]

He emphasized, however, that there still remained the eventual "necessity of introducing larger, even-decked boats, as an integral part of fisheries development."[10] In this respect Barbados had already gone far. In 1955, a hurricane had damaged a great part of her fishing fleet. This disaster initiated a rebuilding program with the opportunity of replacing the older sailing vessels with mechanized launches. By the end of 1959, virtually the entire Barbados fleet, some 450 boats, was mechanized. Dominica, following Barbados' example, and using CD&W funds, built eight mechanized launches during 1959, which it sold to fishermen on a hire-purchase plan.

The increased production of fish which naturally resulted from this mechanization served to emphasize the other development problems that had been neglected, such as storage, transport, and marketing. The perishability of fish, especially in tropical climates, made it urgently necessary to draw up a comprehensive program of development which would take into account not only increased production, but also adequate storage and preservation. "At present," noted one Fisheries Officer, "fish is a food forced in a semi-putrid condition upon a people who cannot afford meat."[11]

The Third Caribbean Fisheries Seminar, which met from July 3-9, 1959, did consider the broad aspects of the development problem. Its recommendation was clear:

> In an area where expansion of the fisheries is practicable, it is normal to find fishing craft to be more or less primitive, and often inefficient in type. It's almost too easy to formulate a programme of rapid improvement and complete mechanization, based upon the concept that all that is needed is highly mechanized boats having every modern improvement. This can create economic disaster and delay the sound, commercial fisheries growth. Improvement of fishing boats, particularly extensive mechanization, is very expensive, compared to the cost of primitive craft in

> any area. It follows, then, that the development of improved fishing craft should have a close relationship to the economic developments in the fishing area. (Emphasis mine) ... Thus, to some extent at least, the development of the fishing boat of a given area must be slightly behind that of the improvement in other factors --market and distribution, fish handling, and storage.[12]

Less than a month afterwards, development pushed ahead on another front. A Fisheries School was formally opened in St. Lucia. Located at Vieux Fort, the school was a self-contained unit with dining room, class rooms, dormitories, engine workshop, and boat-building shop. The training boat, a forty-five foot diesel powered craft, was equipped with an array of modern fishing gear, plus echo sounder and radio telephone. Short courses were given in diesel theory, navigation, theoretical and practical boat-building, carpentry, and principles of marketing. Up until this time St. Lucia fishermen had used the dugout canoe almost exclusively. The F.A.O. (its nearest area office was still located in Mexico City) supplied the services of a technician to advise on fisheries development, particularly in boat design and mechanization. In order to ease the transition from canoe to launch, the students at the St. Lucia training school were shown how to construct modifications of the canoe, including stabilizing outriggers, ice-boxes, and compasses. At the end of the year funds were allocated for the construction of twenty of the new craft for use by the graduates.

With the increase in landings there developed an acute need for a system of keeping accurate records. The collection of statistics had always been a problem, and was never satisfactorily solved. Some of the problems were particularly difficult ones for the fishing industry:

> due to the large number of scattered landing points and markets, the collection of catch and market statistics has proven very difficult and no accurate figures are available for any of the territories. Estimates are in some cases based on the collection of daily market statistics in the major markets, ...the current practice of collecting statistics only during "office" hours or duty hours of the market clerks, which bear no relation, as a rule, to the hours when the fish are actually landed, should be changed. Fishery operations cannot be carried out according to government office hours; neither should the collection of fisheries catch and market statistics.[14]

This, after all, was only the first year of a serious attempt to develop the fisheries. It is difficult to agree with the F.A.O.'s Fisheries Division Director that the development program was "progressive and sound," simply because of increased mechanization. If it tended to be one-sided, it must still be admitted that there was at least an awareness of the broader needs of development. This, however, involved problems of greater scope than the Fisheries Divisions alone were empowered to deal with; transport, storage, marketing and distribution--in sum, the problem of integrating the industry into the economy of the territory. Barbados' relatively advanced state of fisheries development gives us some idea of the kinds of problems that could be anticipated.

Table V

Fresh Fish Production in the British West Indies
1960

	1960 Population	Fishermen		Annual Fish Production (lbs)	
		Total	% of Pop.	Total	Per Fisherman
Antigua	54,354	930	1.7	1,564,000	1,680
Barbados	232,085	1,400	0.6	9,698,000	6,925
Dominica	59,479	1,500	2.5	1,102,000	735
Grenada	88,531	700	0.8	1,763,000	2,520
Jamaica	1,606,546	7,900	0.5	18,293,000	2,315
Montserrat	12,148	120	1.0	110,000	915
St. Kitts-Nevis-Anguilla	56,492	1,000	1.8	1,323,000	1,323
St. Lucia	86,145	2,500	2.9	882,000	355
St. Vincent	80,005	1,000	1.3	1,323,000	1,323
Trinidad & Tobago	825,700	4,500	0.5	15,910,000	3,525
TOTAL	3,101,485	21,550	0.7	51,968,000	2,412

From "Fish Consumption in the West Indies, in relation to production and external trade," West Indies Fisheries Bulletin, No. 2, 1962 (Mar./Apr.), p. 12.

NOTES

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2. Merrill, Gordon, "The survival of the past," in D. Lowenthal, ed., The West Indies Federation (New York, Columbia University Press, 1961), p. 19.

3. Farmers Weekly (Jamaica), October 18, 1958.

4. F.A.O., Report on the fisheries industry in the countries served by the Caribbean Commission (Rome, F.A.O., 1958), p. 21. Report based on the work of Georges C. Salmon, Fisheries Expert.

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6. Canada. Treaty Series, 1958, no. 26. Exchange of notes between Canada and the West Indies, p. 4.

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8. Ibid., p. 6.

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11. Kingsbury, R., Commercial geography of Trinidad and Tobago (Bloomington, Dept. of Geography, Indiana University, 1960), O.N.R. contract Nonr - 908 (13) Nr 388 - 051, p. 16.

12. Caribbean Commission. Report of the third Caribbean fisheries seminar, St. Maarten, Netherlands Antilles, ...1959. (Port-of-Spain, Trinidad, Kent House, 1959), p. 11.

13. West Indies Fisheries Bulletin, no. 6 (Nov.-Dec., 1959), 16.

14. Hess, op. cit., p. 9.

Chapter VIII

BARBADOS

The Preliminary Report of the Anglo-American Fisheries investigation of 1942 describes the Barbados fisheries as follows:

> The dominant fishery is for flying-fish, conducted from small locally built sailboats of an excellent seagoing model. These boats also troll. They average 23 feet in length and six feet in draft, and operate in deep water within five miles of the land. No motors, live wells, or ice boxes are used. Deep hand lines, and fish pots, are important, especially during the hurricane season when the flying fishery is suspended. The fish supply is on a day-to-day basis, with little or no carry over; prices closely following supplies. Fish markets are established at Bridgetown, Oistins, and Speighstown, from which the bulk of the supply is distributed by women hawkers, both in the towns and throughout the countryside. Hawkers also distribute the landings of fish from about 20 open beaches around the island.[1]

At this time it was estimated that local fisheries produced one million pounds of fish annually, only twenty-five percent of all the fish consumed in the island, the other seventy-five percent being imported preserved fish. The critical issue was an imminent food shortage, and the first item listed in the Director's list of urgent recommendations was for the government to "furnish fishermen immediately with (fishing) supplies."[2] The second most important priority was that "support be given to a West Indies fishery development organization."[3] Two years were to pass before the first Fisheries Officer was appointed to one of the islands--Barbados, but sixteen years elapsed before a West Indies fishery program came into being.

1944 - 1954

In April, 1944, Douglas Wiles was appointed as Fisheries Officer in Barbados. Although fish imports into the island had recovered somewhat from their 1942 level (see Table II), production was far from "normal." The 1942 loan scheme, initiated by the Barbados government "with the object of rehabilitating the fishing industry,"[4] was taken over by the new Fisheries Officer as the first step in a program of immediate expansion of the fleet. Although the Fisheries Division was established with

Colonial Development and Welfare funds, the loan scheme itself continued to be financed by the Barbados government, administered through the Peasant's Loan Bank.

To assist the Fisheries Officer, a Fisheries Advisory Committee was appointed under the chairmanship of the Director of Agriculture. In the first year alone, thirty new deep-sea boats were constructed (but fourteen others were lost in accidents at sea), and for the first three years the main activity of the Fisheries Division was the advancing of loans for the construction and repair of boats, not only for the expansion of the fleet, but to offset annual losses which were often considerable.[5] There were, nevertheless, other important improvements undertaken. Heading the list was a new fish market at Bridgetown. One of the important claims of this new structure was that it would improve the collection of fishery statistics. However, only a small percentage of the catch of the entire island passed through the market, and then only between certain hours. The dynamiting of boat channels through coral reefs, and the development of a boat registration scheme (made compulsory in 1947) were two other projects of importance.

Formulation of a comprehensive fishery development scheme was one of the first acts of the Fishery Division after its establishment in 1944. There were seven main sub-areas of development proposed--1) structural improvement of the flying-fish boat, 2) shark fishing, 3) improvement in fishing methods, 4) multiplication of operating units, 5) improvements at beaches, 6) beach rights, and 7) marketing and distribution.[6] This list was later amended as a result of the Director's nine-month training course in fisheries and fishing methods in Great Britain and Norway. In 1947 a programme Report to the Fisheries Advisory Committee listed the following points as important work already in operation or in need of development:[7]

1. The expansion of the fishing fleet.
2. The registration of the fishing fleet and fishermen.
3. The establishment of a fishery experimental station in the metropolitan area.
4. Marketing developments.
5. Collection of statistics.
6. Establishment of beach rights for fisherfolk.

