

1885.

NEW ZEALAND.

DEVELOPMENT OF COLONIAL INDUSTRIES

(PAPERS RELATING TO THE).

Presented to both Houses of the General Assembly by Command of His Excellency.

I. FISHERIES.

CORRESPONDENCE.

No. 1.

Mr. J. MACKENZIE to the Hon. Sir JULIUS VOGEL.

SIR,—

Port Chalmers, 29th March, 1885.

After reviewing the conversation Mr. Thomson and myself had the honour of having with you yesterday about colonial fishery, I think that perhaps it might help you in gaining further information on the subject, unconnected with local or interested opinion, by giving you condensed extracts from my note-books written at the time I made the examination in each locality. I may here state that the firm of Marshall and Co., who commissioned me to make the researches referred, is now associated with the firm of Gillon and Co. The new departure, so to speak, in Scotch fishing, viz., steam-trawling, has caused the amalgamation of the two firms. Although I have not the authority of the firm for using their name, I do not think there is any harm in doing so.

Auckland was my first port of call. The intense heat of the climate there theoretically is against it as a fish-preserving or curing country for other than the most costly processes of preserving and the dearest kinds of fish, only suitable, as far as price is concerned, for consumption as a delicacy and rarity by the wealthy. I carefully fished the Firth of Thames, round Cape Colville to Port Charles, Kennedy Bay, and Mercury Bay; found plenty of firm, delicate fish, the snapper being the only large fish that could be got in anything like large quantities. Examined the coast northwards as far as Whangarei Bay; found snapper, mullet, kahawai, and bream of fine quality; but as the weather was so bad I did not devote much attention to this locality, further than to satisfy myself that fish in countless millions frequent the neighbourhood of Great and Little Barrier Isles, and the Firth of Thames. I crossed overland to Kaipara Harbour. During my visit the whole harbour from Helensville at the one end to Aratapu at the other end, a distance of over thirty miles, seemed to be actually swarming with the largest and finest mullet in the world. Those fish will not take hook and bait, and are very difficult to net. For tinning this is a fine fish, but, as they are covered with a thick coat of very strong scales, the cost of cleaning them for tinning will, in my opinion, cause the cost of production to be too high to allow it to be sold cheap enough to command ready sale other than as a luxury. I am afraid that it will turn soft in the tin. Although I examined the coast-line from Kaipara Heads to Waitara, near New Plymouth, including the harbour or bays of Manukau, Waikato, Whaingaroa, Aotea, and Kawhia, I am not in a position to say that fish always inhabit this region, but I am satisfied that large shoals of snapper, mullet, and kahawai are to be found here during some portion of the year inshore, and most likely offshore all the year round. I found soles or flounders, kelpfish, mullet, and bream everywhere inshore, and also many varieties of small but very excellent fish that I cannot name or classify. After rounding Cape Egmont, rough weather prevented me from fishing until off the Island of Kapiti, and off that island and the Island of Mana I hooked proper and netted moki and rock-cod, and got also crayfish, kelpfish, and butterfish.

Port Nicholson, or Wellington Harbour, and Palliser Bay I did not examine, because I got all the information I wanted from the local fishermen and the Wellington fishmongers. From Wellington I went to Nelson, and from thence to Cape Campbell, on the east. I minutely fished all the Picton Sounds, and also tried the offshore or deep-sea fishing off Cape Campbell. I found the whole of this region actually alive with fish, and the climate more suitable for fish-preserving and curing than north of Cook Strait. The most abundant fish is the Picton herring; not a true herring, neither is it a true pilchard; but it is a good fish, and adapted for tinning and curing, and, as it is found here in immense quantities, it could be so cheaply procured that the export trade

in this article alone should rival in a few years the herring trade from the North of Scotland. Of course this fish, as well as all the herring tribe, are migratory; but fishermen would soon find out its habits, and follow it in its rounds from station to station, as is now done with the Scotch herring. Groper, moki, ling, and crayfish I also found to Cape Farewell, on the west side. The moki is a good fish for tinning, wet salting, and smoke-drying; but, as it will not take hook and bait, but has to be caught in nets, and as it inhabits rocky ground, I was not able to ascertain if it is plentiful enough in this quarter to depend upon it for large supplies. From Cape Campbell, on the west, I did not get a chance to try the fishing on the coast, owing to rough weather, until close to off Martin's Bay, and here I commenced to meet with fish in such numerous shoals that from there to off Oamaru, inshore and offshore, I believe millions of tons of fish could be caught yearly. It is simply a question of proper appliances, and finding out the best and quickest modes of catching the fish; for the fish are there in countless millions, and natural harbours abound from Milford Sound to Oamaru. The Sound swarms with blue-cod, moki, trumpeter, rock-cod, and crayfish; and offshore are ling in great quantities and also groper. Stewart Island coast, in Foveaux Strait, I did not fish, because I got all the information I wanted from a gentleman of the name of Wait, who resided there many years, a very intelligent observer. Raupuka Isles, off Bluff Harbour, in Foveaux Strait, swarms with moki and trumpeter, but, as the moki has to be netted on rocky bottoms, high winds and rough sea, generally prevailing here, make the fishing rather dangerous. Chasland's Mistake, on the mainland, commands splendid moki fishing-grounds, and also blue-cod, rock-cod, and trumpeter fishing. And here I began to meet with the barracouta in large numbers, and found them all the way northwards to off Oamaru; but off Cape Saunders and Otago Heads seems to be a central gathering-ground for countless millions of those fish for several months in the year. Those fish are caught in a most peculiar manner. The fishermen are provided with strong hardwood rods about 10 feet long; to the rod is attached a strong cord 2 or 3 feet long, and to the end of this is tied a piece of red wood, generally cedar, about 4 inches long, $\frac{3}{4}$ inch square, and through the piece of wood a common wrought nail is driven and bent back to form the hook. The point of the rod with the line and piece of wood is vigorously kept describing circles in the water. The fish snaps at the piece of wood, and is flung quickly into the boat. As there is no fang on the hooked nail the fish drops off as soon as it is in the boat. Two men fishing, and one man rowing the boat, will often catch from thirty to forty dozen fish in two or three hours. As the barracouta swims about at great speed, some days it is difficult to follow them about, and if there is a slight sea running the boats now in use cannot work.

