







D U N D E E

NATURALISTS' SOCIETY.

F O U R T H

A N N U A L R E P O R T,

BEING FOR THE YEAR

1 8 7 6 - 7.



D U N D E E :

PRINTED AT THE ADVERTISER OFFICE, BANK STREET.

1878.

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Honorary President.

PROFESSOR H. A. NICHOLSON, M.D., D.Sc., F.R.S.E., &c.

President.

ALBERT GROTHE.

Vice-Presidents.

W. M. OGILVIE, F.S.A. Scot.

JAMES DURHAM, F.G.S.

Treasurer.

ALLAN MATHEWSON, C.M.S.A. Scot., 21 UNION STREET.

Secretary.

JOHN THOMSON, ELMBANK, PERTH ROAD.

Councillors.

A. C. LAMB, F.S.A., Scot.

FRANK W. YOUNG, F.C.S.

JOHN W. JAFFRAY.

Curator.

JOHN HOOD.

INTRODUCTORY.

IN presenting to the Members, for the first time in a printed form, a short account of the work done by the Society, it was thought desirable that something should be said of the origin of the DUNDEE NATURALISTS' SOCIETY, and of its progress to the time when the Fourth Annual Report takes up the tale.

Attempts have been made at various times within the last dozen years, by various individuals, to establish in Dundee a Scientific Society; but, through lack of persevering energy on the part of the promoters, the first efforts were not followed up, and generally the schemes fell through. The shop of Mr LOWDON, Optician, a favourite resort of the scientifically inclined, was the scene of many a talk on the matter. But nothing definite was done until the advent on the scene in 1873 of Mr STEPHEN COOKE, at that time Science Teacher in Dundee, now Professor of Chemistry in the Glasgow Veterinary College. Mr COOKE had long been desirous to see such a Society set agoing, and had consulted with Mr LOWDON as to the possibility of accomplishing such an object. After sundry conversations between Mr LOWDON, Mr W. M. OGILVIE, Mr ALFRED GUTHRIE, and Mr COOKE, the last-named gentleman undertook the work of bringing together a number of those likely to interest themselves in the scheme, and whose names had been supplied to him by the others. He called on several, and wrote to others; and having obtained from a few promises of support, he invited them to meet together on Thursday evening, the 22d January 1874, in the premises of the Young Men's Christian Association, Constitution Road. At that meeting it was unanimously resolved that a Naturalists' Society should be formed, to be called "THE DUNDEE NATURALISTS'

SOCIETY"; and at an adjourned meeting, held in the same place on the 5th of February, a set of Rules and Regulations were agreed to, and a President and other Office-bearers were elected. The first Office-bearers of the Society were:—

President.

W. M. OGILVIE.

Vice-Presidents.

DAVID BROWN, ALFRED GUTHRIE.

Secretary.

STEPHEN COOKE.

Treasurer.

JOHN THOMSON.

Members of Council.

JAMES BREBNER, JOHN HOOD, W. B. SIMSON.

Shortly afterwards application was made to the Free Library Committee for accommodation in the Albert Institute Buildings for the Society's Meetings and proposed Museum. This application was favourably received by the Committee, and at a meeting held in June they generously granted to the Society for these purposes the use of a large room on the upper floor, on condition that the Museum, when sufficiently advanced, would be open to the public.

At the end of the first financial year there were 42 members on the roll.

During the Society's second year, in addition to the usual Meetings, four Lectures, free to the public, were given in the Lecture Hall of the Albert Institute. They were as follows:—

1875.
March 30.

Rev. WM. KNIGHT.

Niagara, and the River Scenery of Canada.

April 6.

ALFRED GUTHRIE.

Wonders of Insect Life.

April 13.

WM. M. OGILVIE.

Structure and Functions of the Leaf.

,, 20.

DR F. BUCHANAN WHITE.

Mushrooms, Toadstools, and Fungus Shows.

These Lectures were all well attended; they served to bring the Society and its aims more into public notice, and were largely instrumental in increasing its membership.

In January 1876 the Society held its first *Conversazione* in the Albert Institute, to which were invited a great many of the inhabitants of the town and neighbourhood. It proved to be an eminently successful affair, and was much lauded in the newspapers. Like the lectures of the previous year, but in a very much greater degree, did the *Conversazione* bring the Society again into notice; and again was there a very large accession to the list of members.

Of course, during the first three years of the Society's existence, in addition to the facts mentioned above, the ordinary meetings were held regularly every fortnight during the winter, at which many excellent and valuable papers were read; and, during summer, botanical and geological excursions were organized; but it is no part of the plan to go into the details of these. In writing the above the intention has been simply to give a bare outline of the Society's birth and growth—something in the nature of an introduction to the "Fourth Annual Report," which is the first Report that has been printed for circulation among the members.

The following shows the number of members on the roll at the close of the several financial years:—

1874,	-	-	-	-	-	42
1874-5,	-	-	-	-	-	102
1875-6,	-	-	-	-	-	232

OFFICE-BEARERS.

1874-5.

President, WM. M. OGILVIE; Vice-Presidents, DAVID BROWN, ALFRED GUTHRIE; Secretary, WM. MORRISON; Treasurer, JOHN DONALDSON; Councillors, JAMES BREBNER, JOHN HOOD, W. B. SIMSON.

1875-6.

President, ALFRED GUTHRIE; Vice-Presidents, ALBERT GROTHE, JOHN HOOD; Secretary, WM. MORRISON; Treasurer, JOHN DONALDSON; Councillors, JAS. DURHAM, ALLAN MATHEWSON, JOHN THOMSON.

1876-7.

President, ALBERT GROTHE; Vice-Presidents, JAS. DURHAM, JOHN DONALDSON; Secretary, WM. MORRISON; Treasurer, ALLAN MATHEWSON; Councillors, A. C. LAMB, JOHN HOOD, JOHN THOMSON.

Papers and Communications read at meetings during the first three Sessions:—

FIRST SESSION—1874.

W. M. OGILVIE, President—*The objects of the Society*; ALFRED GUTHRIE—*Entomology*; STEPHEN COOKE—*The Action of some Ferments in Plants and Animals*; RICHARD RATTRAY—*Diatomaceæ*; DAVID BROWN—*The Study of Natural Science*; JAMES BREBNER—*Alpine Flora*.

SECOND SESSION—1874-5.

JOHN HOOD—*The Circulation of Protoplasm in Vegetable Cells*; WM. MORRISON—*Natural History of the Auchmithie Coast and District*; ALFRED GUTHRIE—*Collecting and Mounting Entomological Specimens*; RICHARD RATTRAY—*Collecting and Mounting Diatoms*; W. M. OGILVIE—*Zoophytes*; JAMES BREBNER—*Ascent of Matterhorn*; JOHN THOMSON—*Methods of promoting the Society's usefulness*; FRANK W. YOUNG—*Milk Analysis*; WM. MORRISON—*Local Scientific Societies*; JOHN HOOD—*Distinction between Plants and Animals*; JAMES DURHAM—*Geology of the Bed of the Firth of Tay*; JOHN NELSON—*Birds of the Firth of Tay*.

THIRD SESSION—1875-6.

Professor H. ALLEYNE NICHOLSON—*The Dawn of Life, with special reference to the Laurentian Rocks and Eozoön Canadense*; ALFRED GUTHRIE—*Presidential Address, Introductory*; FREDERICK SMITH—*Life of the Cretaceous Age*; JAMES DURHAM—*Physical Geology of Scotland*; ALBERT GROTHE—*Physical Features and Natural History of Java* (two papers); A. GROTHE and WM. MORRISON—*Discussion: The Theory of Evolution*; JOHN HOOD—*How to Construct and Maintain an Aquarium*; JOHN W. JAFFRAY—*Structure of the House Fly*; ROBERT SHEPHERD—*Structure of the Saw Fly*; G. D. MACDOUGALD—*Detection of Adulterants in the more common Articles of Food*; WM. MORRISON—*The Structural Basis of Classification in Flowering Plants*.

DUNDEE NATURALISTS' SOCIETY.

THE FOURTH ANNUAL MEETING was held in Lamb's Hotel on Thursday Evening, November 1, 1877—Mr GROTHE, President, in the chair.

After the transaction of some ordinary business, the Report and Treasurer's Statement were read and adopted, and it was ordered that they should be printed and circulated among the members.

The election of Officers and Council was then proceeded with, and resulted as shown on another page.

The Secretaries of Sections read reports of their departments to the meeting. These were adopted; and the proceedings then closed with a vote of thanks to the Chairman.

R E P O R T.

THE Council which you appointed on the 3d November last year, in presenting the Fourth Annual Report of the Society, are glad to be able to say at the outset that, viewed from whatever point we may, the year just closed has been one of wonderful prosperity.

Beginning the session with a membership, including all classes, of 232, our growth during the year might be called extraordinary, for at the close our books show the membership to be 401, the increase being much greater than that of the previous year. Of this number 253 are Ordinary Members, and 148 are Associates; 93 Ordinary Members and 76 Associates having been added during the year. Your Council feel highly gratified with this result; they believe that it is to some extent an indication that the broad and enlightened policy pursued by them in the management of the Society's affairs has had the effect of making it more widely known, and its influence more powerfully felt.

The property of the Society has also been considerably increased during the year, chiefly by gifts of books and specimens to the Library and Museum, for which the donors have received the thanks of the Society. One notable and valuable gift was a complete set of the British Museum Natural History Catalogue, presented by the Trustees of the British Museum.

It might be thought that more should have been done towards displaying in our cases those specimens which we possess. Your Council had taken steps to have this done, when notice was received from the Free Library Committee to quit our rooms from 1st October until further notice, as it was required for an Exhibition of Fine Arts. This put a stop to the plans for having

our Museum arranged. We trust, however, that when access to our room is regained the work will be proceeded with energetically. This notice to quit was accompanied by an intimation that the Committee would do what they could to give us accommodation for our meetings during the time we were shut out of our own room; and it was subsequently arranged with the Chief Librarian that we should get the use of the Lecture Hall in the Albert Institute on Wednesday evenings.

During the winter session nine papers by members were read at the ordinary meetings of the Society. They were as follows, viz. :—

1876.		
10th Nov.	—By JAMES DURHAM, on	<i>Kames, and Traces of Old Sea-Levels, in the neighbourhood of Newport.</i>
24th Nov.	„ A. GUTHRIE,	<i>My Aquarium, and the Life History of some of its Inhabitants.</i>
8th Dec.	„ JOHN THOMSON,	<i>The Spectroscope.</i>
1877.		
12th Jan.	„ ALBERT GROTHE,	<i>The Distribution of Heat on the Earth's Surface, in time past and present.</i>
26th Jan.	„ WM. RAITT,	<i>Structure and Habits of the Honey Bee.</i>
9th Feb.	„ WM. MORRISON,	<i>Circulation of the Blood.</i>
23d Feb.	„ JOHN ROBERTSON,	<i>Spirit Photography.</i>
9th March.	„ THEODORE DELPRAT,	<i>Sensation of Hearing.</i>
6th April.	„ ALLAN MATHEWSON,	<i>The Sands of Culbin: their History and Antiquities.</i>

These papers were all of a popular character, were mostly illustrated with diagrams, &c., and were generally well suited to the kind of audience that is to be expected at a general meeting of the Society. Your Council believe that it was in a large degree owing to the attractiveness of the papers that they have to record a gratifying increase in the average attendance at these meetings. There is still room for improvement, however, and they would be glad to see an interest taken in these meetings by a greater number of the members. They would also like to see more of them coming forward with papers. Hitherto this burden

has lain on the shoulders of a few ; but, from the membership we now have, we are entitled to expect that a greater number will show their willingness to help in this department.

For the summer session an attractive programme of excursions was made out. There were eight in all, extending over the months of June, July, August, and September, as follows:—

2d June,	To Wormit Bay
16th ,,	,, Aberlemno.
30th ,,	,, Baldovan Woods.
18th and 19th July,	,, Clova.
4th August,	,, Tent's Muir.
18th ,,	Dredging Expedition.
1st September,	,, Red Head.
15th ,,	,, Rescobie.

Two of these deserve special notice, as being of a more ambitious character than any we have had hitherto, and certainly far more successful. One of them was a botanical excursion to Clova, extending over two days, which proved to be a very pleasant as well as profitable excursion to all who joined in it. In connection with this, special mention must be made of Colonel Drummond Hay of Seggieden, who took part in it, and rendered valuable aid to our members. The other excursion referred to was the Dredging Expedition, which took place on the 18th of August ; it was, perhaps, the more important of the two, inasmuch as it made an opening in a new field—one which your Council consider this Society ought to follow up. Situated, as we are, on the seaboard, it ought to be one of our chief branches of work as a Society to elucidate the marine fauna and flora of the neighbouring coast. This particular excursion was admirably arranged, and its equipment was very complete ; and had the weather proved more favourable on the occasion, no doubt some very valuable results would have been obtained. Notwithstanding the bad weather, however, some very good specimens were secured ; and members were initiated into the handling and proper working of the apparatus, so that in future similar expeditions, with more favourable weather, we may expect large results. Your Council earnestly hope to see this

branch of work followed up by the Society. For the facilities enjoyed at this excursion the special thanks of the Society are due, first, to Mr Grothe, for having granted for the day the use of the steamer "Excelsior"; and next, to Dr M'Intosh, of Murthly, a very distinguished naturalist, for his valuable personal assistance, and for the use of his dredges and other apparatus. Your Council are of opinion that not the least valuable result of this expedition was the bringing of the Society and Dr M'Intosh together; and it will be greatly for the interests of the Society to maintain and develop this connection so agreeably begun, and to avail ourselves as much as possible of the kind assistance which the Doctor has expressed his willingness to afford at all times in his power.

At all the other excursions the attendance was very small, and it comes to be matter for consideration whether it would not be an improvement to have fewer excursions during the season. Your Council think it would be much better to have two or three thoroughly well organized excursions, than to have a large number where it is impossible to bestow the time necessary for their proper organization.

During the winter a short course of popular Science Lectures, by eminent scientists, arranged for by your previous Council, was given in the Kinnaird Hall. They were as follows:—

1876.

On 13th Nov.—By R. A. PROCTOR, F.R.A.S., on
The Sun.

On 14th Dec.—By Prof. A. GEIKIE, LL.D., F.R.S., &c., on
Geological History of Forfarshire.

1877.

On 22d Jan.—By W. PENGELLY, F.R.S., F.G.S., on
Kent's Cavern Explorations.

On 20th Feb.—By Prof. H. A. NICHOLSON, M.D., F.R.S.E., &c., on
Geology and Evolution.

These Lectures were an experiment, and were offered to the public at charges for admission of 2s., 1s., and 6d.—tickets for the course being offered at a slight reduction, viz.:—6s. and 3s. 6d. It cannot be reported that they have been altogether a success if we judge from the attendance point of view. At the first lecture the attendance might be considered fair; but instead of

improving at subsequent ones it grew smaller, until ultimately it became very meagre indeed, and utterly unworthy a town like Dundee. It was specially notable that the cheapest tickets were hardly taken advantage of at all, showing that in the class for which these cheap prices were intended a taste for science had yet to be awakened. Though our success in this first experiment may not be very encouraging, yet your Council look upon it as one of the principal duties of our Society to do all in our power to spread a knowledge of science. This must be done in a popular way, and if we persevere there can be no doubt of our ultimate success. Knowledge is always elevating, but a knowledge of natural science is especially so. If, then, we devote a part of our energies to the diffusion of such knowledge, we not only enlighten the minds, but we improve the morals, of those whom it reaches. Carrying out to some extent these ideas, and also with the view of making the Society more widely known, your Council, soon after taking office, asked for and obtained your sanction to a scheme for holding a *Conversazione* and Exhibition. In January 1876 the Society's first *Conversazione* was held in the Albert Institute, the use of which was kindly granted for the occasion by the Free Library Committee. In connection with this there was one serious drawback, viz., the Society could only get possession for a single afternoon, thus entailing an enormous labour on those who had the preparations in charge—these preparations having all to be made and completed within a very few hours. Your Council, therefore, having these inconveniences in mind, determined this time to remedy them as far as possible; and, with the view of allowing time for more elaborate arrangements than had been possible before, they engaged the Kinnaird Hall for a whole week in January. This was done with the intention of getting together as good a Scientific Exhibition as possible, so that, after the Members' *Conversazione* was over, the Exhibition could be thrown open to the public during the remainder of the week, at a small charge. A full report of this has already been laid before the Society, and it is therefore unnecessary to say much here. Your Council would now simply express the opinion that it was a great success. They believe that to it alone we are indebted for a large share

of the increase in membership; and, in support of this, they would simply point to the fact that at the first ordinary meeting of the Society which was held after the Exhibition there were brought forward no fewer than twenty-six candidates for membership.

At the very commencement of the session it was resolved to form Sections, "in order," in the words of the resolution, "to secure a more exhaustive and systematic treatment of the various branches of Natural Science." About the same time it was resolved to add to the catalogue of the Society's studies Physics and Chemistry, and also Anthropology. It was left to the Council to carry out the details of the work which these resolutions involved; but, owing to the large amount of other work that had to be undertaken, it was not until the winter session was well over that they were able to take up this matter. The scheme they proposed was laid before a meeting of the Society on the 20th April, and approved of. This scheme provided that three Sections should be formed, viz. :—

1st. PHYSICS and CHEMISTRY.

2d. GEOLOGY.

3d. BIOLOGY.

Steps were at once taken to have these Sections properly formed, and on the 27th April they were actually in existence.

The main object in forming these Sections was to bring together those members who possessed a somewhat advanced knowledge of the various branches; to afford them opportunities for intercommunication, which general meetings of the Society are not calculated to give; and that they might co-operate and help each other in the performance of real work. These Sections must get time to become consolidated before they can be expected to do much work of real value; but it is hoped that the session now begun will see them set to work in earnest.

On the 20th April Mr Wm. Morrison, Secretary, resigned his office. The resignation was considered at an adjourned meeting held on 4th May, and was accepted; and it was unanimously resolved to convey to him the thanks of the Society for his past services.

At the same meeting the Council were empowered to appoint another to the office, and, at a meeting which they held on the 15th May, Mr John Thomson undertook to perform the duties at their request.

In concluding, your Council would now tender you their thanks for the honour you conferred upon them in electing them to office. They have met 31 times during the year to transact the Society's business; and they venture to believe that the Society's interests have not suffered in their hands. In all their dealings the honour and interests of the Society were made their first care.

The Dundee Naturalists' Society is now a recognised institution in the town. It has been acknowledged by the press as one of the chief agencies engaged in the diffusion of scientific education; and it occupies a very high position in the estimation of the more enlightened portion of the community. Your Council leave it in a very healthy and vigorous condition; and they feel assured that, if their successors pursue in the management of its affairs a policy similar to that which has guided them, by the end of another year the membership of the Society and its power for good will be very largely increased.

JOHN THOMSON,
Secretary.

1st NOVEMBER 1877.

TREASURER'S REPORT—1876-7.

Income.

To Balance from last year,	£60 15 5
„ 233 Members' Subscriptions,	58 5 0
„ 139 Associates' do.,	73 16 6
„ Proceeds of Conversazione and Exhibition,	79 14 0
„ Proceeds of Public Lectures,	45 0 6
„ Donation (from A. C. Lamb, Esq.),	3 0 0
„ Interest on Bank Account,	1 13 8
	£322 5 1
	£322 5 1

Expenditure.

By Stationery, Printing, &c.,	£4 3 0
„ Preparing Specimens for Museum,	5 9 5
„ Museum Cases,	52 0 0
„ Advertising,	23 13 6
„ Lecture Expenses,	69 15 0
„ Conversazione and Exhibition Expenses,	145 15 9
„ Attendance and Cleaning,	2 10 0
„ Collector's Commission,	0 19 7
„ Sundries (Postages, &c.),	2 19 1
„ Books for Library,	3 18 0
„ Balance in National Bank,	£2 4 11
„ Do. Treasurer's hands,	8 16 10
	11 1 9
	£322 5 1
Total,	£322 5 1

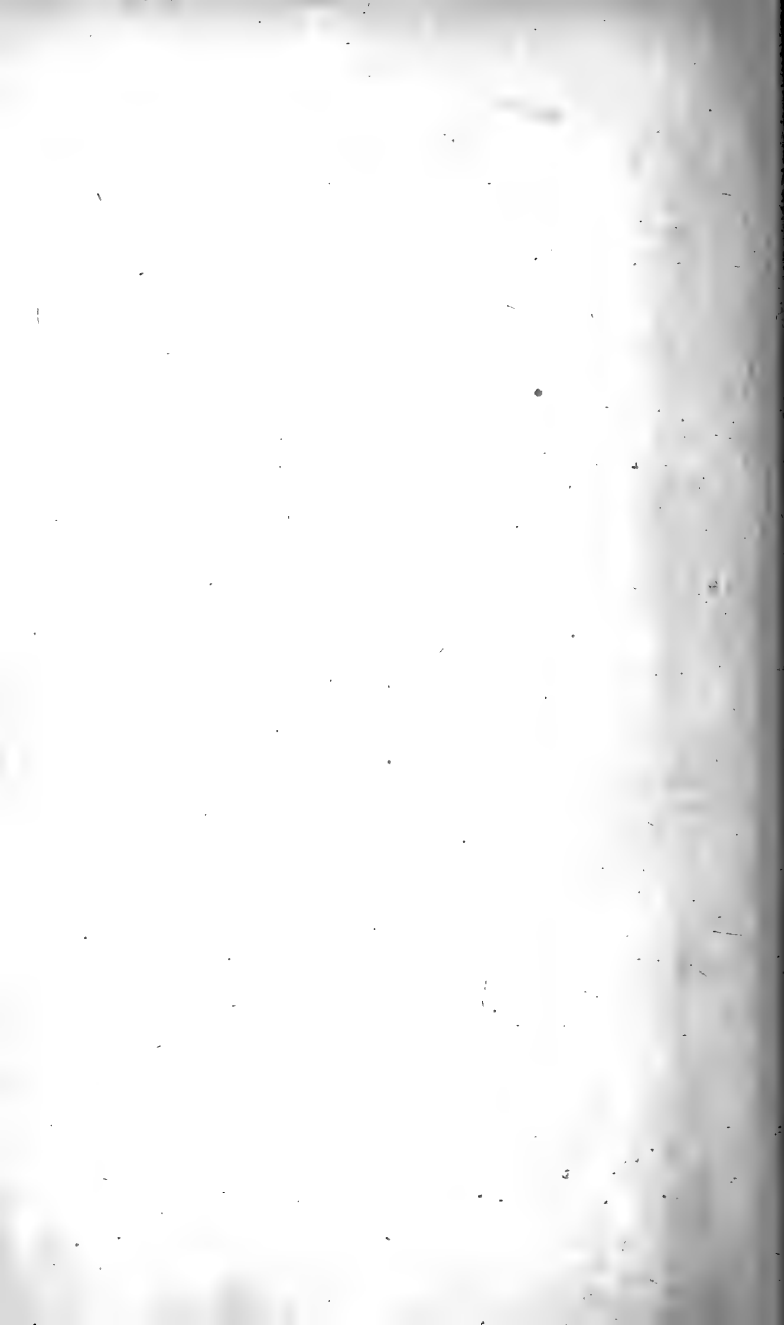
ALLAN MATHEWSON,
Treasurer.

30th September 1877.

LOCHEE, 13th October 1877.—We have examined the foregoing statement, with relative vouchers, and find the same correct.

W. M. OGILVIE, }
ROBERT N. KERR, } *Auditors.*









2. A.

D U N D E E

NATURALISTS' SOCIETY.

FIFTH AND SIXTH

ANNUAL REPORTS,

BEING FOR THE YEARS

1877-8 and 1878-9.



D U N D E E :

PRINTED AT THE ADVERTISER OFFICE, BANK STREET.

1879.



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NATURALISTS' SOCIETY.

FIFTH AND SIXTH

ANNUAL REPORTS,

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1877-8 and 1878-9.



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1879.



FIFTH ANNUAL REPORT,

BEING FOR THE YEAR

1 8 7 7 - 8.

OFFICE-BEARERS, 1878-9.



President.

W. M. OGILVIE, F.B.S. EDIN.

Vice-Presidents.

ALFRED GUTHRIE.

W. B. IRVINE.

Treasurer.

ALLAN MATHEWSON, C.M.S.A.

Secretary.

JOHN THOMSON, ELMBANK, PERTH ROAD.

Councillors.

FRANK W. YOUNG, F.C.S.

A. C. LAMB, F.S.A.

JOHN NELSON.

Curator.

JOHN HOOD.

R E P O R T .

DURING the past year the Society has accomplished a good deal of work of one kind or another ; and, in presenting the Fifth Annual Report, your Council believe that it will be found to compare very favourably with any previous one.

The first of the ordinary fortnightly meetings for the session was held on the 10th October, in the Lecture Hall of the Albert Institute. It will be remembered that at this time, and for some months after, the Society's room was required in connection with an Exhibition of Fine Art, then being held in the Albert Institute ; but the Free Library Committee did their best to accommodate us, and by arrangement with Mr Maclauchlan, the Chief Librarian, we got the use of the long room on the ground floor of the building, usually styled the Lecture Room, on Wednesday evenings. This room was, on trial, found very unsuitable, chiefly because of the noises made in the adjoining cloak-room of the Exhibition, and your Council were obliged to look about for some more suitable place. Application was made to the Directors of the High School for permission to use, for meeting purposes, the Mathematical Class-room in the High School. The Directors, with the greatest kindness, granted the request ; the only conditions attached being that they should be relieved of all expense in connection with our occupancy. Our removal to the High School was attended with most beneficial results : both Speaker and hearer found the room a very comfortable one, its general arrangement being admirably suited for lecture purposes ; and it has been of great advantage to the Society throughout the session to be able to meet in such an eminently suitable and central place. Your Council desire to express in this place their warmest thanks to the High School Directors for their kindness and liberality.

There has been this year a most gratifying increase in the average attendance at the ordinary meetings. On no occasion could the attendance be said to be small, while on several occasions the room was quite filled. Your Council have been very pleased with this evidence

of increasing interest in these meetings, and they hope that the new session will see no abatement of it, but rather a steady increase.

The following is a list of the lectures, &c., given at the ordinary meetings:—

- 1877.
- 10th Oct. —*The Mixing of Colours.* Illustrated with experiments. By A. GROTHE, Pres.
- 24th Oct. —*Arrangement of Scotch Rocks.* Illustrated with Diagrams and Specimens, - - - ,, JAMES DURHAM, F.G.S.
- 7th Nov. —*A few Hints on the Study of Natural History by means of the Microscope.* With practical Illustrations, - - ,, JOHN HOOD.
- 21st Nov. —*Sculptured Stones of the District.* Illustrated with Photographs and Diagrams, - - - ,, ALLAN MATHEWSON.
- 5th Dec. —*Ferns of the District.* Illustrated with Specimens, - - - ,, JOHN DONALDSON.
- 19th Dec. —*Gases and Liquids under different temperatures and pressures.* Illustrated with Experiments, ,, G. D. MACDOUGALD.
- 1878.
- 23d Jan. —*The Muckle Stane o' Glenballoch.* Illustrated, - - - ,, Rev. W. HERDMAN, of Rattray.
- 13th Feb. —*Heat and Radiation.* Illustrated with Experiments, - - - ,, FRANK W. YOUNG, F.C.S.
- 27th Feb. —*Mountains and Mountain-making.* Illustrated with Diagrams, ,, Prof. H. A. NICHOLSON, M.D., D.Sc., &c.
- 13th March.—*Scotland during the Ice Age.* Illustrated with Diagrams, ,, JAMES GEIKIE, LL.D., F.R.S.
- 27th March.—*Polarised Light, and its use in the Microscope.* Illustrated with Experiments, - - - ,, JOHN THOMSON.
- 10th April. —*Alpine Plants of Forfarshire.* Illustrated with Specimens, ,, EDWARD MOIR.
- 24th April. —*Bog Mosses of Forfarshire.* Illustrated with Specimens, ,, W. M. OGILVIE, F.B.S.
- ,, —*Some Experiments in Telephonic Electricity,* - - - ,, F. W. YOUNG, F.C.S.

It will be very difficult to surpass the above programme; and there can be little doubt that to its superiority over all previous ones a large share of the better attendance at the meetings was due. The attractiveness of the subjects, and the popular way in which they were treated and illustrated, could not fail in bringing out the members in large

numbers. The best thanks of the Society are due to all those gentlemen who have so kindly contributed to the instruction of their fellow-members; and we are especially indebted to Professor Nicholson, Dr Geikie, and the Rev. Mr Herdman, for their lectures, entailing, as they did, much trouble and personal inconvenience to the lecturers.