7. Improving roads and paths to certain of the above areas.
8. Improving of conditions at certain landing beaches.
9. Removal of customs duty on certain fishing gear.
10. Establishment of proper cold storage.
11. Establishment of co-operation with a view to
    i. co-operative marketing.
    ii. co-operative buying.
    iii. co-operative insurance for boats.

The plan to establish a fishery experiment station obviously grew out of the Director's experience during his stay abroad. The experimental program included the construction of a research vessel according to plans he had brought back with him from Norway, and for the setting up of a research facility.

Work on the research vessel began in July, 1948 but did not reach launching stage until October, 1949. Two months later it went to sea to begin fishery research. The launching of the research vessel, called "Investigator," coincided with the beginning of the flying fish season. So, from launching until the end of the season (July, 1950) it was engaged in experimental work in new methods of catching flying fish. Although the new vessel was capable of considerable range, the research project was confined to the five to seven mile limit of the sailboats. It was during this project that a small gill-net was developed that proved vastly superior to the usual method of catching these fish by using floating bait and a dip-net, or just hook and line.

For two years, then, from July 1948 until July 1950, the major development activity in Barbados centered around marine research with the "Investigator." Meanwhile, the experimental station project seems to have been neglected. It was not until 1954, when Commander Bellairs donated part of his own seaside residence on the West Coast, eight miles North of Bridgetown, that a marine laboratory was built in Barbados.

Meanwhile, other developments were not neglected. By the end of 1950, a total of 994 fishing boats had been registered, the construction of a new fish market in Oistins was completed, and a tractor with a Hyster winch was permanently located at Bathsheba for hauling up the boats, ending this laborious toil for fishermen at the end of a long day. The importance of the development of the gill-net for taking flying fish was indicated by its immediate and complete adoption by the fishing community.

Notably lacking from the development scheme for Barbados was a plan for improved distribution. This would appear to be subsumed under "Marketing developments." An examination of undertakings in this category, however, reveals that the development of marketing, as seen by the Fisheries Division, meant primarily the construction of market sheds, usually near or at the landing sites. Here, fish could be more conveniently disposed of, and even cleaned, if water and disposal facilities were available. But the construction of such sheds affected inland distribution very little. Improving roads and paths to beaches could have little effect on inland distribution except, of course, that it sometimes made a beach more accessible to purchasers. The development of inland distribution could have been rather simply accomplished by the development of small, insulated vehicles to transport the catch into rural areas. Barbados' roads are quite good, and few communities are even distantly removed from a bus route into Bridgetown itself. As it is, hawkers wait at the Bridgetown bus terminal and sell fish to travellers returning to the country, and those who wish to purchase fish must either travel to landing sites or to a large town (Bridgetown, Speightstown, Oistinis) which are, in any event, located on the coast.

Another curious omission in the development plan was any mention of mechanization. The Director states that "the first practical step towards encouraging mechanization of fishing boats in Barbados was taken in October, 1949, with the launching of the research boat "Investigator."[8] Yet in the same report, it is said that "as a result of hurricane 'Janet' in September, 1955, permission was given to encourage the replacement and building of fishing launches (motorized)..."[9] The delay in encouraging the building of the motorized launch is not explained.

The launching of "Investigator" seems to be rather incidental in the Barbados mechanization scheme, especially when one considers the fact that "Investigator" was launched in 1949, and five years later the number of mechanized launches was only eighteen. Further, the "Investigator" was a 15-ton research craft, hardly a prototype for the small 25-foot launches which later composed the bulk of the fleet. The practical possibilities of boat mechanization were clear enough. After all, the sailboat's range was only five miles, approximately, and the flying fish is a true pelagic species. Later research (1952-53 season) was to show that it had a spawning range of several hundred miles in any direction from Barbados.[10] To press for rapid mechanization on this

basis alone must have been a temptation that was hard to resist, and it is to the Director's credit that he confined his first improvements to boats and gear that would not saddle the fisherman with the added expenses of mechanization.

Finally, however, it was the 1955 hurricane which tipped the scales in favor of full-scale mechanization. Mechanization had much to recommend it in terms of being able to control the immediate situation, i.e., to follow or return to schools of fish at will, and in not having to constantly labor in the stepping-unstepping of the mast as the need required in sailboat fishing. But the very success of mechanization was to exert a pressure on the Barbados fish market it was not prepared to deal with, and which worked ultimately to the detriment of the fishermen themselves.

1955 - 1958

Between 1955 and 1958, fisheries development centered in the main on rebuilding and mechanization of the fleet. At the end of fiscal 1955 the number of powered boats was thirty-two. Within a year this figure had jumped to 157. The increased fishing efficiency of these new boats is evident from their catches compared with those of the sailboats they were replacing (see Table V).

When, in 1958, Barbados became a member of a federated West Indies, she was the only territory with an almost completely mechanized fishing fleet, and an industry which had already been supported by nine years of marine fisheries research.

Federation and After

The progress of the Barbados fishing industry from this time on is seen most easily in the form of the production chart at the end of this chapter. The sharp rise is closely related to maximum mechanization, but it is followed by an equally sharp decline. This was anticipated by Dr. Hess, the Federal Fisheries Adviser, who visited Barbados in the summer of 1960:

> As in most other West Indian Territories and many other countries, the emphasis of early development programmes has been on increasing the landings, often without adequately balancing this with simultaneous development of the other phases of the industry, the handling, distribution and orderly marketing of the increased landings in general, and of seasonal gluts in particular.[11]

In high season, flying fish have been sold for one-half cent apiece, or even thrown away. In times of slack supply, they are readily disposed of for several cents more than the government ceiling of eight cents. Thus, continues Dr. Hess:

> due to marketing difficulties....there has consequently been no economic justification to allow the flying fish fleet to increase further... as each additional boat has merely served to increase competition for the market and helped to depress prices of fish, making the fishing operations unprofitable for considerable periods.[12]

Cold Storage on Barbados

In 1962 an attempt was made to solve the problem of orderly marketing by constructing a Cold Storage Deep Freeze facility in Bridgetown. By freezing and holding "surplus" fish supplies in times of plenty, they could be released for sale in the slack season. This project failed for two main reasons--1) technical difficulties in the necessary filleting of flying fish for long-term storage, and 2) local "politicking" on the Marketing Board with respect to allocation of space.[13] Keen competition developed with local producers of agricultural products. When I visited the plant (1966), it even held quantities of imported frozen food. The most serious competitor for frozen food and deep freeze storage has been the American shrimp industries. A fleet of several shrimp trawlers is based at Barbados in the Careenage at Bridgetown. The shrimping is done off the Guiana coast of South America, but the shrimp are processed at Bridgetown and then shipped out to the United States. John Dibbs, the F.A.O. Chief Marketing Economist in Bridgetown, told the author that were it not for the American shrimping operation, the Barbados Food Co., Ltd. (the deep freeze and storage operation) would be bankrupt. The government apparently agrees. In an official publication released shortly before independence, the main fish caught at Barbados are listed as "shrimp, flying fish, and dolphin."[14] In addition, the 1965-68 Development Plan notes that "a substantial expansion in the shrimp production is expected as a result of the facilities offered to the private sector."[15] It is doubtful that the expansion of the shrimp industry will do much to alleviate local unemployment, one of the critical problems of the island. A few Barbadians do find employment as crewmen on

the American trawlers, and local women are employed in the processing of the shrimp which are returned to Barbados before export. The author observed approximately thirty women engaged in this work one day, but the processing was completed and the facility completely closed down the next day.

As if all this were not enough, the government terminated its long-standing loan scheme to the fishermen for boat building and maintenance. The reason given for this action was that repayments were too slow, an allegation to which the Fishery Officer takes strong exception. It was, in fact, a "remarkable repayment rate" which they maintained, he said. As to the industry's failure to develop further, he said that "when poor people making such a precarious living, can so regularly glut the market with fish, any failure must certainly not be theirs."[16]

The real bottleneck to further development of the fishing industry lies in marketing and distribution. The limited scope of marketing as confined to the improvement of beach sheds is not enough. Even so, there are fourteen of the twenty-nine landings around the island which have no facility whatever. There is almost certainly a considerable undeveloped market in Barbados. The F.A.O. economist believes that a rather unconventional method of disposing of fish will have to be resorted to in these tropical climates. This method, already successfully employed in Africa, consists in selling the fish while solidly frozen at a temperature well below freezing. In this way special refrigeration would not be necessary and the customer's purchase will have only thawed slightly by the time he reaches home. The most serious obstacle to this approach is the strong prejudice against eating iced fish. It was reliably reported to the author that a few enterprising hawkers who have taken iced fish into the country have found it necessary to warm the fish before a sale can be made.

Table VI

Conversion (Mechanization) of Barbados Fishing Fleet, 1955 - 1959
Showing Corresponding Increase in Landings*

Year	Sailboats	Catch	Launches	Catch
1955	288	2,304,000 lbs.	32	512,000 lbs.
1956	232	1,670,400 lbs.	157	2,512,000 lbs.
1957	103	741,600 lbs.	319	5,104,000 lbs.
1958	30	216,000 lbs.	412	6,592,000 lbs.
1959	4	28,000 lbs.	451	6,720,000 lbs.

*Based on Fisheries Statistics, Fisheries Office, Barbados.

