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336^a TRANSACTIONS

OF THE

NATURAL HISTORY SOCIETY

OF

ABERDEEN.



1878.

ABERDEEN:

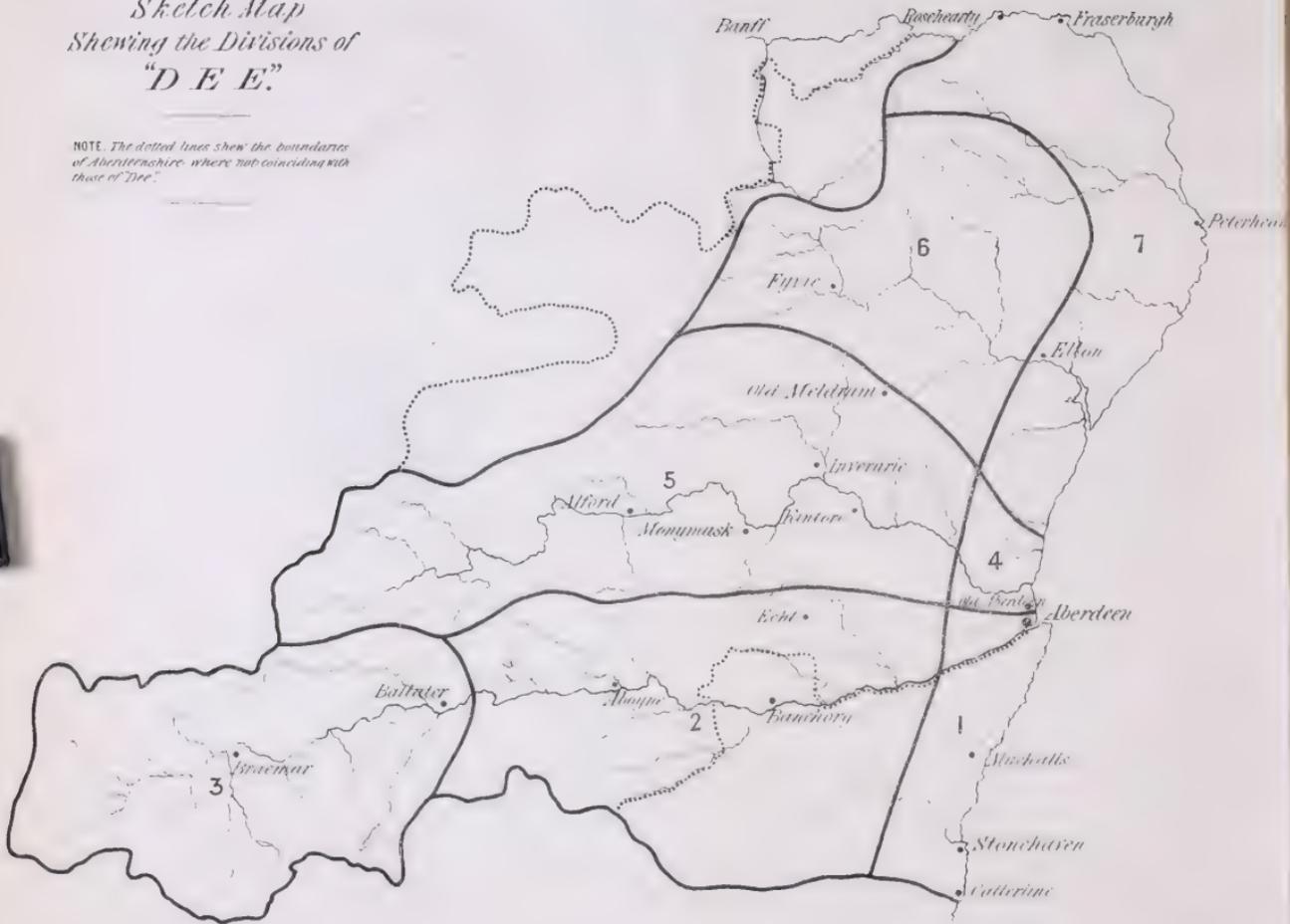
*To be obtained of the Secretary of the Society, Mr. JOHN ROY,
3 Loanhead Place.*

PRICE TWO SHILLINGS.



*Sketch Map
Shewing the Divisions of
"D E E."*

NOTE. The dotted lines show the boundaries of Aberdeenshire, where not coinciding with those of "D E E."



TRANSACTIONS

OF THE

NATURAL HISTORY SOCIETY

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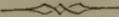


1878.

ABERDEEN:

*To be obtained of the Secretary of the Society, Mr. JOHN ROY,
3 Loanhead Place.*

SESSION 1877-78.

——
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——

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CONTENTS.

	PAGE
“ Introduction,” by Mr. John Roy, - - - - -	3
“ On the Progress of Zoology in Aberdeen and its Neighbourhood,” by Prof. James W. H. Trail, - - - - -	7
“ Introductory Remarks on the Entomology of ‘Dee,’ with a Map,” by Prof. J. W. H. Trail, - - - - -	24
“ Lists of Lepidoptera and other Insects of ‘Dee,’ ” by Prof. J. W. H. Trail, - - - - -	28
“ List of Araneidæ (Spiders) of ‘Dee,’ followed by ‘Hints on Col- lecting Spiders,’ ” by Prof. J. W. H. Trail, - - - - -	48
“ Galls and their Makers in ‘Dee,’ ” by Prof. J. W. H. Trail, - - -	55
“ List of the Crustacea of the North-East Coast of Scotland,” by Mr. George Sim, - - - - -	84
“ Catalogue of Fish found in the vicinity of Aberdeen,” by the late Dr. Dyce and Mr. George Sim, - - - - -	89
“ On the British species of the Genus Sphagnum,” by Mr. John Sim,”	94

INTRODUCTION,

BY JOHN ROY.

The present Natural History Society of Aberdeen held its first regular meeting on November 24, 1863. There were two Natural History Societies in Aberdeen before this date.

The first of these seems to have originated about 1845, and the following gentlemen are known to have been members of it:—Professors M'Gillivray, Dickie, and Blackie, Revs. Dr. Longmuir, Jas. Farquharson, and Dr. Beverly; Alex. Thomson, Esq. of Banchory; Messrs. Cruickshank, Martin, Stables, and Ravenscroft. At its meetings the late Professor M'Gillivray read a series of papers, which after his death were printed for private distribution by Prince Albert, under the title of "The Natural History of Deeside". No other documents relating to this Society are known to have been preserved.

Sometime after it had ceased to exist, another Natural History Society was formed, which held its meetings in Long-acre. The following gentlemen are known to have been connected with it:—Dr. Alex. Stephen, Messrs. Jas. Taylor, Alex. Clark, Arthur Beverly, Geo. Milne, John Wilson, Wm. Ewen, Earnest Donald, and ——— Black. Of these, Mr. Ewen is known to have studied Fungi, and Mr. Black, Lepidoptera. There are no documents relating to this Society known to be in existence.

Since the present Society was formed, it has met regularly during the winter months, and the following papers have been communicated to it:—

Mr. (now Dr.) Alex. M'Rae—"The Objects and Advantages of the Study of the Natural Sciences".

Dr. Sutherland (who went to S. Africa, and is now dead)—"On *Welwitschia mirabilis*".

Mr. (now Dr.) Forbes—"On the Anatomy and Reproduction of the Dragon Fly".

Mr. (now Dr.) King—"On the Calabar Ordeal Bean".

Professor Nicol—"On the Geology of Aberdeenshire".

Mr. Jas. Taylor—"On the Ornithology of the Arctic Regions".

Mr. W. Williamson—"On the History of Fuel".

Mr. King—"On the Cutting at the Gas Work," and "On a Bore to the depth of 418 feet at Sandiland's Chemical Works".

Mr. Roy—"On a Botanical Excursion to Braemar, Clova, &c."

Mr. Taylor—"On the Birds of the District".

Dr. Dyce—"On the Eye of the Mackarel".

Dr. Ogilvie—"On the Growth of the Ivy, and other Climbing Plants".

*Mr. Alex. Adam—"On the Artificial Propagation of the Salmon".

Mr. (now Dr.) Beverly—"On the Laws of Nature".

*Mr. John Sim—"On the Botany of Scotston Moor".

*Dr. Ogilvie—"On Compound Animals".

Dr. Struthers—"On the Structure of the Skeleton of the Seal".

Rev. W. Gregor—"On the Actiniæ of the Moray Firth".

Mr. J. P. Bisset—"On the Botany of the Coast District of Banffshire".

Mr. Roy—"On *Galeopsis intermedia*, Vill. and *Hieracium corymbosum* Fr".

Mr. Burnett—"On certain Rare Birds in the Kemnay District".

Mr. Roy—"Notes of Excursions in the Clova District".

Mr. Taylor—"Notes on American Fresh Water Shells".

Mr. Geo. Sim—"Personal Observations on several Points connected with Natural History".

Mr. W. Williamson—"Notes on the Salamander".

Mr. Roy—"On *Buxbaumia aphylla*".

Mr. John Sim—"On *Buxbaumia indusiata* in Ross-shire".

Mr. S. Burnett—"On the Birds of Inverurie, and neighbouring Parishes".

Dr. Dyce—"On the Fruit and Seeds of the Pawpaw Tree".

Dr. Struthers—"On the Structure of the Tiger".

Rev. W. Gregor—"On the Climate and Flora of the Upper Part of Banffshire".

Mr. Willis—"On a Visit to Shetland".

Mr. Geo. Sim—"On *Cottus Groenlandicus*".

Dr. Dyce—"On Preserving Spiders".

Mr. Taylor—"Notes from Wisconsin".

Dr. Dyce—"On the Œsophagus of the Turtle".

Mr. Dawson—"On the Marine Mollusca of Aberdeenshire".

Dr. Beverly—"A Plea for Mushrooms".

Mr. John Sim—"On the Genus *Sphagnum*".

Mr. S. Burnett—"On the Mammalia of the District".

Mr. John Sim—"On Mosses recently Found in this District".

Mr. George Sim—"On *Brosmius vulgaris*, Cuv.", and "On *Achæus Chranchii*, Lead".

Mr. Taylor—"On *Sorex remifer*".

Dr. Struthers—"On the Structure of the Horse".

Rev. J. Fergusson—"On *Grimmia commutata*, and other Mosses".

Mr. Taylor—"On *Larus glaucus*".

Mr. Roy—"On the Distribution of some of the Plants found in the East Highlands".

Mr. Taylor—"On a Phosphatic Calculus".

Rev. M. L. Anderson—"On Mosses recently found in Forfarshire".

Rev. J. Fergusson—"On Mosses recently found in Kincardineshire".

Professor Nicol—"On the Leech".

*Mr. G. Sim—"On Crustaceans".