Stimulated by the success which attended the Exhibition in the Kinnaird Hall in January last year, and having in mind the fact that it had to be closed when at the very height of its popularity, your Council, almost immediately on entering on their duties, determined to repeat the experiment on a larger scale than before; and, in order that the whole Dundee public might have an opportunity of seeing it, to keep it open a week longer than was done last year. Assisted by several able members, your Council entered heartily on the work of preparation, leaving no stone unturned to make the Exhibition as complete and attractive as possible. The result of their labours was seen by the members on Wednesday, the 31st of January this year, when the Exhibition was opened by Provost Robertson at the Members' Conversazione. Of the Conversazione it need only be said here that it passed off with perfect smoothness, and it seemed to be the unanimous opinion that it surpassed all those that had preceded it in pleasant attractiveness. On the evening of 1st February the Exhibition was opened to the public, and continued open nightly up to and including Saturday the 9th February. During that time it was visited by several thousands—many coming over and over again. As an Exhibition it must be admitted an entire success. Nothing like it had ever been seen in Dundee before. As a means of educating, its value must be put very high, for visitors had there the opportunity of seeing, and hearing explained by competent specialists, objects and phenomena, from which, at ordinary times, they are quite shut out, thus having their ideas enlarged and their minds stored with useful information. But it is needless to dilate here on this head. Every member had the opportunity, and no doubt availed himself of it, of forming his own judgment of the value of the Exhibition. Only one opinion has reached your Council, and that is, that it was an entire success. Such a result, it must be evident, could only be attained by a great deal of labour on the part of those actively engaged in the preparations, and where so many did well it might be invidious to mention any names. But there is one name we cannot pass over without mention, namely, that of Mr A. C. Lamb. This gentleman took a pre-eminent position among those whose work it was to organise the Exhibition; he threw his whole

soul into the work, sparing neither time, trouble, nor expense to make it successful; and to him is due a very large share of the credit of bringing together such a splendid Exhibition.

Whether there shall be another Exhibition next year or no must be left to your new Council to decide; but your retiring Council would like to express the opinion that a year or two ought to elapse before the experiment is repeated. The labour of organisation is enormous; there have already been two in successive years; and it will be found very difficult to introduce sufficient novelty into another so early as to ensure success.

The Summer Excursion Programme was printed and circulated among the members early in June, and contained a list of five excursions, as follows:—

June 24 and 25,	.	.	.	To Clova.
July 18,	.	.	.	Sea Dredging.
„ 27,	.	.	.	To Fotheringham.
Aug. 10,	.	.	.	„ Kinkel Braes.
Sept. 7,	.	.	.	„ Tent's Muir.

It has been remarked in previous Reports that there seemed to be a want of interest in this branch of the Society's work. No improvement in this respect can be reported this year. Only one, in fact, could be called really successful, namely, the Sea-Dredging one. From thirty to forty joined in it; and so successful did it prove, that a second one was organised for the 21st of August, which was even more successful. At these two excursions some valuable marine specimens were secured, a number of which have been preserved and placed in the Society's Museum.

Our Museum has made rapid advance since the time (in February last) when we were again permitted the use of our room. As stated in our last year's Report, we were for a time deprived of the use of our room, because it was required in connection with an Exhibition of Fine Art. This necessitated the removal of all our specimens, and the entire suspension of the work of arrangement. Nothing whatever could be done to our Museum until February, when everything had to be re-arranged. Since then, however, very rapid progress has been made by our Curator, Mr Hood, in putting the collection again in order. Your Council feel that they have been exceedingly fortunate in their choice of a Curator. Mr Hood may be found almost nightly in the Museum, quietly and steadily at work. In some of the departments he has had the advantage of assistance from members possessing special

knowledge; and the result of the combined labours of the Curator and those who have assisted him must be considered highly satisfactory. Since the date of last Report the Society's collection has very largely increased. Some of the additions have had to be purchased, but the far greater portion have been presented to the Society by various members, to all of whom the best thanks of the Society are due. Your Council would like to urge upon members the claims of the Museum for a share of their attention and help. The desire is to make it thoroughly local and educational in character: to contain, not a heterogeneous collection gathered from all parts of the earth, but rather a number of representative specimens of the natural products of the district. This is the aim your Council have had, and this they hope may be the aim of their successors. In addition to the Society's own property there are exhibited in the Museum a fine Archæological collection, and a remarkably fine collection of British Lepidoptera, on loan from members. Should we keep on accumulating property at the rate we have been doing for some time, we shall very soon be in a position to have the collection thrown open to the public.

In February Mr Grothe resigned the office of President of the Society. This was intimated at the meeting held on 27th February, in the following terms:—

“Your Council regret to inform you that our valued President, Mr Grothe, has resigned his office. In making this intimation your Council wish to express their high appreciation of Mr Grothe's services since he was first elected a member of their body, and the extreme regret they feel at having to accept his resignation.”

Nothing need be added to this now, beyond an expression of belief that in Mr Grothe's retirement the Society has met with a loss that will not be easily filled.

It is very pleasant again to have to record an increase in the number of members since last Report. At the close of the Financial Year 1877-8 the Roll shows 460 members of all classes:—

292	of these are Ordinary Members ;
8	„ are Hon. and Cor. do. ;
160	„ „ Associates.

The additions during the year have been—

74	Ordinary Members ;
3	Honorary „ ; and
37	Associates ;
— making a total of	
114	names added during the year.

To go against this, however, there has been a falling off of old members to the extent of—

30 Ordinary Members ; and
 25 Associates ;
 —
 55 in all.

This leaves a nett gain of—

47 Members ; and
 12 Associates ;
 — or a total of
 59

In conclusion, your Council have now to thank you for the honour you did them in electing them to office. They have met 23 times for the purpose of transacting the business and carrying on the work of the Society. They may not have been able to achieve great things, but they did their best ; and all they have undertaken has had an honest and good purpose. They have, at all events, the satisfaction of knowing that they leave the Society better and stronger than they found it.

JOHN THOMSON,

Hon. Secretary.

7th NOVEMBER 1878.

TREASURER'S REPORT—1877-8.

Income.

To Balance from last year,	£11 1 9
„ 264 Members' Subscriptions,	66 0 0
„ 134 Associates' Subscriptions,	71 18 6
„ Members' Subscriptions for 1876-7,	0 15 0
„ Subscriptions for Dredging Apparatus,	13 0 1
„ Proceeds of Conversazione and Exhibition,	159 4 2
„ Donations,	2 2 6
„ Interest on Bank Account,	0 10 11
	<hr/>
Total,	£324 12 11
	<hr/> <hr/>

Expenditure.

By Advertising,	£20 12 3
„ Printing and Stationery,	22 11 6
„ Conversazione and Exhibition Expenses,	202 1 11
„ Dredging Apparatus,	21 3 6
„ Museum and Library,	12 17 11
„ Sundries (Postages, &c.),	12 6 1
„ Lecture Expenses,	3 14 0
„ Attendance and Cleaning,	2 10 0
„ High School Expenses,	2 1 0
„ Collector's Commission,	1 19 0
„ Cash in National Bank,	£19 3 10
„ Do. Treasurer's hands,	3 11 11
	<hr/>
	22 15 9
	<hr/>
Total,	£324 12 11
	<hr/> <hr/>

ALLAN MATHEWSON,

Hon. Treasurer.

30th September 1878.

DUNDEE, 28th October 1878.—We have examined the foregoing Statement, with relative Vouchers, and find the same correct.

ROBERT NIMMO KERR, }
JOHN NELSON, } *Auditors.*

SIXTH ANNUAL REPORT,

BEING FOR THE YEAR

1 8 7 8 - 9.

OFFICE-BEARERS, 1879-80.

President.

W. M. OGILVIE, F.B.S. EDIN.

Vice-Presidents.

Wm. B. IRVINE.

JAMES RORIE, M.D.

Treasurer.

ALLAN MATHEWSON, C.M.S.A., SEAGATE.

Secretaries.

JOHN THOMSON, ELMBANK, PERTH ROAD.

ROBERT N. KERR, 19 KING STREET.

Councillors.

FRANK W. YOUNG, F.C.S.

JOHN NELSON.

A. C. LAMB, F.S.A.

Curator.

JOHN HOOD.

R E P O R T.

At the Annual Business Meeting held on 7th November last year several alterations were made on the Rules of the Society. Only one of these could be considered of any importance, namely, that one which fixes the time at which the Annual Business Meeting shall be held. Formerly this meeting was held in November; now, Rule X. provides that it shall be held on the third Thursday in May. It is expected that this alteration will allow of better and more systematic attention being given to the conduct of the Society's affairs by the Council.

By the liberality of the High School Directors we have again during the past winter been enabled to hold our regular meetings in the Mathematical Class-room of the High School, and the Society is under great obligations to the Directors for so kindly permitting the free use of it.

The attendance at these meetings must have been a source of gratification to all who take an active interest in the Society's work. On more than one occasion during the past session the room, which holds 250, has been quite full, and at no time did the attendance fall below 50. This shows that our Society is in a very healthy state. It speaks well for the members generally that they turn out as they do to these meetings, and the regular and large attendances must be accounted good evidence that the lectures were of a superior order. Thirteen ordinary fortnightly meetings have been held during the Session, at which 16 papers or lectures have been given, all by members of the Society. These were as follows :—

1878.

- 9th Oct. —Notes on an ancient "Kitchen
Midden" found at Stanner-
gate, - - - - - By JAMES DURHAM, F.G.S.
- „ —Notes on the Discovery of Stone
Cists and an Urn at Stanner-
gate, „ ALLAN MATHEWSON, C.M.S.A.
Scot.

1878.

- 23d Oct. —*Notes on a few of the finds at the Society's Dredging Excursions*, - - - - - ,, WM. B. IRVINE.
- 6th Nov. —*Some Experiments in Electricity produced by Friction*, - - - ,, FRANK W. YOUNG, F.C.S.
- 20th Nov. —*Notes on the Insessores*, - - - ,, R. N. KERR.
- 4th Dec. —*Polarisation of Light (Second Lecture)*, - - - - - ,, JOHN THOMSON.
- 18th Dec. —*Fermentation and Putrefaction*, ,, F. W. YOUNG.
- „ —*The Pterygotus Anglicus*, - ,, ALLAN MATHEWSON.

1879.

- 15th Jan. —*Sculptured Stones of the District (Second Lecture)*, - - - ,, ALLAN MATHEWSON.
- 29th Jan. —*Notes on Orkney and Shetland*, ,, WM. B. IRVINE.
- 19th Feb. —*Thoughts on the Evolution Theory of Creation*, - - - - - ,, The Rev. JOHN ANDREW.
- 12th March. —*What is a Volcano?* - - - ,, JAMES DURHAM.
- „ —*The Ancient Volcano and Geology of Mull*, - - - ,, W. NEISH WALKER.
- 26th March. —*On Entomological Classification*, ,, ALFRED GUTHRIE.
- 9th April. —*The Mechanical Principle of Work*, - - - - - ,, ROBERT CHALMERS, Jr.
- 23d April. —*Notes on the Colymbidæ and Alcadaæ*, - - - - - ,, JOHN NELSON.

A Conversazione was held in the Kinnaird Hall on the evening of February 12th, at which a great many objects of scientific interest, including most of the recent novelties in electrical and acoustical science, were exhibited. The meeting proved a very successful and enjoyable one; and no doubt a good deal of the success was due to the fact that Professor W. C. Williamson honoured us on the occasion by presiding.

Your Council are strongly imbued with the idea that one of the chief functions of the Society should be an educational one; that, by means of lectures or otherwise, it should give, not only to members themselves, but to all outside the Society as well, opportunities of becoming acquainted with the beautiful truths of Natural Science. Acting upon this idea, your Council determined to arrange with the most eminent scientific teachers they could secure to give a short series of popular lectures to the public; and on the 11th January they were enabled to intimate to the members by circular that they had arranged

for a course of lectures to be delivered in the Kinnaird Hall as follows :—

1879.

On 13th Feb.—By Professor W. C. WILLIAMSON, F.R.S., &c., Owen's College, Manchester, on *The Age of Salt*.

On 21st Feb.—By Professor ALLEYNE NICHOLSON, M.D., D.Sc., F.R.S.E., &c., on *The Relations between Birds and Reptiles*.

On 26th Feb.—JAMES GEIKIE, LL.D., F.R.S., &c., H.M. Geological Survey, on *The Antiquity of Man in Europe*.

On 7th Mar.—W. B. CARPENTER, M.D., LL.D., F.R.S., &c., London, on *Animal Life of the Deep Sea*.

The prices of admission to the public were 2s., 1s., and 6d. for a single lecture, with the option of buying a ticket for the course at 5s., 2s. 6d., and 1s. Special privileges were given to members of the Society. Knowing from former experience the apathy with which such lectures were regarded by the public, it was expected from the beginning that to meet the necessarily heavy expenses of these lectures the proceeds would require to be supplemented by a considerable sum from our funds. The result, however, has proved far better than was anticipated, and is in reality, when everything is considered, very encouraging. The attendance throughout was indeed very good, when compared with a former venture, and it is to be hoped that in future the Society may be looked to to provide a course of public popular Science lectures every year.

Of course, as the Session just closed included only winter months, there were no Excursions.

The property of the Society, in the shape of Museum specimens and books, has been constantly accumulating, and we are much indebted to various gentlemen, both outside and inside the Society, for valuable donations. Among the additions to the library your Council would draw attention to a work which will be found of great value to all interested in Botany, namely, "Sowerby's English Botany," a book consisting of 11 volumes, and containing a life-sized coloured portrait and description of every British plant. By its means Students will be enabled to compare and name their finds when in doubt. A considerable sum has this Session been expended on the preservation of specimens for the Museum, and the purchase of cases and books; and the collection, especially as regards local birds, is rapidly becoming a very valuable one. The operations in this department, however, are again thrown considerably backward. It is well known that another Fine

Art Exhibition is to be opened in the Albert Institute next month. In preparation for this a good many alterations are being made on the internal arrangements of the building, and these alterations have necessitated the removal of our Museum from the room granted us by the Free Library Board in 1874 to another, newly made, on the attic floor. This removal is understood to be permanent. The arrangement, though an advantage in so far as it does away with the necessity of interfering with our collection during any subsequent Exhibition that may be held in the building, and also in so far as the Society gets the sole use of the room, yet there is connected with it the rather serious disadvantage that the new room is much too small for even our present requirements. At present our collection is in a condition of great disorder, and it will be a long while ere it can again be put in the same orderly state in which our hard-working Curator and those other gentlemen who assisted him had it before the removal. Our Society is now a large one. Why should we not aim at getting premises of our own? The present time, when trade is so bad, is perhaps not the best to go actively to work to secure that end, but it is an end which should be kept in view; and so soon as trade improves, and men's minds are relieved from the anxieties which at present assail them, we should work for its attainment. Housed in a home of our own, our Society would have attractions and our members privileges which neither at present possess; then would we be freed from many drawbacks which affect us now, and only then could we regard our Society as permanently established.

At the date of last Report the membership was 460 of all classes; at this date the Roll shows 458, or 2 less*. Owing to the depression in trade, Societies of all kinds in Dundee have suffered in their membership during the past winter, and in the circumstances, considering our numbers have remained almost stationary, we ought to congratulate ourselves. An analysis of the Roll shows that we have—

297 Ordinary Members ;	
10 Hon. and Cor. Members ;	
151 Associate	„
—	
458	
==	

* Since this Report was read the Treasurer explains that the membership for the previous year, 1877-8, was overstated in the Report for that year. At the time that Report was made he had not taken off the roll the names of all the defaulters, consequently they are included in the "falling off" shown above. Keeping this explanation in view, it will be understood that, instead of the apparent reduction of two in the membership this year, there is in reality an increase in the numbers since last Report.—J. T.

52 Ordinary Members ;
 2 Honorary „ ; and
 16 Associate „ ; or

—
 70 in all have been added since last Report, but against
 this there has to be placed a falling off of

47 Ordinary Members and
 25 Associate „ or

—
 72 in all.

Two new Honorary Members have been elected this Session ; they are, our ex-President, Mr Albert Grothe, who has left this country for Spain, and James Geikie, LL.D., F.R.S.

Among our Ordinary Members we have the pleasure to include 20 ladies.

When it is kept in mind that, owing to the alteration made in Rule X. at last Annual Meeting, this Report covers an actual period of only six months, it will no doubt be admitted that, as regards work done, it will compare very favourably with any previous Report.

JOHN THOMSON,
Hon. Secretary.

15TH MAY 1879.

TREASURER'S REPORT—1878-9.

Income.

To Balance from 1877-8,	£22 15 9
„ 278 Members' Subscriptions,	69 10 0
„ 144 Associates' Subscriptions,	77 14 0
„ Subscriptions for 1877-8,	1 5 6
„ Conversazione Tickets Sold,	7 0 0
„ Proceeds of Lectures,	58 0 3
„ Interest on Bank Account,	0 10 4
„ Received from Section I.,	1 3 11
Total,	£237 19 9

Expenditure.

By Lecture Expenses,	£106 4 5
„ Conversazione Expenses,	58 15 8
„ Preparing Specimens for Museum,	23 19 3
„ Books for Library,	17 10 0
„ Printing, Stationery, and Postages,	10 5 6
„ Advertising,	4 1 0
„ Attendance,	2 6 0
„ High School Expenses,	1 6 0
„ Collector's Commission,	3 8 6
„ Liabilities of Section I.,	2 15 10
„ Sundries,	3 1 2
„ Cash in National Bank,	£4 5 5
„ Cash in Treasurer's hands,	0 1 0
Total,	£237 19 9

ALLAN MATHEWSON,

Hon. Treas.

30th April 1879.

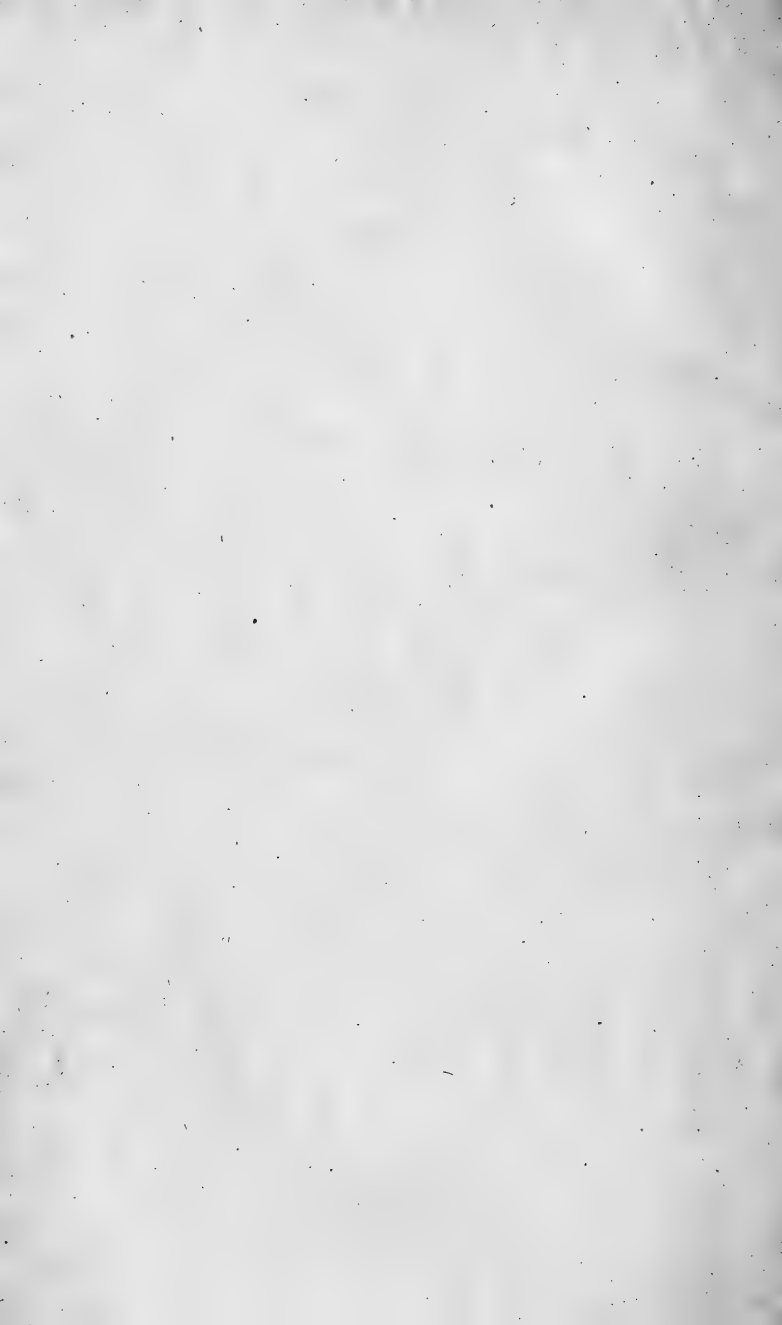
DUNDEE, 9th May 1879.—We have examined the foregoing Statement, with relative vouchers, and find the same correct.

ROBERT N. KERR, }
GEO. MACKENZIE, } *Auditors.*

18 FEB 1888







DUNDEE

NATURALISTS' SOCIETY.

SEVENTH

ANNUAL REPORT,

BEING FOR THE YEAR

1879-80.



DUNDEE:

PRINTED AT THE ADVERTISER OFFICE, BANK STREET.

1880.



D U N D E E
NATURALISTS' SOCIETY.

S E V E N T H
A N N U A L R E P O R T,

BEING FOR THE YEAR

1 8 7 9 - 8 0 .



D U N D E E :

PRINTED AT THE ADVERTISER OFFICE, BANK STREET.

—
1880.

OFFICE-BEARERS, 1880-81.

President.

W. M. OGILVIE, F.B.S., F.S.A. Scot.

Vice-Presidents.

W. B. IRVINE.

JAMES RORIE, M.D.

Treasurer.

ALEXANDER SIMPSON, ACCOUNTANT, 104 COMMERCIAL STREET.

Secretary.

FRANK W. YOUNG, F.C.S., 2 AIRLIE TERRACE.

Councillors.

JAMES DURHAM, F.G.S.

A. C. LAMB, F.S.A. Scot.

ALLAN MATHEWSON, C.M.S.A. Scot.

R E P O R T .

Your Council have pleasure in laying before you the Seventh Annual Report of this Society.

Their term of office began, according to the new arrangement, last May, and they hope that they have been able since then to continue to some extent the good work of their predecessors in advancing the best interests of the Society, and so to encourage the study of Natural Science in Dundee.

Early in June last the following programme of excursions was issued :—

June 14,	-	Sea Dredging,	-	-	St Andrews Bay.
July 12,	-	Geological and Botanical,			Tealing.
Aug. 6,	-	Sea Dredging,	-	-	Bell Rock.
Aug. 23,	-	Geological and Botanical,			Kinkel Braes.

It is to be regretted that sufficient interest was not awakened amongst the Botanists and Geologists to start the excursions to Tealing and Kinkel Braes. The Dredging Excursions were, however, largely attended, well conducted, and in many respects very successful. These expeditions afford not only marine specimens to museums, and profitable improvement in marine zoology, but in the opinion of all who join in them a most enjoyable holiday, beneficial alike to health and energies. Urged by their popularity, your Council have already inaugurated the year's work in this direction by instituting dredging operations yesterday (19th May) beyond the Bell Rock, with favourable weather, and some success. Much credit is due to Mr Allan Mathewson, the Convener of the Excursion Committee, for the care and trouble taken in the organisation and equipment of these expeditions.

In September the Treasurer, Secretary, and Assistant Secretary appointed at last meeting resigned their charge of these important offices. This was intimated to the members at the first ordinary meeting of the Society, on October 22d last, in the following terms :—

“It is with very great regret your Council intimate to you that Messrs Thomson, Mathewson, and Kerr have resigned the offices of Secretary, Treasurer, and Assistant Secretary respectively, the reasons given in their letters of resignation being lack of time to carry out the increasing work of the Society. Their firm adherence to this resolu-

tion, after urgent requests for a favourable reconsideration, left your Council no other alternative but reluctantly to accept the resignations. In giving notice of this decision to each, the Clerk of Council meeting of 24th September, added an extract from minute of that date, which, we think, will be endorsed by all who know anything of the painstaking work of our late Secretary and Treasurer:—

‘The Members of Council desire to express and record their high sense of the many and important services rendered by you to the Society, and their great regret that the causes mentioned by you in your letter of resignation should have led you to follow the course therein intimated.’

Your Council have further to intimate the appointment of two of their number to the vacant offices:—

Mr JOHN NELSON, as interim Hon. Treasurer.

Mr FRANK W. YOUNG, as interim Hon. Secretary.”

Mr Allan Mathewson and Mr James Durham were afterwards elected to fill the two vacancies in the Council, and it is only right to add that the late Secretary and Treasurer (the latter by his presence in the Council) have both willingly guided and aided their successors in the proper discharge of their onerous duties.

Happily we have again to express our great indebtedness to the High School Directors for generously giving us the use of their excellent Mathematical Class-room for ordinary meetings of the Society. For three sessions now we have had the great privilege of a room in every way most admirably adapted for the purposes of our fortnightly meetings. Experiments and diagrams in illustration of lectures and papers are both easily arranged for and well seen from every part of it. Your Council trust that a continuation of this favour will be further granted to the Society.

In all fourteen lectures and papers have been given at thirteen meetings held during the past session. These were as follows:—

1879.

- 22d Oct. —*The Nervous System considered in relation to the manifestation of Mental Phenomena*, - - By JAMES RORIE, M.D.
- 5th Nov. —*Crustaceans*, - - - - - ,, W. B. IRVINE.
- 19th Nov. --*Natural Laws applied to Ventilation and Warming*. Illustrated with Models and Diagrams, - - - - - ,, CHARLES OWER, C.E.
- 3d Dec. —*Musical Sound in Nature*, - - - ,, HENRY NAGEL.
- ,, —*Notes on some of the Relations between Animals and Plants*, ,, F. W. YOUNG, F.C.S.

- 17th Dec. — *A Chapter on Heat. Illustrated*
by Experiments, - - - ,, JOHN THOMSON.
- 1880.
- 14th Jan. — *The Faröe Islands*, - - - ,, JAMES GEIKIE, LL.D., F.R.S.
&c.
- 4th Feb. — *Zermatt and its Environs. Il-*
lustrated with Views and
Photographic Transparencies, ,, JAMES BREBNER, M.A.
- 11th Feb. — *Some Cycles of Chemical Opera-*
tions in Nature. With Experi-
ments, - - - - ,, F. W. YOUNG, F.C.S.
- 25th Feb. — *Evolution and the Geological*
Record. With Diagrams and
Lime Light Illustrations, - ,, JAMES DURHAM, F.G.S.
- 10th March. — *Evolution Past and Present*, - ,, W. NEISH WALKER, F.G.S.
- 24th March. — *Some Principles of Evolution*, - ,, DAVID CUNNINGHAM, M. Inst.
C.E.
- 7th April. — *The Religion and Romance of*
Science, - - - - ,, Rev. HUGH GEORGE WATT,
M.A., B.D.
- 21st April. — *The Organisation of Scientific*
Instruction in our Large
Towns, - - - - JOHN B. CHARLES, M.A.

A very important feature of these lectures and papers should not be overlooked here, nor want our best thanks—the time and trouble which is evidently taken in the preparation of experiments, diagrams, and lime light transparencies for the better elucidation of, and certainly adding greater interest to, the various subjects. The attendance of members and friends throughout has been on the whole good, but it is to be hoped that the number of those who take advantage of the meetings will rather tend to increase, and so encourage those who take the great trouble of bringing matters of interest before the Society. Many of the papers were of great practical value, and your Council feel that the time has now arrived for consideration whether these communications, or at least abstracts of them, should not be published in the form of a Journal or Transactions of our Society.

A short course of popular lectures was delivered in the Kinnaird Hall, under the auspices of the Society, as under :—

1880.

- 3d Feb. — Professor W. C. Williamson, F.R.S., &c., Owen's College, Manchester, on "Insect-Eating Plants."
- 18th Feb. — James Geikie, Esq., LL.D., F.R.S., &c., of H.M. Geological Survey, on "The Geological History of the Tay Valley."
- 3d Mar. — G. J. Romanes, Esq., F.R.S., F.L.S., &c., on "The Beginning of Nerves in the Animal Kingdom."