The local fishermen tell me that some seasons all kinds of fish are scarce, but, as the fishing hitherto has only been prosecuted inshore and in few places, the fishermen do not know much about the habits of the fish. Ling and groper in great quantities I found from off Chasland's Mistake to off Timaru. Those fish are found sometimes inshore, but to get them in quantity they must be fished for offshore. Otago Harbour commands most extensive and valuable barracouta, groper, ling, rock-cod, and crayfish fishing, and with proper fishing-smacks Otago Harbour could also command the blue-cod fishing. The kinds of fishes that I have satisfied myself can be obtained in large quantities cheaply, and fit for export trade, tinned, wet- and dry-salted, and smoke-dried, are Picton herring, in Cook Strait. Blue- and rock-cod, moki, trumpeter, groper, ling, barracouta, crayfish, cockles, flounders, trevalli, silverfish, mullet, kelpfish, gurnet, and about twenty other varieties, including a kind of mackerel, abound on the coast of both Islands, and tinning and curing factories would use all in their season, if ever established. But the other kinds I have mentioned, along with snapper and large mullet of the North Island, are the kinds to make the large trade with; and no other country in the world has such a variety, and distributed round its coasts so well. As a central station for fish-curing and fish-tinning, Stewart Island seems to me to be one of the most suitable places in the world. It commands the best inshore and offshore fishing-grounds in the colony. Sawdust, the proper ingredient for smoking, can be obtained in abundance for taking it away. There is plenty of timber and water. All that is wanted is population to supply the labour for tinning and curing factories, and a market for the preserved and cured fish. If capital, aided by Government subsidy, will start operations here, Stewart Island will be one of the wealthiest provinces of the colony. I hope I have been able to state my views so as to be understood by you.

Sir Julius Vogel.

I have, &c.,

JOHN MACKENZIE.

No. 2.

Messrs. THOMSON BROTHERS to the Hon. Sir J. VOGEL.

SIR,—

Port Chalmers, 4th April, 1885.

Referring to our conversation *re* fish-tinning, we do not wish you to understand that the quantity named as obtainable now, if wanted—namely, 50 tons daily—can be procured all the year round. The present month is the time when they are to be had in largest quantities; next month they are not so plentiful at the heads, and gradually remove farther south until they get beyond the reach of our fishermen here with their present appliances; the price rising in proportion to difficulty in catching.

With regard to the bonus on fish exported, we would respectfully suggest that oysters and other shellfish be specially dealt with, as otherwise it might lead to large quantities of these being rushed into both Sydney and Melbourne, with the view of earning the bonus alone. If tinned it would be quite fair to encourage generously, but not in bulk in their natural condition. We may state that at present about one-half only of what is sent from the Bluff reach the Melbourne market in condition for sale.

Sir Julius Vogel, Wellington.

We have, &c.,

THOMSON BROTHERS.

No. 3.

REPORT ON LANDS selected as SITES for FISHING STATIONS in County of Sounds.

GENERAL.

In carrying out the work intrusted to me, of selecting land for reservation with a view to the fishing industry, it is only in the Pelorus Sound I was able to make the selections on anything like a definite plan. In Queen Charlotte Sound and Port Underwood so much of the land has passed into private hands that it is impossible to predict where the central or curing stations will be established, as this, in a great measure, must now depend on the terms persons desirous of embarking in the industry can make with the owners of the ground. In the Pelorus Sound, finding blocks of land well situated and in every way adapted for the central stations, and having determined on these sites, my next care was to select other and smaller blocks to serve as outposts, or places of refuge or shelter, from the violent and sudden changes of wind which characterize the climate of the district. Although generally throughout the County of Sounds the land for one chain deep above high-water mark has been reserved, where the land at the rear has been purchased, the right to use this reserve, except as a road or to merely land on, would undoubtedly be questioned. When fishing becomes a regular industry, I am satisfied that it will be found expedient to have erected in certain situations houses or places for which those engaged in the work may make when unable to reach the central stations or their regular homes, and it was to provide for this that I determined on the outposts above mentioned. At the same time, these smaller blocks of land, being contiguous to good fishing-grounds, may become the permanent homes of a few individuals. Along the shores of Queen Charlotte Sound there are already a number of reserves where places of refuge might be erected. I do not, therefore, think it necessary to make any special reservation of land on that score in this part of the district.

In all cases, I think, it is expedient that the reserves should extend from the beach to the top of the range, in order that, under whatever control they may be placed, the officers in charge may prevent the destruction of timber on the higher portion of the hills for the preservation of the water supply.

In the different portions of this report the names given have been taken partly from the Admiralty chart,* which I found a great assistance in making the selections. Where no name appears, either on maps or chart, I have taken that in common use in the district.

On the district maps furnished me, which I now return, I have marked, as nearly as I could judge, the frontages of the various reserves proposed, leaving the other lines to be determined whenever a survey is made.

PELORUS SOUND.