Mr. Taylor—"Notes on the Ptarmigan".

Mr. Roy—"Notes on Mosses".

*Rev. J. Keith—"On Fungi found in and near Forres".

*Mr. Dawson—"On the Mollusca of the North-East of Scotland".

Mr. Roy—"On an Excursion to Braemar, &c.".

Mr. Roy—"On *Hieracium collinum* Fr.," and "On *Aira uliginosa*, Weihe".

Mr. W. Williamson—"On the Teeth of Fishes".

Dr. Struthers—"On the Anatomy and Natural History of Whales".

Dr. Trail—"On the Lepidoptera of the Aberdeen District".

Mr. S. Burnett—"On the different Modifications of Incubation, as observed in various native Birds".

Rev. J. Fergusson—"List of Mosses found in Forfar, Kincardine, and Aberdeen".

Mr. H. O. Forbes—"On the Zoophytes of the North-East Coast".

Dr. Trail—"On certain Species of Lepidoptera from Braemar".

Mr. Duncan—"On some of the Rarer Plants of the Buchan District".

Mr. Roy—"Notes on a Collection of New Zealand Ferns".

Dr. Struthers—"Hyperoodon bifida".

Mr. Roy—"On Mosses".

Dr. Struthers—"On the Red Deer of Scotland".

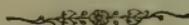
Mr. Bannerman—"On the Bees and Wasps of this District".

- Mr. Vice—"On the Diptera of this District".
- Mr. S. Burnett—"On Shrews," and "On an Excursion up Nethyside".
- Mr. Taylor—"On the Young of the Mammalia of this District".
- Mr. Wilson—"On the Colour of Fishes".
- Mr. Roy—"On Desmids".
- Mr. Geo. Sim—"On Rapacious Birds, and their Uses".
- Mr. Roy—"On an Excursion to the Forest of Athole".
- Dr. Struthers—"On Animal Variability".
- Mr. Taylor—"On *Larus eburneus*," and "On *Myxine glutinosa*".
- Mr. S. Burnett—"Notes on Bees, Wasps, and Birds".
- Dr. Ogilvie—"On *Lótus corniculatus*".
- Dr. Beverly—"On Some Fossil Deposits of Diatoms, in the District of Cromar".
- Dr. Trail—"On an Excursion to Braemar".
- Mr. Roy—"On *Polypogon Monspeliensis*".
- Mr. S. Burnett—"On Bees, &c., Observed in Orkney and Shetland".
- Dr. Ogilvie—"On a Tour in France".
- Professor Nicol—"On *Gobius Nilsonii*".
- Dr. Williamson—"American Notes".
- Dr. Trail—"On Excursions to St. Cyrus and the Ythan".
- Dr. Trail—"On the Progress of Zoology in Aberdeen and its neighbourhood.
- Mr. Taylor—"On former Natural History Societies in Aberdeen".
- Dr. Trail—"Contributions to the Entomology of 'Dee'".
- Dr. Trail—"On the Macrolepidoptera and Tortrices found in 'Dee'".
- Mr. Taylor—"On Two Species of Seals".
- Mr. Taylor—"On Birds which Discharge Pellets".
- Mr. S. Burnett—"On the Migration of Birds".
- Dr. Trail—"On Spiders found in 'Dee'".
- Mr. John Sim—"On *Exidia repanda*, Fr".
- Dr. Trail—"On Galls, and their Makers in 'Dee'".

NOTE.—In the preceding List an asterisk (*) indicates that the paper to which it refers has been printed and circulated.

ON THE
PROGRESS OF ZOOLOGY IN ABERDEEN
AND ITS NEIGHBOURHOOD,

By PROFESSOR J. W. H. TRAIL



IN the following sketch of the progress of Natural Science in this part of Scotland, I shall confine myself entirely to Zoology, as that department has been here so much less studied in the field than the sister science of Botany, of the progress of which, in addition, a very complete account has been given by Dr. Dickie, in his *Botanist's Guide*, up to the date of publication of that work. On the other hand, I am not aware that any attempt has been made as yet to give a connected sketch of what has been done in Zoology.

I must refer the reader to the preceding paper for information on the work of the societies here, and shall endeavour only to sketch out what has been done in the systematic teaching of Zoology, and what has been published in magazines and in monographs of various groups. I am well aware of the imperfect nature of the compilation, and offer it simply as a commencement, in the hope that others may aid in rendering it in course of time complete, so that we may be able to see what progress has been made, and at the same time how much remains to be done ere we can hope for even satisfactory lists, much more for a complete knowledge of the fauna of the district.

In the records of Marischal College and University is a statement that in 1753 various professorships were founded, as distinguished from the former system of each "regent" conducting a class through the full course. Among these professorships we find "Civil and Natural History" enumerated, but there is no record of a professor having been appointed to the chair till 1788, when two names appear, viz., William Morgan and James Beattie, but of neither of them can I find any record beyond the names. The next occupant of the chair seems to have been

James Davidson, M.D., appointed in 1811. He also seems to have done nothing to add to the knowledge of the fauna of the district, a fact which could hardly surprise anyone who reads the following extract from Kennedy's *Annals of Aberdeen* (Vol. II., pp. 95-96), on the subjects embraced in his course, Zoology being conspicuous by its almost total absence.

"2d Class—James Davidson, M.D., Professor of Civil and Natural History. In the Scottish Universities perhaps there is no class correspondent to that of the second year at this University. It is denominated the Natural and Civil History Class. The lectures delivered by Professor Davidson are composed on an extensive plan, and embrace subjects of the utmost importance to the student. They proceed nearly in the following order:—In the first branch is given a short view of the celestial system, comprising an account of the rise and progress of astronomy; then follow short sketches of the nature and effects of light, connecting together the solar and terrestrial system. These naturally lead him to consider electricity, galvanism, magnetism, and their various causes and effects. The professor then proceeds to give a brief view of the affinities which unite minute atoms of matter, of the same kind, forming aggregation; and of dissimilar kinds producing chemical union. Those general principles are then applied, by giving a history of the atmosphere; of the phenomena connected with it, rain, wind, snow, hail, meteors, thunder, &c.; and of the waters on the surface of the globe; with the origin of springs, the nature of rivers, &c. A short explanation is also given of geology, with the various theories of the earth; and the phenomena of volcanoes, earthquakes, &c. In the second branch is given an explanation of the three kingdoms of nature; the simple substances found in minerals, and their unions, are first illustrated by specimens, of which the professor possesses a beautiful and extensive collection. The constituent principles of vegetables next engage his attention; and this branch he concludes with a view of the physiology of plants, an outline of the Linnean classification, animal chemistry and physiology of animals, and the various plans which have been adopted for arranging them into a system. The natural and civil history of man concludes the course. Two hours a-day are devoted, during the time of session, to these various branches of science; and one hour is appropriated, for four months, to the study of the Latin language, in which the students generally read the *Georgics* of Virgil, as being not only models of the most perfect Latin composition, but as affording grounds for illustrating the knowledge of the ancients with regard to natural history."

In the evidence, oral and documentary, received by a Com-

mission appointed to inquire into the state of the Scottish Universities in 1826, Dr. Davidson gave evidence corroborating the above account; but to the question, "Is there any Zoology embraced in your class?" he answered "There is; and I have a very numerous set of specimens for Mineralogy, and Zoology also. Botany I do not at all teach, because the season of the lectures does not admit of it, and Dr. Knight has been in the habit of giving lectures upon Botany." Elsewhere he says, "The collection of specimens of Natural History are mostly my own, except a few in the museum. There are a few in the museum, but they are not adapted for teaching; they are rather showy specimens, than specimens that can illustrate Natural History."

Q.—"It is stated in the return that there are specimens of Natural History under the care of the professor of Civil and Natural History?" A.—"There are; but I have a great deal more than double or treble those, of my own, which I could not do without. I keep my own in a closet off the classroom, and, as it is very damp, I am under the necessity of having them carried to my house at the end of the session."

From the above evidence it is plain that the University collection must have been very limited indeed, and almost useless. Mr. Cruickshank informs me that, for some years before Mr. Macgillivray's appointment to the professorship, the class was very efficiently taught by Dr. Shier, who was a candidate for the professorship in 1841. In 1841, Mr. William Macgillivray was appointed professor of Natural and Civil History, but though the name was retained (and I believe is so still at St. Andrews), he does not seem to have given any lectures on Civil History, but seems to have confined his attention entirely to the subjects at present taught in the class, viz., Zoology and Comparative Anatomy, Mineralogy, and Geology. With his appointment, Zoology may be said to have taken its due place in the University as a subject of study, and the success with which he roused the enthusiasm of his students may be inferred from the frequency with which their names appear in his *Manual of Mollusca*, and the zeal with which they seem to have aided him in his researches. He also made a private collection of specimens in the various departments taught by him (a collection bought by the University after his death), which forms the nucleus of the present museum of Natural History. On his death, in 1853, he was succeeded by Professor Nicol, the present occupant of the chair, of whom it would ill befit me to say more than that I am sure all who have studied in his class must have a warm esteem and respect for him. Since 1852, the museum has been very largely increased, so that the large hall which was empty at that time is now full to overflowing, and more room is felt to be a

pressing want ; while, year by year, the number of specimens is added to by donations, chiefly from graduates of the medical school. Among the more important additions since 1860 may be noted the contents of the Natural History museum at King's College, of the museum of the Pharmaceutical Society, the bequest of the museum collected by the Rev. James Leslie of Coull, and the gift of a large and valuable collection of skins of mammals and birds from Java and of shells from the Indian Ocean, by Mr. A. Fraser. Of objects of local Natural History, the chief additions are the collection of fish made by Dr. Dyce, Mr. Dawson of Cruden's collection of shells, and a pretty fair collection of the *Macro-Lepidoptera* of the district. The vertebrata of the district are also fairly represented, but in the other groups the collection is poor in local specimens. In making local collections, this Natural History Society might and ought to help very materially were the various members to take up the branches most in need of study, and to communicate their duplicates (named if possible) to the University museum, where access to them would be easy to any one. In this way we might hope, in no long time, to make very great advances in our knowledge of the local fauna, and the society would do its part in giving an effective stimulus to the study of Zoology in this part of Scotland.

To return to the systematic teaching of Zoology in former times in Aberdeen, we learn from Kennedy's *Annals* that in King's College and University, in 1818, Mr. Patrick Forbes, A.M., was lecturer on Chemistry and Natural History, and that "Mr. Forbes was appointed lecturer on Chemistry and Natural History on the 18th June, 1817. His class meets 6 days in every week, for an hour each day ; and, by the regulations, every candidate for the degree of Master of Arts, must give attendance for one session. The lectures on Chemistry are delivered in the beginning of the course, and those on Natural History conclude it ; the space of time allotted for each branch being nearly the same." Mr. Forbes was at the same time assistant and successor to the professor of Latin, and was appointed to the professorship of Latin in 1819. There is no record of what was embraced in the course of Natural History. Outside the Universities, Zoology has been little taught in Aberdeen, though I believe a class was taught for some time in the Mechanics' Institute by Dr. Beveridge. However, the class was given up, and a few years ago the specimens in the museum of the Institute were presented to the Natural History museum in Marischal College.