Your Council feel sorry that these excellent lectures were neither so well attended by the general public, nor the members and associates of the Society, as the interest of the subjects and the eminence of the lecturers demanded. They are convinced that were a greater number of our members to take an active interest in bringing this branch of the Society's work under the notice of others, there would be far less likelihood of a deficit (as heretofore) in our public lecture account.

Your Council would point out that in particular the working classes have as yet shown little interest in these lectures. It has been urged over and again that this is due to the comparatively high charges of admission necessitated by the heavy expenses incurred in bringing eminent men and really good lecturers from a distance. To overcome to some extent this difficulty, and open up a way to interest the masses in scientific subjects, your Council have of late been endeavouring to secure for Dundee the benefits of the Gilchrist Educational Trust. The Trustees of this Fund apply yearly the interest of a large sum of money to encourage and establish courses of popular science lectures in our large towns, by supplying able lecturers, or giving substantial aid in payment of lecture expenses, on the sole condition that 800 seats be provided at 1d. each. Your Council were advised to arrange for the co-operation of several other towns in our district, so that a joint application could be made for the delivery of the same course of lectures in these places during the same journey, and thus reduce expense. In this matter Lecture Committees or Societies similar to our own, in Aberdeen, Brechin, Kirkealdy, and Perth, at once united with the Council. The arrangements, however, are only now in progress, and the furtherance of this most desirable object they leave in the hands of their successors, with some hopes of a favourable conclusion.*

In view of the great expense involved in previous conversaciones and scientific exhibitions held in the Kinnaird Hall, your present Council were at first afraid that nothing could be done in this direction during their term of office. Thanks, however, to the kindly and well-directed efforts of Mr John Kennedy, the late Mr David Jobson (in whose untimely death by the falling of the Tay Bridge the Society has to deplore the loss of an active and intelligent member), and Mr John Maclauchlan,

* Since the above Report was read, a letter, of which the following is an important extract, has been received from Dr W. B. Carpenter, F.R.S. :—"I regret to have to inform you that, at a recent meeting of the Gilchrist Trustees, they found themselves precluded by the state of their finances (which have most seriously suffered by the Scottish banking crisis of 1878-9) from making any grants for lectures during the ensuing session."—F. W. Y.

the clerk and librarian to the Free Library Board, the great hall of the Albert Institute was most generously placed by the Board at the disposal of the Society for some weeks.

Your Council immediately thereafter set about collecting from all parts of the country scientific apparatus, natural history specimens, &c., &c.—many objects of great general interest being thus got together. In this work, as well as in the arrangement, your Council was greatly aided by a number of members, who proved themselves most zealous and active workers, and who deserve well of the Society; in particular, your Council must mention Mr A. C. Lamb, who undertook the general superintendence of the whole exhibition, bestowing much time, energy, and talent in making the arrangements most complete.

The exhibition was felicitously opened by ex-Provost Robertson on the 21st of January, at a conversazione of members, associates, and their friends, on which occasion the whole of the Albert Institute, including the picture gallery and museum, was thrown open to the exceptionally large company that thronged the rooms. The exhibition was kept open for two weeks thereafter, from 22d January to 4th February inclusive, and was visited nightly by great numbers of interested and intelligent enquirers after natural knowledge—on several evenings being so inconveniently crowded that arrangements had to be made for opening the picture gallery and ante-rooms in order to relieve the pressure in the Great Hall. It is pleasant to record that many of these visitors expressed themselves as grateful to the Society for thus affording them the means of becoming acquainted not only with the phenomena by which in our own day science has been enriched, but the appliances by which scientific men have widened its boundaries.

Your Council cannot speak too highly of the members who out of their own enthusiasm for science gave so abundantly to those who visited the exhibition night after night. Many, willing and able, were found by the tables looking after the microscopes, and explaining the numerous objects, keeping the apparatus in order, or pointing out their various uses and applications, seeking no other reward than to interest and instruct. Two experimental lectures were also given in the long room of the Institute—one on “Polarisation,” the other on “Magnets and Magnetic Curves”—both being attended by large audiences; as was also Mr James Brebner’s lecture on “Zermatt, and its environs,” given in the same room, and illustrated with numerous beautiful views. These table demonstrations and experimental lectures have always been an interesting feature of our exhibitions, and have given them a

high educational value in Dundee, where until a few years ago the study of natural science has, in spite of its manifest advantages, formed no part of the work of our educational institutions, and where there is still great need of a complete permanent collection of scientific apparatus. In view of this, your Council offered some special inducements to school pupils, which were largely taken advantage of, upwards of 3000 scholars having been admitted at small charges.

Although open for three days longer than was originally intended, your Council had yet to consider numerous representations made to continue the Exhibition for some time longer. They felt, however, they could not further tax the time and energies of those who had already given both so unsparingly. The exhibition was, therefore, finally closed on Wednesday, 4th February, by ex-Bailie Robertson, the Convener of the Free Library Committee, who referred in the most kindly manner to the work and objects of the Society.

After what has appeared in the daily papers, and already been said in this Report, it is hardly necessary to add that we must join in considering the *Conversazione* and Exhibition a great success—we are happy to say, for the first time in the experience of our Society—even financially. Your Treasurer was able to report that, after all expenses were paid, a balance of £4 9s. was left in his hands. This very favourable state of matters must be due not only to the care and economy exercised in fittings by our excellent Superintendent of the Exhibition, Mr Lamb, but to the public-spirited liberality which marked the Free Library Board, in so freely granting the use of their buildings, and even magnanimously declining the offer made them of the balance of the proceeds. To the members of the Board, and its indefatigable and courteous clerk and librarian, Mr Maclauchlan, the most sincere thanks of the Society are due.

Your Council have resolved that the balance of £4 9s. go towards making some improvements in the Society's Library and Museum, in order to make that a more comfortable resort to the members.

During the year several additions of some importance have been made to the Society's collections both of books and specimens. Worthy of note amongst other books are:—

- 10 vols. Curtis's Botanical Magazine, with plates, the gift of Mr A. C. Lamb.
- 2 vols. Our Native Ferns, with coloured plates, from Mr W. B. Irvine.
- Another 7 vols. of the valuable British Museum Catalogues, with coloured plates, the gift of the British Museum Trustees.
- 2 vols. Buckland's Geology, from Mr D. Hodge.
- 6 vols. Phytologist ; 1 vol. Microscopical Journal ; and
- 1 vol. Microscopical Transactions, from W. M. Ogilvie, Esq., the President.

This session, we are happy to say,

296 ordinary members and
154 associates have subscribed, giving, with
10 honorary and corresponding members, a total of

—
460 members, or an increase of
18 ordinary members and
10 associates.

—
28 in all.

In concluding this Report, your Council would here beg to thank all who have aided them in the proper carrying out of the important work of the Society. More especially would they record their indebtedness and best thanks to the following gentlemen :—

Ex-Provost Robertson, who presided at the *Conversazione*, and formally opened the Scientific Exhibition.

Ex-Bailie Robertson, who formally closed the Exhibition.

Sheriff Cheyne, who presided at Professor Williamson's Lecture.

W. O. Dalgleish, Esq. of Mayfield, who presided at Dr Geikie's Lecture.

Dr Nimmo, who presided at Mr G. J. Romanes' Lecture.

Your Council desire further to thank you cordially for having honoured them with your utmost confidence during their tenure of office.

They have met altogether 21 times for the transaction of the business of the Society, and they are hopeful that this Report will show that your best interests have not been neglected, nor your confidence altogether misplaced.

W. M. OGILVIE, *President*.

FRANK W. YOUNG, *Hon. Secretary*.

TREASURER'S REPORT—1879-80.

Income.

To Balance from 1878-79, - - - - -	£4 6 5
„ Subscriptions from 296 Members, - - - - -	74 0 0
„ Subscriptions from 154 Associates, - - - - -	82 8 6
„ Over-due Subscriptions for 1878-79, - - - - -	1 16 0
„ Proceeds of Conversazione and Exhibition, - - - - -	152 18 1
„ Proceeds of Lectures, - - - - -	24 18 6
„ Funds of Biological Section, - - - - -	2 10 6
„ Subscriptions for Dredging Apparatus, - - - - -	7 12 6
„ Periodicals sold, - - - - -	0 10 0
„ Interest on Bank Account, - - - - -	1 0 10
	<hr/>
	£352 1 4

Expenditure.

By Expenses of Conversazione and Exhibition,* - - - - -	£165 10 5½
„ Expenses of Lectures, - - - - -	70 10 5
„ Amount Expended on Museum, Purchasing and Preparing Specimens, - - - - -	29 6 0
„ Books for Library, - - - - -	20 9 3
„ Dredging Apparatus, - - - - -	14 17 6
„ Periodicals, - - - - -	1 15 2½
„ Printing, Stationery, and Postages, - - - - -	10 19 9½
„ Advertising, - - - - -	7 16 11
„ High School Expenses, - - - - -	2 4 6
„ Sundry Expenses, - - - - -	5 11 10
„ Collectors' Commission, - - - - -	3 8 6
„ Balance, { Cash in Treasurer's hands, £0 12 5½	
„ „ National Bank of Scotland, 18 18 6	
	<hr/>
	19 10 11½
	<hr/>
	£352 1 4

JOHN NELSON,
Hon. Treasurer.

We have examined the Accounts of the Dundee Naturalists' Society for the year from May 1879 to May 1880, and find that they are correct, and satisfactorily vouched.

DAVID CUNNINGHAM,
ROBERT N. KERR.

DUNDEE, 20th May, 1880.

* From this sum there falls to be deducted £17 ls. 4½d., charges made for Fittings, now the property of the Society, and for certain expenses in connection with Conversazione not chargeable upon the Exhibition account.—F. W. Y.

LIST OF ASSOCIATES.

- Adamson, John, Exchange Place.
 Alexander, A., St Andrews Street.
 Allan, D. M., Reform Street.
 Anderson, Peter, Lindsay Street.
 Arnot, David, 10 Garland Place.
- Blair, William, Wellgate.
 Boase, G. W., Royal Bank, Castle Street.
 Boase, Henry S., Magdalen Place
 Bradford, J. S., Albany Terrace.
 Brand, J., Newport.
 Brown, P.
 Bruce, J. D., 116 Seagate.
 Buik, Henry, 17 Dock Street.
 Butchart, John, 14 Panmure Street.
- Campbell, Dr, Nethergate.
 Cargill, David, Longhaugh.
 Carmichael, D., 10 Dudhope Terrace.
 Carmichael, G., 11 Dudhope Terrace.
 Carmichael, J. S., Springhill.
 Carmichael, P. (Baxter Bros. & Co.)
 Charles, J. B., M.A., High School.
 Cheyne, Sheriff, Airlie Place.
 Cleghorn, William, Logie House.
 Colville, John, National Bank, Reform Street.
- Connell, Rev. A. B., Lochee.
 Coupar, James O., 30 Princes Street.
 Cox, James, Clement Park, Lochee.
 Crichton, James, Mains, Inchtute.
- Dalglish, W. O., Mayfield, Ferry Road.
 Dawson, D. R., India Buildings.
 Dixon, H. G., 41 High Street.
 Doctor, William, Meadowside.
 Dott, George, High School.
 Douglas, William, Panmure Street.
 Drummond, A. S., 67 Nethergate.
 Duncan, P. M., Dock Street.
- Esplin, A., 8 Cowgate.
- Ferrier, Thomas M., Tayview House, Newport.
 Fleming, James A., Somerville Place.
 Fleming, James, 6 St Phillans Place, Newport.
 Fleming, R., 1 Royal Exchange Place.
 Fraenkl, V., 134 Seagate.
- Gilchrist, Alexander, Somerville Place.
 Gourlay, Gershom, Dundee Foundry.
 Gourlay, Henry, Balgay House.
 Gourlay, H. G., The Gows, Dundee.
 Greig, Dr, Tay Street.
- Grimond, A. D., Whiteleys, Nethergate.
- Hamilton, James, 98 Nethergate.
 Hay, William, Town House.
 Henderson, Alexander, West Park.
 Henderson, Frank, M.P., Clarendon Terrace.
 Henderson, John G., Park Place.
 Henderson, John, Park Place.
 Henderson, William, Park Place.
 Henderson, Richard, Nethergate.
- Ireland, James, 81 Murraygate.
- Jenkins, Edward, London.
 Johnstone, Alexander, 20 Reform Street.
 Johnstone, William, 61 Reform Street.
 Johnstone, James, Murraygate.
 Jones, John, 197 Princes Street.
- Kennedy, R. G., 10 Panmure Street.
 Kerr, Charles, Nethergate.
- Laing, Robert, Greenfield Place.
 Laing, Rev. Mr, 8 Panmure Terrace.
 Law, David, 68 Bell Street.
 Lawson, J. B., Lindsay Street.
 Lindsay, William, 1 Allan Street.
 Lindsay, William (Butchart, Lindsay, & Co.).
 Low, James, Allan Street.
 Luis, J. H., Cidhmore, Perth Road.
 Luke, James, Bain Square.
- Mackay, J. H., Castle Street.
 Mackenzie, George, Royal Bank, Castle Street.
- Martin, W. M., Meadowside.
 Martin, W. Y. Blyth, Newport.
 Mathewson, A., Union Terrace.
 Methven, T. E., Broughty Ferry.
 Millar, Dr J. W., Tay Street.
 Miller, R. A., Westfield Place.
 Moir, William, Bank of Scotland, Reform Street.
- Moon, Dr Steel, King Street.
 Moon, Dr Charles, Nethergate.
 Murdoch, Thomas, St Andrews Street.
 M'Cosh, Dr, Royal Infirmary.
 M'Ginnes, Rev. James, Powrie Place, Ann Street.
 M'Grady, H., Lindsay Street.
 M'Kenzie, M., Grocer, Murraygate.
- Nagel, Henry, Tay Street.
 Neish, John, Laws.

Nimmo, Dr, Airlie Place.
Nucator, P., Meadowside.

Orchar, James G., West Ferry.
Osborne, R., Ramsay Works.

Pattullo, James, Bank Street.
Peacock, Thomas P., Panmure Street.
Phillip, Joseph, 7 Shore Terrace.
Powrie, James, Reswallie, by Forfar.

Reid, Lyle, Meadowside.
Reid, J. C., B. L. Bank, Murraygate.
Reoch, James, Newport.
Rhind, H. S., Bain Square.
Rhind, John, Bain Square.
Ritchie, William, Elmslea.
Ritchie, William, Jr., Elmslea.
Robertson, Charles, Castle Street.
Robertson, John, Craigie Works.
Robertson, T. S., Bank Street.
Robertson, William, Balmore, Newport.
Russel, David, 23 Cowgate.

Scrimgeour, John, Nethergate.
Sharp, Andrew, St Mary's Terrace.
Shaw, James (Shaw, Baxter, & Co.).
Shepherd, W., Union Mount.
Sidey, D., Clydesdale Bank.
Small, W. J., Bank Street.
Small, J. M., Gray House.
Smith, James, Ashwood, Harecraig.
Smith, Thomas, Ashwood, Harecraig.
Smith, Allan, Newport.

Smith, Thomas, Mains of Fowlis.
Smith, J. P., High Street.
Smith, James, Mains of Gray.
Speed, A., Solicitor, Euclid Crescent.
Stevenson, James, 1 Woodville Place,
Maryfield.

Stevenson, James, Nelson Terrace.
Stewart, D., 61 Reform Street.
Stewart, Charles, 6 Constitution Terrace.
Stewart, James, Constitution Terrace.
Stiven, James, 20 East Dock Street.
Strong, William, Dock Street.
Sturrock, William, West Ferry.

Thomson, W., Euclid Crescent.
Thomson, J. W., Bank Street.
Todd, Charles E., Royal Exchange
Place.
Turnbull, William, William Street.

Unna, J., Meadowside.
Urquhart, W. W., Blackness Foundry.

Walker, Harry, Caldram Works.
Walker, J. H., do.
Walker, P. G., 2 Airlie Place.
Watson, D. A., 17 Perth Road.
Watson, J. S., 76 Seagate.
Watson, R. L., 76 Seagate.
Watson, Thomas, 7 Shore Terrace.
Weinberg, J. J., Fernbrae.

Yeaman, James, Craigie Cliff.
Young, W. E. R., 7 Ward Road.

LIST OF MEMBERS.

THESE MARKED * ARE HONORARY MEMBERS.

Adams, D., Meadow Entry.
 Adie, Wm., 8 Cherryfield.
 Allen, Leonard, Trinity House.
 Anderson, A. B., Princes Street.
 Angus, Thomas, Argyle House, Broughty Ferry.
 Arnold, John P., High School.
 Arrott, Dr, Nethergate.

Baird, George, Schoolhouse, Liff.
 Banks, William, 21 Constitution Road.
 Baxter, Charles, Horse Wynd.
 Baxter, Colin, Eden Lodge.
 Baxter, Henry, Newport.
 Baxter, George, Waterloo House, Annfield Road.

Begg, David, Reform Street.
 Begg, Frank, Somerville Place.
 Bell, E. W., Belmont.
 Bell, G. J., Belmont.
 Bell, Herbert, Hawkhill House.
 Bell, J. F., Somerville Place.
 Berg, E. P., Panmure Street.
 Berry, Thomas, 55 Cowgate.
 Boswell, David, 31 Crescent Street.
 Brown, David, Bloomfield, East Newport.

Brown, William, Duncarse.
 Brown, John, 7 King Street.
 Briggs, William, East Dock Street.
 Brebner, J., M.A., Tay Square.
 Brew, William, Nethergate.
 Buchan, Miss, Nethergate.
 Buchan, J. S., Bank Street.
 Buik, Andrew, 125 Nethergate.
 Butchart, W. P., 9 Wellington Street.

Cameron, Rev. D. B., Garland Place.
 Campbell, Alexander, Newport.
 Campbell, W. S., Tay Street.
 Campbell, W., Tay Street.
 Campbell, Miss, Tay Street.
 Campbell, R., 4 Victoria Place, Broughty Ferry.
 Campbell, Rev. George, 4 Lorne Terrace.
 Carmichael, James, Somerville Place.
 Carmichael, Charles, Somerville Place.
 Carmichael, William, Dudhope Terrace.
 Chalmers, R., Jr., 3 Craigie Terrace.
 Chalmers, D. F., 32 Long Wynd.
 Clapperton, Rev. R., 150 Nethergate.
 Colquhoun, D., Carnoustie.
 Comar, Louis, Newport.
 * Cooke, Stephen, F.C.S., Veterinary College, Glasgow.
 Cooper, Rev. James, Broughty Ferry.

Cowe, Geo., Balhousie, Carnoustie.
 Cowie, John, Renny Place.
 Corr, James, 12 Thorn Place.
 Cox, James D., Panmure Street.
 Cox, James C., Beechwood, Lochee.
 Craik, George, 116 Hawkhill.
 Cunningham, D., M. Inst. C.E., Harbour Chambers.
 Cunningham, James, Jr., Royal Exchange.
 Cunningham, James, Douglas House, West Ferry.

† Daniell, Alfred, School of Medicine, Minto House, Edinburgh.
 Dewar, Dr J. A., Hill Terrace, Arbroath.
 Dick, John, Panmure Street.
 Dingwall, William, Strathmartin Road.
 Dodds, James D., Lochee.
 Donaldson, John, Meadow Entry.
 Douglas, James, Annan Terrace.
 * Drummond-Hay, Colonel, Seggieden, Perth.
 Drysdale, Mrs, Dudhope Bank.
 Duncan, George, Craigie.
 Duncan, P. M., Jr., 1 Constitution Terrace.
 Duncan, Miss, 1 Constitution Terrace.
 Duncan, Miss M., 1 Constitution Terrace.
 Duncan, Miss J., 1 Constitution Terrace.
 Duncan, Dr A. J., 144 Nethergate.
 Durham, James, F.G.S., High Street.

Ewan, Alexander, West Port.

Fairweather, James, Murraygate.
 Fairweather, Joseph, Arbroath Road.
 Falconer, C. M., Dock Street.
 Farquharson, Thomas, Dock Street.
 Feathers, Peter, Somerville House, Broughty Ferry.
 Feathers, James, Dock Street.
 Ferguson, Thomas, Bell Street.
 Ferguson, Dr, Royal Infirmary.
 Fleming, J. R., D., P., & L. Shipping Co.
 Fleming, A. D., Nelson Street.
 Fleming, John, Jr., West Dock Street.
 Foggie, John, St Andrews Square.
 Frain, William, Castle Street.
 Freeland, William, Bank of Scotland, Reform Street.
 Freeland, G. W. H., Do. do.

Galloway, Rev. S., Lochee.
 * Geikie, James, LL.D, F.R.S., &c., Balbraith, Perth.

† Corresponding Member.

- George, Rev. James, Nelson Street.
 Gibb, James, 22 Lilybank Road.
 Gibb, William, Post Office.
 Gilruth, F., Tay Square Institution.
 Girdwood, D., Meadowside.
 Glass, R. W., Candle Lane.
 Goodall, A. A. E., Thomson Street.
 Grant, John, Manse, Perth Road.
 Graham, James, Sea View, Carnoustie.
 Gray, Baxter, Fort Street, Bro. Ferry.
 Greig, D. M., Tay Street.
 * Grothe, Albert, Tharsis Mines, Spain.
 Guthrie, Alfred, Lindsay Street.
 Guthrie, Mrs A., 11 Lindsay Street.
 Guthrie, Geo., 11 Lindsay Street.
 Guthrie, Henry, 11 Lindsay Street.
- Halley, William, 4 Blackness Terrace.
 Halley, Miss E. J., 4 Blackness Terrace.
 Hamilton, George, 36 Tait's Lane.
 Hamilton, James, 36 Tait's Lane.
 Hardie, R. A., Panmure Street.
 Hardie, James, 73 Nethergate.
 Hay, George, Perth Road.
 Hay, William, Jr., 23 Magdalen Yard Road.
 Henderson, J. H. F., 5 S. George Street.
 Henderson, John, National Bank.
 Henderson, P., Tally Street.
 Hill, Howard, Ladywell Calender.
 Hill, E. W., Ladywell Calender.
 Hood, John, Dallfield Walk.
 Hood, James, Gladstone Terrace, Bro. Ferry.
 Hodge, D. S., 4 Laurence Street.
 Hodge, James, Surgeon, Tay Street.
 Hodge, Miss, Constitution Terrace.
 Howie, Miss J., 23 Crescent Street.
 Hutchison, Alexander, Reform Street.
 Hutton, Alexander, Royal Bank, Arbroath.
 Hynd, James, Dock Street.
- Imper, Albert, Airlie Terrace.
 Inglis, J. T., Dock Street.
 Ireland, David, Commercial Street.
 Ireland, David, Jr, Vine Cottage, Broughty Ferry.
 Irvine, W. B., Tay Street.
 Isles, James, Blairgowrie.
- Jaffray, J. W., Macgill Street.
 Jobson, Mrs, 17 Dock Street.
 Johnstone, J. J., Bank Street.
- Keir, R. B., High Street, Lochee.
 Kennedy, William (W. & H. Scott, Mid Wynd).
 Kennedy, John, Riversdale, Perth Road.
 Kerr, J. S., Forebank.
 Kerr, Mrs, 19 King Street.
 Kerr, P., Jr., Forebank.
 Kerr, R. N., King Street.
 Kidd, William, Nethergate.
 Kidd, John, Landsdowne Place.
 Kidd, A. G., Princes Street.
- Kidd, W. J., Victoria Place, W. Ferry.
 Kidd, George, Victoria Place, W. Ferry.
 King, David, 145 Princes Street.
 Kinnison, Mrs, 1 Commercial Street.
 * Knight, Professor, University, St Andrews.
 Kyd, Thomas, 36 Thomson Street.
 Kydd, David, Links Place, Bro. Ferry.
- Laird, David, Wallace Foundry.
 Lamb, A. C., F.S.A. Scot., Reform Street.
 Lamb, Mrs A. C., Reform Street.
 Lamb, Miss, Reform Street.
 Lamb, Mrs James, Reform Street.
 Lamb, James, Reform Street.
 Low, William, Bank Street.
 Low, Robert, 5 Taymouth Place, W. Ferry.
 Lowdon, William, Constitution Terrace.
 Lowdon, George, Nethergate.
 Lowdon, J. W., Nethergate.
 Lowdon, Edward, Nethergate.
 Luke, James, Jr., Hillbank Works.
 Lundie, Robert, 73 High Street.
- Macgregor, Thomas, 12 Dallfield Terrace.
 Mackay, D., 2 Union Street.
 Mackenzie, George, 26 Garland Place.
 Mackenzie, G. S., Ph. D., Craiglee, West Ferry.
 Mackenzie, W. L., Do., do.
 Macrae, James, 11 Lindsay Street.
 Macveigh, W. A., Tay View, Newport.
 Malcolm, D. R., 2 Dudhope Place.
 Malcolm, George, Inverlaw.
 Malcolm, H. A., Marrbank.
 Malcolm, Alexander, Marrbank.
 Malcolm, George, Collingwood Terrace, Barnhill.
 Martin, Thomas (D. Martin & Co.).
 Mathewson, Allan, C.M.S.A., Scot., 26 Seagate.
 Mathewson, John, 26 Seagate.
 Mathewson, Miss, Union Terrace.
 Mathewson, Miss V., Union Terrace.
 Mathewson, A. P., Union Terrace.
 Matthew, Alexander, Jr., 61 Princes Street.
 Maxwell, Alexander, Magdalen Green.
 Maxwell, G. F., Magdalen Green.
 Melville, W. S., Cooper's Alley.
 Millar, Robert, R., Bank, Castle Street.
 Millar, Miss, Tay Street.
 Miller, Andrew, M.A., High School.
 Milne, Robert, Beach, W. Ferry.
 Mills, Rev. J., 10 Somerville Place.
 Mitchell, T. E., 228 Perth Road.
 Mitchell, D. K., do.
 Mitchell, D. R., Meadowside.
 Moir, Edward, 27 Cowgate.
 Moodie, D., Balmuir.
 Morris, George, 72 High Street.
 Morrison, W. B., 30 Cowgate.
 Murray, Peter, 1 Nelson Street.
 Mudie, John, 17 William St., Forebank.
 Myles, A. B., 22 Airlie Place.

