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978-1-107-66287-2 - The Resources of the Sea: As Shown in the Scientific Experiments to Test the
Effects of Trawling and of the Closure of Certain Areas off the Scottish Shores
William Carmichael McIntosh
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Blue Shark, the type of a group which often runs man's nets and hooks, and defies his influence

[Frontispiece

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AS SHOWN IN THE SCIENTIFIC EXPERIMENTS
TO TEST THE EFFECTS OF TRAWLING AND OF
THE CLOSURE OF CERTAIN AREAS OFF THE
SCOTTISH SHORES

BY

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DEDICATED
TO THE MEMORY OF
THOMAS LAYCOCK, M.D., ETC.,
PROFESSOR OF THE PRACTICE OF PHYSIC IN THE UNIVERSITY OF EDINBURGH,
AND PHYSICIAN TO THE QUEEN IN SCOTLAND,
A FAR-SEEING AND ACCOMPLISHED PHYSICIAN AND PSYCHOLOGIST,
ALEXANDER MACDUFF, Esq.,
OF BONHARD,
THE IDEAL OF A REFINED AND SAGACIOUS COUNTY ADMINISTRATOR,
AND THE MANY VALUED FRIENDS IN THE COUNTY
AND CITY OF PERTH, 1860-1883,
BY THE AUTHOR.

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PREFACE TO THE FIRST EDITION

THE author has felt it an urgent duty, both previous to and since the work for the Royal Commission under Lord Dalhousie, to watch the various experiments to test the effects of trawling and of the closure, the more especially as these had been originally suggested by himself. Judgment was withheld until all the necessary facts were available, and a sufficient margin of time had supervened for the thorough investigation and testing of the areas. Now, after the lapse of twelve years, and of fifteen since the original work of the Commission was begun; after a study of all that has been done at home and in other maritime countries independently of these experiments; after a prolonged investigation into the development and life-histories of the food-fishes; and after the general statistics of the fisheries had time to settle into a reliable condition, it has been deemed prudent to make a critical survey of the work, and to form conclusions on this important question.

It was hoped that opportunities would have been afforded for repeating in 1898, on the same dates and, as far as possible, under the same circumstances, the experiments of 1884, but the authorities did not appear to see either the way or the importance of such an enterprise. The suggestion was made in no narrow spirit, indeed its acceptance would have entailed very serious responsibilities on the author.

The great aim of the survey has been to search for truth in this complex subject, to weigh carefully every fact bearing on its solution, and to bring an unbiassed mind to the task. To the scientific investigator a conclusion favourable to the continuance of restrictive measures would have been as welcome as the reverse, provided his facts warranted it. Misinterpretation or overstraining of the deductions in any case is equally distasteful, and would be equally short lived.

It is interesting that similar conclusions to those formed by

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the author were reached by Prof. Huxley¹, Lord Eversley, Sir Spencer Walpole, Prof. Hubrecht, and others from a totally different standpoint, a fact which does not detract from the strength of the position. The opportunities for practical inquiries into every branch of the subject have been—during the fifteen years' inquiry—greater than at any former period in this country.

While pondering over all the facts, and fully conscious of the responsibility entailed, one relief has ever been present, and that is—perfect faith in the marvellous ways of Nature in the ocean, ways which enable her to cope, in regard to the food-fishes, with all the wonderful advances in apparatus for capture, and with the steady increase of population.

It was intended to have printed every table prepared during the ten years, but their number (108) was formidable and hence only such as were essential for the appreciation of the facts have been given. In the preparation of these the author has been aided by a series of valued young friends, amongst whom the late Rev. R. Gillespie, M.A., the Rev. E. Teviotdale, Mr W. E. Collinge, Mr Alex Thom, Mr Thomas Cargill, Mr Frank M. Milne, and Mr A. F. Munro deserve special mention. The genial companionship of these gentlemen and their unwearied efforts were sources of sincere satisfaction. The heaviest share of the work fell to Mr Frank M. Milne, M.A., now M.D.

The author has also to acknowledge the aid received in regard to the woodcuts of fishes from Dr Murie, LL.D., and Messrs Cassell, Petter, Galpin and Co., and for photographs from Mr A. Wallace Brown, a name—for fully fifteen years—both welcome and familiar to every worker at the Marine Laboratory. To his valued colleague in the University, Dr Masterman, he is indebted for the preparation of the Index.