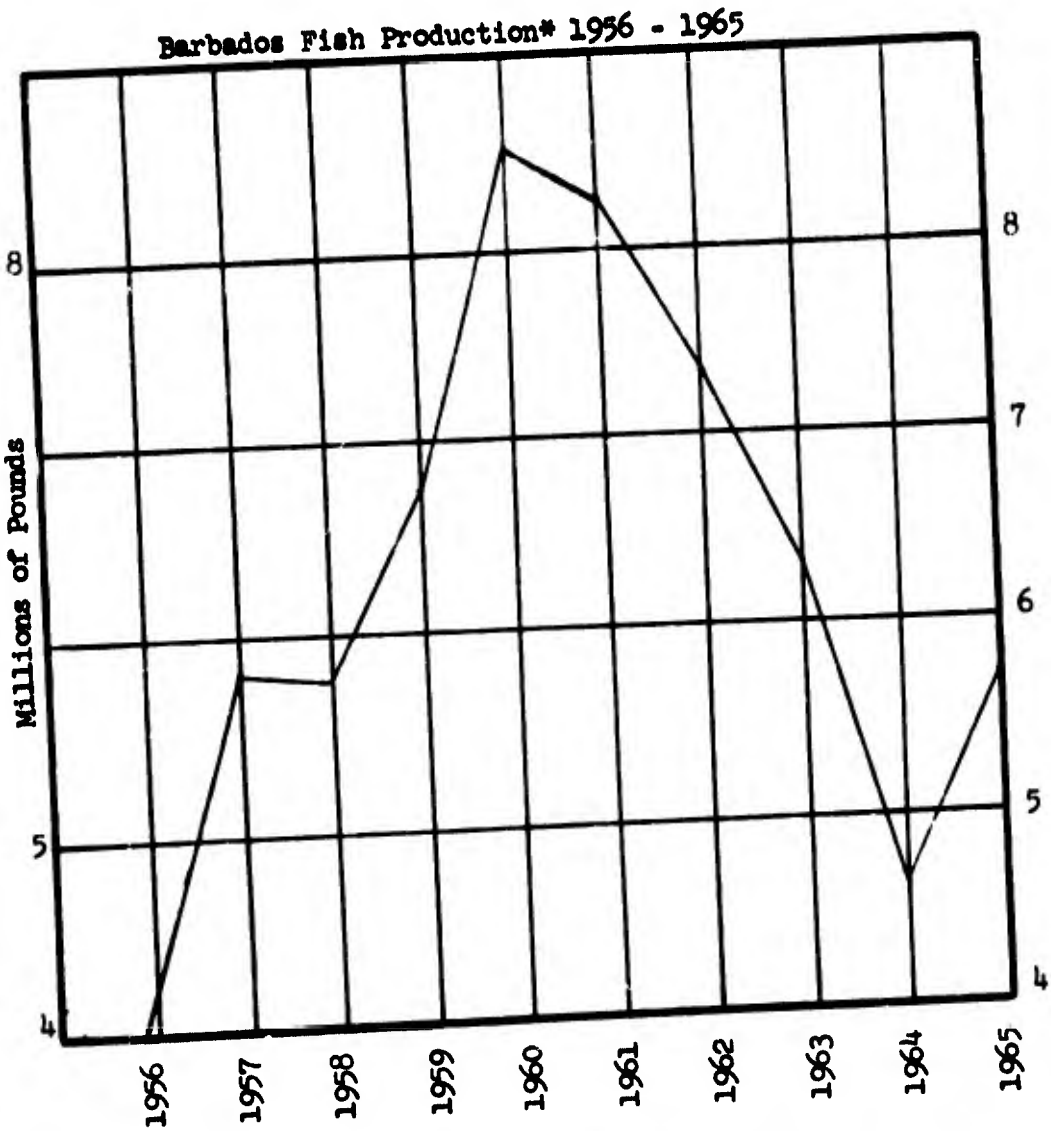
Table VII

Percentage Composition of Fish Catches
Landed at the Four Principal Barbados Fish Markets
(Bridgetown, Bay Street, Speightstown, and Oistins.)
1961 - 1964

Flying Fish	58%
Dolphin	16%
Shark	7%
Bullfish	4%
Kingfish	3%
Albacore	3%
Redfish	2%
All other varieties (Bonita, Jacks, etc.)	7%

Based on Fisheries Statistics, Fisheries Office, Barbados.

Chart I



*Based on Fisheries Statistics, Fisheries Office, Barbados.

Increase closely follows period of mechanization (See Table V).
Decline is attributable in large measure to increased competition, causing depression in fish prices (See Federation and After, p. 55).

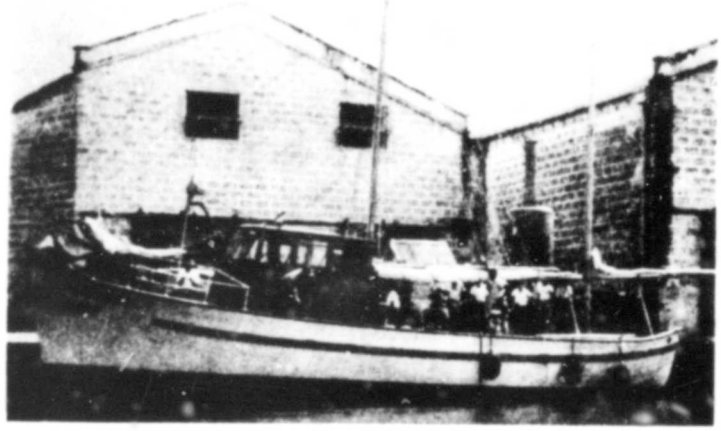


Fig. 3. The "Investigator" in 1953. (Col. Office, Fishery Publ., 1955) - Barbados.

Fig. 4. Gill-net trials for flying fish aboard the "Investigator." (D. W. Wiles)

Fig. 5. Fishermen putting to sea, 1949. (D. W. Wiles) - Barbados.

Fig. 6. Fishing from early flying fish boat. Mast is unstepped as oscillating shadow frightens fish. (Col. Office, Fishery publ., 1955) - Barbados.

Fig. 7. Launch under construction at Half-Moon Fort (North of Speightstown), Barbados.

Fig. 8. Fishing launches at Tent Bay, Barbados.

Fig. 9. Beach market sale of "redfish," Tent Bay, Barbados

Fig. 10. Two varieties of "redfish." Top: Chub snapper or "plumphead" (Rhomboplites aurorubens). Bottom: Yellow-eye snapper (Lutianus vivanus).

Fig. 11. The Barbadian flying fish (Hirundicthys affinis)

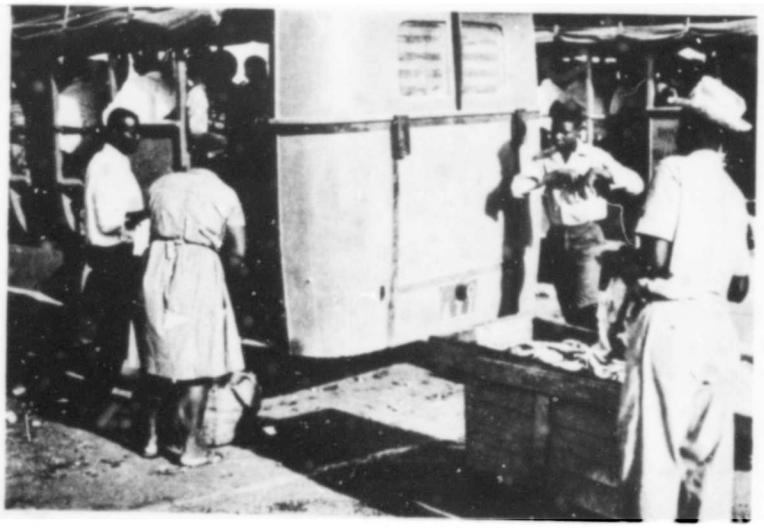


Fig. 12. Flying fish being sold at bus terminal, Bridgetown, Barbados.

Fig. 13. The "Investigator," no longer owned by the Fisheries Division, lies far off of an old pier on the St. James coast. - Barbados.

NOTES

1. Brown, Herbert H., The sea fisheries of Barbados (Bridgetown, Barbados, 1942) Development and Welfare in the West Indies, Bull. no. 1, p. 2.

2. Ibid., p. 3.

3. Ibid.

4. Caribbean Commission. Fisheries in the Caribbean, report of the fisheries conference held at Kent House, Trinidad, March ... 1952 (Port-of-Spain, Trinidad, Kent House, 1952), p. 75.

5. 1946: 5 fishing boats lost at sea, 2 men lost. 1947: 8 boats lost at sea, 7 men lost. 1949: 25 boats lost at sea, 6 men lost.

6. Caribbean Commission.Fisheries in the Caribbean, op. cit., p. 75.

7. Barbados. Department of Science and Agriculture. Annual report, 1947-1948 (Bridgetown, Advocate Co., Ltd.) p. 66.

8. Wiles, D. W., "Mechanization of the Barbados fishing fleet," West Indies Fisheries Bulletin, no. 4 (July-August, 1959) 1.

9. Ibid., p. 9.

10. Great Britain. Colonial Office. Recent developments in flying-fish fishery and contributions to the biology of the flying-fish... By D.N.F. Hall (London, H.M.S.O., 1956).

11. Barbados. Fisheries Development Programme, 1961-1965 (Bridgetown, Barbados, Government Printing Office, 1961), p. 2. Submitted by Dr. Ernest Hess, Federal Fisheries Adviser.