- Mylne, H. C., Dens Works.
 M'Culloch, A., Euclid Crescent.
 M'Farlane, John, 6 Craigie Street.
 M'Glashan, James, South Dudhope Works.
 M'Inlay, James, 8 Lawrence Place.
 * M'Intosh, W. C., M.D., F.R.S., &c., Murthly.
 M'Kay, William, Inglewood Terrace.
 M'Kay, David, Beaconsfield Place.
 M'Kechnie, James, Union Bank, Lochee.
 M'Kelvie, W. R., Euclid Crescent.
 M'Laren, D., 2 Strawberry Bank.
 M'Millan, John, Tay Bridge Station.
 M'Nab, George, Meadowside.
 * M'Nicoll, Walter, Tealing.
 Nagel, David, Tay Street.
 Nairn, Boswell L., (W. B. Ritchie's, Commercial Street).
 Nelson, John, 7 King Street.
 Nicholson, James, Carnoustie.
 * Nicholson, Prof. H. A., F.R.S.E., &c., University, St Andrews.
 Nicoll, G. H., Bank Street.
 Nicoll, Thomas, Monifieth.
 Noble, Henry, Newport.
 Noble, David, Lochee Road.
 Ogilvie, W. M., F.B.S., F.S.A., Scot., Royal Bank, Lochee.
 Ogilvie, Mrs W. M., Lochee.
 Ogilvie, William, Jr., Royal Bank, Castle Street.
 Orchar, James, West Ferry.
 Orchar, Robert, Madeira Street.
 Ower, Charles, C.E., Commercial Street.
 Ower, Leslie, C.E., Commercial Street.
 Paterson, James, Magdalen Yard Road.
 Patrick, William, 13 Mid Wynd.
 Patterson, Peter, 50 Ferry Road.
 Peyton, Rev. W. W., Broughty Ferry.
 Penderleath, H., 1 Commercial Street.
 Powrie, George, Meadowside.
 Pyott, D. W., Dens Works.
 Ramsay, David, 3 Balfour Street.
 Rattray, Richard, Balfour Street.
 Rattray, Robert, Constitution Road.
 Reid, R. C., National Bank, Hilltown.
 Reid, David, Rankin's Court.
 Reid, W. P., 68 St Andrews Street.
 Robertson, Robert, 202 Overgate.
 Robertson, David, Union Grove.
 Robertson, John, Millar's Wynd.
 Robertson, James, 106 Annfield Road.
 Robertson, Robert, Blairgowrie.
 Robertson, John, Balmore, Newport.
 Robertson, R. C., High School.
 Rorie, Dr, Lunatic Asylum.
 Salmond, Frank, C.E., High Street.
 Salmond, William, Commercial Street.
 Scott, David, Rosslyn Terrace.
 Scott, Richard, 8 Airlie Terrace.
 Scrimgeour, Andrew, 51 Victoria Road.
 Scroggie, David, Paradise Road.
 Scroggie, W., Viewbank, Blackness Road.
 Shaw, Charles, Adderley House, Monifieth.
 Shearer, William, 7 King Street.
 Sim, William, teacher, Broughty Ferry.
 Sime, George, King Street, Dundee.
 Simpson, Alexander, Woodriffe Terrace, Newport.
 Simpson, G. B., Seafield, Broughty Ferry.
 Simpson, R. T., do., do.
 Simpson, W. B., Eastern Club.
 Sinclair, Andrew, 73 Nethergate.
 Smith, A. T., Union Street.
 Smith, Mitchell, 15 West Dock Street.
 Smith, Robert, Meadowside.
 Smith, W. R., Gladstone Place, Lindsay Street Works.
 Smith, William, High Street.
 Somerville, Rev. J. E., Broughty Ferry.
 Stephenson, George, Meadow Entry.
 Stevenson, F., Nelson Street.
 Stevenson, G., Woodville Place, Maryfield.
 Stewart, D., Dallfield Terrace.
 Storrie, D., 73 Nethergate.
 Sturrock, James, Bank Street.
 Sturrock, John, Barrack Street.
 Tait, Rev. A. D., Strathkinnes.
 Tennant, James, Carlogie Road, Carnoustie.
 Thomson, Andrew, M.A., Dundee Institution, Tay Square.
 Thomson, D., 10 Garland Place.
 Thomson, James, Springhill.
 Thomson, James, Somerville Place.
 Thomson, John, Elmbank, Perth Road.
 Thomson, Robert, Somerville Place.
 Ure, George, Shore Terrace.
 Walker, James, 1 Allan Street.
 Walker, R., 2 Victoria Street.
 Walker, W. N., F.G.S., Newport.
 Watt, George, Solicitor, High Street.
 Watt, Rev. H. G., M.A., B.D., Windsor Terrace.
 Welch, John, Royal Bank, Castle Street.
 * White, Buchanan, M.D., F.L.S., &c., Perth.
 Whyte, George, Campbell Street, Lochee.
 Wighton, Thomas, 57 Meadowside.
 Williamson, Rev. H., Cupar Street, Lochee.
 Wilson, John, 29 Nethergate.
 Wilson, J. R., Castle Street.
 Wilson, Adam, M.A., High School.
 Wilson, Mrs Alexander, Westfield Place.
 Wilson, Alexander, 29 Nethergate.
 Worrall, Samuel, 7 Airlie Place.
 Wright, Alexander, High Street, Lochee.
 Young, Frank W., Science Department, High School.
 Young, William, 118 Ann Street.



19 FEB 1888





D U N D E E

NATURALISTS' SOCIETY.

E I G H T H

ANNUAL REPORT,

BEING FOR THE YEAR

1 8 8 0 - 8 1.



DUNDEE:

PRINTED BY JOHN LENG & CO., BANK STREET.

1881.



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1881.

OFFICE-BEARERS, 1881-82.

President.

W. M. OGILVIE, F.B.S., F.S.A. Scot.

Vice-Presidents.

W. B. IRVINE.

JAMES RORIE, M.D.

Treasurer.

ALEXANDER SIMPSON, ACCOUNTANT, 104 COMMERCIAL STREET.

Secretary.

FRANK W. YOUNG, F.C.S., 4 AIRLIE TERRACE.

Assistant Secretary.

ROBERT LOW, 5 TAYMOUTH PLACE, BROUGHTY FERRY.

Councillors.

JAMES DURHAM, F.G.S.

A. C. LAMB, F.S.A. Scot.

GEORGE LOWDON.

ALLAN MATHEWSON, C.M.S.A. Scot.

W. NEISH WALKER, F.G.S.

J. MARTIN WHITE.

R E P O R T .



Your Council have pleasure in submitting to you the Eighth Annual Report.

The work of the Society during the past Session may be conveniently described under the three following heads:—

I. Fortnightly Meetings.

II. Conversazione and Exhibition.

III. Excursions.

I. FORTNIGHTLY MEETINGS.

Thirteen Fortnightly Meetings were held during the Session, and at these fourteen papers or lectures were read or delivered, as under:—

- 1880.
- 13th Oct.—*The Perceptive Faculties*, - By JAMES RORIE, M.D., L.R.C.S.E.,
Vice-President of the Society.
- 27th Oct.—*Some Sound Phenomena*. Illus-
trated by Experiments, - ,, ROBERT LOW.
- 10th Nov.—*Stone Implements*. Illustrated
with Numerous Specimens, - ,, ALLAN MATHEWSON, Cor. Mem.
S.A. Scot.
- 24th Nov.—*Notes on the Highland Flora of
Braemar and neighbourhood*, ,, JAMES BREBNER, M.A.
- 8th Dec.—*Natural Rubbish Heaps*, - ,, Dr JAMES GEIKIE, F.R.S., &c., of
H.M. Geological Survey.
- 22d Dec.—*Mollusca*, - - - ,, Rev. J. E. SOMERVILLE, B.D.
- 1881.
- 12th Jan.—*Some recent additions to our know-
ledge of the Morphology of the
Cell*. Illustrated with Diagrams, ,, PATRICK GEDDES, F.R.S.E.,
Demonstrator in Botany, Uni-
versity of Edinburgh.
- 26th Jan.—*Note on recent excavations in the
Kames and gravel terraces near
Newport*. Illustrated with
Diagrams, - - - ,, JAMES DURHAM, F.G.S.
- Do. —*Physical Conditions and Man*, - ,, DAVID CUNNINGHAM, M. Inst.
C.E.

- 16th Feb.—*The Grallatores (Wading Birds) and Natatores (Swimming Birds) of the Estuary of the Tay.* The great decrease in their numbers of late years; the causes; with suggestive remarks for its mitigation, By Col. H. M. DRUMMOND HAY, Cor. Mem. Z.S.
- 2d Mar.—*Crustaceans: their distribution in time,* - - - - ,, WM. B. IRVINE, Vice-President of the Society.
- 16th Mar.—*Vaccination,* - - - - ,, JAMES W. MILLER, M.D., L.R.C.S.E.
- 30th Mar.—*The Scenery of the Northern Counties of Scotland considered in connection with their Geological Formation.* Illustrated with Diagrams, ,, Professor M. FOSTER HEDDLE, M.D., F.R.S.E., St Andrews University.
- 13th Apr.—*Nerves: their origin and environment,* ,, GEORGE LESLIE, Demonstrator in Natural History, University of Edinburgh.

Your Council have again pleasure in referring to the successful nature of these Meetings, and consider that it is most creditable to the Society that so many Members are willing to bring forward the results of their study and research with that elaborate care and illustration by Diagrams and Experiments not unworthy of audiences even much larger than those which from time to time assemble in the Society's Lecture Hall. The paper read by Colonel Drummond Hay, in which he drew attention to the wanton destruction and partial extermination of the Swimming and Wading Birds of the Estuary of the Tay, was considered of sufficient importance to this locality by the Members present at the Meeting that, in order to lay the matter fully before the general public, it was resolved to print and publish the paper. These Meetings were all held in the Mathematical Class Room of the High School, and the Council desire in this place to record their high sense of the kindness of the Directors of that Institution in giving the Society the use of a Room so well adapted in every respect for Lecturing purposes.

II. CONVERSAZIONE AND EXHIBITION.

On the evening of 9th February last, through the kindness of the Free Library Board, your Council were enabled to receive Members, Associates, and their Friends at a *Conversazione* and Exhibition in the Albert Institute. The Meeting was of a most pleasant description, the attendance was very large, and the entire proceedings were most

successful. Colonel Drummond Hay, acting for the Council, welcomed the Company in the Great Hall, and opened the work of the evening by an address admirably suited to the occasion. Thereafter, Dr W. C. M'Intosh, F.R.S., gave an instructive account of some remarkable "Sponges;" and the Assembly then dispersed to the various parts of the building to examine the objects of interest brought together for the evening. Among these may be noted a phonograph belonging to Mr Rodger of St Andrews, exhibited and explained by Professor Scott Lang, a large number of Swan's electric lamps, very kindly sent by Mr Swan, and which were hung and lighted with great effect in the Picture Gallery, the usual display of microscopes and microscopic objects for which this Society has always been distinguished, and the Society's now extensive collection of birds of the Tay valley, as well as a fine collection of shells exhibited and described by the Rev. Mr Somerville. The Exhibition was re-opened on the afternoon and evening of Saturday, when parties not Members of the Society were admitted at a small charge. With this portion of the Society's work the Council have also to express great satisfaction. These annual gatherings are evidently prized by all Members and Associates, and it may not be too much to say that to them is due a large amount of the popularity which the Society enjoys.

III. EXCURSIONS.

These were as follows:—

May 19,	-	Dredging,	-	Off the Bell Rock.
June 28-30,	-	Botanical,	-	Clova and Glen Doll.
July 14,	-	Dredging,	-	The Scaup.
August 7,	-	Botanical,	-	Lunan Bay and Red Head.
„ 27,	-	Dredging,	-	Off the Isle of May.

By means of these Members have an opportunity of increasing their knowledge in various departments of Natural History. All were well attended, and many interesting specimens were obtained. The Dredging Excursions are particularly well attended; indeed, it would almost seem as if their great popularity would interfere with their scientific value. Good work has, however, been done; and, doubtless, as these are continued year after year, a store of experience in Dredging in all its details will have been acquired, so that even greater results will be achieved.

In last year's Report your Council drew attention to the serious pecuniary loss incurred by the Popular Lectures given under the auspices of the Society in former years, and recommended their successors to continue arrangements which they were then making with a view

to avoid the great expenditure, and at the same time to increase the popularity of the Lectures, by an application for the benefits of the Gilchrist Educational Trust. This recommendation your present Council gladly adopted and followed out, making a joint application to the Trustees, along with Lecture Committees or Natural History Societies in Aberdeen, Brechin, Kirkcaldy, and Perth. The Gilchrist Trustees, however, found themselves precluded by the state of their finances from making any grants for Lectures during last session; and your Council, under these circumstances, thought it inadvisable to proceed with any Public Lectures during the year. But they hope that the new Council may see fit, at the proper time, to renew the application to the Trustees, in order to secure for Dundee, if at all possible, the benefits of Dr Gilchrist's legacy.

During the year the following Works have been added to the Society's Library:—

- Siluria. By Sir R. I. Murchison, F.R.S.
- The Great Ice Age. By Dr James Geikie, F.R.S.
- Prehistoric Europe. " " "
- British Mollusca. 5 vols. By Dr Gwyn Jeffreys, F.R.S.
- British Zoophytes. 2 vols. By Hincks.
- Journal of the Mineralogical Society. 3 vols.
- Report on the Scientific Results of the Challenger Expedition. 2 vols.
- The Invertebrate Fauna of the Firth of Forth. By Mr George Leslie and Dr Herdman. Presented by the Authors.
- Papers on Various Subjects. By Mr Patrick Geddes, F.R.S.E. Presented by the Author.
- W. & A. K. Johnston's Diagram of Invertebrata. Presented by Mr David Cunningham, C.E.
- Mineralogical Chart of the Shetland Isles. Presented by Professor Heddle.

Your Council have to report that the New Catalogue is in the printer's hands, and will be issued shortly. In order to give Members greater facilities in the use of the books, your Council would recommend that at least one Member of Council should be in attendance in the Society's Room every Monday evening during six months of the Session to issue books.

The following periodicals have been regularly laid upon the Library Table as issued:—

- Weekly—Nature.
- Monthly—Science Gossip, the Geological Magazine, and the Journal of Botany.
- Quarterly—The Scottish Naturalist.

In order to secure the greater comfort of Members visiting the Room, your Council have during the last year made several important improvements, which they hope may answer that purpose.

Additions continue to be steadily made to the Society's Museum ; among other things, 25 birds having been added to this interesting collection during the year. A good deal of work, however, still remains to be done in the matter of re-arrangement, mounting, naming, and renewing of specimens. The Council trust that, with the assistance of Members who are specialists in the different subjects, these will be materially advanced, if not completed, during the next Session.

During the year the Council have added the following gentlemen to the Society's list of Corresponding Members :—

Dr M. Foster Heddle, Professor of Chemistry in the University of St Andrews.
Mr Patrick Geddes, F.R.S.E., Demonstrator of Botany, University of Edinburgh.
Mr George Leslie, Demonstrator of Natural History, University of Edinburgh.

Last year your Council reported as having on the Roll of Membership :—

296 Ordinary Members,
154 Associates,
10 Honorary and Corresponding Members :
—
460

At present we have to report—

323 Ordinary Members,
134 Associates,
13 Honorary and Corresponding Members :
—
470—a total increase of 10 Members of all classes.

In conclusion, your Council desire to thank you for the confidence and support given them during their period of office, throughout which they have met 17 times for the transaction of the Society's business. Seeking only its best interests, and the general advancement of Natural knowledge in Dundee, they believe they have honestly fulfilled the duties with which you last year entrusted them.

W. M. OGILVIE,
President.

FRANK W. YOUNG,
Hon. Secretary.

TREASURER'S REPORT—1880-1881.

Income.

To Balance from 1879-80,	£19 10 11½
„ Subscriptions from 321 Members,	80 5 0
„ Subscriptions from 134 Associates,	71 8 0
„ Proceeds of Conversazione and Exhibition,	19 3 0
„ Prints of Col. Drummond Hay's Lecture sold,	1 3 9
„ Interest on Bank Account,	0 5 3
	<hr/>
	£191 15 11½
	<hr/> <hr/>

Expenditure.

By Expenses of Conversazione and Exhibition,	£83 12 5
„ Amount Expended on Museum, Purchasing and Preparing Specimens,	23 5 10
„ Books for Library,	13 5 4
„ Dredging Apparatus,	11 12 7
„ Periodicals,	4 18 4
„ Printing, Stationery, and Postages,	22 10 4½
„ Advertising,	11 11 6
„ High School Expenses,	2 0 0
„ Sundry Expenses,	1 5 0
„ Collector's Commission,	3 1 6
„ Balance in National Bank of Scotland,	£13 14 2
„ Balance in hands of Treasurer,	0 18 11
	<hr/>
	14 13 1
	<hr/> <hr/>
	£191 15 11½

ALEX. SIMPSON,

Hon. Treasurer.

We have examined the Accounts of the Dundee Naturalists' Society for the year from May 1880 to May 1881, and find that they are correct, and satisfactorily vouched.

WM. N. WALKER.

J. MARTIN WHITE.

18 FEB 1888





DUNDEE
NATURALISTS' SOCIETY.

NINTH
ANNUAL REPORT,

BEING FOR THE YEAR

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DUNDEE:
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DUNDEE:
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—
1882.

COUNCIL, 1882 - 83.

President.

JAMES RORIE, M.D., L.R.C.S.E.

Vice-Presidents.

WM. N. WALKER, F.G.S.
JAMES DURHAM, F.G.S.

Hon. Treasurer.

ALEXANDER SIMPSON, ACCOUNTANT, 104 COMMERCIAL STREET.

Hon. Secretary.

FRANK. W. YOUNG, F.R.S.E., F.C.S., 4 AIRLIE TERRACE.

Assistant Secretary.

ROBERT LOW, 12 FORFAR ROAD.

Councillors.

DAVID CUNNINGHAM, M. INST. C.E., F.M.S.
A. C. LAMB, F.S.A. Scot.
GEO. LOWDON.
ALLAN MATHEWSON, COR. MEM. S.A. Scot.
W. M. OGILVIE, F.B.S., F.S.A. Scot.
J. MARTIN WHITE.

R E P O R T.

Your Council have much pleasure in submitting to you the Ninth Annual Report of this Society.

It will be remembered that at last Annual Meeting Rule IV. was so altered that the number of Members of Council was raised from eight to twelve. This had become in some degree necessary, owing to the great increase of late years in the membership of the Society, and the consequent increase of work and responsibility. With the better apportioning of this, your present Council believe they have been able to carry on very satisfactorily the duties entrusted to their charge.

In October last, as intimated by the Secretary at one of the Ordinary Meetings, the Society suffered a loss in the resignation by Mr W. B. Irvine of the office of Vice-President, on account of other pressing duties and engagements, and the state of his health. Under the circumstances your Council felt most reluctantly compelled to accept the resignation, placing on record their high appreciation of the numerous services rendered by Mr Irvine to the Society, and their great regret at losing one of their number who had wrought so long and so successfully with them as he had done. The Council afterwards appointed one of their number, Mr W. N. Walker, F.G.S., as Vice-President, and elected Mr David Cunningham, M. Inst., C.E., to the vacancy in the Council.

In June last year the Excursion Committee made arrangements for the following Scientific Excursions :—

June	11.	Sea Dredging,	-	-	St Andrews Bay.
„	18.	Geological and Botanical,	-	-	Fowlis and Balruddery.
July	9.	Geological and Botanical,	-	-	Red Head.
July	20.	Sea Dredging,	-	-	Bell Rock.
August	13.	-	-	-	Kinkel Braes.
„	31.	Sea Dredging,	-	-	Lunan Bay.

The excursion to Kinkel Braes did not take place, owing to the unfavourable state of the weather. All the others, however, passed off very successfully, the dredging expeditions in particular being both numerous attended and enjoyable, many marine specimens being at the same time obtained for the Society's Museum.

The work of the Winter Session was very auspiciously inaugurated by an interesting and eloquent lecture given in the Kinnaird Hall by Dr Andrew Wilson, F.R.S.E., on "Some Features of Evolution." Thirteen

other fortnightly meetings were held during the Session, and the following communications and lectures read or delivered :—

- 19th Oct.—*Colours and Colour Blindness.*
With Experiments, - - - DAVID NAGEL, M.A.
- 2d Nov.—*Some Chemical Operations in Nature.*
With Experiments, - - - FRANK W. YOUNG, F.C.S.
- 16th Nov.—*The Geographical Distribution of Animals,* - - - - WILLIAM N. WALKER, F.G.S.
- 30th Nov.—*Notes on the Paris Electrical Exhibition.* With Experiments, - J. MARTIN WHITE.
- 14th Dec.—*The Metamorphic Rocks of Portsoy,* Rev. W. W. PEYTON.
- 11th Jan.—*Climatic and Geographical Changes in Postglacial Times,* - - - Dr JAMES GEIKIE, F.R.S., F.G.S. &c., of H.M. Geological Survey.
- 25th Jan.—*The Weather and Storms of Great Britain,* - - - - DAVID CUNNINGHAM, M. Inst., C.E.
- 8th Feb.—*Green Animals,* - - - - PATRICK GEDDES, F.R.S.E., Lecturer on Zoology in the Edinburgh School of Medicine.
- 22d Feb.—*The Island of Eigg and its Geological History,* - - - - JAMES DURHAM, F.G.S.
- 8th Mar.—*The Degradation of Energy.* With Experiments, - - - - ROBERT FULLARTON.
- 22d Mar.—*The Distribution of the Alpine Flora in Scotland,* - - - - EDWARD MOIR.
- 5th Apr.—*Polarisation of Light (Plane and Circular).* With Experiments, JOHN THOMSON.
- 19th Apr.—*Some Chemical Operations in Nature* (a continuation of previous communications). With Experiments, - - - - FRANK W. YOUNG, F.C.S.

These Meetings last Session were again held in the Mathematical Class Room of the High School, for the use of which from year to year the Society is very greatly indebted to the kindness and generosity of the Directors of that Institution. An extra Meeting was, however, held in the Society's Museum on December 27th, Mr Patrick Geddes having very kindly consented to the expressed desire of the Council to give a short account of his proposed method for "the Classification of Statistics," based upon the preliminary Sciences.

Your Council desire here to record their great obligation to all the gentlemen mentioned for their valued contribution at these Meetings, and to express their due appreciation of the evident pains taken in the proper illustration of the different subjects. It is to be hoped that this part of the Society's work will continue to receive a large share of the attention of the Members and Associates, and that this interest will be shown more and more, not only by increased attendance at the fortnightly meetings, but by an augmentation of the number of those who thus communicate.

It is now two years since your Council reported having made their first effort to obtain the benefits of the Gilchrist Trust in aid of a course of popular lectures on various branches of Natural Science, and last year a renewal of the application to the Trustees was strongly urged. This matter was early considered by your present Council, who agreed to again ask the Natural Science Societies in Perth, Brechin, Montrose, and Kirkcaldy, to make a conjoint and strong representation to the Trustees through Dr Carpenter, the Secretary of the Trust, for a course of Gilchrist Lectures in Dundee and these other towns. It is hardly now necessary to state that a very favourable reply was received to this second application, your Council being soon after deputed to make arrangements with the Societies or Committees in all the above-named towns for the delivery of a Course of Lectures as under :—

Professor BALL, LL.D., F.R.S., Astronomer Royal for Ireland,
The Telescope and its uses.

WM. LANT CARPENTER, Esq., B.A., B.Sc., F.C.S.,
Electrical Storage of Energy, Illustrated with Experiments.

WM. LANT CARPENTER, Esq., B.A., B.Sc., F.C.S.,
Transmission of Power by Electricity, Illustrated with Experiments.

Dr ANDREW WILSON, F.R.S.E., F.L.S.,
Corals and Coral Islands.

Dr JAMES GEIKIE, F.R.S., F.R.S.E., F.G.S., &c., of H.M. Geological Survey.
The Ice Age in Scotland.

The Rev. W. H. DALLINGER, F.R.S., &c., Professor of Natural Science, and
Governor of Wesley College, Sheffield,
An Hour with the Microscope,

With special reference to the least and lowest forms of life.

In Dundee the Lectures were delivered in the Kinnaird Hall, which was crowded every evening with intelligent and appreciative audiences. In every respect the course may be considered a complete success, and it is gratifying to note that not only was this the case in Dundee, but in Perth, Brechin, Montrose, and Kirkcaldy also—one remarkable feature in the audiences, noticed by the Lecturers as well as by your Council, being the great preponderance of our working classes, for whom the Lectures were mainly instituted.

Your Council have already taken occasion to record and transmit an expression of their great indebtedness to the Gilchrist Trustees, for their goodness in providing eminent scientific men to deliver so interesting and varied a course. To Dr W. B. Carpenter, C.B., F.R.S., your Council feel more especially indebted, for much kindness and courtesy while carrying out, along with him, all the arrangements.

The labours necessarily involved in this matter, and in consideration of the fact that the Art Exhibition in the Albert Institute was open during the winter months of this year, and that in connection with it

there were several evening meetings, your Council deemed it advisable not to hold a *Conversazione* of the Members and Associates of this Society until the beginning of another Session, when the new Council could better arrange for a successful scientific gathering.

Since the issue of the Library Catalogue in the autumn of last year, a number of valuable additions have been made to the Society's Scientific Works.

The following may be noted here :—

- U.S. Geological Survey of the 40th Parallel. Vol. VII. *Odontornithes*. By Prof. O. C. Marsh. Presented by the U.S. Government, per Consul M'Dougall.
- "The Classification of Statistics," and other Scientific Papers. By Mr Patrick Geddes, F.R.S.E. Presented by the Author.
- 14 Vols. of British Association Reports, 1867-1880. } Presented by
13 Vols. Jardine's Naturalists' Library, with Plates. } Mr A. C. Lamb.
2 Vols. Balfour's "Comparative Embryology." Presented by Mr W. N. Walker, F.G.S.
- Bell's "British Reptiles." Presented by Mr J. Martin White.
- Journal of Quekett Microscopical Club. Presented by the Club.
- "Flora of Arbroath and Neighbourhood." Presented by the Compilers.
- Official Report of the Challenger Expedition. Vol. III.
- Flower's "Osteology of the Mammalia."
- Huxley's "Anatomy of the Invertebrated Animals."
- Huxley's "Anatomy of the Vertebrated Animals."
- 6 Vols. W. Saville Kent's "Manual of the Infusoria."
- Green's "Manual of the Protozoa."
- Gosse's "British Sea Anemones and Corals."
- Forbes' "British Star Fishes, Sea Urchins, and Sea Cucumbers."
- 2 Vols. Bate and Westwood's "British Sessile-Eyed Crustacea."
- Murray's "Aptera."
- Newman's "British Butterflies and Moths."
- Heddle's "Geological Map of Sutherland."

The books enumerated in the Catalogue which was issued, and those mentioned here, will be sufficient to show that there is in the possession of the Society a goodly store of valuable works for the use of the Scientific student or specialist.

In order to give greater facilities for their use, the Museum Committee of the Council have now arranged for the attendance of a boy in the Society's Library at all hours of the day during which the Free Library is open.

The following Periodicals have been regularly laid upon the Museum table throughout the year :—

- Weekly—*Nature*.
Monthly—*Science Gossip*, the *Geological Magazine*, and the *Journal of Botany*.
Quarterly—*The Scottish Naturalist*.

In the Museum Department some progress has been made, both in the collecting and arranging of specimens. It may be mentioned that the Society's valuable collection of birds of the Tay Valley now numbers 167 specimens, representative of 113 species.

There has lately been added some few mammals, reptiles, and fishes, including a magnificent specimen of the Sun Fish, caught in the Tay, and presented to the Society by Mr David Cunningham.

The best thanks of the Society are due to Mr Brebner for his having during the year undertaken the great trouble of arranging the Society's Herbarium, at the same time adding many specimens in order to make it more complete. Considering the rapid growth of the Society's collections, your Council found it was necessary in the autumn of last year to agree to a recommendation from the Museum Committee to enlarge the room. Having obtained the kind sanction of the Free Library Board, for which they are grateful, a comparatively large adjoining room was added to the Museum, and a glass case or two fitted up to cover the extra wall space, which it is expected may provide for the wants of the Museum Committee for some time to come.

Since the last annual meeting, the following have been elected Honorary Members of the Society:—Dr ANDREW WILSON, F.R.S.E., F.L.S.; and Mr PATRICK GEDDES, F.R.S.E. In the opinion of your Council, these gentlemen have not only very specially distinguished themselves in science, either by the satisfactory dissemination of its truths or by valuable research, but have furthered the interests of this Society by personal and willing efforts on its behalf.

On our Roll of Membership we have at present

346 Ordinary Members.
119 Associates.
14 Honorary and Corresponding Members :

—
a total of 473 Members.

Last year we had—

323 Ordinary Members.
134 Associates.
13 Honorary and Corresponding Members :

—
470 in all, showing an increase of 3 Members.

In concluding this Report, which it is hoped may be deemed a favourable one, your Council desire here most sincerely to thank all who have in any capacity aided them in carrying on the work of the Society. More especially would they record their indebtedness to the following gentlemen for presiding on the occasion of the Gilchrist Lectures:—Ex Provost Robertson; John Leng, Esq.; Ex-Bailie Robertson; Sheriff Cheyne; Dean of Guild Henderson, and William Hay, Esq.

Your Council also thank the Members of the Society for the confidence and support extended to them during their term of office.

W. M. OGILVIE, *President.*

FRANK W. YOUNG, *Hon. Secretary.*

TREASURER'S REPORT—1881-1882.

Income.

To Balance from 1880-81,	£14 13 1
„ Subscriptions from 325 Members,	81 5 0
„ Subscriptions from 119 Associates,	63 10 6
„ Proceeds of Lectures,	106 15 11
„ Interest on Bank Account,	0 11 2
	£266 15 8

Expenditure.