In recent times great advances, inaugurated by Prof. Baird, have been made in connection with the fisheries by the United States Fish-Commission, and carried on by a distinguished band of workers, amongst whom the names of Alex. Agassiz, Whitman, Earle, Jordan, Tarleton Bean, Ryder, Brown-Goode, and others

¹ *Fisheries Exhib. Literat.*, Vol. iv. i. p. 16, 1884. He refers not to oysters, but to the great sea-fisheries.

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are conspicuous. Canada, under the vigorous hand of Sir Charles Tupper, made a new departure in its fisheries by the appointment of the able and experienced Prof. Prince. The labours of the French under Professors Marion and Pouchet, Fabre-Domergue, Baron J. De Guerne, Dr Sauvage, M. Guitel, Dr Canu, P. Gourret, G. Roché, M. Odin, and others have largely added to our knowledge; as likewise have those of Prof. Hensen, Prof. Möbius, Prof. Brandt, Dr Heincke, Dr Ehrenbaum, and many others in Germany. Valuable work has been done in Denmark by Capt. Drechsel, and Dr Petersen, while the same may be said of Prof. Hoffmann and Dr Hoek in the Netherlands. In Norway the labours of Prof. G. O. Sars are everywhere known, followed recently by those of Dr Hjort, and in that country also the hatching of marine fishes under Capt. Dannevig has been very successful; while in Sweden the names of the Malms, father and son, A. V. Ljungman, and Lundberg are familiar. In Belgium Prof. van Beneden's talents were invaluable—as his son's were subsequently—in the department, and in Italy those of the late Prof. Giglioli. Russia has also made great progress under Dr O. von Grimm, Dr Borodine, Dr Knipowitsch, and others, and Spain under Lieut. R. Vela. Lastly Japan is making active efforts to master its fisheries under Prof. Kishinouye.

In Australia and the Cape of Good Hope able workers are busy with the problems of the fisheries, for example, Prof. Haswell, Mr Lindsay Thompson, and lately Dr Saville Kent in the former, and Prof. J. D. Gilchrist in the latter.

In our own country the earliest work was done at St Andrews, which has never lost touch with the subject; and the workers from which, *e.g.* Prof. E. Prince, W. L. Calderwood, E. W. L. Holt, Dr Scharff, Dr J. H. Wilson, Dr A. T. Masterman, W. E. Collinge, G. Sandeman, H. C. Williamson, J. R. Tosh, H. M. Kyle, Wm. Wallace, and others have extended our knowledge of the subject in a noteworthy manner. The names of the late James Duncan Matthews and the late George Brook, on the staff of the Fishery Board for Scotland, again, will long be remembered for the excellence of their work in connection with the food-fishes. The Marine Biological Association at Plymouth has also made important advances by means of the able researches of W. Heape,

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J. T. Cunningham, G. C. Bourne, W. Bateson, W. Garstang, E. J. Allen, and others. Lastly under the Rev. W. S. Green and Prof. Haddon, an important survey, especially of the food-fishes in the deeper water, off the west coast of Ireland, was made by the St Andrews workers, Prof. E. Prince and E. W. L. Holt.

Prof. Herdman on the Lancashire coast has, in recent years, inaugurated modern methods in the fisheries with success, while Mr Meek at Cullercoats, on the opposite shore, has also made a commencement in the department.

In the criticism of the work of the Fishery Board for Scotland and its methods in regard to closure, it must not be supposed that the author has other feelings than those of respect for that body, from whom in former days he received much courtesy. It is sufficient to mention the names of Sir Thomas Boyd and Mr P. Esslemont—the former distinguished by his wide experience, the latter by his remarkable administrative powers, to indicate how ably the duty was done by each in the office of Chairman, with the support of such well-known members as Mr Maxtone Graham of Cultoquhey, Mr S. Williamson, M.P., Mr J. J. Grieve, Mr William Boyd, Sir James Gibson Maitland of Howieton and Prof. Ewart. The position and talents of the sheriffs, again, and their intimate acquaintance with fishery laws and administration, gave the Board both strength and prestige. The loss of the counsels of Sheriff Guthrie Smith, Sheriff Forbes Irvine, Sheriff Thoms and Sheriff Makechnie to the fisheries and the public cannot be over-estimated. To the energy and ability of the Board's Superintendent of Scientific Investigations (Dr T. W. Fulton) the author would also pay a just tribute of commendation.