Regarded as a fishing-ground the Pelorus Sound may conveniently be divided into three portions: the inland, or the portion south of a line drawn between Tawero and Puaki Points; the central, north of the aforesaid line to East Entry and Danger Points, including Beatrix Bay, Tawhitinui Beach, and Tennyson Inlet; and the seaward portion, extending from East Entry Point outward to the open sea. In the first or inland portion, though fish are plentiful enough for local consumption, they are not sufficiently abundant to warrant the starting of curing establishments. I have therefore selected no land for reservation in this division of the Sound. In the central portion, from the abundance of certain descriptions of fish, such as kahawai, rock-cod, mullet, kingfish, &c., I am satisfied that in time the work of preserving will be found profitable.

I therefore selected two sites: one at Tawa Bay, near the entrance of Tennyson Inlet, where a village community might be established; and another smaller block of land on the northern side of Apuau Channel, knowing it to be an excellent place of shelter in all winds.

It is in the outer or seaward portion that the fishing industry will naturally take its rise, for every description of fish found on this coast can here be had in immense quantities. The large block of level land at the head of Anakoa Bay, forming a natural centre for this portion of the district, should, I consider, be withdrawn from sale until it can be dealt with for special settlement. In connection with this central site I have selected two other sites: one at Orchard Bay, on Forsyth Island, where boats might take refuge in northerly gales; the other an unnamed bay on Kenny's Isle, which, though open to the north, is, from some local causes, safe in all weathers.

Tawa Bay.—A well-timbered and well-watered valley, of considerable extent, drains into the head of this bay. The land, though stony, is good, judging by the vegetation. A level beach, of fine firm gravel, on which boats could easily run up, is exposed along the head of the bay at low-water. Though open to the north-west winds, a landing from boats could be safely effected in the north-east corner of the bay. I would advise the reservation of the whole of the valley referred to, taking the watershed as a boundary, and continuing the line to the entrance of the bay.

Apuau.—The configuration of this part of the coast and the contiguity of Maud Island make this one of the best places of shelter in the Sound. In the small nooks between the projecting rocky points the water is always still however rough it may be outside. At the head of each nook is a gravelly beach on which a landing can be effected. The land is of a terrace-like nature, sloping upwards to a steep birch-clad hill-side. Round Maud Island and in the channel are well-known fishing-grounds. I have marked on the district map boundaries of land which I consider it advisable to reserve.

Anakoa Bay.—By comparing it with other valleys which have been surveyed in the Sound, I estimate the extent of level and sloping terrace-land at the head of this bay at about 3,000 acres. The whole is heavily timbered, the amount of what is now known as marketable timber being, however, comparatively small, tawa being the predominating tree. About one mile from the extreme head of the bay the terrace-land commences, and this I consider to be the best site for a township,

* These names have been altered to names on the district maps.

taking the County of Sounds as a whole, and looking forward to the establishment of the fishing industry. The bay in front is a perfectly safe harbour in all weathers, being even now frequently resorted to for shelter by coasters and vessels bound for the Australian ports. There would be no difficulty in connecting Anakoia by a road with the head of the Kenepuru Reach, thus bringing the place within easy distance of Picton. Were this done I am satisfied it would become a centre for the fishing-grounds as far as the French Pass and D'Urville Island.

In common with all the large blocks throughout the district the Anakoia land varies very much in quality. At the place recommended for a township the terrace is stony, but a little farther towards the head of the bay these stones disappear from the surface. Generally the low land of the valley is very good and well drained. Owing to the narrowness and length of the bay, I do not think the place will suffer during gales from the salt spray, which in this part of the Sound is often found injurious.

Orchard Bay, Forsyth Island.—I selected this site as affording a good shelter or place of refuge from the north-west wind, which is one of the prevailing winds, and blows with great violence. The land here is of a terrace-like nature, but poor and stony. The beach, covered with large rough stones, would be unsafe for boats during southerly weather. There is plenty of fire-wood on the ground, and water can easily be procured by sinking, though it is not always to be found on the surface. The map will show the portion I recommend for reservation.

Shelter Cove, Forsyth Bay.—This little bay has so long and frequently been resorted to as a camping-place by fishermen and persons travelling in the Sound that I have given it the name mentioned. It is not marked either on the district map or chart of the Sound. From a small wooded valley or gully at the back a good stream of fresh water runs on to the beach, which is of fine gravel, perfectly safe to run boats on to. I am informed by persons who have frequently visited this bay that even during the north-west gales, to which it is open, no sea of any consequence runs in. I would recommend the reservation of the whole of the little valley following the watershed.

Port Gore.—This inlet, as a fish-producing locality, is exactly similar to the seaward portion of the Pelorus Sound. In it I have selected one block of land for reservation, viz., Melville Cove, at the extreme south-east corner of the inlet.

Melville Cove.—The small, well-timbered, and well-watered valley which drains into the bay opposite the opening of the cove would make a good site either for a curing establishment or for the residence of persons engaged in fishing. The level land of the valley is mostly stony, and has been at one time under cultivation, though now grown up with scrub. The soil on the hillsides is good, large marketable timber growing to a great elevation. The beach at the head of the bay is a coarse gravel, well adapted for landing boats on; it would, however, be subject to a heavy sea during easterly weather. During such weather, however, boats could always run into the northern arm of the cove with safety. Melville Cove could easily be connected by road with Anakoia Valley.

QUEEN CHARLOTTE SOUND.

Here, as in the Pelorus, it is in the outward or seaward portion that any large supply of fish will be obtained; but there is in the inner part of Queen Charlotte Sound a greater abundance of fish than in the corresponding portion of the Pelorus, which I attribute to the absence of large rivers like the Pelorus and Kaituna. To the inner portion of the Sound the Town of Picton forms a natural centre of operation; and it is even probable that it may become a central station for the whole Sound, the advantages of postal, telegraph, and steam communication outweighing the cost of transporting the fish from the seaward portion. I have selected two blocks of land for reservation: one at Arrowsmith Bay, Tory Channel, the other in Resolution Inlet. I do not consider either of them suitable sites for curing establishments, but both of them are well situated and adapted for the homes of persons engaged in fishing.