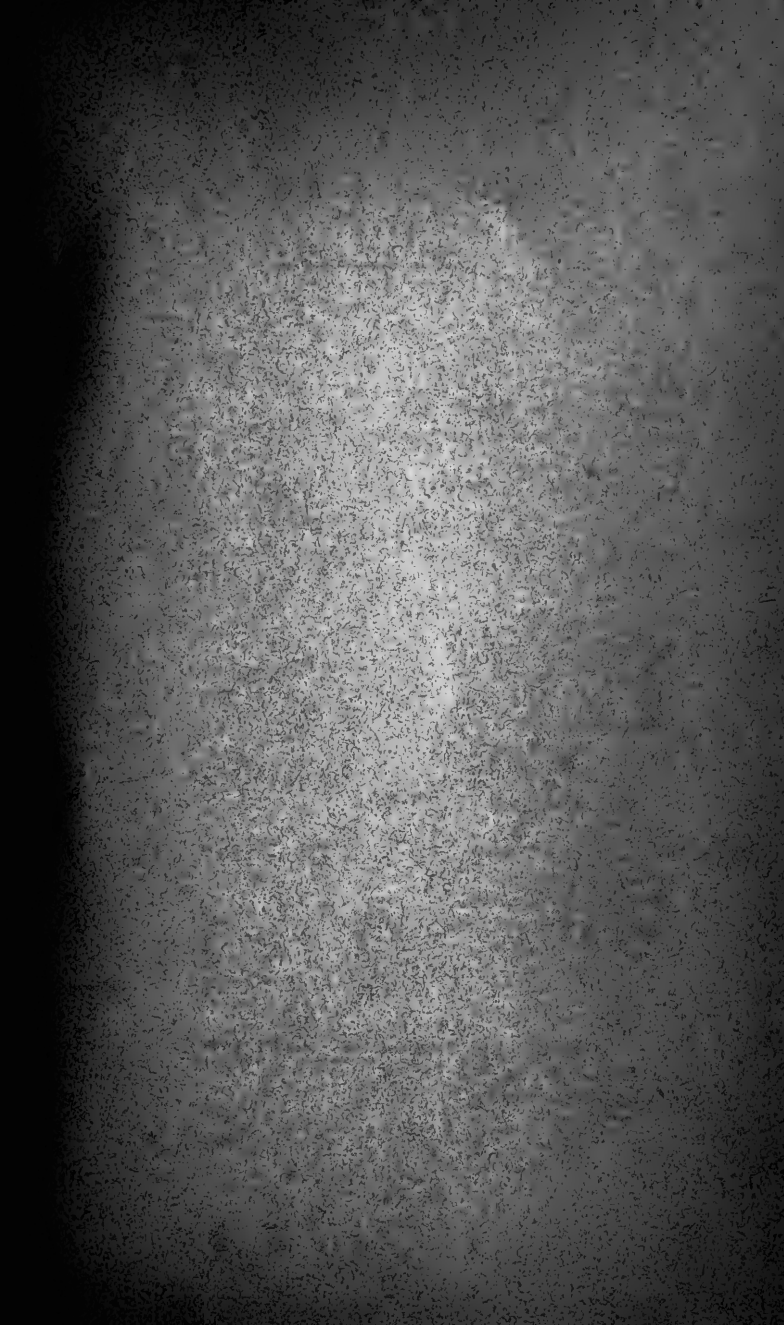
By Expenses of Lectures,	£91 0 10
„ Amount Expended on Museum, Purchasing and Preparing Specimens,	38 11 9
„ Books for Library,	12 8 2½
„ Dredging Apparatus,	7 4 10
„ Periodicals,	2 14 1
„ Printing, Stationery, and Postages,	20 4 0½
„ Advertising,	9 8 11
„ High School Expenses,	2 0 0
„ Sundry Expenses,	0 12 0
„ Collector's Commission,	3 5 0
„ Balance in National Bank of Scotland,	79 6 0
	£266 15 8

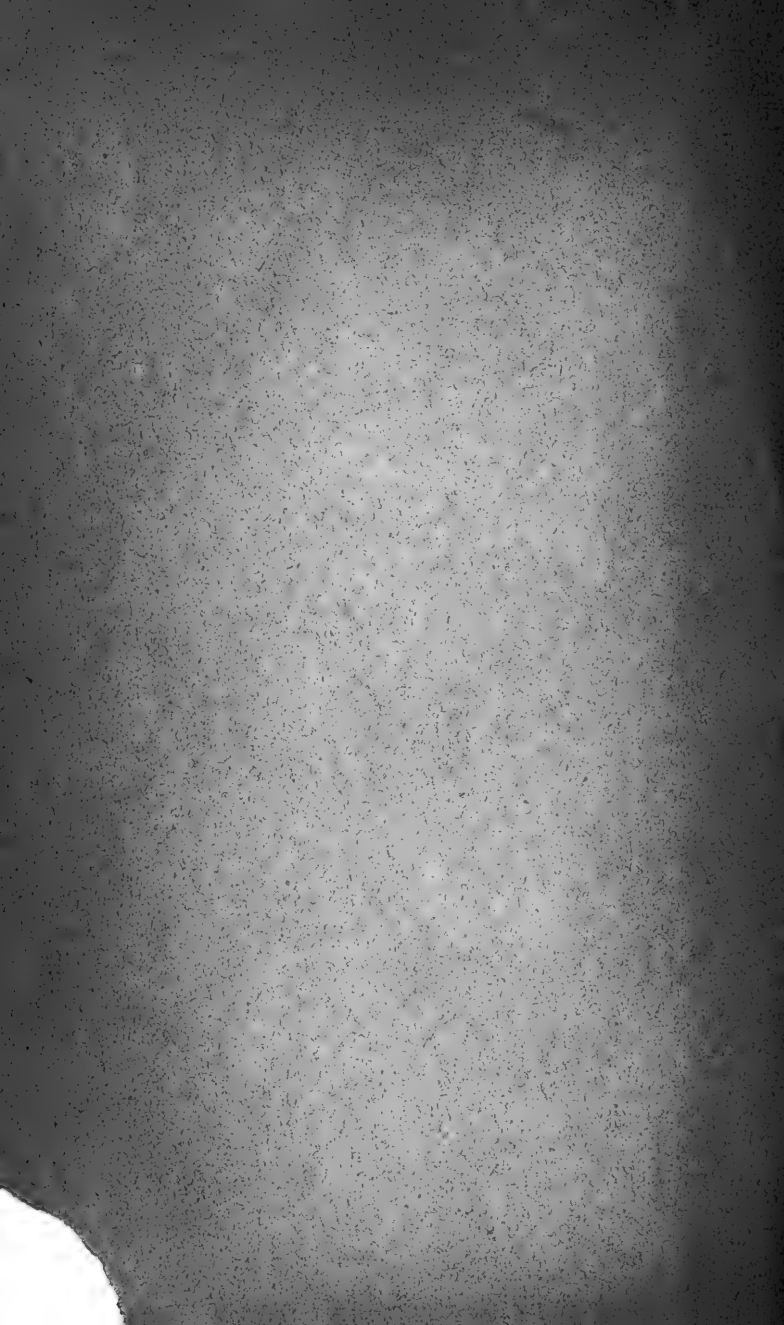
May 15, 1882.—We have examined the Accounts of the Dundee Naturalists' Society for the year from May 1881 to May 1882, and find that they are correct and satisfactorily vouched.

J. DICKSON DODDS.
A. IMPER.

18 FEB 1888









Dundee Naturalists' Society.



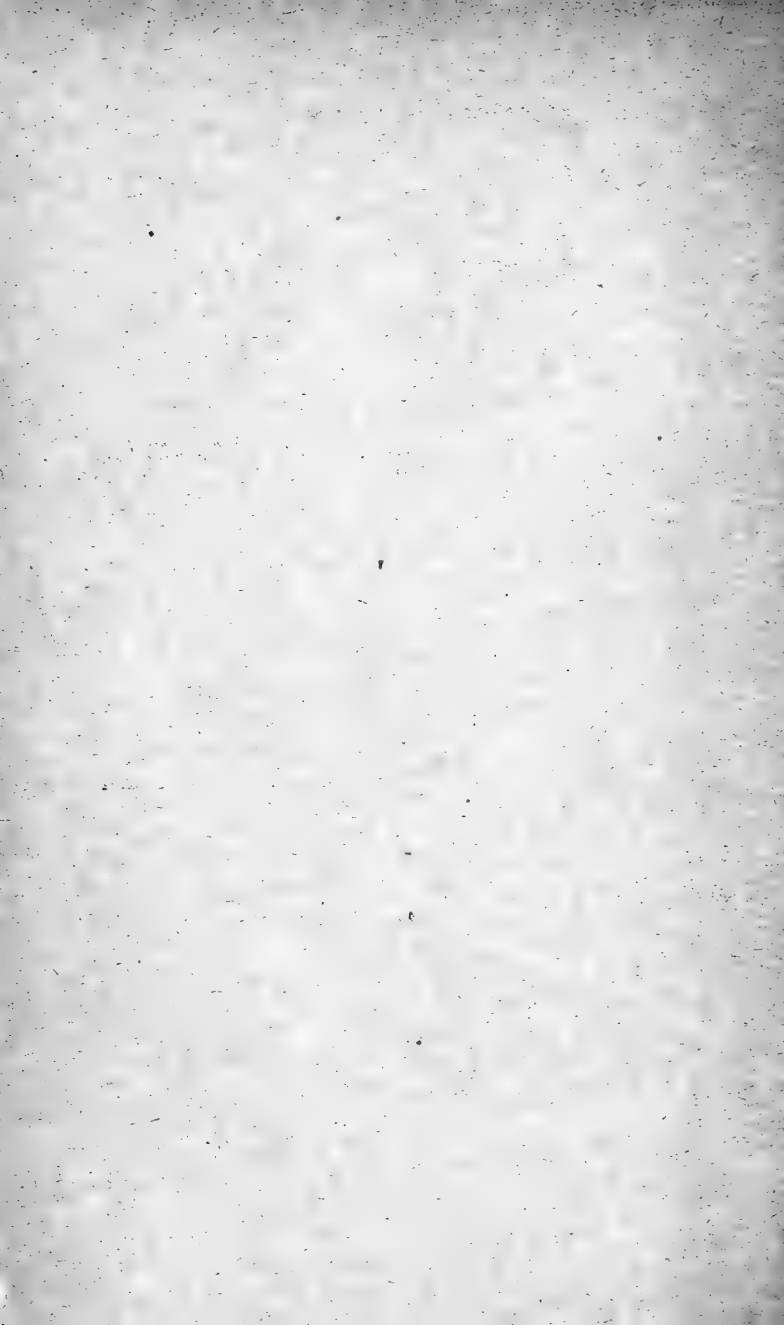
TENTH



ANNUAL REPORT,

1882-83.





Dundee Naturalists' Society.

TENTH ANNUAL REPORT,

BEING FOR THE YEAR

1882 - 83.



DUNDEE:
PRINTED BY JOHN LENG & CO., BANK STREET.

—
1883.

COUNCIL, 1883 - 84.

—
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R E P O R T.



In presenting the Tenth Annual Report of this Society your Council would cordially congratulate the Members on the very satisfactory completion of the first decade of the Society's existence. When ten years ago it was organised by a few enthusiastic Naturalists it was, we dare say, little thought that such a Society would grow to its present proportions, or occupy the position it now does in Dundee.

During the past year the proceedings have been both profitable and agreeable to all those concerned in them.

There were in all five Summer Excursions arranged for last year, as under :—

May 24.	Sea Dredging,	-	-	St Andrews Bay.
June 24.	Botanical,	-	-	Clova and Glen Dole.
July 20.	„	-	-	Tent's Muir.
Aug. 2.	Sea Dredging,	-	-	Bell Rock.
Aug. 19.	Botanical,	-	-	Tealing.

All of these came off very satisfactorily—many marine and other specimens being obtained, and there is good reason to believe that, apart from special work in this direction, the quiet observation of Nature, and the mutual aid in the better understanding of natural objects afforded by these Excursions, leads to a considerable amount of profitable enjoyment. It is, therefore, to be hoped that the expeditions will continue to remain popular, and that increased numbers will take advantage of their many benefits.

The work of the Winter Session was inaugurated by a Conversation of Members and their friends in the Picture Galleries of the Albert Institute. Although it was not the aim of the Council, as in some previous years, to bring together a very large special collection either of scientific apparatus or Natural History objects for exhibition, yet, thanks to the local Telephone Company, the Northern Electric Light Company, Mr Lowdon, and others, a goodly number of scientific novelties were exhibited; and the Society's Museum in the upper rooms of the Institute having, after last year's extensions and alterations, been again got into order, was brilliantly lighted by incandescent electric lamps, and

proved a very attractive resort throughout the evening. Here also Mr P. Geddes, F.R.S.E., gave a short but very interesting discourse on "Some Results of the Study of Biology," and Colonel H. M. Drummond Hay followed with an instructive lecture on some of the local birds in the Society's collection.

An excellent concert of orchestral and vocal music in the Great Hall of the Institute added very much to the harmony of the meeting.

The best thanks of the Society are due to W. Ogilvy Dalgleish, Esq., who ably presided on the occasion, to Colonel Drummond Hay and Mr Geddes for their lectures, to Mr T. Murdoch, who so efficiently conducted the concert, and all who exhibited specimens or apparatus, for their kindly interest in the wellbeing of the Society. Your Council feel again compelled to make mention of one of their number, Mr A. C. Lamb, upon whom falls the bulk of the work of organising these Conversazioni. It is not too much to say that any success which may attend them is in great measure due to Mr Lamb's energy and foresight.

The ordinary Meetings during the last Session have been held in the Museum and Library of the Society. This was rendered necessary owing to a resolution of the High School Directors, after the extensive alterations made in the School last summer, "that the High School buildings and grounds shall be exclusively set apart for the purposes of the School," thereby rendering it needless to apply for the use of the very suitable room so long kindly granted by the Directors.

The Meetings held throughout the Session, the subjects of communications, &c., were as follows:—

- | | | |
|--|-------|---|
| Nov. 8th.— <i>Notes on Orchidaceæ,</i> | - - - | ALEX. HUTTON, F.B.S., F.M.S.,
Arbroath. |
| Nov. 22nd.— <i>On Some Poisonous Plants,</i> | - - - | J. S. CRICHTON, M.D., Arbroath. |
| Dec. 6th.— <i>The Teeth of Fishes,</i> | - - - | WM. M. FISHER, L.D.S. R.C.S. Eng. |
| Dec. 20th.— <i>Plants and their Physical Conditions,</i> | - - - | FRANK W. YOUNG, F.R.S.E., F.C.S. |
| Jan. 24th.— <i>The Diffraction Spectrum,</i> | - - - | JOHN THOMSON. |
| Feb. 7th.— <i>The Scientific Results of the Cruise of
H.M.S. Challenger,</i> | - - - | FRANK E. BEDDARD, B.A., F.R.S.E.,
Naturalist to the "Challenger"
Expedition Commission. |
| Feb. 21st.— <i>Some Points of Interest in the Geo-
graphical Distribution of Plants,</i> | - - - | GEO. G. CHISHOLM, M.A., EDIN. |
| March 7th.— <i>The Tides,</i> | - - - | WM. DURHAM, F.R.S.E. |
| March 21st.— <i>Cyclones and Tornadoes,</i> | - - - | DAVID CUNNINGHAM, M. INST. C.E. |
| April 4th.— <i>Botany, Geology, and Archaeology of
the Killin District,</i> | - - - | JAMES BREBNER, M.A., Dundee, and
D. HAGGART, Killin. |
| April 18th.— <i>Fertilisation of Flowers and Floral
Defences,</i> | - - - | JOHN STEWART, Arbroath. |

Your Council desire here to record their warmest thanks to the gentlemen who so very ably contributed the papers and lectures at the different Meetings, more particularly to those who, coming from a distance, so favoured the Society.

The attendance at the ordinary Meetings has on the whole been very good, but necessarily limited by the size of our Museum, which on two or three occasions was very inconveniently crowded. This, however, your Council hope may be remedied ere another Session opens, by the securing of a more commodious and somewhat more convenient meeting-room.

The work in the Museum continues to progress most satisfactorily, under the active supervision of our earnest Librarian and Curator (Mr Martin White). Several new cases have been added, and some of our Natural History collections largely augmented. Our extensive collection of local birds is now nearly complete, and the eggs have very recently been classified and named by Mr R. N. Kerr. A number of species of reptiles and mammals have been added, and Dr Buchanan White, F.L.S., has very generously undertaken to arrange for the Society a typical series of insects (excluding the Butterflies and Moths, our collection of which is already complete).

The very laborious task of putting our Herbarium in order has been finished by Mr Brebner during the past year, and our large Botanical collection is now in a most efficient condition—every plant being placed in its order and class in neat and easily accessible portfolios.

Your Council have already minuted and conveyed to Mr Brebner their cordial thanks for his good services, but they feel that he has single-handedly accomplished that which entitles him to the gratitude of every Naturalist in the Society. Mr Martin White has very kindly given, for the use of Members in the Museum, a valuable microscope, and which it is to be hoped will be largely taken advantage of by those for whom it is intended.

The plaster casts of the fine fossil *Pterygotus Anglicus* found some years ago in the quarries at Carmyllie, have, in reply to requests, been distributed and duly acknowledged, as follows :—

- (1.) To the Museum of the Royal School of Mines, pro. Prof. Huxley—sent in year 1879.
- (2.) To the Zoological Museum at Marischal College, Aberdeen (1879).
- (3.) To the Natural History Museum (British Museum), South Kensington.
- (4.) To the Natural History Museum, Edinburgh.
- (5.) To the Natural History and Antiquarian Museum, Montrose.
- (6.) To the Natural History Museum of the Perthshire Society of Natural Science.

Early in the autumn of last year there was issued a Supplement to the previously existing Library Catalogue of the Society. Since then, however, a number of important volumes have been added—amongst others the following :—

- Official Report of the Challenger Expedition—Narrative. Vol. II.
 Do. The Petrels, Deep Sea Medusæ and Holothurians. Vol. IV.
 Do. Ophiuroideæ, &c. Vol. V.
 Do. Actinaria and Tunicata. Vol. VI.
 18 Volumes of British Association Reports, 1834—1863. Presented by the Committee of the British Association.
 List of British Birds.
 Hibberd's Marine Aquarium.
 Nature. Vols. XXVI. and XXVII.

As in previous years the following Periodicals have been regularly obtained :—

- Weekly—Nature.
 Monthly—Science Gossip, the Geological Magazine, and the Journal of Botany.
 Quarterly—The Scottish Naturalist.

The Membership of the Society at the present time consists of—

- 11 Hon. Members,
 9 Corresponding Members,
 320 Ordinary Members, and
 112 Associates.

452 in all.

In January the Council sustained a loss in the death of Mr Robert Low, the late active and intelligent Assistant Secretary, and his colleagues desire here to record their grateful sense of the many and important services rendered by Mr Low to the Society, and their very deep regret at the early removal of one so amiable as a friend, so promising as a student of science, and so useful a member of the Society.

In completing this Report, your Council beg to express their gratitude to all who have aided them in carrying on the work of the Society, and to thank the members generally for the confidence and support given them during their term of office.

JAMES RORIE, *President.*

FRANK W. YOUNG, *Hon. Secretary.*

TREASURER'S REPORT—1882-1883.

Income.

To Balance from 1881-82,	£79 6 0
„ Subscriptions from 296 Members,	74 0 0
„ Subscriptions from 108 Associates,	57 15 0
„ Tickets for Conversazione Sold,	2 10 0
„ Interest on Bank Account,	1 16 5
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	£215 7 5
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Expenditure.

By Expenses of Conversazione,	£56 17 8
„ Amount Expended on Museum,	22 9 1½
„ Books for Library,	20 7 3
„ Periodicals,	3 5 0
„ Dredging Apparatus,	0 11 4
„ Printing, Stationery, and Postages,	16 2 10
„ Advertising,	8 14 6
„ Collector's Commission,	3 0 0
„ Sundry Expenses,	1 0 0
„ Balance in National Bank of Scotland, Limited,	£83 8 4
<i>Less</i> —Balance due to Treasurer,	0 8 7½
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	82 19 8½
	<hr/>
	£215 7 5
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ALEX. SIMPSON, *Hon. Treasurer.*

17th May 1883.—We have examined the Accounts of the Dundee Naturalists' Society from May 1882 to May 1883, and find that they are correct, and satisfactorily vouched.

JOHN THOMSON.

JOHN NELSON.

LIST OF ASSOCIATES.

- Adamson, John, Exchange Place.
 Air, David, 7 King Street.
 Alexander, A., St Andrews Street.
 Alston, C., Dundee Prison.
 Anderson, Peter, Lindsay Street.
- Baxter, George W., King Street.
 Bell, J. W., Belmont.
 Bell, Thomas, Windsor Street.
 Boase, G. W., Royal Bank, Castle Street.
 Boase, Henry S., Magdalen Place.
 Bradford, J. S., Albany Terrace.
 Brown, P. S., Exchange Street.
 Bruce, J. D., 116 Seagate.
 Butchart, John, 14 Panmure Street.
- Campbell, Dr A., 15 Airlie Place.
 Cargill, David, Longhaugh.
 Carmichael, D., 10 Dudhope Terrace.
 Carmichael, G., 11 Dudhope Terrace.
 Carmichael, J. S., Springhill.
 Carmichael, P. (Baxter Bros. & Co.)
 Charles, J. B., M.A., High School.
 Cheyne, Sheriff, Airlie Place.
 Colville, John, National Bank, Reform Street.
- Connell, Rev. A. B., Lochee.
 Coupur, James O., 30 Princes Street.
 Cox, Edward, 18 Windsor Street.
 Cox, James, Clement Park, Lochee.
 Crichton, James, Mains, Inchtute.
- Dagleish, W. O., Mayfield, Ferry Road.
 Dixon, H. G., 41 High Street.
 Doctor, William, Meadowsidde.
 Dott, George, High School.
 Douglas, William, Panmure Street.
- Esplin, A., 8 Cowgate.
- Fleming, R., Northern Assurance Buildings.
- Gellatly, Wm., Royal Exchange Place.
 Gourlay, Gershom, Dundee Foundry.
 Gourlay, Henry, Balgay House.
 Gourlay, H. G., Dundee Foundry.
 Greig, Dr, Tay Street.
 Grimond, A. D., Dunmore.
- Hatschek, Louis, Cowgate.
 Hay, William, Town House.
 Hean, Peter, Rosemount, Constitution Road.
 Henderson, Alexander, West Park.
 Henderson, Frank, M.P., Clarendon Terrace.
- Henderson, William, Park Place.
 Henderson, Richard, Nethergate.
- Ireland, James, 81 Murraygate.
- Johnstone, James, Murraygate.
- Keiller, John M., Binrock.
 Kennedy, R. G., 10 Panmure Street.
 Kerr, Charles, Nethergate.
- Laing, Robert, Greenfield Place.
 Laing, Rev. Mr, 8 Panmure Terrace.
 Lawson, J. B., Lindsay Street.
 Lindsay, William, 8 Dudhope Terrace.
 Low, David., Royal Exchange Place.
 Low, James F., Seaview, Monifieth.
 Luis, J. H., Cidhmore, Perth Road.
- Macdonald, D., Thomson Street.
 Mackay, J. H., Castle Street.
 Mackenzie, George, Royal Bank, Castle Street.
- Macrae, Rev. David, Tayview House, Newport.
- Martin, W. Y. Blyth, Blyth House, Newport.
- Mathewson, A., Union Terrace.
 Methven, T. E., Broughty Ferry.
 Millar, Dr J. W., Tay Street.
 Miller, R. A., Westfield Place.
 Moir, William, Bank of Scotland, Reform Street.
- Moon, Dr Steel, King Street.
 Moon, Dr Charles, Tay Street.
 Murdoch, Thomas, St Andrews Street.
 M'Grady, H., Seymour Lodge, Perth Road.
- M'Kenzie, M., Murraygate.
- Nagel, Henry, Tay Street.
 Nucator, P., Meadowsidde.
- Orchar, J. G., Angus Lodge, West Ferry.
- Pattullo, James, Bank Street.
 Paul, G. Brodie, Springfield.
 Powrie, James, Reswallie, by Forfar.
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 Rhind, H. S., Bain Square.
 Rhind, John, Bain Square.
 Rickard, Joseph, British Hotel.
 Ritchie, William, Elmslea.
 Ritchie, William, Jr., Elmslea.
 Robertson, Charles, Castle Street.

Robertson, John, Craigie Works.
 Robertson, T. S., Bank Street.
 Robertson, William, Balmore, Newport.
 Rollo, George, Victoria Foundry,
 Lochee.

Scrimgeour, John, Nethergate.
 Shepherd, W., Union Mount.
 Sidey, D., Clydesdale Bank.
 Small, W. J., Bank Street.
 Small, J. M., Gray House.
 Smith, Thomas, Ashwood, Harecraig.
 Smith, Allan, Newport.
 Speed, A., 82 High Street.
 Spence, G. C., 10 Springfield.
 Stevenson, James, 1 Woodville Place,
 Maryfield.
 Strong, William, Dock Street.

Thomson, W., Euclid Crescent.
 Thomson, J. W., Bank Street.
 Todd, Charles E., Royal Exchange Place.

Unna, J., Meadowside.
 Urquhart, W. W., Blackness Foundry.

Walker, Harry, Westwood, Newport.
 Walker, J. H., Woodburn Villa,
 Newport.
 Walker, P. G., 2 Airlie Place.
 Watson, J. S., 76 Seagate.
 Weinberg, J. J., Fernbrae.
 White, James F., Balruddery.
 Wilson, W. B., Balgillo Terrace,
 Broughty Ferry.

Young, W. E. R., 7 Ward Road.

LIST OF MEMBERS.

THOSE MARKED * ARE HONORARY MEMBERS.

THOSE MARKED † ARE CORRESPONDING MEMBERS.

Aimer, J. D., Viewbank Terrace,
 Provost Road.
 Allan, Robert, Cherryfield House, Black-
 ness Road.
 Allen, Leonard, Trinity House.
 Anderson, A. B., Princes Street.
 Anderson, James, Hill Street, Broughty
 Ferry.
 Anderson, James F., 8 Panmure Street.
 Anderson, Wm., 8 South Lindsay Street.
 Angus, Thomas, Argyle House, Broughty
 Ferry.
 Arnold, John P., High School.
 Baxter, Charles, Horse Wynd.
 Baxter, R. L., Eden Lodge.
 Baxter, Henry, Alma Terrace, Newport.
 Baxter, Stephen, Eden Lodge, Arbroath
 Road.
 †Beddard, Frank E., B.A., F.R.S.E.,
 Challenger Office, Edinburgh.
 Begg, David, 50 Reform Street.
 Begg, Frank, Somerville Place.
 Bell, E. Weston, Belmont.
 Bell, George J., Belmont.
 Bell, J. F., Somerville Place.
 Berg, Robert, The Elms, Seafield,
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 Berry, Thomas, 53 Cowgate.
 Boswell, David, 31 Crescent Street.
 Brown, David, Bloomfield, East New-
 port.
 Brown, Robert, 246 Perth Road.
 Brown, William, Clarendon Terrace.
 Brown, John, 13 Osborne Place.

Brebner, J., M.A., Tay Square.
 Brew, William, Nethergate.
 Buchan, Miss, Nethergate.
 Burgess, Thomas F., 25 Windsor Street.
 Butchart, W. P., 9 Wellington Street.
 Campbell, Walter S., Tay Street.
 Campbell, W., Tay Street.
 Campbell, R., 4 Victoria Place, Broughty
 Ferry.
 Carnelley, Professor T., D.Sc., F.C.S.,
 University College.
 Chalmers, Robt., 91 Arbroath Road.
 †Chisholm, George G., M.A., B.Sc., 9
 Rillbank Terrace, Edinburgh.
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 Clapperton, Rev. R., 150 Nethergate.
 Clark, George, M.A., West End
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 Colquhoun, D., Carnoustie.
 Comar, Louis, Tayview, Newport.
 *Cooke, Stephen, F.C.S., Veterinary
 College, Glasgow.
 Cooper, George P., 2 Hunter Place,
 Broughty Ferry.
 Corr, James, 202 Hawkhill.
 Couper, Charles, Dudhope House.
 Couper, Thomas, Dudhope House.
 Cowan, Wm. C., L.R.C.S.E., Tay Street.
 Cowe, Geo., Balhousie, Carnoustie.
 Cowie, John, Renny Place, West Ferry.
 Cox, James D., Panmure Street.
 Crabbe, David, 7 Somerville Place.
 Crabbe, Miss Edith, 16 Gardner's Lane.
 †Crichton, Dr J. S., Arbroath.