Turning now to what has been done more especially in the elucidation of the local fauna, the first to direct his attention to fauna as well as flora seems to have been Dr. David Skene, whose

2. "Description of *Vespertilio Daubentonii*, from specimens found in Aberdeenshire," by W. Macgillivray, A.M., &c, Pp. 255-259.

In Dr. Macgillivray's works on British Ornithology we find scattered observations on the birds of Aberdeenshire.

In the *Annals and Magazine of Natural History* (Vol. IX.), 1843, appears a "Catalogue of the Marine Zoophytes of the Neighbourhood of Aberdeen," by John Macgillivray, Esq. Pp. 462-469. In this paper are enumerated (with remarks on some) the species of *Hydroid* Zoophytes (32), of *Bryozoa* (28), and of *Polypi*, met with by the author, "either during 3 days' examination of the detritus thrown upon the beach at Donmouth after a storm in October, 1841, or as the result of a diligent and almost daily search during the first fortnight in February, 1842, among the objects brought up from deep water by the lines of the Footdee fishermen".

In 1843 also appeared the first work entirely devoted to any branch of Zoology in this part of Scotland, viz., *A History of the Molluscous Animals of the Counties of Aberdeen, Kincardine, and Banff*, "to which is appended an account of the cirripedal animals of the same district," by William Macgillivray, A.M., &c. In this work the *Foraminifera* also are included under the head of *Cephalopoda*. Though there are not a few errors in nomenclature, and too great tendency to giving names as new species to whatever species the author could not find described in the works accessible to him; yet the addition to the information accessible at the time on Scottish mollusca was very great, and even astonishing, if we take into account the short time spent (22 months) in making the collections, and the difficulties encountered in working out the names with the very inadequate means at his disposal.

In vols. XXXVII. (pp. 383-92) and XXXVIII. (pp. 43-50) of the *New Philosophical Journal*, we find a paper entitled, "On the Mammalia of the Counties of Aberdeen, Banff, and Kincardine," by William Macgillivray, A.M. It begins with a short account of the physical features of these counties, followed by full and minute descriptions of the animals mentioned in it, with notes on their habitats, habits, &c. The following species are mentioned in it:—

Plecotus auritus—In Old Machar Cathedral and elsewhere.

Vespertilio Daubentonii—Abundant about Old Aberdeen.

" *pipistrellus*—Once at Corby Den, also at Peterhead and at Banff.

Erinaceus Europaeus—Rare twenty years before; abundant at date of writing, especially along the Dee. First appeared in St. Fergus about 1834

Sorex tetragonurus (Thraw-mouse)—Common and general.

- Sorex rusticus*—More common in fields and hedges than the former, which occurs chiefly in the wilder districts.
 „ *ciliatus*—Once found dead in the wood at Old Bridge of Don.
 „ *fodiens*—Occurs at Auchterless, Turriff, Castleton, &c.
Talpa Europæa—General and common.

In vol. XXXVIII. of the same journal (pp. 138-41) is an article “On a species of *Teredo* found in cork floats on the coast of Aberdeenshire,” by William Macgillivray, M.A., LL.D. In this he describes the burrows and the shells of what he considers a new species, and names *Teredo subericola*; in Jeffrey’s conchology I find it referred to as a dwarf form of *Teredo megotara*.

In 1855 was published the *Natural History of Deeside*, a work written by Dr. Macgillivray a short time before his death, and printed for private distribution by command of the Queen. Scattered through it are various notes on the vertebrata observed in a tour along the Dee in autumn, and an appendix gives lists of the vertebrata of Deeside, along with a list of coleoptera of Scotland in general, by Mr. A. Murray, and short lists of insects of Aberdeenshire, compiled from Dr. Macgillivray’s manuscripts, by his son, Mr. Paul Macgillivray. There is also a list of Aberdeenshire mollusca, in which are enumerated ten species and one variety, added to the list after the publication of his work on mollusca. The lists of vertebrata are very good, and contain various interesting remarks. Thus, among the mammalia, we find “*Lepus cuniculus*. Rev. Dr. Skene Keith, in 1811, says that “there are no rabbits raised for sale, and only a few for amusement—not a hundred in the whole county.” There were no rabbits in Braemar till very recently, but they have increased there, as elsewhere in the county, so as to be a nuisance.” “*Sciurus vulgaris* has not been found on Dee.”

The list of birds enumerates 103 species, residents or stragglers on Deeside, some of them on the authority of Dr. Adams of Banchory.

The reptilia include the three species, and the amphibia the two to which our lists are still confined. Dr. Macgillivray describes as new the frogs found on the hills in Braemar, under the name of *Rana ericetorum*, but they hardly can be considered as even a well-marked variety.

The species of fish found in the Dee and its tributaries are given as 8 in number, besides the perch and the charr, introduced into some of the lochs.

Turning to the insecta, we find a long list of coleoptera, drawn up by Mr. A. Murray, but though inserted in the *Natural History of Braemar*, it is really a list of the coleoptera of the

north of Scotland. Confining our attention to those specially noted as occurring in Aberdeenshire, or as being generally distributed, we find 494 species and 6 varieties given as occurring in the district, but frequently with little indication of locality.

Next follows an "evidently imperfect" list of the other orders of insects, "drawn up by Mr. P. H. Macgillivray, and principally extracted from a manuscript account of the insects of the North-East of Scotland, by Dr. Macgillivray." Unfortunately, localities are seldom noted, and the numerous errors in identification of species deprives the list of all value in the case of rare species, save when very distinct and unmistakable. When localities are given, they are not in any case in Braemar; so that the list is rather out of place in this work. Employing the orders in the Linnean sense we find enumerated 3 ORTHOPTERA, viz., *Forficula auricularia*, *Acheta domestica*, *Locusta migratoria*. Of NEUROPTERA are enumerated 11 *Libellulidae*, *Crysopa Perla*, and 4 *Trichoptera*. Of HYMENOPTERA, 9 species; of LEPIDOPTERA, 19 species of butterflies and 36 species of moths; of DIPTERA, 28 species, including 9 species of *Pulex*; of HEMIPTERA, *heteroptera* 5 species, and of *homoptera* 8 species, in all 124 species, a considerable number of which are, however, evidently wrongly determined. As they will be again referred to in the lists of insects given elsewhere, I need not enlarge upon them here.

In addition to the works already quoted on our local fauna, there are numerous papers and notes on it scattered throughout periodicals and systematic works, of which it will be better to give the titles, under the various groups of animals. Before commencing it, I would take this occasion of returning my most sincere thanks to the Rev. Dr. Gordon of Birnie for his kindness in sending me his copy of the *Zoologist*, from 1843 to 1865 inclusive, as well as for other information to the utmost of his power. To Mr. Sim, our esteemed friend and fellow-worker, I am indebted for a sight of the *Naturalist* from 1851 to 1860—all, I believe, ever published—in which occur numerous notes of local interest.

The following contractions are used in the subjoined list:—*Zoologist* = Z.; *Naturalist* = N.; *Scottish Naturalist* = Sc. N.; *Entomologist's Monthly Magazine* = E.M.M.; *Reports and Transactions of the British Association* = B.A.R.; *Edinburgh New Philosophical Journal* = E.N.P.J.

The initials within the brackets are those of the writers of the papers enumerated, and are as follows:—

C. W. P.—Mr. C. W. Peach, formerly of Peterhead.
 F. B. W.—Dr. F. Buchanan White, of Perth.

- G. G.—Rev. Dr. G. Gordon, of Birnie, Morayshire.
 G. S.—Mr. G. Sim, of Aberdeen.
 G. S., Fyvie—Mr. G. Sim, of Gourdas, Fyvie.
 H. O. F.—Mr. H. O. Forbes, formerly resident in Aberdeen.
 J. G.—Mr. James Garrow, formerly resident in Inverurie.
 J. L.—Mr. John Longmuir, Jun.
 J. M.—Mr. John Macgillivray, son of Professor Macgillivray.
 J. S.—Rev. James Smith, of Monquhitter.
 J. T.—Mr. James Taylor, Portlethen.
 J. W. H. T.—The writer of this list.
 P. C.—Mr. Peter Cameron, Jun., Glasgow.
 T. E.—Mr. Thomas Edward, Banff.
 W. C. A.—Mr. Wm. Craike Angus, formerly resident in Aberdeen.
 W. M.—The late Professor Wm. Macgillivray, LL.D.

MAMMALIA.

“On the Mammals of the Counties of Aberdeen, Banff, and Kincardine” (W. M.). *E.N.P.J.*, XXXVII, pp. 383-392, and XXXVIII., pp. 43-50.

“List of Mammalia in the Natural History of Deeside and Braemar” (W. M.).

“On some Mammalia, Birds, and Fishes, lately observed in the Neighbourhood of Aberdeen” (J. M.). *Ann. and Mag. of Nat. Hist.*, VIII., p. 230.

“On a species of *Arvicola* common in Aberdeenshire” (W. M.). *Mem. Wern. Soc.*, VI., p. 424.

“Description of *Vespertilio Daubentonii*, from specimens found in Aberdeenshire”—(in Old Machar Cathedral)—(W. M.). *E.N.P.J.*, XXXI., pp. 255-259.

“Bats in Aberdeenshire” (G. G.). *Z.*, XIX., p. 7705.

BIRDS.

“On the Provincial Names of Birds” (J. S.). *Z.*, first series, p. 190.

List of Birds in the *Natural History of Deeside and Braemar*.

“The Birds of Strathbeg and its Neighbourhood, with a few remarks on their habits,” &c. (T. E.). *N.*, IV., pp. 239-247, and 263-271.

“The Birds of Banchory” (by Dr. Adams). Read before the British Association in 1859, and published as a pamphlet.

“On the Birds of the North of Scotland” (by Mr. T. F. Jamieson). *B.A.R.*, 1859, p. 150 (abstract).

“Birds of the North-West of Aberdeenshire” (H. O. F.). *Sc. N.*, I. pp. 47-8.

“Birds of Aberdeenshire” (J. G.). *Sc. N.*, I., pp. 82, 83.

“Notes on certain Aberdeenshire Birds” (by Mr. Stewart M. Burnett). *Sc. N.*, I., pp. 83-85.

"Birds and Birds' Nests in Aberdeenshire" (T. E.). *Z.* VIII., pp. 2642-48.