Arrowsmith Bay.—The land selected along the western shore of the bay from Section No. 87 to the outer point is a hillside broken into a number of small wooded gullies, from which streams of water flow. Though on a slope, it is not too steep for building purposes, and some of it might be converted into gardens lying well to the sun. The beach in front is safe for boats during all weather, the island at the mouth of the bay, and the bank in the centre, shown on the chart, preventing the sea from rising, however strong the wind. This is a good central situation for fishing in Tory Channel or outside the heads.

Resolution Bay.—For the large fish obtainable about the mouth of the Sound this inlet is excellently situated. At the mouth of the inlet is a good hapuka-ground, and from that down in the direction of Jackson's Head and Long Island. These—moki and other large fish—are in great abundance. The land selected by me, at the extreme head of the inlet, is a small, well-wooded valley, containing two good streams of water. The land is of a terrace-like nature, well adapted for a small village site. Though the beach is rather exposed to the southerly winds, I do not think there would ever be any danger for boats landing there.

PORT UNDERWOOD.

As a fishing-ground this inlet differs much from either of the Sounds. The snapper, plentiful in the Pelorus, but very scarce in Queen Charlotte Sound, is entirely wanting here, as are also kahawai and barricouta; the haturi being the most plentiful fish, frequenting the harbour in immense shoals. Hapuka are also abundant, and moki fairly plentiful. The crayfish, unknown in the Pelorus, and scarce in Queen Charlotte Sound, is plentiful here.

After careful inquiries, and visiting several bays, I concluded that none of the land now in the hands of the Government is worth reserving for fishing purposes. Every portion of level land on which permanent streams of water exist has passed into private hands. Ocean Bay would have

made an excellent fishing-station, but it was sold while Marlborough was still a portion of the Nelson Province. The proprietor of the ground, Mr. M. Aldridge, alive to the importance of having fish-curing established in his part of the district, offers to allow any company or individual desirous of embarking in the industry a site on a mere nominal rent.

Picton, 20th April, 1885.

JAS. RUTLAND,
Ranger of Crown Lands.

No. 4.

LIST OF FISHES.

THE following are the names of edible fishes mentioned in the Schedule attached to the Order in Council prescribing the minimum sizes under "The Fisheries Conservation Act, 1884:"—

Hapuka	Horse-mackerel	Mullet
Kahawai	Trevalli	Butterfish
Snapper	Kingfish	Red-cod
Tarakihi	Warehou	Flounder
Trumpeter	Mackerel	Soles
Moki	Rock-cod	Garfish
Barracouta	Gurnard	Herring

No. 5.

Dr. HECTOR to the Hon. Sir JULIUS VOGEL.

On the Food Fishes of New Zealand.

Wellington, 30th May, 1885.

THE following information, condensed from my previous reports and brought up to date, will enable exact reference to be made to the species of fish referred to in the foregoing papers:—

It is necessary to state that our knowledge of the fishes around the New Zealand coast is very imperfect, as our opportunities for observation have hitherto been confined to the shallow waters of harbours, or to the vicinity of rocky promontories.

Of the deep-sea fish, and those which frequent banks and shoals at a distance from the coast, little has been ascertained, except from specimens which have been cast on the shore during heavy storms.

The distribution of sea fish is effected chiefly by causes regulating the distribution of their favourite kinds of food. Thus, swarms of Medusæ, Mollusca, and larval Crustacea crowd the seas round our coast during the summer months, attracting shoals of small fishes, which again are pursued by those of predacious habits, so that many kinds visit our shores at that season, which are absent during the colder months of the year. Many valuable fishes which, from their occurrence in large migratory shoals are of greatest commercial importance, appear to feed chiefly on those lower forms of marine life which have only an ephemeral existence, dependent on the character of the coastal currents. In the Northern Hemisphere it has been ascertained that the herring is restricted to those parts of the sea in which the temperature is never less than 54° nor higher than 58° Fahr., a range so limited that it probably relates to the existence of some delicate marine animal that forms the food of the fish. The study of the ocean currents that sweep our coasts is therefore invested with great practical interest, as it will enable us to infer, from the experience gained in other parts of the world, the character of the marine life which stocks our seas, and thus enable fishing communities to be located in the most advantageous positions. The establishment of marine observatories, for studying the habits, development, and life-history of fishes useful for food supply, and of the lower forms of life upon which they in turn subsist, has been effected in many parts of the coasts of Europe and America, and also near Sydney, with most beneficial results; and any vigorous effort to regulate the existing fisheries of our coasts, or to introduce new species into the fauna, should be preceded by the establishment of similar observatories on the New Zealand coast. From the data respecting the direction and average temperature of the sea round the coast of New Zealand, obtained from a series of observations, it appears that the coldest part of the sea is on the south-east coast of Otago, where the temperature of the surface-water ranges from 48° in winter to 57° in summer, corresponding averages for the atmosphere being 43° to 53°. The cold current thus indicated, which probably exercises a good effect on the quality of the fish, besides limiting the range of a few species, appears to extend its influence up the East Coast as far as Cook Strait; but on the west side of the Islands the average winter temperature of the sea was found to be decidedly higher, and equal to that experienced 6° of latitude farther to the north on the East Coast. In the extreme south the summer temperature does not, however, rise to a corresponding extent, but on the whole there is evidence that the warm equatorial current which is known to skirt the east coast of Australia, and has been, by Commodore Wilkes, likened to a southern counterpart of the Gulf Stream of the Atlantic, must be directed against the west coast of New Zealand, tending to equalize the temperature in that region. These ocean currents are now considered to result from long continuance of winds in one direction; and, in support of this view, we find that there have been several instances of fishes that belong to the Australian coast, and turtles, accompanying areas of drift seaweed, stranding in Cook Strait, and even on Stewart Island.