- Cruickshank, Rev. Robert, Castle Hill House.
- Cunningham, D., M. Inst. C.E., Harbour Chambers.
- Cunningham, James, Jr., Royal Exchange.
- Cunningham, James, Douglas House, West Ferry.
- †Daniell, Alfred, School of Medicine, Minto House, Edinburgh.
- Dewar, Dr J. A., Hill Terrace, Arbroath.
- Dingwall, William, Strathmartine Road.
- Dodds, James D., Lochee.
- Donaldson, John, Meadow Street.
- Donaldson, J. B., Crescent Bank, East Newport.
- *Drummond-Hay, Colonel, C.M.Z.S., Seggieden, Perth.
- Duncan, John, Craigie.
- Duncan, Dr A. J., 144 Nethergate.
- Durham, James, F.G.S., High Street.
- †Durham, Wm., F.R.S.E., Seaforth House, Portobello.
- Ewan, Alexander, West Port.
- Eadie, James, 3 Alma Terrace, West Newport.
- Fairweather, James, 7 Union Terrace.
- Fairweather, Joseph, Arbroath Road.
- Farquharson, Thomas, Dock Street.
- Feathers, Peter, Somerville House, Broughty Ferry.
- Feathers, James, Dock Street.
- Ferguson, Thomas, Bell Street.
- Fisher, W. M., L.D.S., R.C.S., Eng., Nethergate.
- Fleming, A. D., Nelson Street.
- Fleming, James, 31 Yeaman Shore.
- Fleming, James, Jr., Somerville Place.
- Fleming, John, Jr., West Dock Street.
- Fleming, J. R., D., P., & L. Shipping Co.
- Fleming, R. E., 31 Yeaman Shore.
- Forbes, Miss, West Newport.
- Frain, William, Castle Street.
- Freeland, William, Bank of Scotland, Reform Street.
- Fullarton, Robert, Chemical Works, Carnoustie.
- Galloway, Rev. S., Lochee.
- Galt, J. M., Earl Villa, Lochee.
- *Geikie, Professor James, LL.D., F.R.S., &c., University of Edinburgh.
- George, Rev. James, Nelson Street.
- *Geddes, Patrick, F.R.S.E., 81A Princes Street, Edinburgh.
- Gibb, James, 22 Lilybank Road.
- Gibb, William, Post Office.
- Grant, Hugh, 18 Louise Terrace, Broughty Ferry.
- Grant, John, Manse, Perth Road.
- Graham, James, Sea View, Carnoustie.
- Gray, Baxter, Fort Street, Broughty Ferry.
- Gray, D. J. T., 10 Victoria Chambers.
- Greig, D. M., Tay Street.
- Grieve, David N., 151 Victoria Road.
- *Grothe, Albert, Tharsis Mines, Spain.
- Guthrie, Alexander, Hope Park, Broughty Ferry.
- Guthrie, Alfred, Lindsay Street.
- Guthrie, Mrs A., 11 Lindsay Street.
- †Haggart, D., Bank of Scotland, Killin.
- Halley, William, 4 Blackness Terrace.
- Hamilton, George, 36 Tait's Lane.
- Hamilton, James, 36 Tait's Lane.
- Harcourt, Arthur F., 10 Victoria Chambers.
- Hardie, R. A., Panmure Street.
- Hardie, James, 73 Nethergate.
- Hardie, James, Jr., 68 High Street.
- Hay, George, Perth Road.
- Hay, William, Jr., Montpelier.
- †Heddle, Professor M. F., M.D., University of St Andrews.
- Henderson, James, Downiemount, Tayport.
- Henderson, J. H. F., 5 S. George Street.
- Henderson, John, National Bank.
- Henderson, Joseph J., 61 Reform Street.
- Henderson P., Tally Street.
- Henderson, William, West Park.
- Hill, Howard, Ladywell Calender.
- Hill, E. W., Ladywell Calender.
- Hood, John, Dallfield Walk.
- Hood, James, Gladstone Terrace, Bro. Ferry.
- Hodge, D. S., 4 Laurence Street.
- Hodge, Dr James, Tay Street.
- Hodge, Miss, Constitution Terrace.
- Howe, Charles, Woodside, East Newport.
- Hunter, Wm. C. S., M.A., Dundee Institution.
- Hutcheson, Alexander, Reform Street.
- Hutcheson, Henry, Nethergate.
- Hutcheson, William, *Advertiser* Office.
- Hutton, Alexander, Royal Bank, Arbroath.
- Hynd, James, Dock Street.
- Imper, Albert, 17 Tay Street.
- Inglis, J. T., Dock Street.
- Ireland, David, Commercial Street.
- Ireland, David, Jr., Rockhill, Broughty Ferry.
- Irvine, W. B., F.R.G.S., Tay Street.
- Isles, James, Blairgowrie.
- Israel, Gottfried, 10 Victoria Chambers.
- Johnstone, J. J., Bank Street.
- Johnston, Miss Etta, East Newport.
- Keir, R. B., High Street, Lochee.
- Kennedy, William (W. & H. Scott, Mid Wynd).
- Kennedy, John, Riversdale, Perth Road.
- Kerr, J. S., Forebank.
- Kerr, P., Jr., Forebank.
- Kerr, R. N., King Street.
- Kidd, William, Nethergate.

- Kidd, John, Lansdowne Place.
 Kidd, John, Jr., Lansdowne Place.
 Kidd, John, Drummond Villa, Broughty Ferry.
 King, David 145 Princes Street.
 Kinnison, Mrs, Newport.
 *Knight, Professor, University of St Andrews.
 Kyd, Thomas, 36 Thomson Street.
 Lamb, A. C., F.S.A. Scot., Reform Street.
 Lamb, Mrs A. C., Reform Street.
 Lamb, Miss, Reform Street.
 Lamb, James, Reform Street.
 Lang, Rev. Robert, 1 Tay Square.
 Leake, Kenneth, 10 Douglas Terrace.
 †Leslie, Dr George, F.R.S.E., Falkirk.
 Lindsay, Wm. R., 2 Graham Place.
 Low, Wm., Seaview, Monifieth.
 Lowden, Ernest, 1 Constitution Terrace.
 Low, William, Bank Street.
 Lowden, William, Constitution Terrace.
 Lowdon, George, Reform Street.
 Lowdon, J. W., Reform Street.
 Lowdon, Edward, Reform Street.
 Lowson, J. J. F., Ph.D., Gray Bank.
 Lundie, Robert, 75 Nethergate.
 Macgregor, Thomas, 14 Fleuchar Street.
 Mackay, D., 2 Union Street.
 Mackay, Alexander, 104 Commercial Street.
 Mackenzie, George, 26 Garland Place.
 Mackenzie, W. L., Craiglee, West Ferry.
 Mackness, Rev. Dr, Parsonage, Broughty Ferry.
 Macnamara, Rev. Henry, Castle Hill House.
 Macrae, John, Gas Works, Dock Street.
 Macveigh, W. A., Tay View, Newport.
 Malcolm, George, Inverlaw.
 Malcolm Alexander, Marrbank.
 Martin, James H., 53 West Port.
 Mathewson, Allan, C.M.S.A. Scot., 26 Seagate.
 Mathewson, John, 26 Seagate.
 Mathewson, Miss, Union Terrace.
 Mathewson, A. P., Union Terrace.
 Matthew, Alexander, Jr., 61 Princes Street.
 Melville, W. S., Airlie Terrace.
 Millar, Miss, 2 Alma Terrace, Newport.
 Miller, Andrew S., M.A., High School.
 Miller, A. H., *Advertiser* Office.
 Miller, Thomas S., Broughty Ferry.
 Milne, Robert, Beach, West Ferry.
 Mills, Rev. J., 10 Somerville Place.
 Mitchell, T. E., 228 Perth Road.
 Mitchell, D. K., Do.
 Mitchell, D. R., Meadowside.
 Mitchell, James, Douglas Terrace, Broughty Ferry.
 Moir, Edward, 27 Cowgate.
 Moffat, James, 8 Cleghorn Street.
 Morris, George, 72 High Street.
 Morrison, W. B., 30 Cowgate.
 Murray, Peter, 1 Nelson Street.
 Murray, Miss M., 1 Graham Place.
 Mudie, John, 17 William St., Forebank.
 Myles, A. B., Bramble Bank, Camphill, Broughty Ferry.
 Myles, Andrew, 19 Nelson Street.
 M'ulloch, A., Euclid Crescent.
 M'ulloch, John, Nethergate.
 M'Farlane, John, 6 Craigie Street.
 M'Glashan, James, South Dudhope Works.
 M'Gregor, John, 34 Lindsay Street.
 M'Inlay, James, 8 Lawrence Street.
 *M'Intosh, Prof. W. C., M.D., F.R.S., &c., University of St Andrews.
 M'Intyre, D., 84 Commercial Street.
 M'Kay, William, Inglewood Terrace.
 M'Kechnie, James, Union Bank, Lochee.
 M'Kelvie, W. R., Euclid Crescent.
 M'Laren, D., 2 Strawberry Bank.
 M'Millan, John, Tay Bridge Station.
 *M'Nicoll, Walter, Tealing.
 Nagel, Albert, 10 Tay Square.
 Nagel, David, 10 Tay Square.
 Nairn, Boswell L., (W. B.) Ritchie's, Commercial Street).
 Nairn, John M., Maryfield.
 Nelson, John, 7 King Street.
 Nicholson, James, Carnoustie.
 *Nicholson, Prof. H. A., F.R.S.E., &c., University, Aberdeen.
 Nicoll, G. H., Bank Street.
 Nicoll, John, Cemetery, Arbroath.
 Nicoll, Thomas, Monifieth.
 Noble, David, Lochee Road.
 Ogilvie, W. M., F.B.S., 'F.S.A.' Scot., Royal Bank, Lochee.
 Ogilvie, Mrs W. M., Lochee.
 Ogilvie, William, Jr., Royal Bank, Castle Street.
 Orchar, James, West Ferry.
 Orchar, Robert, Madeira Street.
 Ower, Stephen, 87 High Street.
 Ower, Leslie, C.E., Commercial Street.
 Paterson, James, Magdalen Yard Road.
 Patrick, William, 13 Mid Wynd.
 Patterson, Peter, 50 Ferry Road.
 Peyton, Rev. W. W., Broughty Ferry.
 Plenderleath, H., 1 Commercial Street.
 Powrie, George, Airlie Place.
 Pyott, D. W., 22 Victoria Street.
 Ramsay, David, 3 Balfour Street.
 Ramsay, Wm., 13 Park Wynd.
 Rattray, Richard, Balfour Street.
 Rattray, Robert, Constitution Road.
 Reid, R. C., National Bank, Hilltown.
 Reid, W.'P., 68 St Andrews Street.
 Robb, Wm., 246 Perth Road.
 Robertson, David, 9 Ure Street.
 Robertson, James, 106 Annfield Road.
 Robertson, John, Millar's Wynd.
 Robertson, John, 'Balmore,' Newport.
 Robertson, Robert, 202 Overgate.
 Robertson, Robert, Blairgowrie.

- Robertson, R. C., High School.
 Roger, James, 11 Rosefield Street.
 Rollo, Silvester, 2 India Buildings.
 Rorie, Dr, Royal Lunatic Asylum,
 West Green, Liff.
- Salmond, William, Commercial Street.
 Scott, Andrew, Forgan.
 Scott, David, 26 Euclid Crescent.
 Scott, Richard, 8 Airlie Terrace.
 Scott, Thomas, 13 Union Street.
 Scringgeour, Andrew, 51 Victoria Road.
 Scroggie, David, Paradise Road.
 Scroggie, W., Viewbank, Blackness
 Road.
- Shearer, William, 7 King Street.
 Shepherd, Robert, 4 Maryfield Terrace.
 Sime, George, King Street, Dundee.
 Simpson, Alexander, Woodrifle Terrace,
 Newport.
- Simpson, G. B., Seafield, Bro. Ferry.
 Simpson, Geo. Buchan, Jr., do.
 Simson, W. B., Eastern Club.
 Sinclair, Andrew, 73 Nethergate.
 Smieton, James, Panmure Villa, Bro.
 Ferry.
- Smith, Charles, 69 Cowgate.
 Smith, Mitchell, 15 West Dock Street.
 Smith, Robert, Meadowside.
 Smith, W. R., 1 Rustic Place.
 Smith, William, Addison Place,
 Arbroath.
- Smith, Thomas H., M.A., Harecraigs.
 Somerville, Rev. J. E., Broughty Ferry.
 Speakman, James, 4 Craigie Bank
 Terrace.
- Steggall, Prof. J. E. A., M.A.,
 University College.
- Stephenson, George, Meadow Entry.
 Stevenson, F., Nelson Street.
 Stevenson, G., Woodville Place, Mary-
 field.
- Stewart, Rev. Alexander, M.A., The
 Manse, Mains.
- Stewart, David, 109 Nethergate.
 †Stewart, John, Letham Mill, Arbroath.
 Sturrock, James, Bank Street.
 Sturrock, John, F.S.A. Scot., Rustic
 Place.
- Sturrock, William, 2 Lawrence Street.
 Tait, Rev. A. D., Strathkinnes.
 Templeman, Dr, Tay Street.
 Tennant, James, Carlogie Road, Car-
 nousie.
- Thomson, Andrew, M.A., B.Sc., Dundee
 Institution, Tay Square.
 Thomson, David, 21 Bank Street.
 Thomson, James, Springbank House,
 Springhill.
- Thomson, James, Somerville Place.
 Thomson, John, Elmbank, Perth Road.
 Thomson, Robert, Somerville Place.
 Tosh, W. H., Harecraigs, Ferry Road.
- Ure, George, Shore Terrace.
- Walker, R., 2 Victoria Street.
 Walker, W. N., F.G.S., Newport.
 Walker, Mrs W. N., Newport.
 Watson, James, Shore Dues Office.
 Watson, John D., 7 Euclid Street.
 Watt, Rev. H. G., M.A., B.D., Windsor
 Terrace.
- Welch, John, Royal Bank, Castle Street.
 *White, Buchanan, M.D., F.L.S.,
 Perth.
- White, J. Martin, Spring Grove.
 White, Miss E., Spring Grove.
 White, Miss M. H., Spring Grove.
 Whyte, George, Loons Road, Lochee.
 Williamson, Rev. H., Coupar Street,
 Lochee.
- Wilson, Adam, M.A., High School.
 Wilson, Mrs Alexander, Westfield Place.
 Wilson, Alexander, 29 Nethergate.
 *Wilson, Dr Andrew, F.R.S.E., &c.,
 Gilmore Place, Edinburgh.
- Wilson, John, 29 Nethergate.
 Wilson, J. R., 46 Castle Street.
 Wilson, Miss, Youngsdale Place, New-
 port.
- Wilson, James R., 13 Westfield Place.
 Wright, Alexander, High Street, Lochee.
- Young, Frank W., F.R.S.E., Laboratory,
 High School.
 Young, William, Melrose Terrace,
 Clepington.









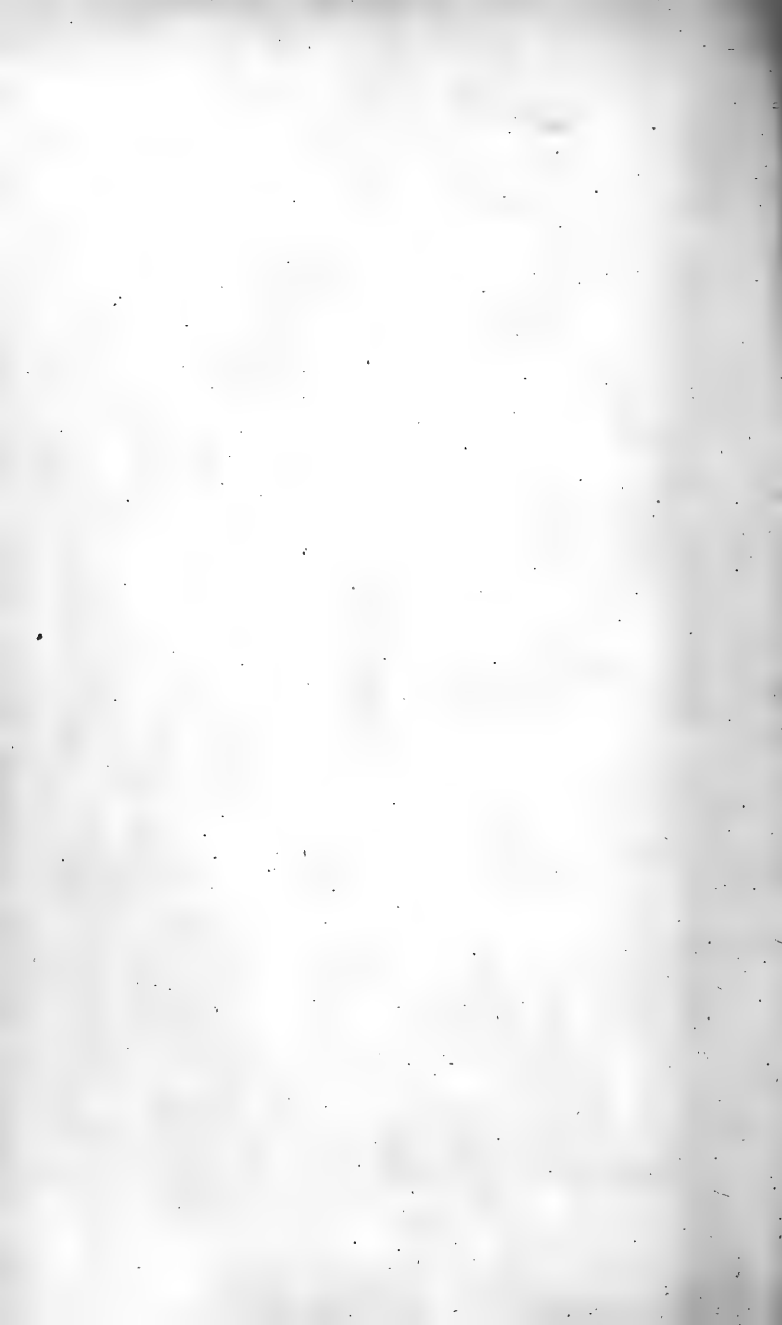
Dundee Naturalists' Society.

T W E L F T H

ANNUAL REPORT,

1884-85.





Dundee Naturalists' Society.

T W E L F T H A N N U A L R E P O R T,

BEING FOR THE YEAR

1 8 8 4 - 8 5.



DUNDEE:

PRINTED BY JOHN LENG & CO., BANK STREET.

—
1885.

COUNCIL, 1885 - 86.



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R E P O R T .

Your Council have much pleasure in laying before you the Twelfth Annual Report.

At the last Annual Meeting the formation of the East of Scotland Union of Naturalists' Societies was announced, and its aims and methods of work explained. Shortly thereafter, on the 6th of June, the first General Meeting was held in University College, Dundee.

A suggestive address was delivered by Dr Buchanan White, F.L.S., and preliminary Reports were read, indicating the present state of our knowledge of the Zoology, Botany, Geology, and Meteorology of this district, and making suggestions as to the lines of future work. These have since been printed, and form a most useful and necessary volume for all interested in the Natural History of the East of Scotland.

On the evening of the Meeting a *Conversazione* was given in the Albert Institute by your Society, to which the Members of the Union and others were invited. The attendance was very large, many workers in the neighbouring Societies embracing the opportunity afforded of meeting one another. They were welcomed by your President, and several admirable addresses were given on Scientific subjects by distinguished Naturalists. Goodly collections of Chemical and Physical Apparatus, and of Biological and Geological specimens, were exhibited, Members of the Society taking much trouble, not only in arranging but in describing or explaining, throughout the evening. The music, orchestral and vocal, was evidently much appreciated, and added greatly to the harmony of the meeting.

Your Council desire here to express their great indebtedness to all who aided them in the work connected with this *Conversazione*; and again they feel compelled to remind you of the great pains taken by Mr A. C. Lamb in the very successful organization and carrying out of all

the arrangements of the evening. The Society, indeed, owes Mr Lamb a deep debt of gratitude for this as for similar and previous labours on their behalf.

On the day following the Meeting two excursions were made by Members—one a Dredging Expedition to the Bell Rock and St Andrews Bay, under the direction of Drs Buchanan White and Rorie ; the other, Botanical and Geological, to the Lochs of Rescobie and Reswallie, with Professor Trail and Mr Graham as leaders. Though rather early in the season, yet each excursion was fruitful of a considerable number of interesting forms, which were exhibited in the Society's Museum in the evening. To the Botanical and Geological party Mr Powrie of Reswallie very kindly showed his splendid and unique collection of old red sandstone fossils, and further earned the gratitude of the excursionists by placing boats on Rescobie Loch at their disposal. The two days' meetings, your Council has every reason to believe, were enjoyed by all who took a part in them, and will have, it is to be hoped, a lasting influence on the Scientific work of the whole district.

It has now been arranged that the second Annual Meeting of the Union be held in Kirkcaldy on the 4th September next, and it is to be hoped that the Members of the Dundee Naturalists' Society will show their interest in its work by their attendance on this occasion.

Of the other excursions advertised for last summer that to Invergowrie Bay did not come off, the Perthshire Society having fixed on a very unsuitable day—that on which the Liberal Demonstration was held in Dundee. The expedition to Ben Lawers and Ben More, although not so large in point of numbers as it might have been, was still a most successful one. Many rare plants were found, and a district was explored which hitherto has been but little investigated.

It having been felt by many that the Ordinary Meetings were suffering in the matter of attendance through not being held in a room very suitable for the purpose, your Council applied to the authorities of University College, through Principal Peterson, for permission to use one of their class-rooms. This they very readily gave, placing the Mathematical class-room at the disposal of the Society ; and to them, as also to Professor Steggall, whose excellent class-room we used, your Council feels greatly indebted. The increased attendance, especially towards the end of our session, when Members became aware of the great advantages of our new meeting place, may be taken as sufficient proof of the desirability of the change.

The following communications were made to the Society during the Session :—

Oct. 22nd.—“ <i>Excursions in 1884</i> ,”	Mr JAMES BREBNER, M.A.
“ „ „ „ “ <i>Soils: their Formation and Classification</i> ,”	Mr ANDREW THOMSON, M.A., B.Sc.
Nov. 5th.—“ <i>The Storage of Energy</i> ” (<i>Illustrated with Experiments</i>),	Mr THOMAS REID, Assistant in the Engineering Department, University College.
Nov. 22nd.—“ <i>The Teeth of Reptiles and Birds</i> ,”	Mr WM. M. FISHER, L.D.S.R.C.S., Eng.
Dec. 3rd.—“ <i>The Ether</i> ” (<i>Illustrated with Experiments</i>),	Mr J. W. CAPSTICK, B.A., B.Sc.
Dec. 17th.—“ <i>Notes on the Geology of Western Sutherlandshire</i> ,”	Mr W. N. WALKER, F.G.S., President of the Society.
“ „ „ „ “ <i>Notes on Two Volcanoes</i> ,”	Mr JAMES DURHAM, F.G.S., Vice-President of the Society.
Jan. 14th.—“ <i>Diatoms</i> ,”	Mr JOHN RATTRAY, M.A., B.Sc., Botanist to the Marine Station, Granton.
Jan. 28th.—“ <i>Microscopic Fungi</i> ,”	Professor J. W. H. TRAIL, F.L.S., Aberdeen University.
Feb. 11th.—“ <i>The Relationship of Palaeontology to Biology</i> ,”	Mr R. J. HARVEY GIBSON, M.A., Assistant Lecturer in Biology, University College, Liverpool.
Feb. 25th.—“ <i>Marine Zoology</i> ,”	Mr J. T. CUNNINGHAM, B.A., Superintendent of the Marine Station, Granton.
Mar. 11th.—“ <i>Modern Methods of Biological Study</i> ,”	Professor D'ARCY W. THOMPSON, B.A., University College, Dundee.
Mar. 25th.—“ <i>Weather Observations</i> ,”	Mr DAVID CUNNINGHAM, M. Inst. C.E., F.R. Met. Soc.

To the contributors of these papers the Members of Council tender their warmest thanks; but more especially do they feel their indebtedness to several who came a considerable distance to read their communications to the Society.

The foundation of a Chair of Biology in University College, and the appointment of Professor D'Arcy Thompson as its occupant, must be a matter of much interest and congratulation to many of the Members of the Society. Your Council trust that the increased facility for the study of Natural Science thus afforded, together with the influence exercised by the other Scientific Chairs in the College, will greatly promote the usefulness and activity of the Society.

The following Periodicals continue to be laid on the Library table :—

Weekly—*Nature*.

Monthly—*Science Gossip*, the *Geological Magazine*, and the *Journal of Botany*.

Quarterly—*The Scottish Naturalist*.

Quarterly *Journal of Microscopical Science*.

The additions to the Library have not been so numerous as in some former years, yet several very important works have been purchased, amongst others—

6 Vols. of the Challenger Reports.

Quarterly Journal of Microscopical Science, Jan. 1883 to April 1884 ; presented by Mr D. Cunningham.

Mineralogical Magazine. Vols. XXII., XXIII., and XXIV.

Although the Society's Library now contains many valuable volumes, there is reason to believe it is not, in its present position, taken advantage of to the extent that could be wished. Your Council, therefore, contemplate its removal to the Biological Department of University College, which will undoubtedly secure a greater usefulness for it, with some advantages to the Members of the Society.

The Museum continues to have additions made to it, the Society's collection of local birds in particular being added to constantly. Your Council are, however, very desirous to see a greater interest taken by the Members in this part of the Society's work.

During the year the following gentlemen were elected Corresponding Members of the Society :—

Professor J. H. W. TRAIL, M.D., F.L.S.

Mr J. T. CUNNINGHAM, B.A., Director of the Scottish Marine Station.

Mr R. J. HARVEY GIBSON, M.A., Demonstrator in Biology at University College, Liverpool.

Mr JOHN RATTRAY, M.A., B.Sc., Botanist to the Scottish Marine Station.

On the Membership Roll at present there are—

11 Hon. Members,
14 Corresponding Members,
305 Ordinary Members, and
78 Associates.

408 in all.

showing the Society to be in a very prosperous condition.

Your Council, in conclusion, thank all who have aided them in furthering the interests of the Society.

WM. N. WALKER, *President.*

FRANK W. YOUNG, }
J. MARTIN WHITE, } *Hon. Secretaries.*

TREASURER'S REPORT—1884-85.

Income.

To Balance from 1883-84,	£156 5 2
„ Subscriptions from 264 Members,	66 0 0
„ Subscriptions from 77 Associates,	40 8 6
„ Interest on Bank Account,	3 4 9
	<hr/>
	£265 18 5

Expenditure.