12. Ibid., p. 3.

13. Personal conversation with the author.

14. Great Britain. British Information Services. Barbados (London, H.M.S.O., 1966) Photo caption.

15. See below, Chapter 10 note on development plans.

16. Personal conversation with the author.

17. Mr. Dibbs said that this method has been effectively employed in African countries where he has worked.

Chapter IX

OTHER ISLANDS, OTHER FISHERIES

Trinidad and Tobago

Oceanographic conditions in the vicinity of Trinidad make it potentially the most productive of all the British West Indian islands, yet fishery development can only be described as "primitive." The typical fishing boat is the pirogue, known also as the "lambia," or "shell boat." Pirogues operate from approximately sixty-eight different landing points around the island. Having no well or ice box, fish arrive at landings in a variety of condition, but generally "less than good."[1] There were over 12,000 fishermen registered in Trinidad and Tobago in 1965,[2] of whom slightly less than half were engaged in the industry full time. Most of the approximately 4200 craft are now mechanized, but this has made no discernible impact on overall fisheries development.

The principal fish caught is the Spanish mackerel (Scomberomous maculatus), known locally as "carite." It comprises about half the annual catch. Other prominent species are kingfish and couvalli.

The fisherman's "pirogue" is a boat peculiar to Trinidad waters. It is made of imported white pine planks which are fastened clinker-fashion onto a basic keel, or "shell." The keel is of local cedar, and varies in length from fifteen to twenty-two feet. About 100 of these boats are built every year in Trinidad. The most popular builder has his workshop in the heart of Trinidad, only a few blocks from the main post office.

There are no adequate cold storage facilities in Trinidad, and this makes it possible for middlemen to profit from the inability of fishermen to keep their catch beyond a certain period. In 1957 a Development and Welfare report stated that a private organization so controlled the market at Cedros and Icacos that it was doing a half-million dollar business annually.[3] Most fish are delivered to the main fish market at Port-of-Spain. Although the construction of a new market has been planned for years, no funds have been forthcoming for its construction. The present market is in an appalling state, as the committee appointed to plan the new market describes:

> The present fish market has often been described as a "slum structure in a slum area." This statement was considered a just description of the present market; and the existing condition of this market might well have been a contributory factor to the stigma which is attached by some people to those engaged in the fishing industry.[4]

The market building is an old abandoned pitch store-house. The jetty, which stands high out of the water at low tide, is little more than a rickety frame standing in a morass of mud, littered with fish offal and miscellaneous debris.

As for distribution in Trinidad, the Market Committee (quoted above) stated categorically that "fish distribution is the greatest single obstacle to the development of the fishing industry."[5] In order to investigate the market possibilities and the distribution problems, Mr. Eric Nyholm, former F.A.O. Fisheries Economics Adviser in Trinidad, initiated a pilot distribution project in the parish of Caroni, central Trinidad. He arranged with several businessmen to obtain, deliver, and sell fresh fish as a demonstration project to show how a distributing and marketing system should work in its entirety--in miniature. The project was implemented in September, 1966. The adviser left Trinidad at the end of 1966, "too early to draw any conclusions from the operation of the scheme."[6] He did say, however, that "actual demand for fresh fish in the villages appeared to be less than our preliminary investigation had led us to expect."[7]

A number of impressive development projects have been proposed by the Trinidad Fishery Officer in the fields of education, research, conservation, and processing. The most ambitious one is the plan to start a fishing college. It is hoped that the scheme will eventually give employment to 22,000 people.[8] However, as with the fish market, the necessary funds have not been made available since the writer's visit in the summer of 1966.

Tobago

There are 400 registered fishermen in Tobago, and only 75 of these are employed full time. The rest are casual or part time fishermen, working on an estate or road crew for a day or so, and fish when they are so inclined. The standard boat is a clinker built craft, similar in appearance to the Trinidadian pirogue. It is called a "bomboat."

Local expansion of the industry is planned with the construction of a larger fishing vessel of local design. A 25' prototype was under construction at the time of the author's visit in the summer of 1966. Power will be delivered by a 10-HP Petter diesel. It will be the first of Tobago's mechanized craft.

Beach seining is another important way of taking fish in Tobago. It is a casual affair, with passers-by and tourists assisting in hauling the net on shore.

.....

The chief commercial fish of Trinidad (comprising 80% of the catch) are as follows:

Carite (about 60% of catch).....	(Scomberomorus maculatus)
King.....	(Scomberomorus cavalla)
Herring.....	(Harengula spp., Opisthonema, engraulids)
Cavalli.....	(Caranx spp.)
Red fish.....	(Lutianus spp.)
Shark.....	(Selanchians)
Salmon.....	(Cynoscion spp.)
Paoua.....	(Chaetodipterus)
Moonshine.....	(Selene, Vomer)

Source: J. S. Kenney, former Trinidad Fisheries Officer, "Report of Third Caribbean Fisheries Seminar," Caribbean Commission, Central Secretariat, Kent House, Trinidad, 1959, p. 29.

Fig. 14. Fishing pirogues at Port-of-Spain fish market landing. Note vultures. -Trinidad

Fig. 15. Fresh fish being sold at Port-of-Spain fish market. -Trinidad

Fig. 16. Fishing launches, Port-of-Spain, Trinidad. Note fish market building in background.

Fig. 17. Trinidad's prototype fishing launch, "Explorer." A relic of the federal period.

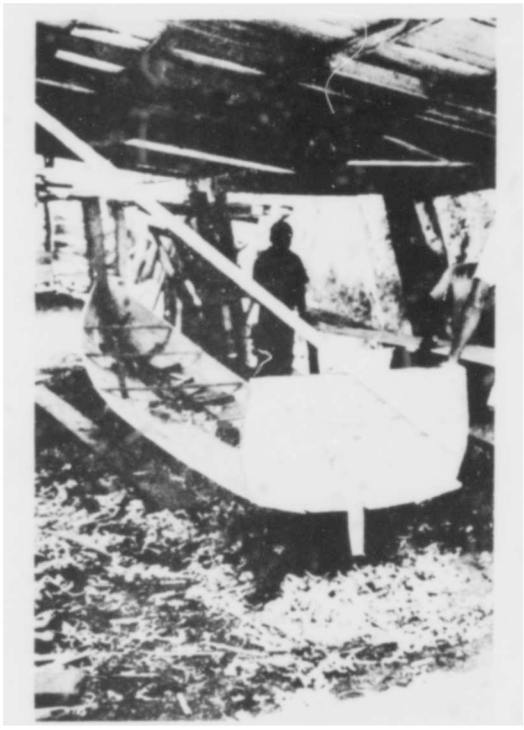


Fig. 18. Pirogue under construction, Port-of-Spain, Trinidad.

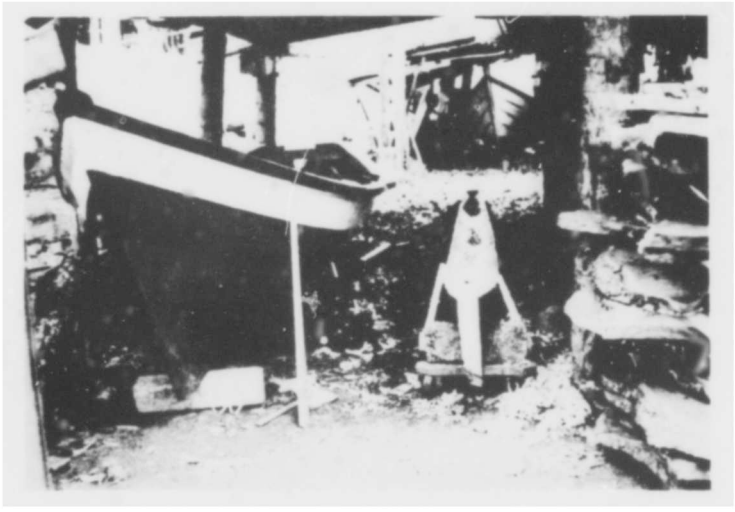


Fig. 19. Three stages of pirogue construction. Right: cedar keel or "shell." Rear: ribs being installed after planking. Left: completed pirogue.

-Trinidad

Fig. 20. Fishing boats (the "bomboat") in Tobago.

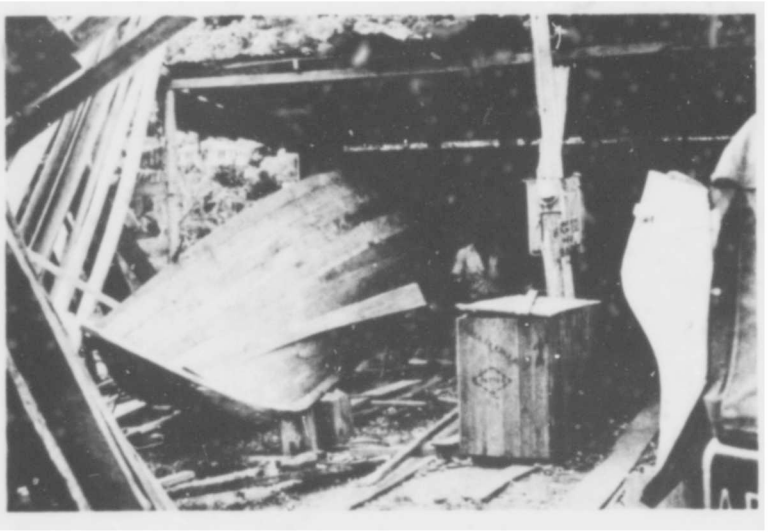


Fig. 21. Prototype of new fishing boat, under construction. -Tobago

Antigua

The fishing industry of Antigua impresses one as being very much in balance with the economy. The boats used are built of local pine, 35 to 40 feet in length, powered by a diesel, but equipped also with a sail. There are about 1000 registered fishermen, and 100 registered craft.