"Rare Birds in Fyvie" (G. S., Fyvie). *Sc. N.*, I., p. 266.

"Rare Birds at Aberdeen" (G. S.). *Sc. N.*, I., p. 226.

"Rare Birds occurring in Aberdeenshire" (J. L.). *N.*, II., p. 238, and III., p. 219.

"Occurrence of Rare Landbirds in Aberdeenshire" (J. T.). *N.*, II., p. 139.

"Occurrence and Capture of a few *Raræ Aves* and *Pisces* at Fraserburgh, Aberdeenshire" (T. E.). *N.*, IV., pp. 225-227.

"Osprey and Golden Eagle in Aberdeenshire" (W. C. A.). *Z.*, 2d S., I., p. 497.

"Goshawk and other Rare Birds in Aberdeenshire" (G. S.). *Sc. N.*, III., p. 265.

"Honey Buzzard (*Pernis apivora*)"—(shot at Raeden)—(J. L.). *N.*, III., p. 155.

"Honey Buzzard in Aberdeenshire" (W. C. A.). *Z.*, 2d S., p. 554.

"Snowy Owl (*Surnia nyctea*)"—(two shot at the Buck of the Cabrach, and one seen near Aberdeen, by Mr. A. Mitchell)—(J. L.). *N.*, III., p. 157.

"Occurrence of the American Greater Shrike (*Lanius borealis*) near Aberdeen" (J. S.). *Z.*, VII., p. 2495.

"Great Ash-coloured Shrike in Aberdeenshire" (T. E.). *Z.*, XVIII., p. 6807.

"Occurrence of Pied Flycatcher (*Muscicapa luctuosa*) in Aberdeenshire" (J. S.). *Z.*, VIII., 2651.

"*Bombycilla garrula* in Aberdeenshire" (at Kinmundy) (by Mr. W. Ferguson). *N.*, I., p. 94.

"The Bohemian Waxwing in Aberdeenshire" (J. G.). *Sc. N.* I., p. 154.

"Rare Birds (*Picus Pipra*, and *Bombycilla garrula*) in Aberdeenshire" (G. S.) *Sc. N.*, I., p. 154.

"On the Occurrence of the White-throated Sparrow (*Zonotrichia albicollis*) in Aberdeenshire" (W. C. A.). *Z.* 2nd series, pp. 1547-9.

"Bearded Tit and Hawfinch in Aberdeenshire" (T. E.). *Z.*, 3rd series, p. 255.

"The Hawfinch (*Coccothraustes vulgaris*)" (Two shot near Banchory) (J. L.). *N.* III., p. 157.

"Occurrence of the Bee-eater (*Merops Apiaster*) in Aberdeenshire" (by Mr. T. Ferguson.) *N.* II., p. 204.

"Turtledove in Aberdeenshire" (G. S.). *Sc. N.* III., p. 112.

"Red-legged Partridge in Aberdeenshire" (W. C. A.). *Z.* 2nd series, p. 635.

"Occurrence of Little Bustard (*Otis Tetrax*) in Aberdeenshire" (G. S.) *Sc. N.* II., p. 204.

"Heronry at Edinglassie, Strathdon" (J. L.) *N.* III., p. 137.

"Occurrence of the Purple Heron (*Ardea purpurea*) in Aberdeenshire" (J. S.) *Z.* VII., p. 2497.

"Purple Heron shot near Aberdeen" (H. O. F.) *Sc. N.* II., p. 10.

"Common Bittern in Aberdeenshire" (W. C. A.) *Z.* 2nd series, p. 1134.

"Occurrence of the White Stork (*Ciconia alba*) in Scotland" (killed on a swampy moor in Lonmay) (J. S.) *Z.* IX., 3035.

"Occurrence of the Esquimaux Curlew (*Numenius borealis*) in Scotland" (on Cairn-mon-earn) (J. L.) *N.* IV., pp. 265-268.

"Wood Sandpiper in Aberdeenshire" (W. C. A.) *Z.* 2nd series, vol. I., p. 525.

"Occurrence of the Red-necked Phalarope (*Phalaropus hyperboreus*) in Aberdeenshire" (T. E.) *N.* IV., p. 3.

"Black Tern in Aberdeenshire" (W. C. A.) *Z.* 2nd series, I., 525.

"Ivory Gulls at Aberdeen" (G. S.) *Sc. N.* III., p. 8.

"Little Gull at Aberdeen" Do. do. p. 64.

REPTILIA AND AMPHIBIA.

List in the Natural History of Deeside and Braemar.

FISHES.

List of Fishes of Deeside in the Natural History of Deeside and Braemar.

"Occurrence of the Alice Shad (*Alosa communis*) on the Aberdeenshire Coast" (T. E.) *Z.* 2nd S. I.,

"The Tunny near Aberdeen" (G. S.) *Sc. N.* III., p. 348.

"*Orthogoriscus truncatus* (error for *Mola*) at Portlethen" (J. T.) *N.* II., p. 280.

"Anglesey Morris (*Leptocephalus Morrisii*) found on the Beach at Aberdeen" (J. L.) *N.* III., p. 158.

"The Greenland Shark (*Seymnus borealis*) in Aberdeen Bay" (J. W. H. T.) *Sc. N.* I., p. 48.

"Occurrence of *Echinorhynchus Spinus* on the Aberdeenshire coast" (J. W. H. T.) *Sc. N.* II., p. 154.

"Description of a Species of Skate new to the British Fauna" (by Rev. J. Fleming, D.D.) *E. N. P. J.* XXXI., pp. 236-8, plates IV-V (vide supra).

MOLLUSCA.

"A History of the Molluscous Animals of Aberdeen, Kincardine, and Banff." 1843.

"List of Land and Fresh Water Mollusca found in Aberdeenshire and Kincardineshire" (J. T.) *Z.* XI., pp. 3878-81.

"On the Mollusca of Aberdeenshire" (by Dr. Dickie, B.A.R., 1859, p. 167.

"On some Fishes, Crustacea, and Mollusca found at Peterhead" (C. W. P.), *B.A.R.* 1852, p. 78 (abstract).

"Reversed variety of *Helix nemoralis* L. var *Hortensis*" (by J. W. H. T.) *Sc. N. I.*, p. 155.

"*Lottia (Tectura) testudinalis* on the coast of Kincardine" (J. W., *N. I.*, p. 236, and J. T., *N. III.*, p. 134).

"*Natica Helicoides* (= *N. Islandica*) at Cove" (J. T.) *N. III.*, 207.

"*Flustra Murrayana*" (found on the beach at Aberdeen by Mr. Clark) (J. T.) *N. III.*, p. 207.

"Catalogue of the Marine Zoophytes of the neighbourhood of Aberdeen" (J. M.) *Ann and Mag. of Nat. Hist.*, IX., pp. 462-69. The Bryozoa are included in the Catalogue among the Zoophytes.

ENTOMOLOGY.

List of Insects in the Natural History of Deeside and Braemar.

"Scottish Galls" (J. W. H. T.) *Sc. N. I.*, pp. 123-5, 156-9, 192-7, 234-5; II., pp. 30-32, 78-80, 126-8, 170-73, 251-4, 301-5; IV., pp. 13-18. 168-70. A number of insects are mentioned as makers of the galls described.

COLEOPTERA.

"The Coleoptera of Scotland," edited by D. Sharp, M.B. *Sc. N. I.*, pp. 202-8, 242-8, 277-80; II., 44-8, 89-96, 138-44, 185-92, 233-40, 285-88, 229-36, 377-84; III., 33-40, 85-88, 133-36, 183-84, 231-32, 277-80, 321-28, 368-76; IV., 35-36, 80-84, 129-32, 176-80.

"Addition of six Species (including two new to science) and two Genera to the British List of Coleoptera," by D. Sharp, M.B., *E.M.M.* VIII., pp. 73-4. (Enumerates a number of species from Braemar.)

"Additions to the Aberdeenshire Fauna," (J. W. H. T.) *Sc. N. II.*, p. 20.

"Occurrence in Aberdeenshire of *Amara Quenseli* Schön, a species new to the British list of Coleoptera," by Mr. R. Hislop, *E.M.M.* VI., p. 212.

"Notes on Coleoptera at Braemar," by Mr. J. C. Champion, *E.M.M.* X., p. 158-9.

"Carabus Nitens at Cove and at Durriss, and *Dytiscus circumflexus* at Upper Banchory" (J. T.). *N. III.*, p. 85.

HYMENOPTERA.

"Scottish Galls." (See Entomology.)

"Occurrence of Galls of *Andricus quadrilineatus* Hart. near Aberdeen" (J. W. H. T.). *E.M.M.*, X., p. 39.

"Occurrence of Galls of *Spathogaster vesicatrix* Schl. at Banchory" (J. W. H. T.). *E.M.M.*, X., p. 85.

"Oak Galls at Ballater in June, including *Andricus Amenti* Gir, new to Britain" (J. W. H. T.). *E.M.M.*, X., p. 85.

"New British Oak Galls" (J. W. H. T.). *Sc. N.* II., p. 128.

"Four Species of *Nematus* new to Britain" (P. C.). *E.M.M.*, X., pp. 211-2. (*N. pallipes* Fall, and *N. mollis* Hart. from Braemar.)

"Descriptions of two Species of Tenthredinidae new to science, from Scotland" (by P. C.). *E.M.M.*, X., pp. 220-22. (*Nematus graminis* from Aberdeen.)

"Tenthredinidae in Braemar" (P. C.). *Sc. Nat.*, IV., pp. 10-11.

"Notes on British Terebrant Hymenoptera" (P. C.). *E.M.M.*, XII., pp. 226-8. *Nematus Zetterstedtii* from Braemar.)

LEPIDOPTERA.

"The Lepidoptera of Scotland" (edited by F. B. W.). *Sc. N.* I., pp. 161-68, 198-202, 238-41, 273-76; II., pp. 34-43, 81-88, 129-36, 177-84, 225-32, 281-84, 321-28, 369-76; III., pp. 29-32, 81-84, 129-32, 180-82, 227-30, 274-76, 319-20, 360-367; IV., 31-36, 120-28, 173-75.

"Capture of Lepidoptera in Scotland" (by Mr. James C. Howden). *Z.*, VII. (1849), pp. 2401-2.

"Notes on the Lepidoptera of Braemar" (J. W. H. T.). *E.M.M.*, VII., pp. 114-5.

(?) Lepidoptera of Braemar (by Dr. B. Jazdowski). *Entomol. Weekly Intelligencer*, II., p. 171.

"Notes on an Entomological Visit to Braemar" (by Mr. W. D. Robinson-Douglas). *E.M.M.*, VIII., pp. 185-7.

"Additions to the Aberdeenshire Fauna" (J. W. H. T.). *Sc. N.*, II., p. 20.

