

## SECTION XI.

## FISHERIES AND PISCICULTURE.

## § 1. Commercial Fisheries.

1. **Fish Stocks.**—Australasia possesses an abundant and varied fish fauna, which embraces both tropical and temperate varieties and includes destructive as well as valuable species. In rivers and lakes both indigenous and imported varieties thrive. The latter have been introduced and acclimatised for industrial and sporting purposes by Governments and angling societies. Exploitation of the fishing areas—for some classes of fish for the whole year, for others during the breeding season only, or until a certain size is attained—is, where necessary, expressly forbidden; proclaimed localities are closed against net-fishing, and a minimum size of mesh for nets is fixed. The sea-fishermen in some districts have made regulations in their own interests for the purpose of controlling the market supply, and these they rigorously observe.

2. **Economic Fisheries.**—Although Australia's food fishes are abundant, the development of the industry has been slow. It has been authoritatively stated that the marine fisheries, properly fostered, will develop into an industry of national importance. Local catches of lake and river fishes furnish, in the aggregate, a not inconsiderable amount of food supply. (See also § 5 and 6 hereinafter.)

3. **Distribution of Supplies.**—Present methods of distribution impose serious difficulties on the development of fishing generally, since there is a wide divergence between the price paid by the consumer and the return received by the producer. States and municipalities are interesting themselves in the direction of more economic distribution. Good markets are assured in the chief cities for regular deliveries of fresh fish. (See also § 5 and 6 hereinafter.)

4. **Oyster Fisheries.**—Natural oyster beds, whose ample product is of excellent quality, exist on the foreshores in the shallow waters of inlets and estuaries in several parts of Australia. By husbanding the natural crop, and by judicious transplanting, the oyster output has been very materially augmented, and it is believed that there is a great future for the industry. The areas are leased by the Government to private persons, lengths of foreshore being taken up and profitably exploited. In New South Wales and Queensland particularly, the industry has developed; and small yields have been obtained in South Australia and Victoria.

5. **Pearl-shelling, Bêche-de-Mer, etc.**—(i) *General.* Pearl-shelling is carried on in the tropical districts of Queensland, the Northern Territory, and Western Australia. The pearl oyster inhabits the northern and western coastal waters from Cape York to Shark Bay, a length of shore of over 2,000 miles. The shells are marketed in considerable quantities, and pearls also are obtained in Queensland and Western Australia. The fishing is generally conducted with the aid of diving apparatus, in water varying from 4 to 20 fathoms in depth. In Queensland and the Northern Territory the bêche-de-mer

industry is carried on, and tortoise-shell is obtained on the coasts. Experiments have been made in cultivating the pearl oyster on suitable banks. During the year 1917-18 there were twenty boats engaged in pearl-shelling in the Northern Territory, and the pearl-shell obtained was returned as 912 cwt., valued at £6,319. Bêche-de-mer valued at £3,529 was also raised during the same year. In October, 1911, a pearl weighing 178 grains, and valued at £3,000, was obtained at Broome. Further details regarding pearl-shelling are given in Official Year Book No. 6, p. 463. Trochus-shell to the value of £12,000, £23,000, and £21,800 was raised in Queensland during 1915, 1916, and 1917 respectively.

(ii) *Royal Commission on Pearl-shelling Industry.* In accordance with the "White Australia" policy, it was originally determined that the employment of Asiatic labour in the pearl-shelling industry should be restricted, and ultimately cease, and it was proposed that after 31st December, 1913, permits to indent Asiatics for the pearling fleet should no longer be issued. In view, however, of the disorganisation of the industry occasioned by the war, the time was extended to the 30th June, 1918, after which date permits to introduce Asiatic labour were to be granted only in cases where the diver and tender of a boat were Europeans. Since the receipt of the Report of the Royal Commission, referred to hereunder, this proviso was, however, revoked. In March, 1912, a Royal Commission to inquire into the pearling industry was appointed by the Commonwealth Government, and after visits to the Queensland and Western Australian waters, various sittings, and the issue of a progress report, presented its final report in 1916. The Commissioners stated that, while it may be practicable, they did not consider it desirable or profitable to attempt by any drastic methods to transfer the industry from Asiatics to Europeans. They further stated that, while the labour now employed is almost entirely Asiatic, they did not consider that the "White Australia" policy would be weakened or imperilled by allowing the industry to continue as at present conducted.