Most fishing is done by "pots" (traps) set within two to five miles of the island. The fisherman leaves at daybreak and returns in the early afternoon, enabling him to have the remainder of the day to engage in other part-time work. The fish most often taken are grunt and snapper, although a variety of reef fishes are obtained as well.

Although there is one main fish market at St. John, there are numerous landings all around the island where fish are purchased directly from the boat. In St. John, for example, fish will often be delivered at a point other than the market area, sold, and then cleaned on the spot. Some buyers take their purchases a short distance into town for resale.

There is a small lobster industry in Antigua, but most are exported, or else delivered to luxury hotels on the island.

Fish poisoning, ciguatera, is a not infrequent problem in Antigua. The Fisheries Officer was still not fully recovered in the summer of 1966 from a mild case sustained over a year previously. The extremely virulent nature of the poison is described in the following case:

> On July 11, 1951, at Terre-de-Bas, Saintes Islands in the Lesser Antilles a total of 12 persons of two families were poisoned by eating a large barracuda. It was eaten within a few hours of its capture and appeared normal in all respects. Thirteen chickens which pecked at the material vomited after the meal, and a dog which ate the fish's intestines, died. The next day rats which were believed to have fed on offal from the fish were found dead. Doctors were helpless as the illness progressed and the victims suffered terribly. Three died, and another went insane three months later.[9]

One of the effects of the poison is a "copperish" or "brassy" taste in the mouth. The name of "Copper Bank" has been given the southeast corner of the Saba Bank by local fishermen because of the frequent cases of poisoning resulting from fish caught in the area. Mr. Camacho has written:

In the Caribbean, particularly in Montserrat, St. Kitts, the Netherlands, Windward Islands, and the Virgin Islands, poisoning due to eating fish is so prominent that it mitigates fisheries development in these areas.[10]

.....

The following is a partial list of commercial fishes of Antigua:

Conya..... (Holocentridae)
Balahoo..... (Hemirampnidae)
Gar..... (Belonidae)
Mullet..... (Mugilidae)
Barracuda..... (Sphyraena barracuda)
Grouper..... (Epinephelus striatus)
Hind..... (Epinephelus guttatus)
Butterfish..... (Cephalopholis fulvus)
Rockfish..... (Mycteroperca)
Snapper..... (Lutianus spp.)
Jack..... (Caranx spp.)
Parrotfish..... (Scaridae)

Source: R. Camacho, Antigua Fisheries Officer, "Report of the Third Caribbean Fisheries Seminar," Caribbean Commission, Central Secretariat, Kent House, Trinidad, 1959, p. 31.

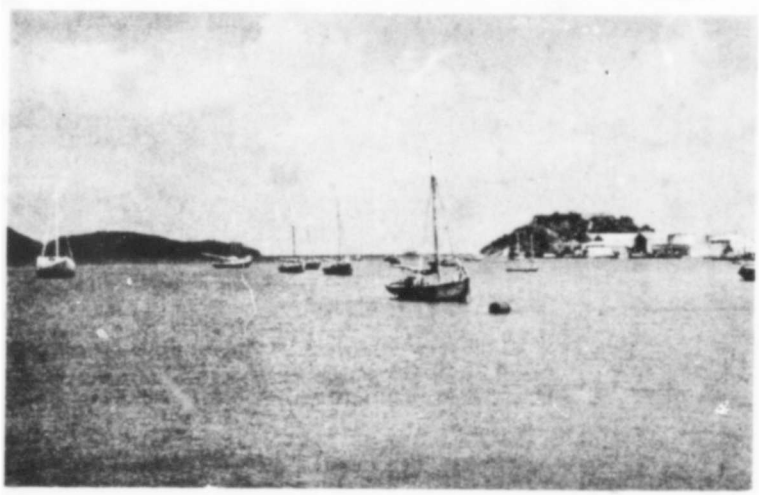


Fig. 22. Fishing boats at anchor in St. John's harbor.
-Antigua

Fig. 23. Newly constructed fish-pots. Antigua

Fig. 24. Fish being sold directly from fishing boat. The man in the white shirt has just bought a "sailors choice" -Antigua.

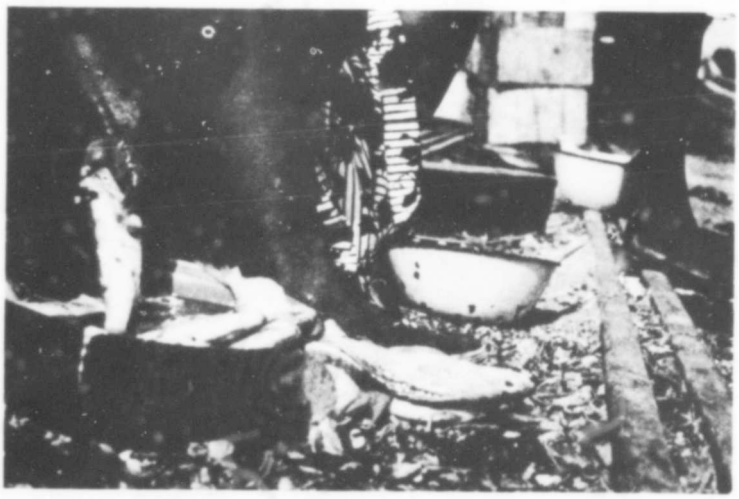


Fig. 25. Cleaning takes place on the spot.

St. Vincent

The 1966-70 St. Vincent Development Plan begins its section on Fisheries Development as follows:

> The difficulties which beset the fishing industry may be summarized as follows:
> a) poor marketing
> b) poor cold storage facilities, and
> c) shortage of trained fishery officers

The greatest difficulty is, in actuality, a shortage of fish. The coastal shelf around St. Vincent is very narrow, attaining an exploitable extent only in the south-east corner. However, more profitable fishing obtains southward through the St. Vincent Grenadines.

Most fishing is conducted from small (13' - 25') double-ended open sailboats. There is also some trolling, bank fishing (line fishing on the deeper banks), pot (trap) fishing, beach seining, and even some spear fishing.

There is a small fishery for the pilot-whale (Globecephalus melas) commonly known as "blackfish." The "Blackfish Fishing Fleet," as it is known on the tourist maps, is in reality only a few small sailboats, equipped with a primitive harpoon, which operate out of a very poor fishing village. The village, Barrouallie, earns cash by selling the dried meat of the whales, which is known locally as "island bacon." The blubber of the animals is boiled down over open fires, using discarded sugar boiling pans. The oil obtained is usually sold through private channels with outlets in Port-of-Spain. It is popularly believed to have medicinal qualities. When the writer visited the village one rainy afternoon, a lone fishing-boat was just returning, but was still some distance at sea. An old man, watching the boat very closely, volunteered the information that nothing had been taken that day. When asked by the writer how he knew this when the ship remained so far from the beach, he told me that it was the manner of sailing. "When they catch the blackfish, they sail joyfully." The skull and bones of two fish caught the previous day were being chewed on by a couple of small dogs. Beneath an open shed, roofed with corrugated iron, the women sliced blubber and hung raw flesh out to dry. But it continued to rain, filling the boiling pans with water in which large cubes of blubber

floated. Undismayed, an older woman said--"God sends the sun, and we are grateful. He sends the rain, and we are grateful."

Most of the fish landed on the island are landed at Kingston. They are mostly jacks (Caranx spp.) and robins (Coryphaena hippurus).

Fig. 26. Haul seine being pulled ashore at Kingston, St. Vincent.

Fig. 27. The catch. Sprat.

Fig. 28. Blackfish fishing village at Barroualie, St. Vincent.

Fig. 29. Slicing blackfish blubber preparatory to melting down.

Jamaica and the End of Federation

Fishery development in Jamaica began in 1956 when the government first took an active interest in the industry. A scheme was undertaken for the mechanization of canoes. Following upon this program a second scheme was begun which made all fuel sold to fishermen duty-exempt. At a later date, 1959, plans were laid for the construction of a prototype fishing vessel, designed by F.A.O's fishing boat specialist, J. O. Traung. This craft, the 43-foot "Bluefin," was purchased by the Fisheries division in May, 1961, and carried out a number of experimental fishing and exploratory cruises.

It has been repeatedly observed that Jamaica's southern coastal shelf has been seriously depleted as a result of a century or more of intensive fishing. However, it was hoped that some expansion of the industry would take place by fishing the nearby Pedro and Morant Banks. The shallow waters of the Pedro Bank are 50 miles to the south of Jamaica (70 miles from Kingston harbour) and are more than half as extensive as the island itself. (See Map III.) There are four cays emerging from this bank jutting up 8 to 12 feet above sea level along its southern boundary. These are Northeast Cay, Middle Cay, Southwest Cay, and South Cay. The largest of the four is Southwest Cay, about two acres in area. Approximately 100 fishermen camp out on these cays, delivering their catch daily to the 11 fish transports which ply between the cays and Kingston. It is estimated that more than 300 tons of fish are landed at Kingston annually from this area. Canoe mechanization has improved the fishing range, but the low-lying cays are difficult to observe. To solve this problem, a light beacon has been erected on Northeast Cay.