"Capture of Lepidoptera near Aberdeen in 1871" (J. W. H. T.). *E. M. M.*, IX., pp. 42-4.

"On Light as a means of Attraction for Moths" (with list of captures at Old Aberdeen) (J. W. H. T.). *Sc. N.*, I., pp. 212-3.

"Lepidoptera of the Scotch Fir" (mentioning species found in Braemar" (F. B. W.). *Sc. N.*, I., pp. 86-7.

"Vanessa Antiopa in Aberdeenshire" (J. W. H. T. and J. G.). *Sc. N.*, I., 267.

"Choerocampa Celerio, and Sphinx Convolvuli in Aberdeenshire" (H. O. F.). *Sc. N.*, I., p. 146.

"Occurrence of *Sesia Rhilanthiformis* near Aberdeen" (J. W. H. T.). *Sc. N.*, I., p. 87.

"Capture of a *Zygaena* new to the British lists, in Braemar" (F. B. W.). *E. M. M.*, VIII., p. 68.

"The Scottish form of *Zygaena Exulans* Hoch" (F. B. W.). *Sc. N.*, I., pp. 174-5.

"*Trichiura Crataegi* in Braemar" (by Mr. Tait.) *Sc. N.*, II., p. 162.

"Capture of *Xylophasia Zollikoferi* Fr. at Inverury" (F. B. W.). *Sc. N.*, I., p. 267.

"*Pachnobia alpina* in Braemar" (by Mr. J. S. Allin.) *Sc. N.*, II., p. 162, and *E. M. M.*, X., p. 88.

"*Crambus Myellus* at Braemar" (F. B. W.). *E. M. M.*, VIII., p. 70.

"*Crambus Myellus*, and other rare Lepidoptera in Aberdeenshire" (J. W. H. T.). *Sc. N.*, I., pp. 117-8.

"Occurrence of *Zelleria Saxifragæ*, Stt. in Braemar" (F. B. W.). *Sc. N.*, I., p. 176, *E. M. M.*, VIII., p. 271.

DIPTERA.

"A new British Dipteron" (*Laphria flava*, and other *Syrphidae* in Strathdon) by Mr. W. A. Vice. *Sc. N.*, II., p. 120.

"Diptera at Braemar, Aberdeen, and Aberlady, including six Species not hitherto recorded as British" (by Mr. G. H. Vèrall). *Sc. N.*, II., pp. 199-202.

"*Syrphidae* of the Dee District" (by Mr. W. A. Vice). *Sc. N.*, II., p. 203-4.

"Metamorphoses of *Xylophagus cinctus* F. and *X. ater* F" (both from Braemar) (F. B. W.). *E. M. M.*, XIII., pp. 160-62.

"Galls of *Cecidomyia Salicis* Schr. on *Salix purpurea*" (J. W. H. T.). *E. M. M.*, X., p. 39.

For Gall-making Diptera, see "Scottish Galls," under *Entomology*.

NEUROPTERA.

"*Sialis Fuliginosa* in Braemar" (F. B. W.). *E. M. M.*, VIII., p. 85.

"Occurrence of *Megalomus hirtus* near Aberdeen" (by R. McLachlan, F.L.S.). *E. M. M.*, X., p. 90.

HEMIPTERA.

- "Notes on Scottish Hemiptera" (by F. B. W.). *Sc. N.*, I., pp. 223-6, 263-5. (Enumerates several species from Braemar.)
 "Two new British Hemiptera" from Braemar (F. B. W.). *Sc. N.*, II., p. 63.

ARACHNIDA.

- "Captures of Spiders in Scotland during 1872" (J. W. H. T.). *Sc. N.*, II., pp. 23-25.
 "Scottish Spiders" (J. W. H. T.). *Sc. N.*, II., p. 300.

CRUSTACEA.

"The Stalk-eyed Crustacea of the North-East Coast of Scotland (with descriptions of new Genera and Species)" (G. S.). *Sc. N.*, I., pp. 182-90, plates 4 and 5.

"On some Fishes, Crustacea, and Mollusca found at Peterhead" (C. W. P.). *B. A. R.*, 1852, p. 78.

In "Recent British Ostracoda," by G. S. Brady, Esq., in *Trans Linn. Soc.*, XXVI., a number of species are recorded as forwarded from Cruden by Mr. Dawson, and from Macduff and Peterhead by Mr. D. Robertson.

In "Molluscous Animals of the Counties of Aberdeen, Kincardine, and Banff," the Cirrhipedia are included.

ZOOPHYTES.

"Catalogue of the Marine Zoophytes of the neighbourhood of Aberdeen" (J. M.). *Ann. and Mag. of Nat. Hist.*, IX., p. 462-69.

"On Zoophytes found in the vicinity of Peterhead, with a Notice of some new to the British List" (C. W. P.). *B. A. R.*, 1850, p. 126.

"List of Hydroid Zoophytes from the North-East Coast of Scotland" (H. O. F.). *Sc. N.*, I., pp. 190-1.

In Hinck's "History of British Hydroid Zoophytes," several species from Peterhead are mentioned, on the authority of C. W. P.

In Gosse's "British Sea-Anemones," several species are mentioned as occurring at Peterhead, on the authority of Mr. C. W. Peach, and others on the south shore of the Moray Firth, on the authority of the Rev. W. Grigor.

FORAMINIFERA.

A good many species are recorded in Macgillivray's "Molluscous Animals of the Counties of Aberdeen, Kincardine, and Banff".

I have in this short, and necessarily very far from complete sketch, directed your attention only to the published results of Zoological work done in this neighbourhood, for various reasons, among others, because I have had the pleasure of personal acquaintance with but few of those who deserve mention in an account of the bygone Naturalists of Aberdeenshire, and because a knowledge of what they have done is difficult of attainment where not preserved for us by means of published records.

Before leaving this subject, allow me to direct your attention for yet a few moments to what has been done in times past in the neighbouring counties of Banff and Elgin, by zoologists resident in these counties, most of them, I am proud to say, members of this Society.

The neighbourhood of Banff has been rendered classic ground for the naturalist by the exertions of several zoologists, foremost among whom stands Mr. Thomas Edward, a man of whom any country may well be proud, and who needs no eulogy from me. Numerous observations published by him in the *Zoologist* and the *Naturalist*, as well as scattered through such works as Bate and Westwood's *British Sessile-eyed Crustacea*, and Couch's *British Fishes*, bear witness alike to the enthusiasm and to the success with which he has pursued the study of zoology near Banff. In Mr. Smiles' most interesting "Life of a Scottish Naturalist," lists of the Vertebrata, and of the Crustacea of Banffshire collected by Mr. Edward, are given in an appendix, with numerous notes on the habits of the animals mentioned. The following are among the more important of Mr. Edward's papers in Magazines:—

"Notes on the Lepidoptera of Banffshire." *N.*, IV., pp. 127-32.

"The Fishes of Banffshire." *N.*, V., pp. 1-4, 59-62, 127-31; *X.*, pp. 38-39.

"A List of the Rayed Echinodermata of Banffshire". *N.*, IV., pp. 127-32.

"A List of the Zoophytes found on the Coast of Banffshire." *N.*, V., pp. 232-37.

"A List of the Birds of Banffshire, accompanied with Anecdotes." *Z.*, XIV., pp. 5117-22, 5199-202, 5258-68; XVII., 6595-6601, 6631-37, 6665-72; XVIII., 6841-49, 6964-75.

The Rev. W. Grigor, formerly schoolmaster at Macduff, and now minister of Pitsligo, published in the *Naturalist*, under the signature "W," several valuable lists of the animals of the neighbourhood of Macduff and Banff. The more important are—

"Contributions to the Ichthyology of Banffshire." Vol. IV., pp. 230-31; vol. V., pp. 207-10; vol. VI., pp. 229-33.

- "Fish Notes." Vol. VII., pp. 150-2.
 "Notes on Starfishes found in the Moray Firth at Macduff, near Banff." Vol. IV., p. 34, and vol. V., pp. 73-6.
 "Stalk-eyed Crustacea of Banffshire." Vol. V., 172-74.
 "Notes on Crustaceans." Vol. VII., pp. 232-34.
 "A Third Medley." Vol. VI., pp. 174-5.
 "A Fourth Medley." Vol. VI., pp. 194-6.
 "Contributions to an Entomology of Banffshire (Butterflies.)" Vol. VII., pp. 87-89.

The Rev. Mr. Smith, of Monquhitter, and the Rev. G. Harris, of Gamrie, also published various short notes on the Fauna of Banffshire in the earlier volumes of the *Zoologist*, the former treating chiefly of the ornithology, the latter chiefly of the marine fauna.

Turning now to glance at what has been done for the elucidation of the fauna of Elgin or Moray, we find excellent lists by the Rev. Dr. Gordon of Birnie, in which the fauna is systematically enumerated in various classes of the animal kingdom, and those who aided the author in his labours are honourably mentioned. These lists are contained in the *Zoologist*, and are as follows:—

Mammalia. Vol. II., pp. 421-28.

Birds. Vol. II., pp. 502-15, 551.

Reptiles. Vol. II., p. 551.

"A List of Fishes that have been found in the Moray Firth, and in the Fresh Waters of the Province of Moray." Vol. X., pp. 3454-62, 3480-89.

"A List of the Crustaceans of the Moray Firth." Vol. X., pp. 3678-87.

"A List of the Mollusca hitherto found in the Province of Moray, and in the Moray Firth." Vol. XII., pp. 4300-18, 4421-35, 4453-62.

"List of the Echinodermata hitherto met with in the Moray Firth." Vol. XI., 3781-85.

"List of Lepidoptera hitherto found within the Province of Moray." Vol. XIX., pp. 7663-75.

There are, besides, numerous short notes by Dr. Gordon on the fauna of Moray scattered through the pages of the *Zoologist*.

Mr. G. Norman has published "A List of the Noctuidae observed in Morayshire," in the *Entom. Monthly Magazine*, Vol. V., pp. 201-4, in which several butterflies, and Nocturni also, are mentioned. He re-published the list in the *Scottish Naturalist*, Vol. I., pp. 16-18, with corrections and additions, under the title, "A List of the Noctuae occurring in Morayshire".

INTRODUCTORY REMARKS ON THE ENTOMOLOGY OF 'DEE.'

Having already given in detail an account of what has been done up to this date in the way of increasing our knowledge of the Entomology of this part of Scotland, it is not necessary that I should go over the same ground again, or should mention what has been done by each observer in every case; though in the case of rare insects it is desirable to have the name of the captor or possessor, as adding authenticity to the record.