On the north-east coast of New Zealand, as far south as the Bay of Plenty, there are further evidences of a current from the north to be found in the abundance of the flying-fish, the occasional visits of the true nautilus, and also of the argonaut or paper-nautilus. Gigantic pods of a leguminous plant that grows on the Fijis are also frequently cast up in the same way that West Indian seeds

are thrown on the coast of Scotland by the Gulf Stream. This current, although it reaches New Zealand, does not however appear to pass down the east coast, as there is a steady drift from New Zealand to the eastward, by which sawn logs, telegraph poles, and on one occasion, on the authority of Mr. H. Travers, a number of totara sleepers that broke adrift from Pigeon Bay during the earthquake wave in 1868, were cast up on the Chatham Islands, which lie 450 miles east of Banks Peninsula. These islands appear, as it were, to lie in an eddy to the leeward of New Zealand, as a much larger proportion of pumice-stone and driftwood, floating to the eastward, finds a resting place there than the relative size of the two groups of islands would lead us to expect.

It is, most probably, this tropical current sweeping from the East Cape to the Chatham Islands that gives rise to what the whalers call the "Banks," which is a favourite feeding-ground for the sperm whale. The depth of water in this area has not yet been explored, and it is considered doubtful if there is really a shallow bank, or anything more than a tract of ocean which is unusually rich in marine life.

It is important to note that, according to the most recent discoveries, it appears that the eggs of many species of marine fish rise to the surface of the sea and float about while hatching in the warmer surface-water, so that the set of ocean currents towards or away from an island like New Zealand might seriously interfere with the acclimatization of some kinds of food-fish.

If we compare the assemblage of fishes which we find in the New Zealand seas with those in the European region, we find that, on the whole, they resemble those which are found on the coast between Madeira and the Bay of Biscay more than those which are caught about the north of Scotland. If we contrast the thirty-three sea fishes that are fit to be used as food in New Zealand, we have among the constant residents on all parts of our coast the hapuka, tarakihi, trevalli, moki, aua, rock-cod, wrasse, and patiki; and while the snapper, mullet, and gurnet are only met with in the North, the trumpeter, butterfish, and red-cod are chiefly abundant in the South. But, with the exception of the patiki or flounder and the red-cod, none of these are representatives of fishes that are common even in the south of Britain, while from the more northern seas similar fishes are altogether absent.

In addition to those which remain throughout the year, a very large number of the fishes on the New Zealand coast, owing to its geographical position, are pelagic in their habits, and roam over a wide range of ocean, visiting our shores only irregularly in pursuit of food. Of the edible fishes of this class, by far the largest number are visitors from warmer latitudes, such as the frostfish, barracuda, horse-mackerel, kingfish, dory, warehou, mackerel, and garfish, while only the ling, hake, haddock, and a few other rare fishes, which are worthless as food, are among those of more southern types which reach the New Zealand coast in their migrations.

There is, however, no reason to complain of any want of useful variety in the New Zealand fishes as compared with Britain, for we find that, out of 208 species of fishes enumerated as occurring in the Britain seas, including many which are extremely rare or only occasional visitors, only forty are considered to have a marketable value. In New Zealand, notwithstanding our very imperfect knowledge, especially with regard to the gregarious tribes, which there is reason to believe inhabit shoals at some distance from land, out of 130 sea fishes, of which thirty are only known to us by report, we have nearly as many varieties used for food as are brought to market in the British Islands.

The following notes refer to the fishes mentioned in the regulations under "The Conservation of Fisheries Act, 1884:"—

Hapuku.—The first on the list of marketable fishes is the hapuku or whapuku of the Maoris (*Hectoria gigas* of Count Castelnau), or habuka, as the name is generally pronounced by Europeans, who in the south apply the name proper to the same fish. It is also occasionally called the codfish, which is altogether erroneous, as it is more properly the representative of the sea-perch (*Seranus*) of European seas.

This fish has a peculiar interest, from its close affinity to the famous "Murray cod" (*Oligorus Maquariensis*) which inhabits the rivers in the interior of the Australian Continent. The hapuku, however, never enters fresh water, but is a deep-sea fish, though not generally captured far from the coast. Round exposed rocky capes and islands that rise in twenty to fifty fathoms water, with patches of sandy bottom, appear to be the favourite feeding-grounds of this fish during the season, and on nearly every part of the New Zealand coast where such conditions prevail the hapuku may be obtained from November to May at the proper time of the tide. During the winter season they are seldom caught, as they probably leave the coast for deeper water. In the month of July I have, however, caught many of them far up the Sounds on the west coast of Otago, in 50 to 60 fathoms of water, heavy with roe, for the purpose of spawning; for at this season they appear to crowd up to the freshwater falls by which the rivers often discharge into the deep sea in this wonderful region. Hapuku fishing is excellent sport, the average weight of the fish being about 45lb., but occasionally large specimens, reaching to 130lb. weight, are caught. The head and shoulder-cut of this fish is most dainty food, but the flesh of the remainder is rather coarse and stringy; it is, however, well adapted for pickling, and may yet become a valuable article of commerce. The hapuku in the northern parts of the colony is of two kinds, but whether there are different species has not been determined.