## § 2. Fisheries Statistics.

1. *Estimates for the Commonwealth.*—The returns given below have been furnished by the State departments. Estimates and approximations, where shewn, are official. The data do not generally lend themselves to presentation on a uniform scheme, but the principal facts have as far as possible been compiled for the Commonwealth.

### GENERAL FISHERIES (EXCLUDING EDIBLE OYSTERS, PEARL-SHELL, AND BÊCHE-DE-MER), COMMONWEALTH, 1917.

State.	No. of Boats Engaged.	Value of Boats and Equipment.	No. of Men Employed.	Total Take of—		Value of Take.	
				Fish.	Lobsters.	Fish.	Lobsters.
				cwt.	doz.	£	£
New South Wales ..	898	52,278	3,126	173,470 <sup>b</sup>	8,546 <sup>c</sup>	243,062 <sup>b</sup>	6,410
Victoria ..	789	68,412	992	92,019	15,305	121,148	8,381
Queensland ..	540	26,756	1,064	47,298	..	64,660	..
South Australia ..	925	55,500	1,073	129,000	9,000 <sup>e</sup>	225,000	12,000
Western Australia	246	19,658	506	21,142	3,624	38,356	1,812
Tasmania (a) ..	..	..	..	..	..	..	..
Northern Territory	3	200	12	910	..	3,492	..
Commonwealth (d)	3,401	222,804	6,773	463,839	(a)	695,718	28,603

(a) Not available. (b) Including 14,789 cwt. fish, valued at £27,606, obtained by State trawlers.  
(c) Also 818 baskets crabs, value £614. (d) Exclusive of Tasmania. (e) Cwt.

The available returns from the Commonwealth oyster fisheries appear in the next table. Edible oysters are not found in Western Australia. There is no information available in regard to the small consumption of local oysters in Tasmania.

## EDIBLE OYSTER FISHERIES, COMMONWEALTH, 1917.

State.	Number of Boats Engaged.	Value of Boats and Equip-ment.	Number of Men Em-ployed.	Number of Leases.	Oysters Taken.	
					Quantity.	Value.
	No.	£	No.	No.	cwt.	£
New South Wales .. ..	408	13,487	400	3,181	36,860	52,928
Victoria .. ..	77	4,270	109	1	13,155	7,894
Queensland .. ..	91	9,603	129	638	24,048	25,353
South Australia .. ..	1	200	2	..	250	375
Western Australia .. ..	..	..	..	..	..	..
Tasmania .. ..	..	..	..	..	..	..
Northern Territory .. ..	..	..	..	..	..	..
Commonwealth .. ..	577	27,560	640	3,820	74,313	86,550

The pearling industry is carried on in the tropical waters of Queensland, Western Australia, and the Northern Territory. During the last few years the return from the pearling industry has been adversely affected by labour conditions, coupled with the restriction in the market consequent on the war. Some of the pearling fleets have transferred their operations to Dutch waters. Bêche-de-mer is obtained in Queensland and the Northern Territory, the product being exported to China.

## PEARL, PEARL-SHELL, AND BÊCHE-DE-MER FISHERIES, COMMONWEALTH, 1917.

State.	Number of Boats Engaged.	Value of Boats and Equip-ment.	Number of Men Em-ployed.	Quantity of Pearl-shell obtained.	Value of Pearl-shell obtained.	Value of Pearls obtained.	Value of Bêche-de-mer obtained.	Value of Tor-toise-shell obtained.
	No.	£	No.	Tons.	£	£	£	£
New South Wales .. ..	..	..	..	..	..	..	..	..
Victoria .. ..	..	..	..	..	..	..	..	..
Queensland (a) .. ..	126	63,000	1,098	155	21,000	572	39,305	278
South Australia .. ..	..	..	..	..	..	..	..	..
Western Australia .. ..	317	129,160	2,349	2,007	238,344	38,761	..	..
Tasmania .. ..	..	..	..	..	..	..	..	..
Northern Territory .. ..	28	6,750	168	30	4,951	..	2,759	100
Commonwealth .. ..	471	198,910	3,615	2,192	264,295	39,333	42,064	378

(a) Also trochus-shell to the value of £21,800.

For obvious reasons the returns in regard to the value of pearls obtained can be regarded as rough approximations only. The next table gives the revenue from fisheries in each State.