In most orders of insects our knowledge is still very fragmentary, and there is much to be done before anything like a complete list can be attempted. Even among the *Coleoptera* there are many blanks in 'Dee' in the list of Scottish *Coleoptera* by Dr. Sharp that has been appearing for some time in the *Scottish Naturalist*. Among the *Lepidoptera* we may claim to have a fair knowledge of the '*Macros*,' thanks to the labours of not a few workers in this city and neighbourhood, whom I would take this opportunity of thanking for their cordial and welcome aid in enabling me to compile the list of species subjoined. Of the *Tineina*, however, we as yet know very little; while our knowledge of the *Tortriccs* is still very defective. To Dr. Vice we owe it that an accurate and trustworthy list of species of some of the families of *Diptera* is obtainable. Of all the remaining orders of insects our knowledge is still of the most fragmentary kind, as will be seen from the very brief lists that follow. I trust that some of our younger members may be led to study the neglected but most interesting orders of which we know so little. Not a few are deterred by what they regard as the dry and tedious work of determining species. To such I would say that zoological pursuits are forbidding only to those on the threshold, and that they are soon found a most agreeable and pleasant relaxation from other studies, especially when, as ought to be the case, indoor studies and out of door observations of habits, and other points in the life history of the subjects of study, are made to go hand in hand.

In the following lists I have restricted myself to the district between the basin of the North Esk on the South, and the basin of the Spey (including the Deveron) on the North and West.

This tract was first defined as one of the zoological provinces of Scotland in the *Scottish Naturalist* (Vol. I., p. 161), and distinguished by the name of 'Dee,' alike for brevity and to distinguish it from the County of Aberdeen, with which it is not quite equivalent. The coast line runs from Catterline to Cullen. To gain a good knowledge of the distribution of our local fauna, it is expedient to sub-divide this tract, and this seems most naturally effected as follows, into 7 districts, viz:—The valley of the Dee containing 3 districts, the valley of the Don containing 2 districts, and the rest of the tract, *i.e.*, Buchan, containing 2 districts. The valley of the Dee is well bounded in its western two-thirds by ranges of hills, which become lower and less marked as we go eastward, and may be said to end on the South at Catterline, and on the North in the Broadhill. It is most readily made out on any good map by including in it the district through which burns flow that fall into the Dee, or into the sea between these points.

The basin of the Don has a short coast-line, *viz.*, from the Broadhill to the Blackdog rock, but it widens considerably inland; it may be traced out on a map by the streams falling into the Don, or into the sea in its short coast-line.

Buchan is a low, flat country, with very few hills, well cultivated, but with comparatively few trees. It is watered by the Ythan, by the Ugie, and by numerous shorter streams that fall into the sea.

The valley of the Dee, as a whole, contains little absolutely level ground. It may be advantageously sub-divided into a coast district (afterwards referred to as No. 1), a midland district (No. 2), and an alpine district (No. 3). The coast district may be taken as including a strip along the coast about five miles wide; its fauna differs in some respect from that of the more inland regions. The coast of No. 1 is rocky, with one or two large bays, and numerous smaller inlets, precipitous in many places, but frequently with sheltered slopes covered with rank vegetation, *e.g.*, at Muchalls. The rocks are mostly gneiss, with occasional trap dikes in the northern part, conglomerate near and South of Stonehaven. The 2nd district, with Banchory for its centre, extends up to within about two miles of Ballater. It is lowland and sub-alpine in character, and contains some moors of considerable extent, cultivated ground and woods, especially along the banks of the Dee.

The 3rd district is sub-alpine and alpine in character, and no part of it is under 600 feet above the sea-level, while several of the hills exceed 4000 feet in height above the sea-level. It is characterized by very extensive moors, with forests of birch and fir along the slopes of the hills and narrow strips of cul-

tivation in the glens. Here and there also,—*e.g.*, in Glen Callater, on Little Craigandal, on Lochnagar, &c,—occur patches of alpine flora (descended from the flora of Britain during the Glacial Epoch) more or less associated with an alpine fauna.

District No. 4 is a strip along the coast about five miles wide, by six miles from North to South. Along the shore stretch sandhills and links, diversified by small marshes here and there, and producing a rather peculiar fauna. This district is chiefly under cultivation, but has some wood and moorland also. No. 5 includes the rest of the valley of the Don, almost altogether lowland in character. Though pieces of woodland, as well as moors, occur here and there, yet as a whole it is under cultivation. The upper part of the valley, *viz.*, part of Strathdon and Corgarff, is sub-alpine, but information as to the fauna of that part is completely wanting. No. 6 is Buchan, exclusive of a strip, five or six miles wide, along the coast; it is mostly flat and well cultivated. My information as to this district is confined to that obtained from a collection of Lepidoptera made in the Parish of Fyvie (chiefly on the Braes of Gight), by Mr. Sim of Gourdas.

No. 7 is the coast district corresponding to No. 6. As far North as Slains, and again at Crimond, the coast is sandy, as in No. 4; but from Slains to Peterhead, and again on the North Coast, it is rocky. For information about the fauna of this district I am indebted to the Rev. Mr. Yuill, F.C. Minister of Peterhead, in whose possession I saw specimens of the Lepidoptera, enumerated under that province, caught in the vicinity of Peterhead, or at Cruden.

To Mr. Tait I owe most of my information regarding the Lepidoptera of No. 5, the list for which will be seen to be a good deal larger than that of any of the other districts. By far the greater number of the species have been taken by him in the vicinity of Inverurie. From him, also, I have obtained information in regard to the other districts, insomuch that the list of species occurring in 'Dee' has been not a little enlarged by him, more especially among the Tortrices, of which the greater part have been added by him. I have also to thank him for a list from Mr. Carpenter of the species taken by the latter at Echt, while employed in the Observatory there.

Mr. James Garrow also gave me valuable information, and favoured me with a sight of his collection of Lepidoptera, made at Inverurie.

To Messrs. G. Sim, John Rae, and R. Gibb, members of this Society, and to Mr. A. Clark, in Old Aberdeen, I would express my obligations for valuable information, chiefly in regard to

districts 1 and 4, whereby I have been enabled to add some species to our lists.

Mr. Wm. Christie, formerly resident in Aberdeen, gave me information of captures made by himself at Banchory in No. 2, and in No. 1.

The list for No. 3 is made up partly from personal observations, partly from information supplied to me by Dr. Buchanau White and by Mr. Tait, partly from published records.

A list of notes and papers published on the insects of Dee will be found elsewhere. In the following lists I have borrowed in a good many cases from them.

In the case of common species I have thought it useless to give the captor's name; where very rare, I have inserted the captors' names in districts 1, 2, 3, 4, 5, save when taken by myself; from districts 6 and 7, my sole sources of information have been already mentioned. I have excluded from the list all species yet doubtful, or of which authentic specimens were not seen by myself (or among the *Tortices*, by Mr. Tait), though a very few, e.g., *Choerocampa Elpenor*, and *Liparis auriflua*, which have occurred only once in towns, may have been accidentally introduced. In all such cases, the fact of their having occurred but once is noticed.

The lists of other orders of insects appended have been made up from personal observations chiefly, and are offered here simply as a slight contribution to our knowledge. Any assistance will be thankfully received.

LEPIDOPTERA OF DEE.

DIURNI.

PIERIDÆ—

Pieris Brassicae	1 2 3 4 5 6 7	Generally near cultivated land seen at 1800 ft.
„ Rapae	1 2 3 4 5 6 7	„ „ „
„ Napi	1 2 3 4 5 6 7	„ „ „
Anthocaris Cardamines	4 5 6 7	Local, near Fintray, Inverury, Fyvie, New Deer.

VANESSIDÆ—

Argynnis Paphia	1	1 taken at Muchalls (J. Rae).
„ Aglaia	1 2 3 4 5 6 7	On waste ground from coast to 3000 ft.
„ Euphrosyne	2 3 5 6 7	Local, in marshy places, 1600 ft.
„ Selene	2 3 5 6 7	„ „ „ 2000 ft.
Melitæa Artemis	5 7	Local and scarce, Monymusk, Fyvie.
Vanessa Urticæ	1 2 3 4 5 6 7	Abundant, occurs at 3000 ft.
„ Polychloros	5	One taken and another seen at Inverurie (Mr T.)
„ Antiopa	1 3 5	6 seen in 1872, near Aberdeen, at Inverurie and Braemar.
„ Io	1 4 5 7	Single examples taken at various times near Aberdeen, on Brimmond Hill, in Monymusk (M'Gill), and in Fyvie.
„ Atalanta	1 2 3 4 5 6 7	Uncertain, but sometimes common.
„ Cardui	1 2 3 4 5 6 7	„ „ „

SATYRIDÆ—

Erebia Medea (Blandina)	1 3	Common in Braemar, once at Bay of Nigg (J. Rae).
Satyrus Ægeria	1	Two caught at Hazelhead near Aberdeen (Mr. Clark).
„ Semele	1 4	Common along the coast south of Aberdeen, once on Mur- car Links; the form occur- ing here is handsomer than that found in England.
„ Janira	1 2 3 4 5 6 7	Abundant everywhere.
„ var. splendida, B. W	1 5 7	Not rare.
„ Hyperanthus	3 5 6 7	Local, but abundant where it occurs, as at Fyvie, Inve- rurie, Cruden, Morven.
Chortobius Davus	2 3 5 6	On most inland moors up to 2500 ft. Rare at Fyvie.
Laidion		

Chortobius Pamphilus	1 2 3 4 5 6 7	Common everywhere.
LYCÆNIDÆ—		
Thecla Rubi	2 6	Scarce, at Fyvie and near Tarland.
Polyommatus Phlaeas	1 2 3 4 5 6 7	Everywhere.
Lycæna Agestis var Ar-taxerxes	1 2 3 5 6	Abundant along coast from Aberdeen southwards, and in many places in valley of Dee to 2000 ft., at Inverurie, and at Fyvie.
Lycæna Alexis	1 2 3 4 5 6 7	Everywhere.
„ Alsus	1 2 4 5 6 7	Local but common from coast upwards.

NOCTURNI.

SPHINGIDÆ—		
Smerinthus ocellatus . . . . .	. . . . . 6	Once taken at Fyvie.
„ populi	1 2 3 4 5 6 7	Common from coast to 1100 ft. (Castleton).
Acherontia Atropos	1 2 4 5 6 7	Scarce, but occurs every year here and there.
Sphinx Convolvuli	1 2 4 5 6 7	Uncertain, hardly rare in some years.
Deilephila Galii	1 4	Once at Summerhill, and once in the Manse garden, Old Aberdeen (Dr. Smith).
Chærocampa celerio . . . . .	. . . . . 6 7	Fyvie, once; in townhall of Peterhead, once (Rev. Mr. Yuill).
„ Elpenor	1	Reared from larva found in a garden in Crown Street, Aberdeen (Dr. B. Jazdowski).
„ Porcellus	1 4 5	Scarce, along the coast, and at Inverurie.
Macroglossa stellatarum	1 4 5 6 7	Scarce, but widely distributed.
„ Bombylifomis	2 4 5	Scarce, Old Aberdeen Links, Scotston Moor, Inverurie, Monymusk.