Kahawai.—This fish (*Arripis salar*) is frequently termed the native salmon, from its elegant form and lively habits, in which it resembles the true salmon. During the summer months these fish—which reach the weight of 7lb., but are more usual from 2lb. to 3lb.—visit the coast in great shoals, especially frequenting the mouths of streams. They afford good sport to the angler, as they rise to an artificial fly, and are readily taken at sea with spoon-bait. When of large size the flesh is rather dry and tasteless, but the young fish, when under 1lb. in weight, and quite fresh, are very delicate and well flavoured, especially when boiled in water acidulated with vinegar. In the early stage of their growth they are spotted on the sides like trout, but with fainter colours. Kahawai is

one of the early fishes in spring, at which season it follows voraciously the young fry of the aua, or sea mullet. It is a fairly good fish for preserving in tins, and has been successfully prepared in this manner by Mr. Liardet, of Wellington. The kahawai appears to be a migratory fish, avoiding only that portion of the coast that is washed by the cold south-east current.

Snapper.—There are few fishes better known in the northern parts of the colony than the snapper (*Pagrus unicolor*). The name snapper or schnapper, by which it is best known, is adopted from Australia, its Maori name, tamure, being seldom used by Europeans. It represents in these seas the braize of the European markets, and is remarkable for its singularly abrupt profile and the brilliant metallic lustre of its scales. The snapper is not frequently reported to occur south of the Kaikoura Peninsula; a few have been caught off Moeraki, but the fish which usually goes by that name in the Dunedin market is the tarakihi. The snapper frequents shallow water, and is generally caught with the net in Wellington Harbour, but the Natives may often be seen catching them with a hook and line in the surf on exposed sandy beaches when the wind is offshore. In clear shallow bays troops of this fish may be observed rooting up shellfish that are buried in the sandy bottom, and crushing them with their powerfully-armed jaws. 5lb. is the weight of an average sized snapper in Wellington market, but they are frequently obtained four times that size. It is a handsome fish for the table, and when boiled or baked, the latter being the preferable process of cooking, it may be eaten either hot or cold.

Tarakihi (*Chilodactylus macropterus*).—This is a very common fish in the market, and comes into season in September. Two sizes are generally sold during the spring months—the smaller ones, three or four to the pound, being the best; the flesh of the larger fish, which are 3lb. to 6lb. weight, being considered rather tasteless. Throughout the whole year the tarakihi may be caught with the hook in ten to twenty-five fathoms water with a sandy bottom.

Trumpeter.—The trumpeter (*Latris hecateia*), which is the Tasmanian name for this fish, and which the Natives call kohikohi, is one of the best flavoured of any of our fishes, and, though abundant, is so extremely local in its habits, remaining continually on certain patches of feeding-ground, that it is only rarely brought to market. It feeds on a sandy bottom in twenty-five to thirty-five fathoms water, preferring banks or shoals. It is caught with the hook, and, if the proper fishing-ground is once found, a large haul of these fish, averaging about 6lb. each, is soon obtained, but they frequently reach a weight of 35lb. The areas which they frequent are very limited, and require to be carefully marked. Whether fresh or smoked, the trumpeter always commands a good price, yet it is rarely seen in any market, except in Dunedin. It would be an excellent fish for tinning or for sending to the Australian or Home markets in a frozen state.

Moki.—The moki (*Latris ciliaris*) is an abundant fish in the Wellington market, and, though occasionally seen at all seasons, is most common and in best condition during spring and early summer. It rarely takes bait, but is chiefly caught with the net. The quality of this fish is very varied and much affected by the nature of the feeding-ground, for, though usually rich and well flavoured, it is frequently, even during the proper season, insipid, and with the strong rank taste that characterizes it when out of season. It is found on all rocky points of the New Zealand coast, the usual size being from 2lb. to 4lb., but it sometimes reaches 19lb. weight. The moki is admirably adapted for preserving, and when properly cured and smoked will keep for a much longer time than most other fish when prepared in that manner. When in good condition the flesh of the moki is very rich, and well adapted for being cooked by roasting or baking, which latter is the favourite method of preparing this fish among the Natives in the South. There appears to be a difference in the size of the head and in the tumidity of the mouth in the specimens of the moki brought to market about midsummer, making two well-marked varieties that are supposed by some to be different sexes. Like the trumpeter, it would keep well and command a fair price if frozen for export.

Barracouda.—A very common fish, well known throughout the colonies as the barracouda (*Thyrsites atun*), which name is no doubt borrowed from a fish of similar shape, the barracouda pike of the tropical parts of the Atlantic. This fish is a favourite with the Maoris, who call it the manga or maka. They are obtained at all seasons, but abound in the spring and autumn, and are easily caught with a short piece of red wood having a nail driven through it for a hook. This rude tackle is passed rapidly through the water alongside the canoe or boat by a short line and rod, and is eagerly grasped by the fish, which is then jerked aboard. The usual length of the barracouda is 3 feet, and its weight 5lb. Its flesh is white and flaky, and by some is thought to resemble that of the cod. In the early days of the Otago settlement, when the colonists depended solely on the Maoris for the supply of fish, it was very extensively used. It dries well, and is thus preserved in large quantities by the Natives. When pickled and smoked it is excellent food, and preferable even to fresh fish. Dried barracouda, or snook as it is called, is imported into the Mauritius and Batavia as a regular article of commerce, being worth over £17 per ton.