Nothing, however, has been allowed to interfere with the faithful discharge, to the best of the author's ability, of a public duty, and in relation to a question of such vital importance in the department.

It is a source of regret that the popular statesman who was at the head of the Royal Commission (1883–85) has not lived to see the result of these experiments in which, from their commencement in the beginning of January 1884, he took so deep an interest. Even to the last he kept himself acquainted with their progress, and though, when he died in 1887, the systematic

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work of the ‘Garland’ had just begun, he saw how necessary it was to test thoroughly and check previous observations. Indeed, when in 1884 any decided view was expressed, he was wont to add the caution “Remember others will follow you, criticise and check every step taken.” Yet, perhaps, his acutely sensitive mind, not to allude to his well-known sympathy with the liners, whose hardy, daring ways aroused his respect, and to whose appeals he ever cordially responded, might have felt a shade of disappointment at a result so different from the oft repeated views and wide-spread opinions of the fishing-community and the public.

W. C. M.

GATTY MARINE LABORATORY,
 ST ANDREWS,
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PREFACE TO THE SECOND EDITION

TWENTY-ONE years having elapsed since the First Edition of this work was published, an ample margin has been given for the establishment of views opposed to those summarized in it. Besides, about 20 years of International Fisheries Investigations, mainly instigated by a disbelief in the facts of the *Resources of the Sea*, have been carried out by the countries bordering on the North Sea, viz., Britain, Denmark, Holland, Germany, Norway and Sweden, with a result which leaves the position of the *Resources* as secure as before. Moreover, the annual returns of the Fishery Board for Scotland, of the Fisheries Department of England, of the Colonies and Foreign countries, and all the independent observations made since the issue of the work, either leave its principles unshaken or corroborate them. Doubtless it may be politic to close the inshore waters for the benefit of the local fishermen, some of whom, however, would rather have had the trawlers confined to that area, whilst they were free beyond it, but that step (closure) rests on no scientific data.

Further, the Scientific Report of the author (as Sub-Commissioner on the Trawling Commission) has been substantiated in every main feature, proving that the advice then given was the best under the circumstances, viz., to test the truth of the allegations in regard to trawling and the fisheries before proceeding to any legislation. It would have been well if the Fishery Board for Scotland had subsequently followed that advice. The International scheme and its expenditures of public money might have been modified.

There should be no dubiety as to the initiation of the experiments in the inshore and other waters, since these were carefully drawn up by the author, and revised by Lord Dalhousie before they were communicated to the Fishery Board for carrying out.

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The work has been revised, additions made up to date, and the experiences of a long period incorporated. A few slips in the array of figures in the tables may occur, as, for instance, in the tables published annually by the Fishery Board, but those in the *Resources* have no possible influence on the main facts and conclusions.

It may be explained that in fixing a size-limit for fishes the Fishery Board left without it in 1886 and 1887, the author did so from personal observation on board the ship.

The variable views of the fishing community with regard to the condition of the sea since the commencement of the war are interesting. Some assert that the fishes have increased about a third, and that the shoals are more dense. Others observe no material difference, and probably are nearest the mark. The enormous consumption of “roes” and their countless myriads of eggs have had no more influence on the abundance or scarcity of the marine food-fishes than the interference of the war with fishing operations. Nature in the sea is unaffected to any material extent by either.

I have to thank Dr A. T. Masterman, F.R.S., Prof. Prince, LL.D., Dominion Commissioner of Fisheries for Canada, Prof. Gilchrist, Cape Town, Dr Fulton, Scientific Superintendent of the Fishery Board for Scotland, Dr C. H. Williamson, on the same staff, Dr H. M. Kyle, Dr W. Pringle Dickson, Prof. Kishinouye, Tokyo, Mr D. G. Stead, New South Wales, Prof. Starr Jordan, California, Dr Annandale, Calcutta, Mr Hornell, Tuticorin, India, Dr Hugh Smith, Washington, Commander Drechsel, Dr Petersen and Dr Schmidt, Copenhagen, the late Prof. Hubrecht, Utrecht, Dr Hjort, Dr Fabre-Domergue, Prof. Caullery, Paris, Mr Tudor, and Mr Want, Sydney, for aid in various ways.