SESIIDÆ—

Sesia muscæformis (philanthiformis) . . . . .	. . . . . 1	Along the coast south of Aberdeen, the larvae may be found in rhizomes of <i>Armeria maritima</i> , this insect is not known to occur elsewhere on the east coast of Britain.
Sesia culiciformis 3	Among birches near Castleton (Dr. White).

ZEUZERIDÆ—

Cossus ligniperda 6	Fyvie, scarce.
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HEPIALIDÆ—

Hepialus Hectus	2 4 5 6 7	Local but abundant where it occurs.
„ sylvinus	1 2 6	Muchalls, Banchory, Fyvie.

<i>Hepialus vellea</i>	. . . 1 2 3 4 5 6 7	Common up to 1200 ft. from sea level.
var. <i>carnus</i>	. . . 1 4 5	Not common.
,, <i>humuli</i>	. . . 1 2 3 4 5 6 7	Common up to 1200 feet from sea level.
ZYGÆNIDÆ—		
<i>Zygaena exulans</i>	. . . 3	Abundant in one or two localities, 2400-2700 ft. above the sea level in Braemar.
,, <i>trifolii</i>	. . . . 1	One taken between Muchalls and Stonehaven (J. Rae).
,, <i>flipendulæ</i>	. . . 1 5	Coast south of Aberdeen, Ardoch, Lochshangie, moss in Kemnay (Mr. Burnett and Mr. Tait), local, but abundant where it occurs.
LITHOSIDÆ—		
<i>Lithosia lurideola</i> (comp-lanula)	. . . . . 1	Along coast occasionally, at Cove, Muchalls, and Thorny-hive.
<i>Lithosia rubricollis</i>	. . . 6	Once taken at Fyvie.
CHELONIDÆ—		
<i>Euthemonia Russula</i>	. . . 2 5	Scarce, Banchory, Park, Inverurie, Monymusk.
<i>Chelonia Plantaginis</i>	. . 1 2 3 4 5 6 7	Common on Moors from coast to 2000 ft.
var. <i>hospita</i>	. . . 2 3	At Aboyne, and in Braemar.
,, <i>caja</i>	. . . 1 2 3 4 5 6 7	Common everywhere.
<i>Arctia fuliginosa</i>	. . . 1 2 3 4 5 6 7	Common (as larva in autumn, pupa in spring) up to 2000 ft.
,, <i>mendica</i>	. . . . 1	2 caught near Cove 8/6/73 (G. Sim).
,, <i>menthastri</i>	. . . 1 2 3 4 5 6 7	Abundant.
LIPARIDÆ—		
<i>Liparis auriflua</i>	. . . . 1	1 taken in Hanover Street, Aberdeen (J. Rae).
,, <i>salicis</i>	. . . . 5 7 1	1 taken in garden at Peterhead (Rev. J. Yuill), and once in garden at Broomend, Inverurie (Mr. Tait).
<i>Orgyia fascelina</i>	. . . 1 2 3 5 6	On moors from coast to Braemar, but rather scarce.
,, <i>antiqua</i>	. . . . 1 2 3 4 5 6 7	Abundant in many places.
<i>Demas coryli</i>	. . . . 2 5 6 7	Scarce and local, Echt, Fyvie, Inverurie, Peterhead.
BOMBYCIDÆ—		
<i>Trichiura Crataegi</i>	. . . 3	Some larvæ found on Morroine Hill, at 2600 ft., by Mr. J. Garrow, reared by Mr. Tait, passed a winter in pupa state.
<i>Poecilocampa Populi</i>	. . . 5 6	Scarce, Inverurie, Fyvie.
<i>Bombyx Rubi</i>	. . . . 1 2 3 4 5 6 7	Everywhere, the larvæ are common on waste ground in autumn.

Bombyx Quercus (callunæ)	1 2 3 4 5 5 7	Common on all moors.
Odonestis potatoria	4	One taken on Murcar Links many years ago (Mr. Clark).
Endromis versicolora	2 (3)	Once near Tarland (Mr. Sim) (near Balmoral).
Saturnia carpini	1 2 3 4 5 6 7	Common on moors.

GEOMETRÆ.

ENNOMIDÆ—

Epione apiciaria	5 6	Scarce, Monymusk, Fyvie.
Rumia crataegata	1 2 3 4 5 6 7	Common in many places.
Metrocampa Margaritata	1 2 3 5 6	" "
Ellopiia fasciaria	1 2 3 5 6 7	Not common, "Hazelhead" woods Echt, Braemar, &c.
Selenia illunaria	2 5 6	Local, but not rare.
„ lunaria	5 6	Local.
Odontopera bidentata	1 2 4 5 6 7	Not uncommon in many places.
Crocallis elinguaris	1 2 3 4 5 6 7	Common in many places, yet rather local.
[Himera pennaria	4	Old Aberdeen (Mr. Clark).]

AMPHYDASIDÆ—

Phigalia pilosaria	5 6	Scarce.
Amphydasis betularia	2 4 5 6	Near Aberdeen (Mr. Clark), not uncommon in some localities.

BOARMIDÆ—

Hemerophila abruptaria	1	Once near Stonehaven.
Cleora lichenaria	5	Once at Monymusk (Mr. Tait).
Boarmia repandata	1 2 3 5 6	Common.
Gnophos obscurata	1	Muchalls, common.
Dasydia obfuscata	1 2 3 4 6 7	On moors in Braemar not uncommon, elsewhere singly down to the coast line, <i>e. g.</i> , at Muchalls.
Psodos trepidaria	3	Common on hills in Braemar above 2500 ft.

GEOMETRIDÆ—

Geometra papilionaria	2 3 6	Near Banchory, Glen Muick, Fyvie, scarce.
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EPHYRIDÆ—

Ephyra punctaria	2 6	Rare.
„ pendularia	3 5 6	Not uncommon but very local.

ACIDALIDÆ—

Acidalia bisetata	7	Peterhead (Rev. J. Yuill).
„ incanaria	1	Near Stonehaven (Mr. Tait).
„ remutata	7	Peterhead (Rev. J. Yuill).
„ fumata	3	Abundant in Braemar.
„ aversata	1 2 3 4 5 6 7	Abundant beside water in lower districts.
var. remutata	7	Very scarce, Peterhead (Rev. J. Yuill).

CABERIDÆ—

Cabera pusaria	1 2 3 4 5 6 7	Abundant everywhere.
„ exanthemaria	3 5 6 7	Local but common in Glen-gairn and elsewhere.

MACARIDÆ—

<i>Macaria liturata</i> . . .	1 2	5 6	Not rare in firwoods.
<i>Halia Wavaria</i> . . .	1 2 3 4 5 6 7		Common in gardens in the lower districts.

FIDONIDÆ—

<i>Scodiona Belgiaria</i> . . .		5 7	Rare, Inverurie (Mr. J. Garrow), Peterhead (Mr. Yuill).
<i>Fidonia carbonaria</i> . . .	3		5 taken on Morroine Hill (Dr. White).
„ <i>atomaria</i> . . .	1 2 3 4 5 6 7		On all moors from the coast inwards.
„ <i>pinaria</i> . . .	1 2 3 4 5 6 7		In firwoods everywhere.
„ <i>pinetaria</i> . . .	3		Common on moor near Castleton.

ZERENIDÆ—

<i>Abraxas grossulariata</i> . . .	1	4 5	Abundant in gardens around Aberdeen and Old Aberdeen and at Oldmeldrum
<i>Lomaspilis marginata</i> . . .	1		Rather common beside the Cowie near Stonehaven.

HYBERNIDÆ—

<i>Hybernia aurantiaria</i> . . .	2	5 6	Scarce, Echt, Inverurie, Fyvie.
„ <i>progemmaria</i> . . .		5 6	„ „ „
„ <i>defoliaria</i> . . .		5	Very rare.

LARENTIDÆ—

<i>Cheimatobia brumata</i> . . .	1 2 3 4 5 6 7		Everywhere only too abundant.
<i>Oporabia dilutata</i> . . .	1 2	4 5 6	Common.
„ <i>filigrammaria</i> . . .	2 3	5	Rare, Echt, and Braemar (Dr. White), Inverurie (Mr. Tait).
<i>Larentia didymata</i> . . .	1 2 3 4 5 6 7		Swarms everwhere.
„ <i>multistrigaria</i> . . .	1 2 3 4 5 6 7		Abundant and general.
„ <i>caesiata</i> . . .	2 3	5 6	Rare in the lower districts, swarms on the higher moors.
„ <i>salicata</i> . . .	3		Common in Braemar.
„ <i>olivata</i> . . .	1 2 3 4 5		Local, Muchalls, Echt, Braemar, Kinellar, Inverurie.
„ <i>pectinitaria</i> . . .	1 2 3 4 5 6 7		Common everywhere.
<i>Emmelesia affinitata</i> . . .		5 7	Rare.
„ <i>alchemillata</i> . . .	1	4 5 6 7	Nowhere common.
„ <i>albulata</i> . . .	1	4 5 6 7	Local, but swarms in some places, e.g., Muchalls, Links, &c.
„ <i>ericetata</i> . . .	3 4 5		„ Common in Braemar, on Scotston moor and at Inverurie.
<i>Eupithecia pulchellata</i> . . .	1 2	4 5	Local, common at Muchalls, and at Dyce, at Banchory, and at Inverurie.
„ <i>linariata</i> . . .		5	Inverurie (Mr. Tait).
„ <i>subfulvata</i> . . .		4 5	Denmore, Inverurie (Mr. Tait) scarce.
„ <i>plumbeolata</i> . . .		4 6	Old Aberdeen, Fyvie, scarce.
„ <i>Helveticata</i> . . .	3		Braemar.
„ <i>satyrata</i> . . .		4 5 6	Local but not scarce.
„ var. <i>callunaria</i> . . .		5	Inverurie, scarce.