By Expenses connected with Conversazione,	£74 4 6½
„ Amount Expended on Museum,	3 16 1
„ Books for Library,	18 3 9
„ Periodicals,	2 14 3
„ Advertising, Printing, Stationery, and Postages,	21 0 7½
„ Dredging Expenses,	2 7 4
„ Collector's Commission,	2 10 6
„ Subscription to East of Scotland Union of Naturalists,	9 14 0
„ Sundry Expenses,	2 9 6
„ Cash in National Bank of Scotland, Limited—	
On Deposit Receipt, £120 0 0	
On Current Account, 6 14 10	
	<hr/>
	126 14 10
„ Balance in hands of Treasurer,	2 3 0
	<hr/>
	£265 18 5

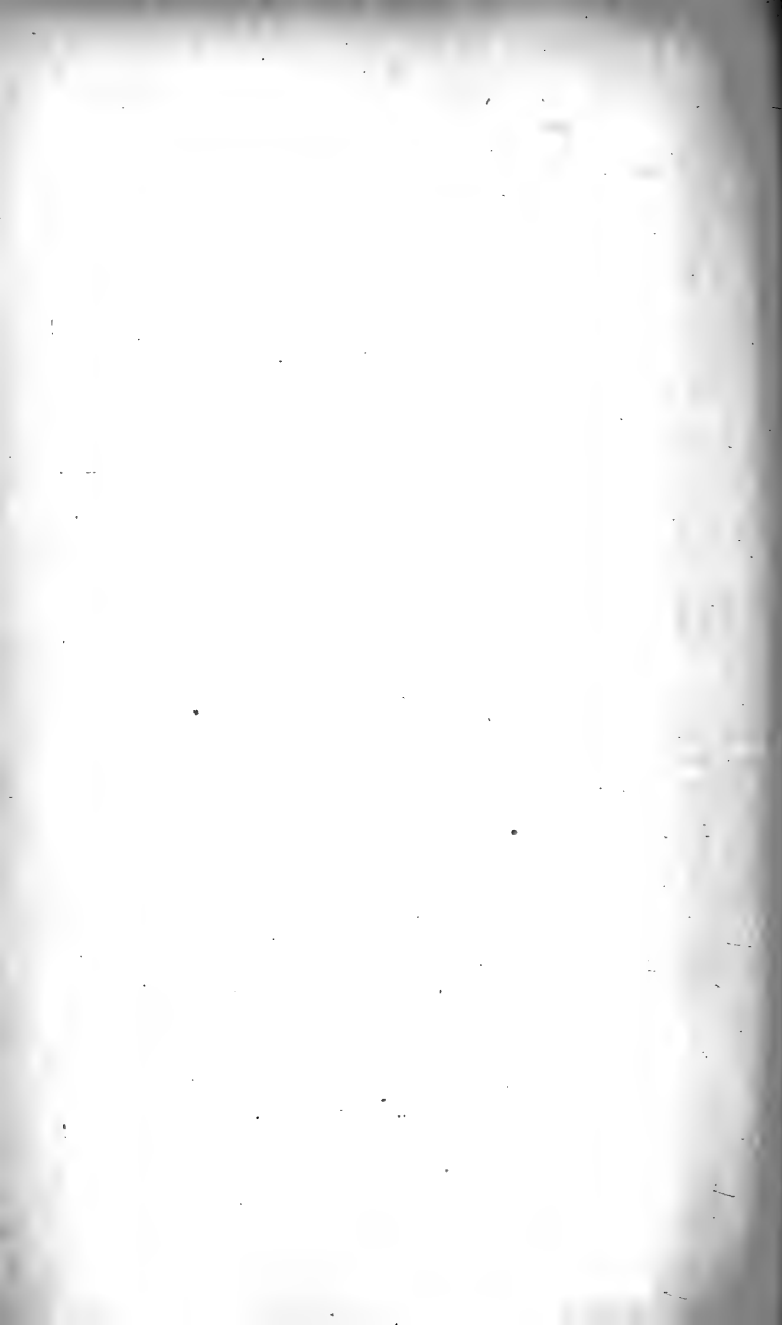
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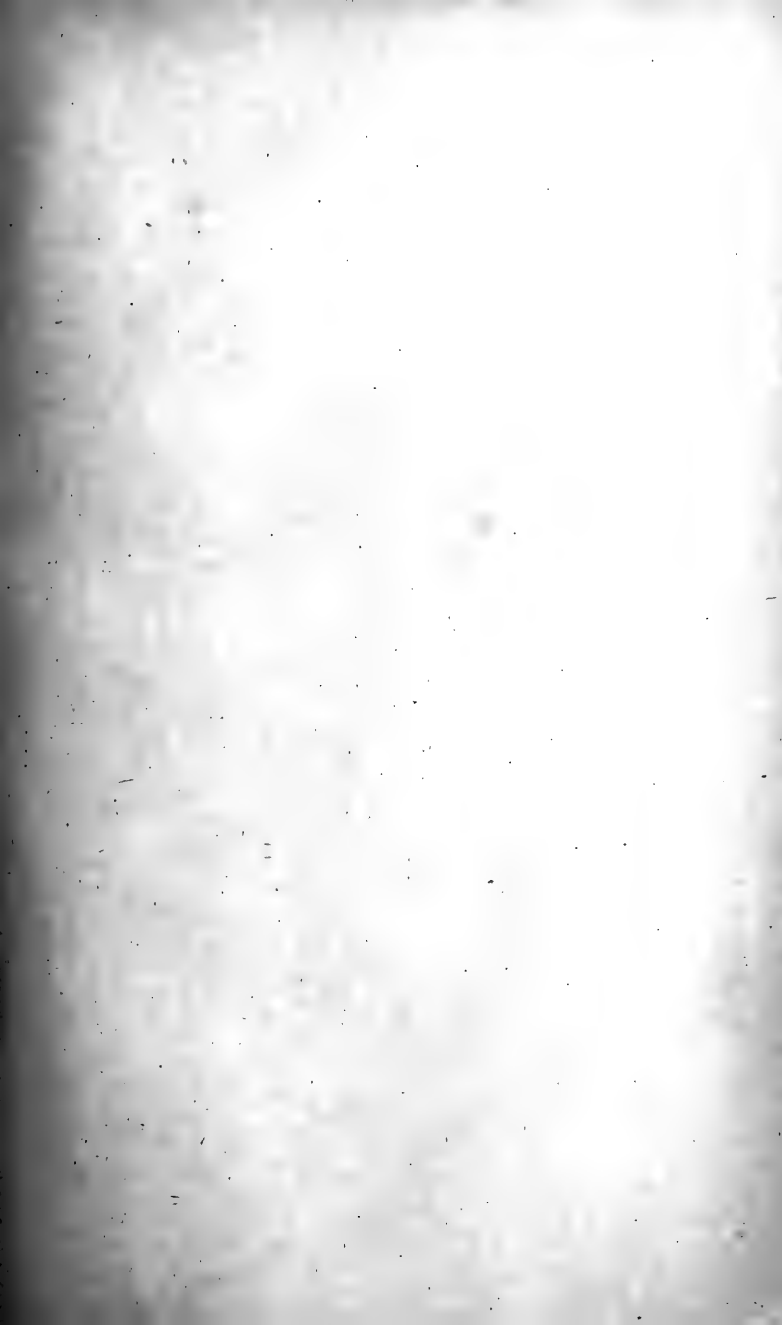
DUNDEE, 21st May 1885.—Examined and found correct.

A. B. MYLES.
JOHN THOMSON.

18 FEB 1888









Dundee Naturalists' Society. x 207

THE GRALLATORES AND NATATORES

OF THE

ESTUARY OF THE TAY:

THE GREAT DECREASE IN THEIR NUMBERS OF LATE
YEARS; THE CAUSES; WITH SUGGESTIONS FOR
ITS MITIGATION.

A P A P E R

READ BY

COLONEL DRUMMOND HAY, C.M.Z.S.,
OF SEGGIEDEN, ~~—————~~ K.

AT AN ORDINARY MEETING OF THE DUNDEE NATURALISTS' SOCIETY
WEDNESDAY, 16TH FEBRUARY 1881:

PUBLISHED BY THE SOCIETY.

PRICE SIXPENCE.



DUNDEE:

PRINTED BY JOHN LENG & CO., BANK STREET.

1881.



THE GRALLATORES (WADERS) AND NATATORES (SWIMMING BIRDS) OF THE ESTUARY OF THE TAY.

In the remarks I am about to make to you this evening on the Waders and Swimming Birds of the Estuary of the Tay, their great decrease, and the causes of the same, it will be necessary for me to go somewhat further than our own immediate neighbourhood on the Tay, and bring before you some instances of the cruel and wanton destruction which went on all along our coasts during the breeding season some few years ago, causing the interference of the Legislature, and no doubt in a measure influencing our own particular district. This, again, will lead me to make some comments on Bird protection, and the alleged injury said to be done in consequence to our Fisheries—one of the questions of the hour. In the year 1868 the slaughter of Sea Birds was found to be so great that it ended in the passing in the following year of “The Sea Birds’ Protection Act,” and subsequently the passing of two other Acts, for the better preservation of our Waders and Land Birds not included in the first Act, entitled respectively the “Wild Fowl,” and the “Wild Birds’ Protection Acts.” These several Acts, all very confusing, have during the last session very wisely been amalgamated and amended, under the title of the “Wild Birds’ Protection Amended Act, 1880,” a law which I trust, though it may have its defects, all lovers of natural objects, especially of our birds, in which such Societies as our Natural History Societies stand conspicuous—and I believe I am safe in saying none more so than the Society I am now addressing—will unanimously support. It is, therefore, with a feeling of confidence that I look forward to the Naturalists of Dundee joining with the Naturalists of Banff, who I am happy to say have taken the initiative in advocating protection. It is the more especially necessary at a time like this that efforts should be made by all Natural History Societies to unite in the defence of our birds, when, as I regret to say, so strong a feeling—I may almost call it of prejudice—prevails against all protection, especially with regard to our Sea Birds, as seems to be the case, when we see in the public prints the name of one of H.M. Commissioners on the Scottish Salmon Fisheries, Mr Henry Gordon

Cumming, mentioned as taking an active part in getting, if possible, what he calls "that mistaken piece of legislation, the Sea Birds' Preservation Act" altogether repealed, on the plea of the serious damage caused by it to our Fisheries, both as regards salmon and herring—a subject on which I hope to be able to show there is little cause of apprehension, and that the fears entertained are in a great measure perfectly groundless, at least as far as concerns the Tay, and I firmly believe the same will be found equally to apply to all other districts. I must, therefore, crave your indulgence if I dilate hereafter upon it somewhat fully. But to proceed to my subject. The Estuary of the Tay may properly be said to commence at the mouth of the Earn; but taking a bit of the river four miles higher up from Kinfauns, which, though narrower, is so much of the same character as to induce me to include it, we have a total distance from the above place to Buddonness, at the mouth, of 28 miles, varying from a quarter of a mile at high water to 3 and $3\frac{1}{2}$ at the widest parts about Powgavie and Invergowrie, a distance of 5 miles or so between, where, with its numerous sandbanks uncovered for many hours each tide, its intricate channels, and its deep oozy shores stretching for miles along the northern bank, fringed with dense massive reed-brakes and wide marshy muddy tracts, covered with what is commonly called salt grass—a mixture of reed meadow grass (*Poa Maritima*) and reed canary grass (*Diglyphis Arundinacea*), interspersed with sea club rush (*Scirpus Maritimus*) and glaucous bull rush, (*Scirpus Tubernæmontani*), where snipe, teal, and duck loved to have their home, and on the roots of which wild geese and other birds of the duck tribe were wont to feed—while on the southern side the island of Mugdrum, extending at low water for a couple of miles or more, surrounded with its thick reeds and deep mud banks clothed with the same kind of vegetation, renders this upper part of the Estuary, especially from its position, running, as it does, at the foot of the rich alluvial deposits of the Carse of Gowrie, a peculiarly favourite resort for wild-fowl, affording the best of feeding, with shelter and retirement. Again, lower down on the salt water, it is well adapted for the harbouring of many sea birds which frequent the neighbouring coasts, margined as it is by the extensive flats and sandhills of Barry and Tents-muir—in former days the great breeding district and very paradise for the various waders and web-footed birds, which once unmolested were there enabled to rear their young in peace and safety; but now, alas! a different story must be told, both as regards Tents-muir and every other part of the Tay. It is not, however, impossible but that with a little care and solicitude on the part of those who will interest themselves, and are in

the position to do so, the wholesale destruction that has been going on with impunity for some years past may be very materially lessened, and our birds in a great measure again restored—but more of this anon. Though the ranks of both waders and swimming birds are so sadly thinned to what they were forty or fifty years ago, yet I am happy to say representatives of most of the species of former years still exist, and when taken as a whole exhibit a goodly number, as will appear when I mention that there are in all 77 species which are to be found either as resident, migratory, or occasional on the Estuary. Of this number 23 are waders and 54 swimmers, or, more properly speaking, web-footed birds, as some of the Gallatores are by no means indifferent swimmers, such as the Waterhen, Coot, Phalarope, and some others. Of the resident birds, or those which remain with us generally the whole season, excepting perhaps in severe winters, or retiring for a short time in the breeding season, there are 24—11 being waders. Of the migratory birds—in all 30—the larger proportion are winter visitants, amounting to 24, all being swimmers with the exception of 6, leaving only 5 swimmers and 1 wader coming to us in summer. Of the occasional visitants we have 23, if we include the Mute Swan and the Egyptian Wild Goose. The former, though known to be wild in Denmark and north-eastern Europe, is not usually considered so in this country, and may, along with the latter—both of which are occasionally seen in severe winters on the estuary and other parts of the Tay—be merely frozen-out domesticated birds. Of this last section, 5 only of which are waders, I now propose treating; but not to be too tedious, or to take up your time unnecessarily, I will merely give you their names, and as I go along touch only on those I may consider to be the more interesting. Of occasionals, then, we have—

- | | | |
|-------------------------|--------------------------|------------------------|
| 1. Bittern. | 9. Shoveller. | 17. Puffin. |
| 2. Whimbrel. | 10. Pintailed Duck. | 18. Glaucous Gull. |
| 3. Sanderling. | 11. King Duck. | 19. Iceland Gull. |
| *4. Turnstone. | 12. Smew. | 20. Pomatorhine Skua. |
| 5. Great Snipe. | 13. Great Crested Grebe. | 21. Richardson's Skua. |
| 6. Whooper or Wild Swan | 14. Horned Grebe. | 22. Fulmar Petrel. |
| 7. Mute Swan. | 15. Black Guillemot. | 23. Storm Petrel. |
| 8. Egyptian Goose. | 16. Little Auk. | |

The first of these, the Bittern, one of the Ardeidæ or Heron tribe, a very fine specimen of which was shot in the spring of 1864 on the Gutterhole fishing, near Newburgh, is now at Carpow House, where it

* It is interesting to record that the young chicks of this species, a rare breeder in this country, have been noticed at the mouth of the Tay by Mr Henderson, of Dundee, but he has not as yet had the good fortune to fall in with the eggs.

is preserved. This bird was probably one of a very large flight mentioned by Mr Gould as having reached our shores in that year, when examples were killed in every part of the country, from the northmost part of Scotland to the extreme west of Cornwall. It is now a very rare and accidental visitor, not only on the Tay, but in all those parts of Great Britain where it was once very common, and most probably was the same in these parts at the time when the Carse of Gowrie, no farther back than the middle of last century, was for the most part covered with reeds (some of which still exist), swamps, and marshes, the remains of what was once a portion of the estuary itself, then "the land of fever and ague," where, no doubt, on many a night its strange booming noise was often heard, but—being a strictly nocturnal bird, stealthily hiding itself all day in some secure spot among the thick reeds, feeding only at night on whatever it might pick up, whether a passing fish, frog, or water rail—seldom seen. Passing over the Whimbrel, Sanderling, and others, we come to the King Duck, which is worthy of note as being seldom met with on British shores, yet not unfrequently seen off the mouth of the Tay, and in the year 1879 recorded as being pretty plentiful as high up even as Dundee.

For those not familiar with the King Duck, I may mention that this very beautiful bird in appearance very much resembles the Eider Duck, but in vividness of colour and beauty of plumage it very far surpasses it—the females, however, are somewhat difficult to distinguish except in size, the King Duck being always the smaller of the two. The next I will notice is the Little Auk, another of our occasional visitors, which sometimes appears suddenly on our coasts in large numbers, driven in by severe gales and heavy weather, an instance of which occurred in December 1878, when a wonderful irruption of these birds took place, spreading themselves from the mouth of the Tay upwards, many of them having been picked up dead far inland. Another similar case is that of the Skua Gulls. The Pomatorhine, or as it is more commonly called the Pomarine Skua, and Richardson's or Arctic Skua, visited the Tay and many other parts of the coast, both in England and Scotland, in uncountable numbers, in October and November 1879, when the former was especially abundant, which is generally considered the rarer of the two, and many of both species were shot on the Tay, in all their various stages of plumage. The Skua, more like a Hawk than a Gull, is entirely predatory in his habits. Always on the watch, he will suddenly swoop down on some unsuspecting Gull or Tern, just having captured its prey, and, making it disgorge, catch the prize before it has time to touch the water, and like some pirate of the sea, which he quite represents, hasten off to

secure some fresh booty. An instance of this is very amusingly described by the late Dr Saxby, in his account of the birds of Shetland, in which, talking of the smaller Skua, Richardson's, or the Shooi, as it is there called, he says—"To watch the bird among the Gulls is a continual source of amusement—the robber sails smoothly about on the look-out for a meal, and at last sees a poor, industrious Gull carrying home a dinner or a supper to his family, and at once gives chase. No sooner does the Gull perceive that he is the object of attention, than his wings begin to beat with more than their customary rapidity; the Shooi glides after him like an arrow, and the Gull finding his enemy close upon him, drops suddenly for a yard or so. This causes the other to overshoot his mark, and as he turns back the Gull reascends, and the Shooi passes under him. In this way they continue for some little time, the Gull jabbering all the while, but presently Shooi gets impatient. He goes straight at the Gull—all is confusion, there is a squall from the big stupid Gull, and down goes the fish, and down goes little Shooi after it, snapping it up long, long, before it reaches the ground or the water, and making off with it in triumph, and almost winking at you as he passes. The great blundering Gull flaps sulkily away, uttering discontented and rueful notes, which would try the gravity of a judge; its queer gruntings and croakings seeming almost to shape themselves into an aspiration that the fish may do anything but agree with the stomach of the new proprietor."

We will now take the resident birds, which are as follows:—

- | | | |
|--------------------|------------------|-------------------------------|
| 1. Heron. | 9. Common Snipe. | 17. Guillemot. |
| 2. Lapwing. | 10. Coot. | 18. Cormorant. |
| 3. Golden Plover. | 11. Water-Hen. | 19. Great Black-backed Gull. |
| 4. Ring Plover. | 12. Shieldrake. | 20. Lesser Black-backed Gull. |
| 5. Oyster Catcher. | 13. Wild Duck. | 21. Herring Gull. |
| 6. Curlew. | 14. Teal. | 22. Common Gull. |
| 7. Redshank. | 15. Eider Duck. | 23. Kittiwake. |
| 8. Dunlin. | 16. Razorbill. | 24. Black-headed Gull. |

The first on the list, the Heron, though a bird well known, is so handsome an ornament, and feature in the landscape, as he stands motionless on the water side, that I feel I cannot pass over him without saying a word in his favour. The Heron, I am glad to say, is in a measure still preserved to us, not being a marketable bird, and there being also several breeding-places or heronries in the upper districts, though none of them of very great extent, where they are permitted to rear their young in safety; namely in Athole, an island on Loch Lydoch, where they migrated, as was supposed, a few years since—their favourite trees at the head of Loch Rannoch having been blown down; at Strowan, near

Crieff, Glendochart, and some other places ; and, though not so plentiful as formerly, being a good deal kept under by gamekeepers, on the accusation of taking a trout or two from some preserve, they are still to be seen on the estuary about Mugdrum, and lower down ; there congregating during the Autumn months in pretty considerable numbers, where I have counted from twenty to thirty at a time, scattered in various directions over the mud banks—each taking up his solitary stand in some choice spot of his own, either near the water's edge, or sometimes nearly knee-deep in one of the numerous little watercourses which intersect the banks, anxiously awaiting the flowing tide. With eye intent, and position fixed, he watches the arrival of the small fish, as they unsuspectingly come up as the water rises, when, quick as lightning, and with unerring stroke, the head is darted forward, and a fluke or a wriggling eel is the result, which, if of a proper size, is immediately devoured, head foremost. At these times it is highly interesting to watch their motions with a powerful glass, as near as may be without being perceived, and witness the admirable and expert manner in which they will throw a fish into the air, giving it a certain cant, and invariably catching it head downwards. On one occasion, while thus watching, I observed a dab that had been secured, but was found to be too broad to swallow, and it was not till after repeated trials and tossings that at last it was so caught as to be doubled in some way, and finally to disappear, but not without several convulsive efforts on the part of the Heron to get it down. But it is not always they are so fortunate, becoming sometimes victims to their own voracity, by being choked in endeavouring to swallow what has proved to be too big for them. On this subject the late Mr Yarrell relates a very singular instance of the death of a Heron by striking its sharp beak through the head of an eel, piercing both the eyes. The eel thus held had coiled itself so tightly round the neck of the Heron as to stop the bird's respiration, and both were thus found dead. As the banks get covered and the fishing ceases, these birds betake themselves to some of the old stone dykes which jut out into the river, where, with head drawn back between the shoulders, and perhaps standing on one leg, six or seven may be seen in a row, patiently waiting, if not disturbed, till it be time to resume fishing operations. Should it, however, be late tide, they retire for the night, either singly or in twos and threes, when, from high up in the air, their unmusical "*quanck*" will sometimes suddenly strike the ear in the gloaming with startling effect, as they otherwise silently wing their way to some distant pine wood to roost. Though a fish feeder, he is not particular as to diet, as frogs, mice, rats, water hens, or anything else that may come in his way, even to a young wild duck, is not refused. Though a Heron may do a certain

amount of mischief among trout in a preserve, yet he is easily scared. His favourite food, when he can get it, seems to be the eel. I have known a heronry adjoining a trout stream, but I never heard any particular complaints; and on examining underneath the trees where they nested, I never found more than the remains of eels. This is not to say that he would not clear a pond of gold fish at a single morning's meal, as he has been known to do when getting the chance. At the same time, he is a bird which I trust may long be an ornament to our waters, and not ruthlessly shot, in season and out of season, by every fellow with a gun, because he is a big bird and affords an easy shot. The Lapwing, which comes next, though widely dispersed over the country, is nowhere so abundant as formerly, especially on the estuary and its immediate neighbourhood, where, forty or fifty years ago, on the banks, as also on the adjoining fields in autumn and early winter, it was to be seen in flocks of many hundreds. In the consumption of slugs, particularly on the strong clay lands of the Carse of Gowrie, their presence was most beneficial, so much so, that since their great diminution, I have known in some of the late wet seasons whole fields of autumn wheat after beans, so utterly destroyed by slug, that they have had to be resown with some other grain in the following spring; and this I attribute entirely to the absence of the Peesweep or Toughet, as it was commonly called in those days. The decrease of these birds I think may be traced to three causes. First, and mainly, from the presence on our waters of punt gunners, which dates back to somewhere between the years 1830 and 1840, before which time they were unknown. Driven off from the Fens of Lincolnshire, which had then begun to be drained, several English fowlers made their appearance, with their punts and heavy swivel guns, weighing, some of them, as much as 200 lbs., carrying a charge from one to two pounds of shot, according to size, and making sad havoc among the Wild Geese and various kinds of Wild Duck which then abounded; but as these began to lessen in number, and the survivors to become cautious, and more difficult to obtain, many a heavy shot was made instead among the unsuspecting Peewits, when lingering on some spit still uncovered by the rising tide, hundreds of which during a season were killed, and sold to the dealers for what would now be considered a mere trifle—if I recollect right, fourpence a pair. The Englishmen have long since gone, but not the punts or canoes, as I believe they are now called. Increased twenty to thirty-fold, they are in the season continually to be seen here and there, stealthily gliding out from behind some thicket of reeds, or silently, and, to the birds invisibly, creeping through some of the deeper channels along the banks, so get within shot. The present canoe being smaller in size, as

is also the calibre of gun, which is now commonly used from the shoulder, the professional on the Tay of the present day is not so particular as to what he shoots at, be it Sandpiper, Duck, or Peewit, as long as it will sell in the market; consequently there is such a continual firing and persecution going on daily and nightly as the tide suits, that the birds, finding no rest, are fairly driven off the water. Where, may be asked, are the large flocks of Dunlin, Redshank, Knots, Peewits, Golden Plover, &c., which previous to the time mentioned might be seen in hundreds busily occupied on the mudbanks in scattered parties in search of food, or perhaps sweeping over them in countless masses performing the most intricate evolutions—at one time glancing like a sheet of silver in the sun, as they show their snowy breasts, in the next instant, as if by magic, darkening the sky, as they simultaneously turn and display their dark-coloured backs? The question is easily answered—“Nowhere.” I may be thought to be drawing too glowing a picture, but any one who may have been well acquainted with the lower Tay at the time I speak, were he an observer of birds, will, I am sure, bear me out. Another cause is the great destruction of eggs during the breeding season, but more of this hereafter. Thirdly, in addition to all this, drainage and high farming have been much against them. There being now no fallows, where frequently they had their eggs, and the ploughed lands being worked much earlier than formerly, many a sitting of eggs, if not otherwise discovered and robbed, are either turned up and harrowed over, or crushed by the clod-breaking roller as it heavily and loudly grates along, whereas, in olden times, these would have been safe, and the young birds hatched and able to take care of themselves by the time farming operations commenced. Its congener the Golden Plover, the next on the list, breeds on the moors and heathy places, and at that season, unlike the gregarious Lapwing, is only found in solitary pairs, consequently it might be supposed to be pretty safe as regards its eggs, but not so, as I shall afterwards show to be the case, at least in this neighbourhood. Of all the hordes of Golden Plover which used to assemble every autumn on our fields, as well as on the tidal banks, only comparatively a few years back, there is now not one for every hundred there was then; indeed, so scarce have they become within the past three or four years, they may be said to have almost entirely disappeared, at least on the upper parts of the estuary. This is to be attributed much to some of the causes that have occasioned the great decrease of the Lapwing; the continued firing and persecution with which they meet, and, being the more valuable of the two for the market, they are the more eagerly sought after, and have consequently fared the worse. Another of our

resident waders which has greatly decreased of late years is the common Snipe, which mostly at all seasons was to be found on the sedgy banks, and though, from the rise and fall of the tide not always actually breeding there, but doing so on many spots in the vicinity and on the hills around. The young birds, therefore, as also those of the wild duck and teal, were always to be seen pretty plentifully in the months of July and August, all of them receiving large accessions in September and October, when at times the former were often very numerous, but then were seldom disturbed, except occasionally by some legitimate sportsman, snipe not being thought worthy of wasting powder or shot upon by the professional punt-gunner. Within the last four or five years, however, their numbers have been getting less and less, and they seem now to be gradually disappearing altogether. One, and perhaps the chief cause of this, is that the birds get no rest. What with cheap guns and breech-loaders, amateur shooters, to use a mild term, from the various towns and villages, have enormously increased within the last few years, claiming as they do the right of shooting all the foreshores without let or hindrance. They come from up or down, as it may be, with boats in large parties of six or eight guns, scouring the river from shore to shore, and especially so on Saturdays, and not always very particular as to whether it be in season or out of season. On the other hand, the professional, to his own interest, I believe, rigidly keeps the close time. I only wish I could say the same for the other, of whose utter disregard of all law of protection I will just give one instance out of many, and this though to my knowledge notices of the existence of the Act had been posted up within the three counties adjoining the river, so that ignorance could scarcely be pleaded. On the 7th of April last year (1880) I observed a considerable number of duck swimming and diving quite unsuspectingly close up to the salmon fishers while at work, and a beautiful sight it was, showing what a little rest and quiet will effect. Next day, the 8th, was the Perth Fast-day, when, I am grieved to say, though upwards of seven weeks after the close time (the 15th of February being then the day fixed), the river was covered with amateur shooters from early morning till long after sunset, ransacking all the marshes, and driving every bird off the water, and this at a time when many had nests. The great sufferers on these occasions are the Snipe, Redshank, Peewit, Water Hen, Duck, Teal and Black-headed Gull, all birds mentioned under the Act. To give some idea of the number of shooters on the lower Tay, in two parishes alone, Perth (not including Kinnoul) and Errol, there were 127 who took out gun licenses last year, and were we to count Abernethy, Newburgh, Dundee, and all other places contiguous

to the river from Perth downwards where gun licenses have been issued, we should have a goodly regiment, even supposing two-thirds only shot on the Tay, and that a mere tithe of these did so out of season, still there would be sufficient left to do the most serious damage. It is these abuses which do so much harm, and which I would like to see every Natural History Society, as well as all promoters of the welfare of our birds, make common cause to suppress. Why should not something be got up like our Societies for the Prevention of Cruelty to Animals, by raising a small fund to enforce, if possible, prosecution in such cases? What more cruel or heedless than to shoot a bird off its nest and allow the young to die of starvation? and yet this is frequently done, and with impunity. I will now proceed to some of our resident swimming birds. The first is the Shieldrake, formerly abundant on all the lower parts of the estuary, breeding in the rabbit burrows on Tents-muir and Barry. In autumn and early winter I have seen them assembled in considerable flocks, coming up and returning with the tide, but seldom ascending much farther than the head of Mugdrum Island. Being a worthless bird for the table, it is seldom sought after excepting for the beauty of its plumage, the wild fowl shooter easily distinguishing it from other ducks, even on the darkest night, by its peculiar croak. From the Shieldrake never changing its plumage like other ducks after it has come to maturity, but retaining its beautiful colours at all seasons, it has always been a special favourite—the more so as it stands confinement well and is easily domesticated, thus becoming a very attractive addition either to the poultry-yard or the pond. The eggs, therefore, being in demand for this purpose, the birds suffer much in consequence, but more especially do they do so from *reckless robbery* from mere wantonness. Passing over the Wild Duck and Teal, already alluded to, which, like the rest, from continual firing and egg-robbery, have become greatly reduced and scared from their former haunts, we come to what may be considered, with the exception of the Blackheaded Gull, to be more truly sea birds, especially the Guillemot and Razorbill, found only on the salt water, in the lower parts of the estuary, and at the mouth of the river. Both these birds have also very materially decreased of late years, not only here, but all along our line of coast; and where I can recollect them in hundreds, such as at St Abb's Head and Flamborough, comparatively few are now to be seen, and the numerous flocks which then frequented the mouth of the Tay have now, with few exceptions, nearly disappeared. For the reasons we have not far to go:—the wholesale destruction which everywhere took place without check or hindrance. Not to dwell too long on these, I pass to the Gulls, of which we have six resident