Horse-mackerel.—This is the hauture of the Natives, and the scad of the Northern Hemisphere (*Trachurus trachurus*). It has a very wide range, being common to the seas of Britain and New Zealand. This fish appears in Wellington Harbour about the end of November, and is one of the commonest offered for sale throughout the summer. Its form is somewhat like the true mackerel, but the line of armed plates along each side at once distinguishes it from the more valuable and rarer fish. Immense shoals of scads are occasionally driven on the beaches round the harbour, by their impetuosity when following their prey into shallow water, or from their sufferings caused by an irritating isopod crustacean that infests their gills at this season. Their usual length is about 13in., but occasionally they are of much larger size, there being probably two distinct forms included under this specific name, which in that case should only apply to the larger kind. This fish is not mentioned as occurring in the southern provinces, but I noted a few on the West Coast at Martin Bay.

Trevalli.—The arara of the Maoris, or the trevalli or cavalli of the fishermen (*Caranx*

georgianus), is a highly esteemed fish, that is very common in every part of the colony during the summer months, but is in best condition at the commencement and close of the season. Its sides are partially armed with keeled spines like those of the horse-mackerel, but its brilliant yellow tints and deep compressed body readily distinguish it. The flesh is very delicate, but less so in the larger sized fish, about 12in. in length being the best size for the table. The trevalli frequents shallow water and feeds among the rocks, so that it may sometimes be caught by the hand at low water. In Auckland it is sometimes called the yellow-tail, but this name appears to be also used for the kingfish. The fish known as trevalli in the Dunedin market is a different fish, allied to the warehou.

Haku.—The haku of the Natives is the kingfish (*Seriola lalandii*) of Wellington and the yellow-tail of Australia. In the months of January and February in each year large shoals of this fish visit Cook Straits and occasionally enter Wellington Harbour. They are generally of two distinct sizes, the smaller about 6lb. weight and 20in. long, and the larger about 4ft. in length and weighing about 40lb. The flesh is very rich and well flavoured, but like all fishes of this class must be eaten quite fresh. These fish are often caught in moki nets, to which they do great damage. They also drive on to exposed beaches, several of them being generally cast up together. The Natives value them very highly, and eagerly search the coast for them at the proper season, and have been known to carry choice specimens far into the interior as gifts to friends. This species has a wide range, being found on the high seas of the Atlantic. In New Zealand it is not mentioned as having been seen farther south than Cook Strait, but in all probability it must occur along the whole of the west side of the Island. In its habits it is migratory and gregarious, like the tunny. The latter fish has, however, a proper representative in these seas (*Pelamys Chilensis*), which, judging by the head of a specimen that was caught in Cook Strait, and now in the Museum, must attain to a length of between 8ft. and 9ft.

Warehou.—The sea bream (*Neptonemus Brama*) is a fish deservedly prized by the Natives. In Wellington it appears in the market in October, and continues at intervals during the whole summer, but the largest specimens are seen in the north during the winter. It cannot be considered a common fish, especially in the south, and according to the Natives, it is very irregular in its visits to the coast. Those commonly brought to Wellington weigh from 1lb. to 6lb., but in the north, outside Hokianga Harbour, they are sometimes obtained 3ft. in length, in which case their weight would not be less than 25lb. or 30lb. The flesh of the smaller sized warehou is rich with a very delicate flavour, and they deserve to be preferred to the tarakihi and young moki, along with which they are generally sold in the market. In Dunedin market, during the autumn months, a closely allied species (*Platystellius huttoni*) passes for trevalli, but these fish are very small, and rarely exceed the prescribed size.

Mackerel.—This valuable fish (*Scomber australasicus*) is well known as an occasional visitant in Wellington Harbour, being called by the Natives tawatawa. In colour, size, and form it closely approaches the common mackerel of England, and is very superior in delicacy to the scad or horse-mackerel, which is commonly called the mackerel in New Zealand. As the mackerel is a migratory fish, making periodical visits to the coast from deep water, it will, no doubt, become better known when regular fisheries are established. In Europe the mackerel is obtained throughout the year, but is most abundant in early summer, and is caught either with a hook or drift-nets. In the north of Auckland the Natives make great preparations for fishing tawatawa at the time of new moon during summer and capture immense numbers.

Rock-cod.—This (*Percis colias*) is the coal-fish of Captain Cook and blue-cod of the settlers in the South, and the pakirikiri of the Maoris, and is the most commonly caught fish among rocks on the coast. When quite fresh it is wanting in firmness, but if slightly salted for twenty-four hours it is greatly improved in quality. In the neighbourhood of rocks, in from 10 to 15 fathoms of water, is the best fishing-ground for the rock-cod, but they are also caught inside harbours, and even far up the Sounds on the West Coast, keeping at about 10 fathoms below the surface alongside of the great submarine precipices that descend vertically for more than 1,000ft. They are, however, rarely brought to market, although they may be caught at any period of the year. Their full size is about 5lb. weight.

Gurnard.—The red gurnard or kumukumu (*Trigla kumu*) is very abundant during the summer months in the harbours in the North, and full nets are sometimes drawn in Wellington with no other fish in them. The full-grown fish weighs about 4lb., but all sizes are used as food, the smaller ones being preferred. The flesh is firm and white, but rather dry and deficient in flavour. The grunting noise which this beautifully-coloured fish makes when caught should be mentioned, as it is a great source of amusement to amateur fishermen.

Kanae.—The grey-mullet (*Mugil Perusii*) is a very familiar fish to residents in the northern parts of the colony, where it forms a staple article of food among the Natives at certain seasons, and is the commonest fish sold in Auckland. Kanae have of late years been commonly obtained on the west coast as far south as Porirua, at the north entrance of Cook Strait, and occasionally enter, but are not common in Wellington Harbour, probably because a rocky coast and deep water are not suitable to their habits. The kanae frequents the tidal rivers, going out to sea in summer and returning in the winter in immense numbers. They are captured generally with nets, but they also take the bait. The Natives frequently capture them on still moonlight nights by paddling their canoes close to the banks of the streams; the fish are startled by the beat of the paddle, and leaping up fall into the canoe. This mullet excels all other New Zealand fishes in richness, and is now dried and smoked in large quantities for sale in Auckland, where several extensive establishments also exist for tinning this fish. In this form it is highly esteemed, rivalling the American tinned salmon in the market.