## PUBLIC REVENUE FROM FISHERIES, COMMONWEALTH, 1917.

State.	Licenses.	Leases.	Fines and Forfeitures.	Other Sources.	Total.
	£	£	£	£	£
New South Wales ..	1,385	7,837	243	361	9,826
Victoria.. ..	450	1	110	10	571
Queensland .. ..	2,164	3,515	5	..	5,684
South Australia .. ..	389	..	..	..	389
Western Australia .. ..	4,091	1,067	..	557	5,715
Tasmania (a) .. ..	547	..	..	55	602
Northern Territory .. ..	54	..	..	16	70
<b>Commonwealth .. ..</b>	<b>9,080</b>	<b>12,420</b>	<b>358</b>	<b>999</b>	<b>22,857</b>

(a) Returns incomplete; refer mainly to Fisheries Board of Hobart.

A summary of the main items of information available in regard to General and Oyster Fisheries in the Commonwealth is given hereunder for the five years 1913-17 :—

## GENERAL AND OYSTER FISHERIES, COMMONWEALTH, 1913 TO 1917.

Particulars.	1913.	1914.	1915.	1916.	1917.
<b>General Fisheries—</b>					
No. of boats engaged ..	3,114	3,321	3,374	3,581	3,401 (b)
No. of men employed ..	6,428	7,363	7,355	7,102	6,773 (b)
<b>Fish obtained—</b>					
Quantity .. cwt.	388,371 (b)	563,543	466,040 (b)	469,574 (b)	463,839 (b)
Value .. £	489,236	519,723	709,176	742,535	695,718
Lobsters obtained—Value £	30,879	33,111	30,722	33,582 (b)	28,603 (b)
<b>Edible Oyster Fisheries(a)—</b>					
No. of boats engaged ..	428	398	503	547	577
No. of men employed ..	487	453	618	618	640
<b>Oysters obtained—</b>					
Quantity .. cwt.	68,054	60,199	71,122	85,740	74,313
Value .. £	74,204	62,153	76,160	94,884	86,550
<b>Public Revenue from Fisheries—</b>					
Licenses .. £	7,379	9,664	7,717	8,673	9,080
Leases .. £	11,081	12,823	13,004	14,065	12,420
Fines and forfeitures .. £	480	427	713	764	358
Other sources .. £	442	662	218	255	999
<b>Total revenue .. £</b>	<b>19,382</b>	<b>23,576</b>	<b>21,652</b>	<b>23,757</b>	<b>22,857</b>

(a) There are practically no oyster fisheries in Victoria, Western Australia, and Tasmania.

(b) Exclusive of Tasmania.

The following table gives in summarised form for the years 1913-17 the details available in regard to pearling and bêche-de-mer fishery for the States where these industries are carried on, i.e., Queensland, Western Australia, and the Northern Territory. The low production of pearl-shell in 1915 was, of course, due to the loss of market occasioned by the war. For obvious reasons, figures regarding value of pearls obtained can be taken as rough approximations only.

**PEARL, PEARL-SHELL, AND BÊCHE-DE-MER FISHERIES, COMMONWEALTH,  
1913 TO 1917.**

Particulars.	1913.	1914.	1915.	1916.	1917.
No. of boats engaged ..	598	581	346	429	471
No. of men employed ..	4,277	4,137	2,561	3,336	3,615
Pearl-shell obtained—					
Quantity .. tons	2,014	1,823	1,180	1,538	2,192
Value .. £	346,437	297,776	143,407	229,255	264,295
Pearls obtained(a)—					
Value .. £	97,730 (b)	97,535 (b)	14,894 (b)	27,190 (b)	39,333 (b)
Bêche-de-mer obtained—					
Quantity .. tons	625	531	770	513	624
Value .. £	30,943	27,847	40,078	30,222	42,064
Tortoise-shell obtained—					
Quantity .. lbs.	1,382	870	327	982	942
Value .. £	850	625	155	262	378

(a) As returned. (b) Incomplete.

In addition to the production mentioned above, Queensland during 1917 raised trochus shell valued at £21,800. The shell is used principally in the manufacture of "pearl" buttons.