It is nigh 40 years since scientific fisheries work was taken in hand, and in looking back the initial help of the late Lord Dalhousie (13th Earl) is held in grateful remembrance, as also the connection for 12½ years with the Fishery Board for Scotland. The Fishmongers' Company have likewise done much to advance the subject by their Conferences, and by their grants to young workers formerly trained at St Andrews, as well as by their generous support of the Plymouth Marine Laboratory, under the

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Marine Biological Association of the United Kingdom. To the late Dr Charles Henry Gatty we owe the present Gatty Marine Laboratory at St Andrews. Further, we are indebted to the 1851 Exhibition Scholarships (instituted mainly by Lord Playfair of St Andrews), to the invaluable Carnegie Trust for the Scottish Universities, to the Walker Trust and the Woodall Prize for the University of St Andrews for aid and encouragement to the young workers at the Laboratory. The foregoing, unfortunately, is in contrast with the present academic policy on the subject.

It has been deemed quite unnecessary to alter the published averages when the corrections on the totals amount to trifles, such as 1 or 2, more or less.

For photographs my thanks are due to the late Dr J. R. Tosh, so long with me at St Andrews, the late Mr A. W. Brown, of the Gatty Marine Laboratory, and for the use of an excellent block of the Gatty Marine Laboratory to Dr Maitland Anderson of the University Library, St Andrews.

Finally, it is to be hoped that the facts stated in this work, and the long experience of the subject, may aid in dispelling the ever recurring fears as to the diminution of the marine food-fishes, as well as in demonstrating the powers of Nature in the sea.

W. C. M.

GATTY MARINE LABORATORY,
 ST ANDREWS.
 24 *November*, 1920.

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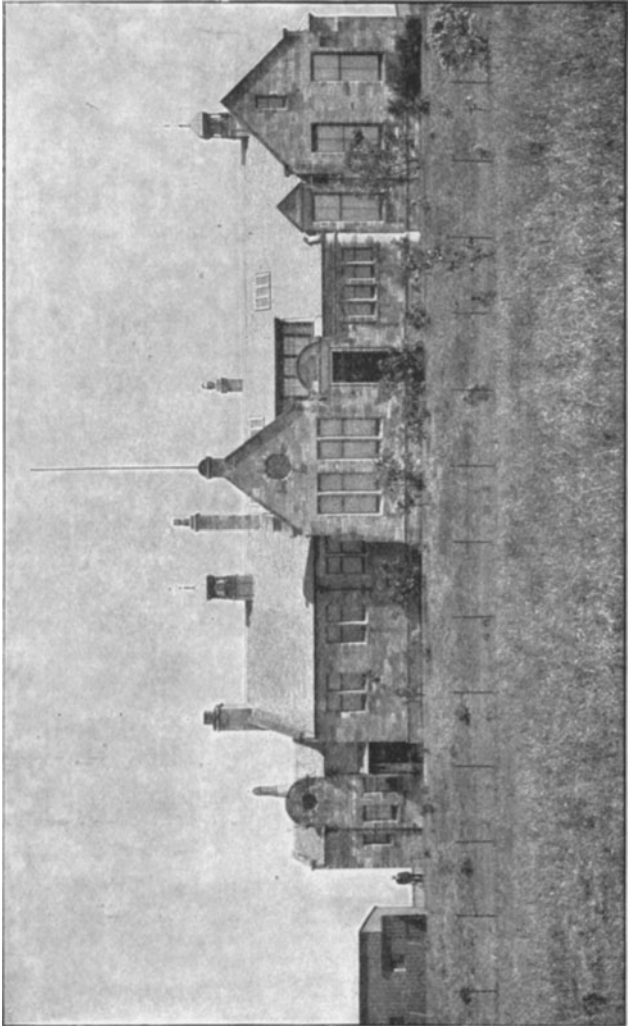
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The Gatty Marine Laboratory, St Andrews, in summer.

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