In addition to the Pedro Bank, successful fishing has been carried out in the vicinity of Morant Bank, 60 miles southeast of Jamaica. The combined area of these two banks is approximately 3000 square miles, but as of 1961 only 500 square miles were being exploited.[11]

It was also in 1961 that Jamaica elected to leave the West Indies Federation, precipitating thereby its eventual collapse. With the Federation went also the impetus given the development of fisheries. Early the following year, the Federal Fisheries Adviser gave notice of termination of the Fisheries Development Program, saying in part:

> It is with deep regret...that we have arrived at the point of saying farewell.... Best wishes of encouragement are extended to all those who have the development of the West Indies fisheries at heart and who are actively engaged in their promotion for the welfare of the whole fishing community as well as for the improvement of the nutritional standards of the population.[12]

The Federation was finished, and Jamaica, as most of the other islands, had never got fisheries development really started. Now, in Jamaica's need to develop more immediate and lucrative sources of income, the fishing industry was further victimized by the promotion of both tourism and industry. Concerning the former, the Jamaican Annual Report noted that

> The situation resulting from the actual or threatened displacement of fishermen by the expansion of the tourist industry has become increasingly difficult and, if not remedied, may result in serious embarassment of fishing groups....[13]

Industry, too, was rapidly displacing fishermen from the beaches. Several years ago the Fisheries Office itself was compelled to relinquish its coastal location at Kingston for the establishment of an oil refinery. On the north coast the author photographed a bauxite loading pier located at a favorable inlet formerly used at will by fishermen. (See Fig. 30) This displacement has been a long and continuing process. In 1955 it was observed that

> The continued development of the Island, particularly the tourist industry,...rendered the problem of fishing beaches more acute. For some years, development along the north coast has slowly displaced fishermen from the beaches which they utilized.[14]

The encroachments of tourism and industry do not ordinarily deprive the Jamaican fisherman of his only living. To earn a living by full-time fishing would be an extremely poor one at best.* (Significantly, the program to initiate cooperatives among the fishing communities has been in the hands of the Jamaican Department of Social Welfare.) The dependence of Jamaican fishermen on employment ashore has been mentioned earlier (Chap. II).

*Special mention should be made of Mr. Hugh Daley of Kingston, shipwright, and "fishermen by preference," who designed and spent ten years building two launches, using materials he found cast aside. The crafts have been constructed using large cottonwood dugouts as hulls. The smaller of the two is 28 feet long and is said by him to be extremely seaworthy. The larger boat, appropriately named "Time," is 33 feet long

The following is a partial list of common Jamaican sea-water fishes:

Herring..... (Harengula)
Mullet..... (Mulgilidae)
Grouper..... (Epinephelus striatus)
Rockfish..... (Mycteroperca)
Butterfish..... (Cephalopholis fulvus)
Snapper..... (Lutianus spp.)
Jack..... (Caranx spp.)
Tuna..... (Thunnus spp.)
Bonita..... (Euthynnus)

Source: A. J. Thomas, former Jamaica Fisheries Officer, "Report of Third Caribbean Fisheries Seminar," Caribbean Commission, Central Secretariat, Kent House, Trinidad, 1959, p. 31.

Resource Development

African perch

The effort to supply fresh fish as an important protein source has not been confined to marine development. An intensive and continuing effort is being made to establish a variety of African perch (Tilapia mossambicus) in natural and artificial fresh water ponds throughout the islands. The most successful work has been done in Trinidad and Jamaica, where swamps, flooded rice fields, and small concrete tanks have all been used to breed this highly prolific fish. The extreme fecundity of the species has, in fact, been the major stumbling block in its development. For example, fifty immature pairs placed in production ponds multiplied to approximately 300,000 to 500,000 in the short space of nine months.[15] Such rapid expansion of the population causes overcrowding which inhibits growth.

Successful experimentation has been carried out with Tilapia, establishing ponds or tanks containing only one sex. Fortunately, sex distinction of the species is fairly easy, making it possible to establish mono-sex culture programs in both Jamaica and Trinidad. The

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and too large for him to obtain the proper power unit under the present loan scheme. (It has a beam of 10 feet and a draft of 6 feet.) Being only a poor fisherman, Mr. Daley has not been able to obtain financing for the larger power unit this requires. It is unfortunate that a man of such dedication and ability should be lost in a declining industry.

ability to deliver given numbers of male individuals of the species to local farm ponds and tanks assures the growth of the fish to a marketable size.

Green turtle

There are three essential requisites for a "valuable and controllable marine food resource," according to Archie Carr.[16] "It ought to be big, it ought to be herbivorous,...and it has got to be edible." The animal he had in mind was the green turtle (Chelonia mydas). The historical abundance of the green turtle in Caribbean waters is legendary, the giant reptile having been in former times especially abundant in the waters around the Cayman Islands.

> They rendezvoused here at a certain time of the year, in order to lay their eggs in the sand. At such seasons, the fishermen came hither to catch them, and were sure of returning home with full-loaded vessels.[17]

In 1707, Hans Sloane recorded that "forty Sloops, part of one hundred and eighty, belonging to Port Royal (were) always employed"[18] in bringing green turtles from the Caymans to Jamaica. "(They) are very good Victuals," he wrote, "and sustain a great many, especially the poorer sort of the islands."[19]

Unfortunately, the nesting habits of the green turtle have made it uniquely vulnerable at the hands of man.[20] As a result, "the green turtle is in trouble, its range and numbers having been sharply reduced by the unrelenting demand of a burgeoning human population and the continuing activities of the turtle hunters."[21]

To counter this continued attrition of the green turtle, the Caribbean Conservation Association recently has been active in a restoration program, distributing hatchlings to all of the Caribbean territories in an effort to restore the dwindling population.

Meanwhile, in the Cayman Islands, turtling continues to be one of the main industries, the catch being taken off the coast of Honduras and Nicaragua. Turtle fishing is a highly skilled pursuit, and the fishermen operate two-masted, 100-ft. schooners hundreds of miles from home, quite unlike the fishermen of the other islands of the British West Indies. It is perhaps worth noting in this respect that the Cayman Islands were not agriculturally suited to a plantation economy,

though some slaves were brought to the island. Herein, too, lies the racial uniqueness of the islands, the inhabitants of European and mixed ancestry outnumbering those of purely African descent by five to one.[22]

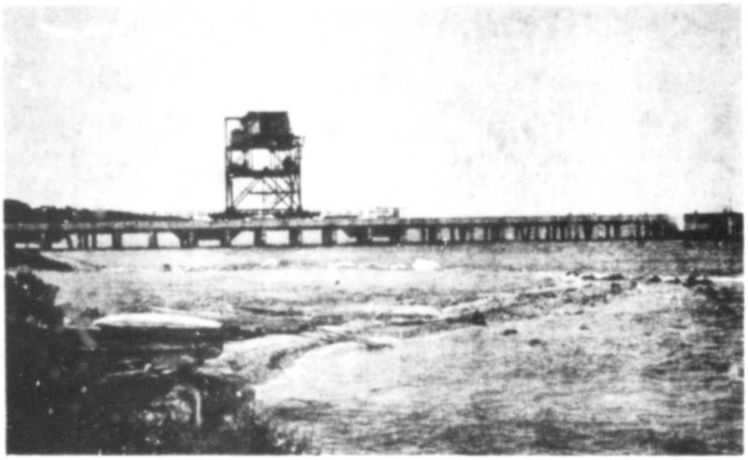

Fig. 30. Canoes beached near bauxite loading pier. North coast. Jamaica

Fig. 31. Outboard engine attached to dugout. Jamaica

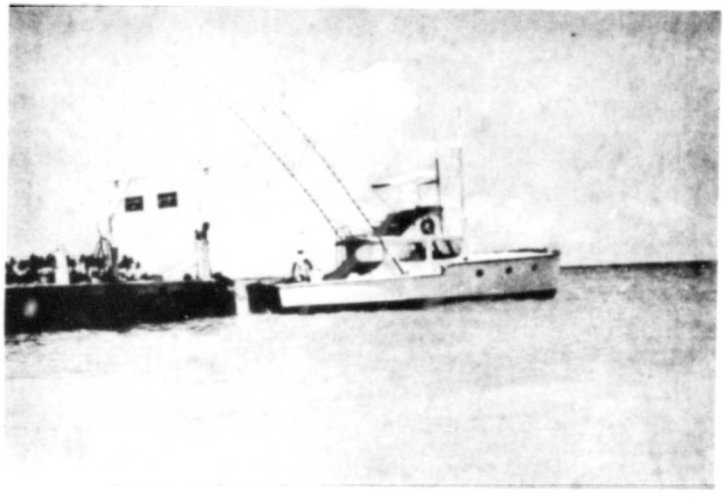

Fig. 32. Tourist fishing boat. -Jamaica

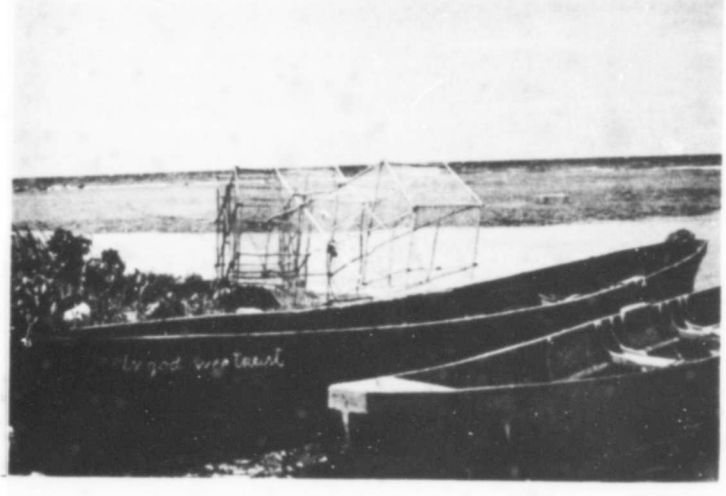

Fig. 33. Native fishing boat. -Jamaica

NOTES

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6. Personal communication to the author.

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17. Long, Edward, The history of Jamaica, v. 1 (London, 1774), p. 309.