### § 3. Oversea Trade in Fish.

That the development of the fishing industry in Australia leaves much to be desired is evident from the fact that the import of preserved fish into the Commonwealth is very large. The figures for the imports for the last five years were as follows:—

#### IMPORTS OF FISH, COMMONWEALTH, 1913 TO 1917-18.

Classification.	1913.	1914-15.	1915-16.	1916-17.	1917-18.
Fresh (oysters) ..	{ cwt. 8,912	6,353	4,736	3,059	1,583
	{ £ 5,281	4,187	3,040	2,157	1,098
Fresh, or preserved by cold process	{ cwt. 34,172	27,015	25,771	18,363	11,080
	{ £ 78,510	65,741	68,676	48,191	26,306
Potted .. ..	{ cwt. (a)	(a)	(a)	(a)	(a)
	{ £ 37,644	38,552	54,414	44,268	1,300
Preserved in tins	{ cwt. 171,733	194,005	213,347	174,145	148,421
	{ £ 525,996	660,693	755,286	715,741	788,728
Smoked, dried, and n.e.i.	{ cwt. 24,629	15,477	10,403	10,015	7,320
	{ £ 70,605	37,141	32,868	37,239	35,602
Total .. ..	{ cwt. (b) 239,446	242,850	254,257	205,582	168,404
	{ £ 718,036	806,314	914,284	847,596	853,034

(a) Not available. (b) Exclusive of potted fish.

Tinned fish constitutes by far the largest proportion of the imports, the bulk of it consisting of salmon from the United States, Canada, Norway, and Alaska. The potted fish comes chiefly from the United Kingdom. New Zealand supplies the largest proportion of the fresh fish, the bulk of the remainder coming from the United Kingdom. The small import of oysters consists entirely of New Zealand produce.

The exports of local fish produce for the five years 1913 to 1917-18 are given hereunder :—

### EXPORTS OF FISH (AUSTRALIAN PRODUCE), 1913 TO 1917-18.

#### COMMONWEALTH.

Classification.	1913.	1914-15.	1915-16.	1916-17.	1917-18.
Fish, fresh, smoked, or preserved by cold process	{ cwt. 114 £ 367	1,919 9,532	918 2,806	764 3,089	983 4,048
Preserved, in tins, dried, salted, etc.	{ cwt. 11,334 £ 40,573	10,655 29,337	11,044 40,441	12,222 39,839	13,413 57,254
Total	{ cwt. 11,448 £ 40,940	12,574 38,869	11,962 43,247	12,986 42,928	14,396 61,302

The quantity of fresh fish exported from the Commonwealth is trifling, and the amount of £4,048 shewn in the table above consists chiefly of cured bêche-de-mer exported to Hong Kong from the Northern Territory. The bulk of the amount of £57,254 consists of an export of salt fish also to Hong Kong from Queensland.

The exports of pearl-shell and tortoise-shell are given hereunder for the five years 1913 to 1917-18 :—

### EXPORTS OF PEARL-SHELL AND TORTOISE-SHELL, 1913 TO 1917-18.

#### COMMONWEALTH.

Article.	1913.	1914-15.	1915-16.	1916-17.	1917-18.
Pearl-shell	{ cwt. 41,813 £ 383,193	26,276 179,430	50,124 194,052	70,030 363,669	59,598 347,964
Tortoise-shell	{ lbs. 3,244 £ 2,081	1,244 822	570 333	1,283 802	1,241 609

More than 80 per cent. of the pearl-shell exported during 1917-18 was consigned to the United States, which took nearly £286,000 worth of the total export. The next largest share went to Japan, which took £53,000 worth. Smaller quantities were sent to Canada and the United Kingdom.

## § 4. Development of the Fishing Industry.

1. **Transport and Marketing.**—Up to the present the question of adequate transport and marketing of the proved supplies of fish has not been satisfactorily dealt with in all the States. In New South Wales, as shewn in § 6 hereinafter, the matter of exploiting and marketing trawlable fish has been undertaken by the State Government, which has also taken steps to improve the conditions under which the ordinary coastal fishing is carried on. In Queensland, also, State trawling was developed in 1919.

2. **Experiment and Culture.**—In many respects the fishing industry is capable of modification and development. Although some valuable work has been done by the State Governments in the way of experiment and culture, a uniform policy of development for Australia is desirable, and recommendations have been made that the Fisheries Departments of the various States should co-operate with the Federal Government with a view to increasing the productiveness of the Commonwealth waters; and that uniform fisheries laws should be adopted by adjacent States.