—the Greater Blackbacked, the Lesser Blackbacked, Herring Gull, Common Gull, Kittiwake, and Blackheaded—all of which, found more or less in the estuary at all seasons, are included in the present Wild Birds Protection Act, with the exception of the first. The Greater Blackbacked (a veritable black sheep among Gulls), now excluded, and especially mentioned as such—and perhaps rightly so, from his carnivorous and plundering disposition—is a large and powerful bird, with a stretch of wing of over five feet from tip to tip, and is not particular as he roams along the hillside near his breeding grounds as to what he takes—whether it be a bit of dead sheep or a live lamb, which he will at once attack and devour. His propensities, also, in these expeditions for young hares, rabbits, and grouse, as well as their eggs, make him no friend of the gamekeeper. He is, however, during nesting time too far removed from us to do much injury in that respect, his nearest breeding grounds to the Tay being the Isle of May and the Bass. By far the commonest of our Tay Gulls is the Black-headed, which is more of an inland species, nesting in large colonies on our lochs and marshes, choosing some unapproachable spot for the purpose, accessible only to the egg-gatherer by means of a boat; and this being under the control of the proprietor, the birds, after a limited gathering, are eventually allowed to hatch out their brood in peace. Hence its numbers. Could only a regulation of this sort be established for other species, in which a limited number of the first sittings alone should be taken, and a certain date fixed after which the birds should be left unmolested, we should have plenty of eggs, minus the complaints we now hear. Though, as I have said, the Blackheaded Gull breeds with us more commonly inland, he is also found to be occasionally doing so nearer the sea, as Mr Henderson, of Dundee—to whom I am indebted and have to thank for much interesting and valuable information as to the breeding of our birds on the Links of Barry and the lower parts of the Tay—informs me of a few nesting there every season. The little Kittiwake, again, one of the most lovely of our Gulls, is a decided marine species. Though common on the lower parts of the estuary, abounding in our harbours, and assuming the part of a most useful scavenger, he seldom leaves the salt water, formerly nesting in prodigious numbers, as I hope he may do again, on all our higher maritime cliffs (but now much thinned), his nearest breeding-places to us being the Isle of May, the Bass, and the Red-Head. About the years 1867 and 1868, so great was their destruction at breeding-time, when in their finest plumage, and so great was the demand for them in that state, owing to the unhappy and then universal practice of wearing birds' wings in ladies' hats, that the attention of the public was at last

aroused, by the appearance in the papers of such heartrending articles as the following, which I do not hesitate quoting and bringing back to your memory at a time like this, when so strong a feeling as I have before mentioned is on foot for the purpose of getting this very wise measure of protecting our sea birds reversed, for, if it were, "What took place before, would take place again." The journal of *Land and Water*, Aug. 29, 1868, embodying a letter in the *Times*, thus remarks:—"No words can convey any adequate idea of the wanton, wicked cruelty perpetrated by these ruthless slayers of unoffending birds. Broken-winged birds are abandoned, and drift away to perish by slow degrees; badly wounded birds are allowed to flutter and struggle in the bottom of the boat, their sufferings unheeded and uncared-for; while many, fearfully hurt, manage to reach the shore to die in lingering agony; and, lamentable to say, this butchery is committed for no good purpose. We find a letter in the *Times* headed 'A Plea for the Kittiwake,' in which it is remarked, 'Some months ago a contributor to a public journal of natural history, writing from Lincolnshire, disclosed the fact that London and provincial dealers now gave one shilling per head for every white Gull* forwarded; that one man (a stranger, drawn thither for profitable occupation) boasted of having last year killed with his own gun at Flamborough-Head four thousand; and that another sea-fowl shooter had an order from a London house for 10,000, all for the plume trade. During the present summer (that was 1868), it is added, one of the *Plumassiers* has visited various breeding stations in Scotland, and laid his plans for having supplies of birds sent to him. At Ailsa Craig he gave an order for one thousand Gulls per week, and there stated that he was prepared to take any quantity more. To meet this demand, the tacksman of the Rock spread his nets while the birds were sitting on their newly hatched young, which were left in hundreds to perish on the ledges." Again, in the *Guardian* of 18th November 1868 the following paragraph appears:—"On a strip of coast 18 miles long near Flamborough Head, 107,250 sea birds were destroyed by pleasure parties in four months—12,000 by men who shoot them for their feathers to adorn women's hats, and 79,500 young birds died of starvation in emptied nests. Commander Knocker, R.N., there stationed, who reports these facts, saw two boats loaded above the gunwales with dead birds, and one party of eight guns killed eleven hundred in a week. Besides these instances, it is a well-known fact that the Londoners during the breeding season (for their Saturday outing) used to go down to the Isle of Wight for what they

* The dealers' name for the Kittiwake in full plumage.

called a day's wild fowl shooting—that is, destroying the unhappy birds off their nests, and leaving their young to starve, and, as recorded by an eye-witness, piling them up afterwards on the sea shore, merely for the pleasure of seeing them washed away by the rising tide. Not only the Kittiwake, but among the Guillemots, Razorbills, Puffins, and every species of Rockbird, did this fearful and sinful destruction go on. One instance is mentioned by Mr Gray, in his “Birds of the West of Scotland,” of the Tacksman on Ailsa Craig on one occasion undertaking for a wager to kill 80 dozen of Puffins (a little less than a thousand birds) with a pole in one day, striking them down as they flew past him, and actually accomplished the cruel feat. The late Captain M'Donald, then in charge of the Fisheries, and who had long experience on the Northern and Western Coasts of Scotland, where he was stationed, also bears testimony to the enormous destruction and great decrease of sea birds all along the Islands and Western Coast. It is a well-known fact that sea birds are of the greatest value in pointing out the whereabouts of fish, as without their assistance the fishermen would often labour in vain, and their catch of herring would depend chiefly on mere chance. No wonder, then, that Government interfered, and in the end established a close time for sea birds, not only in England, but also for Scotland, and that not a bit too soon, for had such a measure not been carried out, it is not too much to say that for many of our sea birds a similar fate was impending to that of the Great Auk, now extinct from precisely the same cause—reckless persecution. We will now proceed to the migratory birds, of which by far the larger proportion are to be found, as previously explained, in winter, a few, however, not always staying, such as the Green Shank, Water Rail, and Spotted Crake. These, together with the Godwit, Knot, Jack Snipe, and Common Sandpiper or Summer Snipe, which visits us in spring, complete the list of migratory waders. I may mention that the Woodcock and Land-rail, both belonging to the family of waders, are not included, as, though an individual or two may occasionally be found along shore, they cannot be considered truly as birds of the estuary. The remaining winter birds are all swimmers or web-footed, such as—

Wild or Grey Goose.	Tufted Duck.	Long-tailed Duck.
Bean Goose.	Widgeon.	Goosander.
Pink-footed Goose.	Scaup Duck.	Red-breasted Mergunter.
White-fronted Goose.	Common Scoter.	Great Northern Diver.
Brent Goose.	Velvet Scoter.	Red-Throated Diver.
Pochard.	Golden Eye.	Black-throated Diver.

This last, however, does not always remain. Of the above, the principal and most worthy of notice are the Wild Geese, which, with

the exception of the Brent, more partial to the salt water—its favourite food being the grass-like *zostera marina*, on the roots of which it greedily feeds—have from time immemorial assembled in countless hordes on the upper parts of the estuary and the adjoining lands of the Carse of Gowrie, moving, according to the tide, to and fro in marshalled and V shaped flights, collecting, after much wheeling and close inspection, on some wheat or clover field in flocks of many hundreds. A few still occupy the same haunts, but in very greatly reduced numbers, and these are now confined almost entirely to the Grey and Pink-footed kinds—the latter being the more common of the two, the Bean and White-fronted being now scarcely or ever seen. Not only have punt guns, before-mentioned, the setting of steel traps on the mud banks, and the perpetual firing that now goes on, had to do with this, but also the great change under which the Carse has gone within the last thirty-five years, by the construction of the railway right through the very best and heart of their feeding grounds, and the consequent increase of buildings which have sprung up on every side, together with steam mills, then unknown to the Carse, have greatly effected it. It is a curious fact, and worth mentioning, that it is only since the year 1833 that the difference between the Pink-footed and the Bean Goose was known to naturalists, and that it should be left to a French naturalist, M. Baillon, at Abbeville, to find it out, who at that date, for the first time, had them separated; and yet, long before this, both species were well known, and considered perfectly distinct, by every wild goose shooter in the Carse—the Pink-footed under the name of the “Little Black-nebbed,” and the Bean, under that of the “Big Black-nebbed,” both having the nail of the beak black, whereas in the Grey Goose and the White-fronted it is white; besides which, the pink feet of the one and the yellow legs of the other were at all times sufficient to distinguish them. As time presses, I will now pass over the remainder of this section, and come to the summer migrants, in which, as above stated, we have only one wader, the little Summer Snipe, with his cheery piping note as the month of May arrives, the five remaining being all web-footed species. The first of these, the Gannet, brings me to a subject into which it will be necessary for me to enter somewhat fully, as chiefly to this bird is ascribed the great mischief and damage *said* to be done to our Fisheries, but which, after all, seems to me to be very much of a “mare’s nest”—as, though the number of Gannets in Scotland is certainly very large, and their consumption of herring enormous, still the supply of fish food, as I will show, is so great as believed to be more than sufficient both for man and bird. In the Report of the Commissioners on the Scotland

Herring Fisheries, dated 1st March 1878, it is stated that there are five Scottish breeding places for the Gannet, and Captain M'Donald, in a letter to Lord Caithness, in Appendix No. II. of the Report, p. 171, estimates the numbers annually breeding on the several stations to be as follows (and from his long experience he is probably pretty correct) :—Ailsa Craig, 12,000 ; Bass Rock, 12,000 ; St Kilda, 50,000 ; the Stack, off Cape Wrath, 50,000 ; and Sula Sgeir, 40 miles north-east of the Butt of Lewis, 200,000—in all, 324,000. Though no evidence appears on the face of the Report as to Captain M'Donald having considered the supply of fish on the Scottish coasts as in no way diminishing from the superabundance of sea birds, still I know it to have been his opinion, and this is borne out in the letter above alluded to, in which he thus remarks :—“The Gulls, Cormorants, Hawks, Guillemots, Puffins, and other birds prey upon the herring at every stage of their growth, and must take a very large quantity, of which no one can pretend to form an estimate, and I consider that the quantity taken both by men and birds forms a very small proportion of what is destroyed in the shape of spawn, herring fry, and full grown herrings by fish of all kinds. I have, therefore, *no fear* about the herrings being fished-up on the Caithness Coast, or any other part of the coast they visit ;” and in continuation, he gives expression of his being favourable to sea bird protection, owing to “their marked decrease going on year after year ;” and the late Mr Buckland, as one of the Commissioners, in his Natural History of the Herring, in the same Appendix No. II. of the Report, makes the following apt remark—“It is finally to be observed that, in spite of all the enemies which are continually preying on them, and the enormous losses which they must suffer, Nature holds in her hand the balance of compensation, resulting in the fact that annual fecundity *exceeds the total sum* of the annual destruction.” Lastly, in the summary of the general conclusions arrived at by the Commissioners, they state in conclusion No. 1 :—“The Herring Fishery on the coasts of Scotland, as a whole, has *increased* and is *increasing* ;” and in conclusion No. 3—“Nothing that man has yet done, and nothing that man is likely to do, *has diminished* or is *likely to diminish* the general stock of herrings in the sea.” Is it not, therefore, somewhat surprising that in the last of the conclusions, No. 13 (though there is nothing in any of the previous ones shewing the birds to be so detrimental to the fisheries as to require it, but rather an inference to the contrary) the Commissioners should recommend the repeal of the Act in so far as applies to Scotland? This naturally attracted the attention of the Close Time Committee appointed by the British Association, in which they gave it as their decided opinion—

“That conclusion No. 13 seems to have been arrived at from exaggerated or incorrect information, as will appear from the following considerations :—The number of gannets on Ailsa is estimated (Report, p. xi.) at 10,000, and a yearly consumption of 21,600,000 herrings is assigned to them ; while the Commissioners assume that there are ‘ 50 gannets in the rest of Scotland for every one on Ailsa,’ and on that assumption declare that the total destruction of herrings by Scottish gannets is more than 1,110,000,000 per annum. This is evidently a miscalculation, for, on the premises, this last number should be 1,101,000,000—a difference of more than 8,000,000.

“ But, more than this, supposing the figures at the outset are right, it appears to the Close Time Committee that the succeeding assumption of the Commissioners must be altogether wrong ; at any rate there is no evidence adduced in its support, and some that is contradictory of it.

“ The number of breeding-places of the gannet in the Scottish seas has long been known to be five only, as, indeed, is admitted by one of the Commissioners (Appendix No. 2, p. 171) ; and the evidence of Captain M’Donald, which is quoted in a note to the same passage, while estimating the Ailsa gannets at 12,000 in 1869 (not 1859, as printed), puts the whole number of Scottish gannets at 324,000, instead of 510,000, which there would be at the rate of 50 in the rest of Scotland for one on Ailsa, according to the Commissioners’ assumption.

“ Moreover, 50,000 of these 324,000 birds, or nearly one-sixth, are admitted by this same Commissioner to be ‘ of great value to the inhabitants ’ of St Kilda ; and, indeed, they are of far greater value to them than any number of herrings, since it is perfectly well known that the people of St Kilda could hardly live without their birds ; therefore this 50,000 must be omitted from any estimate of detriment. Deducting, then, 50,000 from Captain M’Donald’s 324,000, we have 274,000, and these, at the Commissioners’ estimate, would consume 600,060,000 herrings, instead of the 1,110,000,000 alleged by the Report, and, therefore, nearly 200,000,000 fewer than the Commissioners’ estimate of the annual take of the Scottish fisheries (800,000,000)—25 per cent. less, instead of 37 per cent. more.”

But the British Association Committee further shewed that, not to exaggerate the case, assuming the birds to frequent the waters seven months instead of twelve months in the year, this would make only 350,350,000 herring consumed, as against eleven hundred and ten millions as estimated by the Commissioners, being a less consumption by nearly 700,000,000, or much less than one-third. This opinion was forwarded by the British Association to the Home Secretary, when it was duly acknowledged, but never disputed, and the Act was amended, but not repealed. In a recent publication, “The Sea,” we read—“It has been computed, so fecund is the herring, that, assuming the British waters to contain sixty millions of female herrings, each depositing the moderate estimate of 20,000, it follows that the total number of eggs which, but for natural and artificial checks, would come to maturity is twelve hundred millions of millions—an expression which is easy to put on paper, but which the mind can no more comprehend than it can grasp the idea of eternity : enough that these countless hordes, were they to do so, if compressed by five hundreds into foot cubes, would build a wall round the earth 200 feet broad and 100 feet high.” The inference is, from such astounding figures, that man’s destructiveness, or that of birds either, can do but little harm. All fish, it is true, are not so prolific as the herring, but

the argument applies to each kind in its degree. I think sufficient has now been said to shew, with regard to the Gannet or other sea birds, the herring at all events can hold its own. We will now turn to the salmon, on account of which Mr Gordon Cumming, as appears in the *Inverness Courier* of 26th October 1880, urges, in a letter of his to the Clerks of the Inverness District Fishery Board, the necessity of taking steps to have the Sea Birds Preservation Act repealed as regards Scotland, in consequence of the *destruction now known* to be wrought among par and smolts by Gannets, Gulls, and other birds, now fostered by that *mis-taken piece of legislation*. This, it is added, has strongly been recommended by the Herring Fishery Commissioners in their Report of 1878, but nothing has been done in consequence. Yes, but it must be recollected when the Commissioners penned that resolution No. 13, which I have already alluded to, it was entirely in regard to the herring fishery and not the salmon—a resolution, besides, which was shewn by the British Association to be founded on exaggerated evidence, which was forwarded, as already mentioned, to the Home Secretary, and was never refuted (that I am aware of), but tacitly, as it were, approved of, by the very fact (which Mr Gordon Cumming mentions) of the non-repealing of the Act. As to the great destruction wrought among pars and smolts, is there any evidence to show that there has been so enormous a consumption by these birds as actually to have impoverished the fishings, or that the real injury from which the salmon fisheries are said to be suffering is done by these birds alone? This is the point; and if there is no real substantiated proof to this effect, which I have certainly failed to find, then let the birds in all justice have the benefit until this has been thoroughly sifted. What we want to get at is the truth. I have taken some pains to investigate these accusations, and have been in communication with the principal Tacksmen on the Tay, Cromarty Frith, and Dornoch Frith, in the neighbourhood of the injuries alleged. In the Tay, and the adjoining shores in the Tay District, the opinion is that the sea birds have not been in any way injurious. In the Cromarty Frith, the Tacksman who holds the fishings from Cromarty to Dingwall, at a rent of £1200 a-year, also the fishings of the Dornoch on both sides, at a rental of £1600, assures me that any real injury done by sea birds to the fishery is mere talk; that the Gannet seldom molests them, and that the bird which is more destructive to smolts than any other, both in the Cromarty and the Dornoch Friths, is the Golden Eye Duck, appearing in large flocks at the beginning of April, just as the smolts descend, and that he has shot them with three and four smolts in them; and this no doubt is the same in the Moray and Beaully Friths. Now these birds are *not* in the *Act* at all, or ever were, and may be shot

with impunity at all times. They are birds of passage, and are mostly all off to their breeding grounds in the northern regions by the third or fourth week of April; so, after all, the damage they can do cannot be very much, and they can be kept in check by shooting. Of course no one would dispute that a Gannet or a Gull would not devour a par or a smolt if it came across it, but there is no proof here to show that any serious injury is being done by them to the fishery. I have seen plenty of articles on the subject in the public journals, but not one of them proving what they try to show. What one asserts another takes up, and a third, perhaps shooting a bird with some salmon roe in its stomach, wildly jumps to a conclusion without any further investigation; and, as an instance of this, lately an anonymous writer from the Tweed, to change the subject from par and smolts to salmon spawn, calculates in some marvellous way that there is from sea birds alone an annual loss of £100,000 to the Tacksmen by the destruction of ova, and mentions among a few birds that have been shot in winter from twenty to one hundred ova having been found in the stomach of each; and to prove it he names the following as being so destructive to the *spawning beds* (mind, our friend is talking of salmon):—The Auk, Diver, Eider Duck, Gannet (be it remarked, Gannets are not found in winter), Guillemot, Kingfisher, Marrot, and Wild Duck. Granted salmon ova was found in the stomach of each of these birds, Gannet included, it does not in the least follow that this was obtained from off the spawning beds. Now, it is a well-known fact, at least I never heard to the contrary, and I am sure every naturalist here present will bear me out when I say, that salmon proceed up our rivers and streams for the purpose of spawning in *fresh* water, and never do so in *salt*. Again, that the whole of the birds mentioned, with the exception of the Kingfisher and common Wild Duck, which I presume him to mean, are sea birds, never found in fresh water except by the mere accident of having been driven there by some great storm, when, if they do not manage to get back, they perish. It is not the habit of the Mallard to dive under water, and it would be quite impossible in the usual way, by turning a somersault with his head down, to hold his own on the fords in the rapid water where the spawn is deposited, much less to gather it. The Kingfisher, a singularly rare bird in Scotland, supposing him to dash into the water and drive his pointed bill through some inches of rough gravel and reach the spawn—which I doubt his ability to do, or his attempting it a second time if he did—from the paucity of their numbers could not add much to the £100,000 annual loss. Another common accepted fact is, that the common whiting is a *sea* fish, and not a fresh water one. Would the anonymous writer, I wonder (as was

remarked in a famous trial), be surprised to hear that the whiting has been caught in the lower part of the estuary of Tay with no less than 300 impregnated ova in its stomach? But such is the case. The whiting, therefore, with as much justice, should be proscribed as well as the birds. But you will ask, "How was this?" It is not difficult to explain. During spawning time, what with the numbers of male fish on the beds, the fighting and routing up of newly deposited spawn that goes on from overcrowding, the washing away of it by floods, the scouring of the beds by ice, and consequent disturbance of the ova, which, if not devoured by pike and trout, ever on the watch for it, finally finds its way down to the sea, where it becomes the prey of both *sea fish* and *sea bird*; but these ova were lost to all chance of ever coming to maturity long before it ever reached them. But it is said the fish are getting scarcer. Is this, however, really the fact? I do not dispute the comparatively few salmon or grilse which now ascend our rivers during the fishing season, especially in the months of May and June, and even at the back end, to former times; not because there are fewer of them from destruction by birds, but because within the last few years, from sheep-farm draining in all the bogs and marshy spots on the higher hills, which acted like so many sponges, the whole character of the river has become changed; for after the disappearance of snow, instead of the water being emitted gradually, giving a steady rise and fall during the June or July and August rains, keeping the river up for two or three weeks together, with fish running the whole time, we have now a three days' rush of turbid water, when not a fin will stir, and in the next few days a corresponding sudden fall, reducing the river to as low a state as ever, which, with the additional drawback of pollution—saw-mills, potato-mills, paper-mills, bleach-works, dye-works, sewerage, all uniting in one common result of absolute poison, render the bottom one fœtid and foul mass of corruption, not only preventing the fish lying, but effectually stopping any run of fish when the water is low; and consequently, in a dry season such as the last, the fish are kept back so late as to cause the most serious loss to the Tacksman. The fish not getting up till after the season is over, as was the case this year, and even then, as was reported, requiring two or three rises of water, from its running out so rapidly, before the fish could reach their ground—I believe to be one of the great and chief causes of detriment to the fisheries, and not the birds. This destruction of our salmon rivers by pollution is no overdrawn picture. Look at the Clyde. What is it now? A seething mass; once one of the most beautiful salmon rivers in Scotland, and if we do not take care we shall have the same one day applying to the Tay. To say that there

are fewer salmon now than there were before the passing of the Bird Act is a statement by no means borne out by facts, for the reports from the upper waters shew that this year—and it has been the same for several years past—the fish are as abundant on the spawning beds as ever they were, if not fully more so, crowding and interfering with each other in some of the fords so much as to be doing more harm than good. The late Mr Stoddart, than whom, perhaps, there was no better authority, calculated that 150,000,000 of salmon ova are annually deposited on the Tay, of which only 50,000,000, or one-third, ever come to life, leaving 100,000,000 ova either to be dried up by the partial falling in of the water, or washed away by the floods, to be devoured by any roving fish or sea bird which may chance to come across them. I cannot quit this subject without saying one word in favour of a bird, though not under consideration in this paper, which is most unjustly accused of destroying salmon spawn on the beds, and in its case, just what I said before, a conclusion is jumped at without further inquiry, and this unfortunate bird is shot down without scruple or conscience. This is the little Water Ouzel, or Water Crow. Now, it is an incontestable fact, of which I have had frequent proof, that the Water Ouzel, though continually on the beds during spawning time, plunging and tumbling about under water in the midst of the most rapid stream, devours not the spawn, but the very creatures which prey upon it—the larvæ of water beetles and small fresh water crustaceans, with which the gizzard will be found crammed, but not one single ovum. In justice, therefore, not only to this bird, but to all, let the saddle be put on the right horse. I now come to the last birds on the list—the Terns or Sea Swallows, of which there are four species which come to us, the Sandwich, the Arctic, Lesser and Common (by no means, however, a very common bird), all of which, with the exception of the Sandwich, used to breed in large numbers on the sand hill at Buddonness and round about on Barry, now much reduced in numbers, a spot which I had understood them to have altogether deserted; but Mr Henderson assures me that they breed there still, though in small parties, but are much interfered with by the Volunteer Artillery practice, the shot passing over their favourite station, to the great discomfiture of the birds, which have in consequence been driven off and shifted their ground. The three latter all breed at the mouth of the Tay. The former, however, as Mr Henderson tells me, though seen at the beginning of the season, do not breed there, but do so on an island on the Firth of Forth, and make their appearance again later or in the season in company with their young. This leads me to what was casually alluded to in the beginning of this paper, and which, in the

concluding remarks, would not be perfect were I silent on the subject, namely, the *wicked* and *deplorable plunder* of eggs that now goes on spring after spring on Tents-muir, at one time the great nursery of a large proportion of our Tay birds—and I do so in the hope that in thus bringing it publicly before you, and exposing the iniquity that goes on there, it may be the means in some way of helping to check it ; but I should not have felt justified in doing this, for, with the exception of the actual sea shore, the whole ground in question is private property, had it not been for the cordial support of two of the proprietors—one of whom I am happy to see here present to-night—Admiral-Maitland Dougal of Scotsraig, and Mr Speedy, proprietor of Kinshaldy, also tenant, on long lease, of the remaining portion on the estate of Earlshall, who has promised every assistance in getting, if possible, this abominable practice put down, both on his own property and that of the adjoining, as long as he holds it. I therefore make no further apology, but proceed to describe this fine breeding station, consisting of the whole of that sandy tract known as Tents-muir, stretching for a distance of several miles, from the Tay to the Eden, with a width of some two or three miles, which is most wonderfully adapted for breeding purposes, and therefore the choice spot of many of our birds—sixteen species of which, not counting land birds, are to be found nesting there. This arises not only from its isolated and retired position along this part of the sea coast, but from the great extent of heath, marsh, and rushy ground with which it is clothed, together with the interspersion of sand hillocks, wood, and arable land. Along the shores are exclusively to be found, in small patches, the Terns, each species by itself, together with the little Ring Plover, or Ring Dotterel ; further back, on the higher flats, large colonies of Dunlin were formerly to be seen, but now terribly diminished. Moving on through heath, marsh, and woody spots would be found in abundance Eider, Peewit, Snipe, Redshank, Duck, and Teal ; while from many a knoll the plaintive note of the Golden Plover, or the trilling cry of the Curlew would be heard ; and further inland again, among the old sand hills, deep down in some deserted rabbit burrow, at a depth perhaps of some ten or twelve feet, lay the soft nest of the Shieldrake, lined, like the Eider, with its own down, and tenanted with its twelve or sixteen eggs. These, together with the eggs of every other species, have for several past years, in thousands, either been collected for profit, or destroyed in mere wantonness. Over three hundred eggs have been known to be collected by one party alone in a single day, consisting of Tern, Peewit, Plover, Curlew, besides considerable numbers of Eider, Teal, and other Ducks. But the principal mischief is done by boys and lads from Dundee, St Andrews, Leuchars, &c., especially on Sundays ; and I have been

told by an eye-witness that he has seen them frequently with caps full of the eggs of Terns, Peewits, Golden Plover, Ring Plover, and other kinds. Sometimes these were blown in mass, or pelted at each other, until they were all smashed and scattered in every direction. Again, by the same authority, when walking with a friend along the main drain, dozens of eggs of all kinds were seen, evidently quite fresh, ruthlessly smashed and scattered along the banks, some lying whole at the bottom of the water, evidently the scene of some egg-fight the night before. Many a visit is made before daylight, and seventy or eighty eggs secured in sufficient time to admit of a man getting back to Tayport or elsewhere before his work began at six. The salmon fishers on the coast also, during their slack time, gather large quantities of Ring Plover, Arctic and Lesser Tern in their immediate vicinity along the shore, which they either sell or use for food; and from incessant persecution the birds are getting altogether driven off the ground. The Lesser Tern lays only two eggs, consequently, if this goes on much longer, very little more will extirpate them altogether. Not only do the Terns suffer from all these depredations, but also from natural causes. Numbers of young birds are often destroyed wholesale by high north-west winds causing sand drift, especially in dry weather. To a person not accustomed to see one of these storms, it is something extraordinary; and Mr Henderson tells me he has seen Terns from one to eight days old perfectly annihilated, and not only buried, but the poor soft downy little things rolled over and over as they were hurled swiftly along like so many pieces of tow, quite dead, and never stopping till held by some bit of drift wood. This is one among the many provisions of Nature to keep the proper balance. A severe winter comes, or some great storm arises, when hundreds of our sea birds perish, and our coasts have been strewn for miles with their dead bodies, the Gannet among the rest, showing that with protection and all, we need not fear to be overrun. It must be borne in mind that sea birds were far more numerous eighty or a hundred years ago than at the present date, and that at a time when our fisheries were not even protected as they are now, and there never was any complaint of the want of either salmon or herring—on the contrary, they both abounded; nor has there since the passing of the Act, ten or twelve years ago, been any undue increase. It is, therefore, to be hoped that not only the integrity of the Act will be maintained, but that the destruction of eggs and the shooting of birds in close time will be discountenanced in future, for we should ever recollect that all things which a beneficent Creator has put under our charge and vouchsafed to give us, are for our use, and not our abuse.

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