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20. Ibid.

21. Ibid.

22. Approximate proportions determined from figures presented in Colonial Report, Cayman Islands, 1953-54. (H.M.S.O., London, 1955).

Chapter X

SUMMARY AND CONCLUSIONS

> Canoe operation is not the first stage in the development of a fishery. It is the first (and last) stage of something that has served, and will continue to serve, a very useful function--exploitation of bottom dwelling fish and a few other species in the waters 10-15 miles off our shores. It provides a living for a small number of sturdy, independent minded men...for whom the greatest need is more in the nature of welfare than development.[1]

So wrote a "special correspondent" to the Kingston Daily Gleaner in September, 1959, summing up the fisheries development program as he saw it. It is difficult to improve on what is, in truth, a succinct and fundamentally accurate analysis; one which can be broadly applied to the entire West Indies development program.

The program to develop the primitive marine fisheries of the British West Indies was undertaken, beginning in 1940, to make up for the shortage of fish imports occasioned by World War II. Unfortunately, during the time of greatest need, local production was confronted by great obstacles; the siphoning off of fishermen into wartime activities, the shortage of fishing supplies and gear, and the interruption of transport routes caused by the establishment of military bases. (See Chapter I.) Even so, the incipient development plans sponsored in the beginning by Colonial Development and Welfare revived old and untested assumptions that the Caribbean Sea was an untapped mine of marine fauna, another Grand Banks. The local literature to this day is liberally sprinkled with such optimistic phrases as "harvesting our unlimited marine resources,"[2] and "our own protein bonanza." (author's emphasis.) Meanwhile, the need of the hour had passed, and fisheries development remained unfortunately linked to the idea of rehabilitation of peasant fishermen. The result was that there was a consistent tendency to overlook the general underdevelopment of the economy as a whole. Fishery development should bear "a close relationship to economic developments in a fishing area."[3] The economy of the British West Indies was a colonial economy, geared to the production and export of agricultural products, and the multi-million dollar fish-import industry which supported this system for three centuries was not likely to be displaced by mechanizing small fleets of peasant canoes.

Underwriting peasant fishery development is not an expensive proposition, and it is perhaps for this reason that interest in this sphere has persisted. It is much easier to establish a loan scheme to mechanize canoes, or build some beach sheds than it is to build training schools, establish a sophisticated (or at least effective) distribution and storage system, and maintain all of the ancillary industries in shipbuilding, electronics, and research so necessary to a modern fishery. Modern fishing industries are backed by modern industrial communities. The British West Indies have a pre-industrial economy and it is hardly possible that a peasant fishery could modernize itself significantly, independent of substantial improvement in the rest of the economy. Yet one economist did go so far as to suggest that fisheries could "play the role once played by the railway booms as generators of economic development."[4] He did, however, go on to say that:

> in order to have the physical conditions for fishery development, the basic resource, the fish stocks of the sea or in the inland waters, must be absolutely large.[5]

The early planners placed emphasis on fishery surveys as the prerequisite for development, recognizing that "fish resources may exist untapped for many years even in waters that are continually traversed by all kinds of vessels. Discovery and exploitation of previously unknown tuna stocks off the east coast of the United States was cited as an example. If adequate stocks were found, they would usually be open to exploitation by anyone with the capacity to do so, provided, of course, there was no intrusion into national waters. Thus, in 1960, a 60-ton fishing boat out of Capetown, South Africa caught 150 tons of tuna valued at $84,000 "just" 300 miles from Jamaica. A local agricultural official said that he was "thrilled and excited that the fish were caught within the precincts of Jamaica waters," and expressed the hope that "the knowledge gained would be imparted to Jamaica fishermen,"[7] whose canoes rarely leave the sight of land. In his excitement, the official apparently failed to notice that the vessel from Capetown had come some 7000 miles.

This frequently encountered proprietary view of the Caribbean Sea has limited the perspective of fishery development. Hopeton Gordon spoke to this particular point in 1964:

> Let us note that in talking about the marine fisheries we cannot really speak of "our fisheries resources,"...not unless we intend to restrict our activities to those fishing grounds located entirely within our territorial waters in which case we would be condemning our marine fisheries to remain permanently at the subsistence level.[8]

There was some justifiable sense of mutual proprietorship of the Caribbean Sea during the period of Federation, and it was the valuable contribution of the Federal Ministry of Natural Resources to develop a comprehensive plan as befitted the Federation. Even so, some of the same basic errors were being made in failing to account for the level of each island's economic development. The scheme to establish training schools was frustrated because the older and more experienced fishermen (and therefore the least literate) were excluded from the program, while the younger men used the education as an opportunity to move on to something that better suited them personally.[9]

The fisheries development begun during the Federal period did, however, give a sense of importance and usefulness to the people of the British West Indies fisheries. Production increased markedly almost everywhere, and assistance was made available from international organizations such as the F.A.O. Every territory had its own experimental "prototype" fishing vessel which was at least a hope of better things to come. With the end of Federation each territory was thrown back on its own resources (though basic Colonial Development and Welfare Funds were continued). Capital does not as a rule find the risks of fishery development very attractive, particularly in unproved waters. Economic development has consequently concentrated on the twin resources of beauty and location; a tropical sea that is attractive, even if it is not yet sufficiently productive, and a position that is accessible to the vast North American tourist market.

In 1966, the United Nations Development Project began in its search for fish in the Caribbean. The project is described as a "commercial feasibility project" by project manager, Harry Windsor. The three essential phases are: 1) exploratory and demonstration fishing, 2) marketing study and demonstration, and 3) training. The project is under the general direction of FAO but it is organized and sponsored by the U.S. Bureau of Commercial Fisheries. Biologic exploration is

being carried out by deep sea vessels, supplies by the U.N. Special Fund. Two of these vessels have already begun operations, the "Alcyon," out of Jamaica, and the "Calamar," out of Barbados. The director regards the training phase of the project as "possibly of the greatest interest to the participating countries. They recognize that lack of properly trained personnel is probably their greatest handicap."[10]

The first official communication from the project reports that their "initial results were not spectacular."[11] Using the longline method, experimental fishing was conducted by the two vessels in an area throughout the entire Caribbean Sea, west to the Cayman Islands. The combined cruise was conducted during December, 1966 through February, 1967. "Fishing results were not productive when considered with a view of commercial potential."[12]

If the "Alcyon" and "Calamar" have been having little luck with their tuna fishing, it may well be due in part to the impressive success that Japanese tuna fishermen have had in Caribbean waters. The Fishery Officer of Antigua, himself an avid sports-fisherman, alleges that operations of the Japanese tuna boats have markedly reduced the supply of tuna, as they have in other sportsfishing areas of the world.[13]

The success of the American and Japanese shrimp trawlers in Caribbean waters, and the above mentioned success of the Japanese tuna boats indicates that significant expansion of any of the West Indian fisheries lies in industrial-type exploitation of fishery resources. To repeat what was said at the beginning of this chapter, canoe fisheries development is not a stage leading towards this end. In matter of fact, even the policy of mechanization of small fishing boats as a means of initiating expansion rests on the assumption that the time and labor saved will be employed in the production of substantially greater quantities of fresh fish. Additionally, "even where easy credit facilities are provided by governments, considerable additional catches must be landed per boat to pay for the financing and operation of the boat and engine."[14]

Last, but not least, local fisheries development in the British West Indies is pitted against the technology of countries which operate fishing fleets in distant waters, including the Caribbean, employing highly sophisticated methods of locating schools of fish.[15] The establishment of an exclusive fisheries zone,[16] or of extending territorial

waters from three to twelve miles, as Jamaica has recently done,[17] will be of little avail inasmuch as the fish with the greatest commercial potential--tuna and marlin, are migratory species, and do not linger this close to the islands.

The author knows of only one "local" organization (International Foods, Ltd., Port-of-Spain, Trinidad) which has begun fishing operations using modern-equipped trawlers. It is locally claimed that the effort is being "forwarded by local investors", but a look at the list of stockholders shows that 75 per cent of the shares are owned in Hong Kong and New York. The director himself a Chinese, observes that "the present West Indies fishing industry is still primitive and in an infant stage, Japanese and American operations excepted." It is likely to continue this way into the foreseeable future.

Fig. 34. Shrimp trawlers in the Careenage. Barbados.