All live fish imported into Australia are examined on shipboard in order to prevent the importation of undesirable fish.

With the object of ascertaining something of the movements of oceanic fishes, as well as of those estuarine fishes which make periodical oceanic migrations, reports are furnished regarding the various kinds of fishes, etc., and their movements along the coast.

Fuller details regarding the activities of the States in fish-culture are given in Official Year Book No. 6, pp. 471-2.

By arrangement with the Commonwealth Fisheries Department, members of the staff of the Australian Museum, Sydney, accompanied the F.I.S. *Endeavour* on various cruises. Specimens were collected, mounted for scientific purposes, and distributed to other Australian Museums, a considerable number being put aside for the Commonwealth Fishery Museum.

**3. Consumption of Fish.**—Despite the circumstance that numerous varieties of valuable food fishes abound in the coastal waters of Australia, while the freshwater rivers and lakes yield abundant supplies of natural and acclimatised species, the fishing industry has not developed to the extent that might reasonably be expected. It has been said that the Australians are not an "ichthyophagous race," but the comparatively heavy import of dried and preserved fish would appear to disprove this statement. The natural explanation seems to be that the industry is ill-managed, the price to the consumer is high, while the fisherman's gain is uncertain—and the system of distribution lacks method. Considerable improvement has, however, been effected in recent years, particularly in New South Wales (*vide* § 6 herein).

## § 5. The Commonwealth Department of Fisheries.

**1. The Federal Council of Australasia.**—The Federal Council had power to legislate with regard to fisheries in Australasian waters beyond territorial limits. In its second session (opened 16th January, 1888) an Act was passed to regulate pearl-shell and bêche-de-mer fisheries in Australasian waters adjacent to Queensland; and in the third session, opened shortly afterwards, the Act was made applicable to Western Australia. Upon the passing of the Commonwealth Constitution Act of 1900, however, the Federal Council ceased to exist.

**2. Commonwealth Investigations.**—In 1907 the Commonwealth Government decided to demonstrate what might be attained commercially by the application of modern methods. A Federal Investigation Ship, the *Endeavour*, was constructed specially for the work, and a Director of Fisheries was appointed. Experimental cruises were immediately undertaken. These shewed that the Commonwealth possesses an asset of considerable value in her sea fisheries. The scope and results of the inquiries are set out in the reports issued by the late Director.

**3. Scope of the Inquiry.**—The immediate scope laid down for the investigation was, shortly, as follows:—

- (i) By various means of capture to ascertain what marketable food-fishes may be found in ocean waters adjacent to Australia.
- (ii) In what quantity they may be taken.
- (iii) To what extent they migrate, and whither.
- (iv) How they may be conveniently and economically captured.
- (v) By systematic survey to find out and chart suitable fishing grounds.

In addition to the work which was thus carried on in the various recognised methods of capture (including long-line and drift-net fishing, etc.), hydrographic survey work, etc., was carried out for the purpose of ascertaining the nature of the sea bottom, depth of water, currents, and sea temperature.

4. **The F.I.S. "Endeavour."**—The construction of the investigation vessel was undertaken in the Commonwealth, and was upon the lines shown by the most recent European experience to be of greatest advantage, with necessary modifications to suit the Australian climate. A description of the vessel, which was the first Commonwealth-owned seagoing ship, is given in Official Year Book No. 6, p. 473. Up to the end of 1913, 85 cruises had been made in eastern and southern waters. In 1914, 13 more cruises were successfully undertaken; but the vessel with all on board, including the Director, was lost on her 99th cruise, which was commenced on 20th November, 1914.

5. **Trawling Grounds Discovered by the "Endeavour."**—According to information supplied by the Commonwealth Department of Trade and Customs, it would appear from the experiments carried out by the *Endeavour* on the shelf of the east coast of Australia, that the best trawling grounds extend from near Port Stephens, in New South Wales, past Sydney to Gabo Island, continuing across the eastern slope of Bass Strait past Flinders Island to Tasmania. These trawling grounds cover an area of approximately 6,000 square miles, and are within easy access to two markets—Sydney and Melbourne. Extensive operations have been carried out on these grounds, and fish in payable quantities have been obtained.