The makawhiti or aua of the Maoris (*Agonostoma Fosteri*), a common fish obtained at all seasons of the year by fishing from the wharves in the harbours, is commonly called herring, from its general

resemblance in size and form to that fish, except in Dunedin, where it is known as mullet. It is, however, a very different fish in value from the true mullet or kanae.

The red mullet (*Upenoides vlamingii*) represents in these seas a fish that is highly esteemed in Europe, and which was prized by the Romans for their banquets above all other kinds. Our red mullet was first caught by Captain Cook in Queen Charlotte Sound, and the second specimen was not caught for a hundred years afterwards, off the Brothers. It is probably not uncommon, and, if its habits were better understood, could be obtained in quantity for the market.

Butterfish.—The marare of the Natives, sometimes known as the kelpfish among the fishermen and the butterfish in the market (*Coridodax pullus*), is the fish most commonly sold in Wellington during the winter months. It has rather a forbidding appearance, having a dark-coloured slimy skin and inelegant form; it is nevertheless very good food, the flesh being exceedingly short in the grain and well flavoured without being rich, every part of the fish being singularly deficient in oil. It is always advisable to remove the skin as soon as cooked, as if allowed to remain in contact with the flesh while cooling it imparts to it a disagreeable taste. Its usual weight is from 4lb. to 5lb., and the largest specimens measure about 20 inches long. Large quantities of the butterfish are caught in Foveaux Strait and brought to market in Invercargill, and it will probably be found on all parts of the coast where kelp grows. The bones of the marare are singular, from their being of a bright-green colour. It feeds on zoophytes, scraping them from the surface of the kelp with its curiously-formed teeth, which are curved plates, one in the upper and two in the lower jaw, with sharp-cutting edges that cut like scissors. This fish does not bear keeping, nor does it preserve well in any form.

Red-cod (also called the yellow-tail and the haddock) (*Lottella bacchus*) is a well-known fish on some parts of the coast, being the species that is cured and sold as the Findon haddock at Port Chalmers. It is a handsome fish, with a brilliant play of metallic colours when alive. The usual size is about 24in. in length, and weight 4lb. to 5lb. They are generally obtained with the hook where there is a sandy bottom, in ten to fifteen fathoms water. They are common in Port Underwood, and are netted in Wellington Harbour, and, though rarely got on the exposed parts of a rocky coast, are caught in abundance from vessels lying at anchor in the roadsteads off Hokitika and Greymouth.

Lotella rhacinus, a closely-allied species, having a larger head and longer fins, has been termed the hake, but it is apparently a rare fish in these latitudes, and only small-sized specimens have been seen.

Another fish of the cod kind (*Pseudophycis breviusculus*), has a deeper body than the foregoing and more delicate flesh, resembling that of the whiting. It is abundant on the west coast of Otago, where specimens are caught with the hook, in fifteen fathoms water, at the entrance to Dusky Bay, weighing about 5lb.

Pilchard or *Sardine* (*Clupea sagax*). This is a true representative of the herring kind in these seas, and it visits the east coast of Otago every year in February and March, and when the schools migrate they extend as far as the eye can reach, followed by a multitude of gulls, mutton-birds, barracouda, and porpoises. So densely packed are they some years that by dipping a pitcher in the sea it would contain half fish, so that if large boats and suitable nets were employed thousands of tons could be caught. In the beginning of April they appear in Queen Charlotte Sound and are caught in large numbers, and converted by salting and smoking into the highly-esteemed Picton herring. Towards the end of April they appear on the coast of New South Wales, but nevertheless it is very probable that these herrings do not really migrate beyond retiring to the deep sea off-shore to deposit their spawn. Another fish of the same family, not uncommon in New Zealand, and exceedingly abundant in Victoria, is the well-known anchovy (*Engraulis encrasicolus*), being identical with the well-known anchovy of commerce. This fish is easily distinguished from the pilchard by its long head and projecting upper jaw and deeply-cut mouth.

King (*Genypterus blacoides*). This fish, which is not included in the official list, as it should have been, is also known as the Cloudy Bay cod, is exceedingly common in Cook Strait and on other parts of the coast to the southward. It is, however, seldom brought to market, not being as much appreciated for food as it deserves. It is a large fish, reaching occasionally 5ft. in length, weighs 15lb. to 20lb., and has a white flaky flesh that takes salt well, and, being easily freed from bone, is well adapted for curing in the same manner as the codfish of commerce. It is in best condition in the beginning of winter. This is one of the fish that is cast up on the beaches outside Wellington Harbour after heavy gales in extraordinary profusion. It is very voracious, with powerful well-armed jaws, and takes the bait greedily, so that large numbers can be readily caught.

Flatfish.—Under this term are sold many species of valuable food-fishes, which are justly the most highly esteemed of any in our markets. They are all, with one exception, of small size, and frequent estuaries, saltwater lagoons, and the larger rivers. The only deep-sea species we yet know is the so-called turbot (*Amotrites Guntheri*), which is, though a most delicious fish, very unlike turbot. It will be, as at present, rarely seen in the market until deep-sea fisheries are established, when most probably this and many other valuable kinds of fish will come into abundant use.

JAMES HECTOR.

The first part of the document is a list of names and titles, including:

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