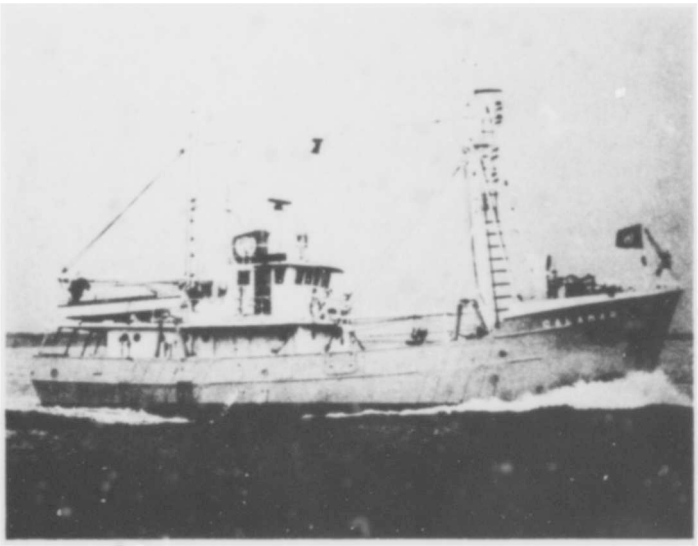
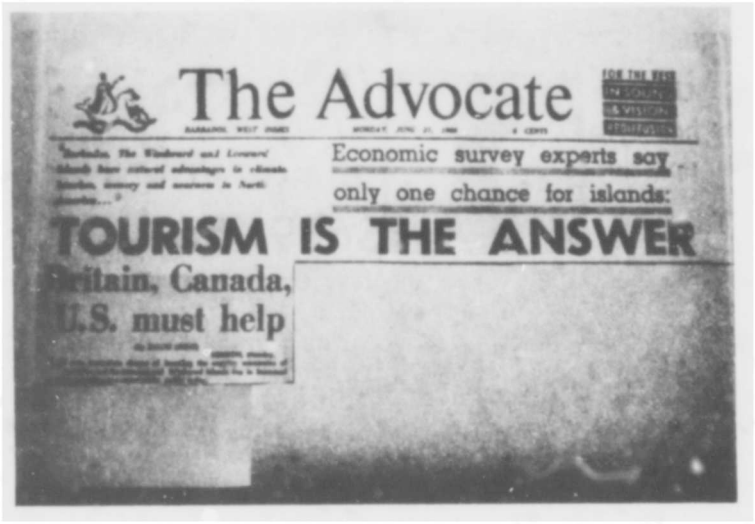


Fig. 35. UNDP/FAO research vessel, "Calamar." Barbados.
(UNDP/FAO Photo)



The Advocate

Economic survey experts say only one chance for islands:

TOURISM IS THE ANSWER

Britain, Canada, U.S. must help

Fig. 36. "The Advocate," Barbados, June 27, 1966.
"The only immediate chance of boosting the sagging economies of Barbados and the Leeward and Windward Islands lies in increased tourism, according to a report made public today."

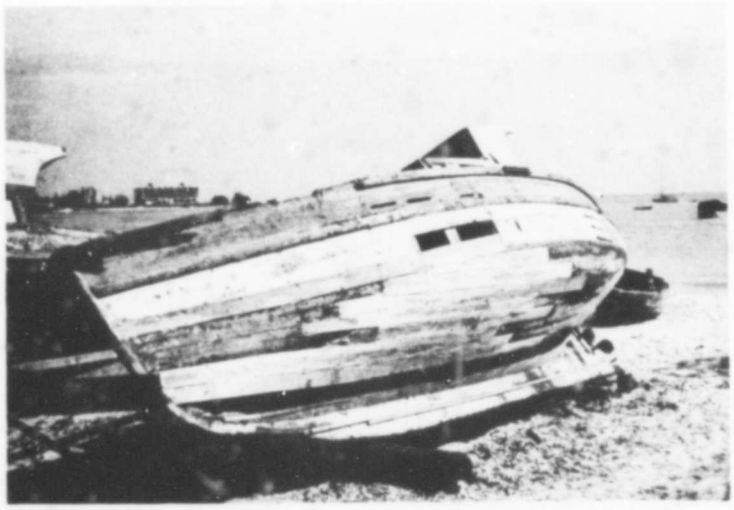


Fig. 37. Fishing launch under repair at Brown's Beach, Barbados. Barbados Hilton in background.

NOTES

1. Sunday Gleaner (Kingston), September 6, 1959.

2. Barbados Advocate, July, 1966.

3. Caribbean Commission. Report of the third Caribbean fisheries seminar, St. Maarten, Netherlands Antilles, July ... 1959 (Port-of-Spain, Trinidad, Kent House, 1959), p. 11.

4. Kirby, E. S. and E. F. Szczepanik, "Special problems of fisheries in poor countries," in F.A.O., The economics of fisheries (Rome, F.A.O., 1957), p. 11.

5. Ibid.

6. Caribbean Commission. Fisheries in the Caribbean, report of the fisheries conference held at Kent House, Trinidad, March ... 1952 (Port-of-Spain, Kent House, 1952), p. 88.

7. Daily Gleaner (Kingston), June 3, 1960.

8. Gordon, Hopeton, "A note on Jamaica's marine fisheries," Caribbean Quarterly, v. 10 (Sept., 1964), 42.

9. Personal conversation of author with Carleen O'Laughlin.

10. United Nations Development Project, Food and Agriculture Organization, Caribbean fisheries development project, Project information sheet. Barbados, 1966.

11. Ibid.

12. United Nations Development Project, Food and Agriculture Organization, Caribbean fishery development, Combined cruise report, number 1, Barbados, March 10, 1967.

13. Personal conversation with author. See also Time, Jan. 28, 1966, p. 44.

14. Hess, Ernest, "Fisheries development in the West Indies, 1960-1961," West Indies Fisheries Bulletin, No. 1, 1962 (Jan.-Feb.), p. 7.

15. Jones, Albert C., and P. N. Sund, "An aircraft and vessel survey of surface tuna schools in the Lesser Antilles," Commercial Fisheries Review, v. 29, no. 3, March, 1967, p. 141.

16. Special extensions of 3-mile territorial waters to the 12-mile limit.

17. This report, heard by the author on a newscast, has not been verified.

APPENDIX I

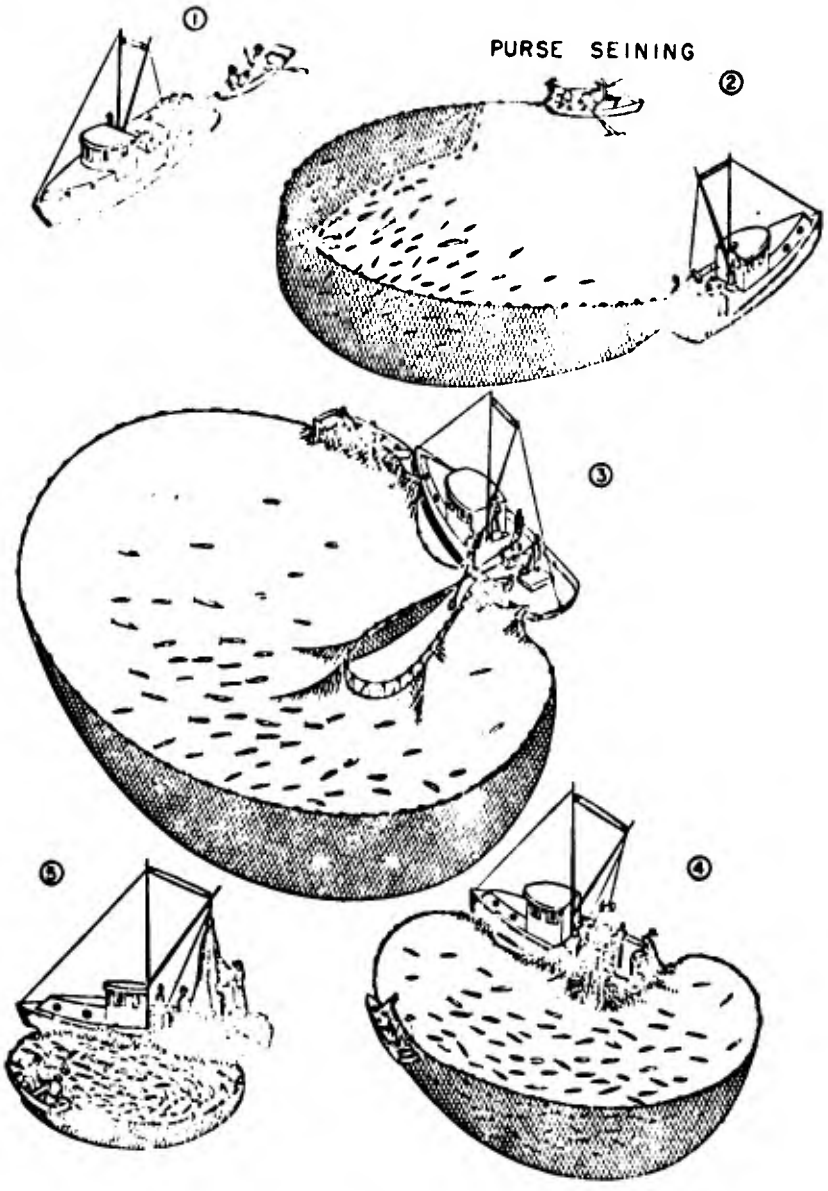
Notes on Fishing Gear and Methods

The most widespread method of fishing in the British West Indies, as in the rest of the Caribbean, is with the fish pot or trap. The pot is a frame, usually of local wood, covered with chicken wire. It is most often rectangular in shape and may vary from 3 to 12 feet in length, and from 1½ to 3 feet in width or depth. Set on the bottom in depths up to 50 or 60 fathoms, it is "baited" with any object attractive to the demersal species. The fish enters by way of a funnel shaped tunnel but is unable to make his way out again. The catch is removed by means of a trap door. Pots are visited at regular intervals, the location being generally marked by a simple buoy with a line attached.

The great merit of pot fishing is that it permits the owner, who may own only a few or a great many, to visit them according to his own schedule, permitting him to engage in other work on land, as is the general pattern of the fisherman-farmer. While he works, the pot goes on fishing.

The haul seine, or beach seine, is another popular method of taking numbers of fish at a time, but is restricted to places where there is a smooth surface and gradient seaward. Other methods include hook and line (for "bank fishing"), weirs, and even spears in some out of the way places. I have not heard of dynamite being used recently (it was a common problem, due to wastage and danger of injury or death) though I suspect that the practice has not been completely eliminated.

The purse seine, used by Whiteleather and Brown (see bibliography) in their survey, involves a higher level of technology than is generally employed in the Caribbean fisheries. The seine is essentially a wall of netting which is set around a school of fish in a complete circle. It is not a method which the small craft in general use could well employ.



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