A very rich trawling ground has also been located in the centre of the Great Australian Bight, estimated to cover an area of about 4,000 square miles. The depth varies from 80 to 300 fathoms, but the greater portion of the trawlable area is situated between 100 and 200 fathoms. Excellent results were obtained by the *Endeavour* in this locality, *fine rock ling and flathead being among the many choice varieties caught*. This ground is situated about half-way between Adelaide and Albany, and about two days' steaming from either place.

In both of the trawling areas referred to above, considerable quantities of prime edible fish have been caught by the *Endeavour*, thus demonstrating the potential value of Australia's deep-sea fisheries.

6. **The Continental Shelf.**—In addition to the primary duty of locating payable trawling grounds, extensive hydrographic surveys were carried out by the *Endeavour* along the coast from the north of Queensland to the west coast of Western Australia. Soundings, samples of the sea bottom, sea temperatures, etc., were taken, principally within the hundred-fathom line, in order to determine the suitability or otherwise of the localities for trawling. These observations were, in most instances, taken prior to the casting of the trawl net, which was the principal means of capture used by the *Endeavour* for ascertaining the richness of areas so far as the abundance of fish food was concerned. Most of the soundings have been charted and are available for public information.

The late Mr. H. C. Dannevig, formerly Director of Fisheries for the Commonwealth, in his "Report on the Continental Shelf on the East Coast of Australia" (Fisheries—Volume III, Part 6), explained how systematic surveys were carried out by him on the *Endeavour* and information obtained as to the nature of the continental shelf which surrounds the Australian continent.

The shelf consists of a narrow submerged ledge, varying in width from 10 miles to more than 100 miles, covered by a depth of less than 100 fathoms. From the outer edge of this ledge or shelf the bottom slopes away more or less abruptly towards the great ocean depths. It is within the area of the shelf that trawling grounds may be looked for.

On the east coast of Australia, the typical shelf commences at Sandy Cape in Queensland, and continues southwards. For about 360 miles, or south of Smoky Cape in latitude 31° S., the shelf presents peculiarities which gradually disappear further south. One of these peculiarities is that the shallow portion of the shelf continues seawards for a considerable distance, so that, for instance, at Double Island, the depth is only 50 fathoms. At this depth the shelf may here be said to terminate, as, at depths



from 60 to 100 fathoms, apart from being narrow and rocky, the sea floor is frequently so steep as to form part of the general slope downwards to abyssal depths. Another peculiarity is that northwards from Cape Moreton the shallow portion of the ledge is mainly covered with coral sand, which southwards gives way to a somewhat yellow sand, occasionally interspersed, in localities where the currents are strong, with gravelly beds.

Southwards from Smoky Cape the relative proportion between the inner and outer areas becomes reversed. At the Cape itself the shelf is narrow and divides into two equal belts; the shallow area of less than 50 fathoms, and a deeper stratum with an average depth of 70 fathoms. From here southwards the outer stratum becomes gradually wider at the expense of the inshore or secondary ledge, a maximum width of which is found in the Newcastle Bight, where the inshore ledge is seven to eight miles wide, while the outer ledge extends for another twenty-one miles before breaking off into the deep. Simultaneously with the appearance of the outside ledge at Smoky Cape the depth of the "break off" increases quickly to about 100 fathoms, and remains so for the remainder of the coast south to Gabo Island.

Southwards from Gabo Island the shelf widens out considerably, and consists entirely of the outward or deeper stratum, which, between 50 and 300 fathoms, is many miles wide. The edge gradually bends westward parallel with the coast until opposite the mouth of the Snowy River, where at a distance of about thirty miles from land it turns abruptly to the south. On approaching the bend, the shallow area (of less than 50 fathoms) has gradually extended at the expense of the outer ledge, and while the former continues westward through Bass Strait and connects Victoria and Tasmania, the latter extends as a relatively narrow belt along the eastern slope past Flinders Island and along the east coast of Tasmania.

The hundred-fathom line from the south of Tasmania to the western end of the Great Australian Bight was also surveyed by the *Endeavour*. On that portion of the coast it was found that the continental shelf was considerably wider than on the east coast, and the slope of the shelf more gradual.

7. **Publications of the Commonwealth Fisheries Department.**—New and rare species of fish and marine forms secured by the *Endeavour* have been preserved, examined and described by various scientists, recognised as authorities on the subject of marine life. The following monographs have been published by the Department of Trade and Customs, the names of the authors being appended :—

Subject.	Author.
<i>Mollusca</i> (2 parts) .. ..	Charles Hedley, F.L.S. (Assistant Curator and Conchologist, Australian Museum, Sydney).
<i>Fishes</i> (4 parts) .. ..	Allan R. McCulloch (Zoologist, Australian Museum).
<i>Sponges</i> .. ..	E. F. Hallmann, B.Sc. (Australian Museum).
<i>Assymetron</i> .. ..	Miss Janet W. Raff, B.Sc. (Melbourne University).
<i>Globigerina Ooze</i> .. ..	F. Chapman, B.A., A.L.S. (Palæontologist, National Museum, Melbourne).
<i>Hydroïda</i> (3 parts) .. ..	W. M. Bale, F.R.M.S.
<i>Foraminifera and Ostræoda</i> .. ..	F. Chapman, B.A., A.L.S.
<i>Algæ</i> .. ..	A. H. Lucas, M.A. (Sydney Grammar School).
<i>Polychæta</i> (2 parts) .. ..	William Benham, M.A., D.Sc., F.R.S. (Professor of Biology at the University of Otago, N.Z.).
<i>Gephyrean Priapulæ</i> .. ..	Do. do. do.
<i>Sea Lilies, Star Fishes, Brittle Stars and Sea Urchins</i> .. ..	Hubert Lyman Clark (Curator of Echinoderms, Museum of Comparative Zoology, Cambridge, Mass., U.S.A.).
<i>Cephalopoda</i> .. ..	S. Stillman Berry.
<i>Spider Crabs</i> .. ..	Miss Mary J. Rathbun (United States National Museum, Washington, D.C.).

The following papers were, in addition, prepared by the Director of Fisheries, the late Mr. H. C. Dannevig :—

First and Second Preliminary Reports on the Fishing Experiments carried out by the F.I.S. *Endeavour*.

Notes on Australia's Fisheries, with a summary of the results obtained by the F.I.S. *Endeavour*.

Paper on the Continental Shelf of the East Coast of Australia.

Paper on the Physiography of Bass Strait.

## § 6. The State Trawling Industry—New South Wales.

As far back as the year 1898, the New South Wales Government equipped a small vessel called *Thetis* for the purpose of investigating the potentialities of the State coastal waters in regard to the supply of edible fish. The knowledge gained from the cruises of this vessel was, of course, considerably augmented by that obtained since 1907 by the more modern methods adopted by the Commonwealth vessel *Endeavour*. In view of the favourable outlook, the State Government determined to exploit the fishing industry. The necessary vessels and equipment were ordered, and by the middle of the year 1915, three steam trawlers built of steel and equipped in accordance with the most up-to-date methods had commenced operations in the coastal waters. Other vessels have also been built for trawling and surface fishing. It was not long before these vessels had proved the existence of highly valuable trawling grounds within a day's steam of Sydney Heads, and what is believed to be one of the most prolific areas in the world has been located within three hours' steam of the home wharf. The ample product has been landed and sold to the public at extremely low rates in the State retail depots as well as at occasional sales in markets and in country districts.

There are seven State retail fish depots, six in the metropolitan district, and one at Newcastle.

Moreover, in connection with the undertaking, arrangements have been made for the collection and distribution of fish taken by coastal and estuarine fishermen. With this end in view, large refrigerating stations have been built at Newcastle, Clarence River, and Port Stephens. The scheme has proved a great boon to fishermen by obviating the losses caused by the uncertain supply of ice and the absence of facilities for marketing.

There is a strong feeling that it is desirable for either the Government or the City Council to take over the entire control of the fishing industry.

## § 7. Fish Preserving.

Bounties were provided for ten years by the Federal Government for fish preserving, the rate payable being  $\frac{1}{4}$ d. per lb. The amounts paid were £27 in 1907-8; £1,727 in 1908-9; £311 in 1909-10; £115 in 1910-11; £168 in 1911-12; £103 in 1912-13; £80 in 1913-14; £156 in 1914-15; £106 in 1915-16; £177 in 1916-17. In 1917-18, £35 was paid in satisfaction of a claim made in the preceding year. Up to the present but little development has taken place, the establishments which claimed bounty for fish preserving numbering only one in 1917-18, as compared with five in 1916-17, two in 1915-16, and five in 1914-15.