<i>Eupithecia castigata</i> . . .	1	5	Rare, near Aberdeen, Inverurie (Mr. Tait).
„ <i>lariciata</i> . . .		5	Rare.
„ <i>indigata</i> . . .	3	5	Local, Braemar (Dr. White), Inverurie (Mr. Tait).
„ <i>nanata</i> . . .	1 2 3 4 5 6 7		On all moors.
„ <i>vulgata</i> . . .		4 5 7	Local, but common at Old Aberdeen &c.
„ <i>absynthiata</i> . . .		4 5	Rare, Old Aberdeen, Inverurie (Mr. Tait).
„ <i>minutata</i> . . .		5	Scarce.
„ <i>tenuiata</i> . . .		4	„ Old Aberdeen.
„ <i>sobrinata</i> . . .	3	5	Abundant at Braemar, also at Inverurie.
„ <i>pumilata</i> . . .		5 7	Not rare, but local.
„ <i>rectangulata</i> . . .		5	Once at Inverurie (Mr. Tait).
<i>Lobophora hexapterata</i> . . .		6	Once at Fyvie.
„ <i>lobulata</i> . . .	3	5	Scarce and local, Braemar (Dr. White), Inverurie (Mr. Tait).
<i>Thera juniperata</i> . . .	3	5	Local, but common.
„ <i>simulata</i> . . .	3	5	At Braemar, and once at Inverurie (Mr. Tait).
„ <i>variata</i> . . .	1 2 3 4 5 6 7		In every firwood from coast to Braemar.
„ <i>firmata</i> . . .	1	5 7	Local and scarce.
<i>Ypsipetes impluviata</i> . . .	1 2 3	5 6	Local, but sometimes common near rivers.
„ <i>elutata</i> . . .	1 2 3 4 5 6 7		Common on moors, specimens from this district, have the ground colour some shade of green. Mr. Tait has specimens from Inverurie almost black.
<i>Melanthia rubiginata</i> . . .	2 3	5 6 7	Rather local, but common beside streams.
„ <i>ocellata</i> . . .	1 2 3 4 5 6 7		Abundant everywhere.
<i>Melanippe tristata</i> . . .		3	Local, Braemar (Dr. White).
„ <i>sociata</i> (subtristata) . . .	1 2 3 4 5 6 7		Common in every wood and moor.
„ <i>montanata</i> . . .	1 2 3 4 5 6 7		Abundant everywhere.
„ <i>fluctuata</i> . . .	1 2 3 4 5 6 7		„ „
<i>Anticlea badiata</i> . . .		5	Rare, Inverurie (Mr. J. Garrow).
„ <i>derivata</i> . . .		5 6	„ „ (Mr. Tait), and Fyvie once.
<i>Coremia munitata</i> . . .	2 3 4 5 6 7		Local, sometimes common, occurs up to 2500 ft.
„ <i>propugnata</i> . . .		4 5	Scarce, Old Aberdeen, &c.
„ <i>ferrugata</i> . . .		4 5	Local, but not uncommon, Old Aberdeen, &c.
<i>Camptogramma bilineata</i> . . .	1 2 3 4 5 6 7		Swarms in the lower districts, but has not been seen more than a mile or two above Ballater.
<i>Phibalapteryx lignata</i> . . .	(4)	5 6	Rare, (Links at Aberdeen, Z. 2401).
<i>Cidaria psittacata</i> . . .	2	5 6	Local, and scarce usually.

<i>Cidaria miata</i>	2 3 4 5 6	Local, but common.
„ <i>corylata</i>	5 6	„ rather scarce.
„ <i>russata</i>	1 2 3 4 5 6 7	Abundant from coast to Braemar up to 1300 ft. and very variable.
„ <i>immanata</i>	1 2 3 4 5 6 7	Common „ „ 1500 ft.
„ <i>suffumata</i>	2 5 6	Local, rather scarce usually.
„ var. <i>piceata</i>	5	Inverurie, scarce.
„ <i>prunata</i>	1 2 3 4 5 6 7	Common in gardens up to 1300 ft.
„ <i>testata</i>	1 2 3 4 5 6 7	Abundant on all moors.
„ <i>populata</i>	1 3 3 4 5 6 7	„ „ „
„ <i>fulvata</i>	1 2 3 4 5 6 7	Common in „ gardens „ up to Braemar.
„ <i>pyraliata</i>	1 3 4	Rather common at Muchalls, rare elsewhere.

EUBOLIDÆ—

<i>Eubolia mensuraria</i>	1 2 3 4 5 6 7	Common in the low districts, rarer above Balmoral.
„ <i>palumbaria</i>	2 3 5 6(7)	Abundant on the Highland moors.
<i>Carsia imbutata</i>	3	Rather common in Braemar, but local.
<i>Anaitis plagiata</i>	1 2 5 6 7	Local, but not scarce on uncultivated ground.
<i>Chesias spartiata</i>	1 2 4 5 6	Common among broom, though local.
„ <i>obliquaria</i>	2 4 5 6	Local, but common on O. A. Links.

SIONIDÆ—

<i>Tanagra choerophyllata</i>	1 3 5 7	Local, but often abundant, Muchalls, Braemar, Inverurie, Peterhead.
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DREPANULÆ.

<i>Platypteryx lacertula</i>	2 3 5 6	Local and rather rare.
„ <i>falcula</i>	5 6	„ „

PSEUDO-BOMBYCES.

DICRANURIDÆ—

<i>Cerura furcula</i>	2 5 6 7	Scarce.
„ <i>vinula</i>	1 2 3 4 4 6 7	Not uncommon.

PYGÆRIDÆ—

<i>Pygæra bucephala</i>	1 2 4 5 6 7	Very common in some places as larvæ.
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NOTODONTIDÆ—

<i>Notodonta camelina</i>	1 2 3 4 5 6 7	Common.
„ <i>Dictæa</i>	1 2 3 5 6 7	Rather common.
„ <i>Dictæoides</i>	2 3 5	Rare.
„ <i>Dromedarius</i>	2 3 5	„
„ <i>ziczac</i>	1 2 3 5 6	Not uncommon, especially as larvæ.

NOCTUÆ.

NOCTUO-BOMBYCIDÆ—

<i>Thyatira Batis</i>	2	5 6	Local, but not rare.
<i>Cymatophora duplaris</i>	2 3	5 6 7	Not rare.
" or.	3	5 6	Rare.

BRYOPHILIDÆ—

<i>Bryophila perla</i>	1	4	In Stonehaven, Aberdeen, and Old Aberdeen, at light.
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BOMBYCOIDÆ—

<i>Acronycta psi</i>	1 2	4 5 6 7	Abundant everywhere in the lowlands.
" <i>leporina</i>		5	Larvæ found (and one reared) by Mr. Tait at Inverurie.
" <i>ligustri</i>		6	Rare.
" <i>rumicis</i>	1 2	4	Larvæ not uncommon.
" <i>menyanthidis</i>		4 5 6 7	" common on Scotston moor, Inverurie.
" <i>myricæ</i>	1 2 3	4 5 6 7	Local, but common at rest on stones. Occurs at 1300 ft.

LEUCANIDÆ—

<i>Leucania conigera</i>	2	4 5 6 7	Common.
" <i>lithargyria</i>	1 2	4 5 6 7	Abundant in all the districts but Braemar.
" <i>impura</i>	1 2	4 5 6 7	" " "
" <i>pallens</i>	1 2	4 5 6 7	" " "
<i>Nonagria fulva</i>	2	4 5 6	Local, but common in several places.
" <i>lutosa</i>		6	Once at Fyvie.

APAMIDÆ—

<i>Gortyna flavago</i>	2	4	1 at Banchory (Mr W. Christie), and 1 at Old Aberdeen.
<i>Hydræcia nictitans</i>	2	4 5 7	Abundant on ragwort on the sandhills on the coast, also at Inverurie and at Echt.
" <i>micacea</i>	2	4 5 6 7	Abundant in various localities.
<i>Axylia putris</i>		7	Rare, Peterhead (Rev. J. Yuill).
<i>Xylophasia rurea</i>	1 2 3	4 5 6 7	Abundant, all the varieties occur in this district.
" <i>Zellikoferi</i>		5	Once at Inverurie (Mr. Tait).
" <i>lithoxylea</i>		6 7	Local and scarce.
" <i>polyodon</i>	1 2 3 4	5 6 7	Abundant everywhere; dark varieties are common.
<i>Dipterygia pinastri</i>		7	Very rare, Peterhead (Rev. J. Yuill).
<i>Chareas graminis</i>	1 2 3 4	5 6 7	Very common on ragwort flowers.
<i>Luperina testacea</i>	2	4 5 6	Abundant.
<i>Mamestra furva</i>		3 5	Rare and local.
" <i>brassicæ</i>	1 2	4 5 6 7	Abundant.
<i>Apamea basilinea</i>	1 2 3 4	5 6 7	"
" <i>gemina</i>	1 2 3 4	5 6 7	"
var. <i>remissa</i>		5	Inverurie, very rare.
" <i>unanimis</i>		5	Rare and local.
" <i>fibrosa</i>		6	Fyvie (Mr Tait), rare.
" <i>oculea</i>	1 2 3 4	5 6 7	Abundant.

<i>Miana strigilis</i>	2	4					Once on Scotston Moor, and once at Echt.	
„ <i>fasciuncula</i>	1	2	3	4	5	6	7	Abundant everywhere.
„ <i>literosa</i>		2		4	5			Local, and not very common.
„ <i>arcuosa</i>	1	2		4	5			Not common, Nigg, Loch of Park, Old Aberdeen, &c.
<i>Celæna Haworthii</i>				5	6	7		Local, Stocket Moor, &c.
CARADRINIDÆ—								
<i>Caradrina Morpheus</i>				4				Once at Old Aberdeen.
„ <i>blanda</i>				4	5			Rare, Old Abdn. and Inverurie.
„ <i>cubicularis</i>	1	2	3	4	5	6	7	Common in houses, as far as Braemar.
NOCTUIDÆ—								
<i>Rusina tenebrosa</i>		2		5	6			Local, but abundant.
<i>Agrotis valligera</i>				4			7	Abundant on ragwort flowers on the sandhills.
„ <i>suffusa</i>		2		4	5	6		Local, but common.
„ <i>saucia</i>					5			Local and rare.
„ <i>segetum</i>	1	2		4	5	6		Common.
„ <i>exclamationis</i>	1	2	3	4	5	6	7	Abundant.
„ <i>cursoria</i>				4				Old Aberdeen, at light, rare.
„ <i>nigricans</i>		2		4	5			Local, but common.
„ <i>tritici</i>	1	2	3	4	5	6	7	Abundant.
„ <i>obelisca</i>				4				Once at Old Aberdeen.
„ <i>agathina</i>	1	2			5			Scarce. Not uncommon at Inverurie.
„ <i>porphyrea</i>	1	2	3	4	5	6	7	Abundant on all moors up to 2500 ft.
„ <i>præcox</i>				4	5			Occasionally at Old Aberdeen, and at Inverurie.
„ <i>pyrophila</i>		2		4	6	7		Scarce.
„ <i>lucernea</i>	1							Not uncommon at Muchalls.
<i>Triphaena Ianthina</i>	1	2		4	5			Local and scarce.
„ <i>Fimbria</i>				5	6			„ „
„ <i>subsequa</i>		2		5	6			„ „
„ <i>orbona</i>	1	2		4	5	6	7	Abundant.
„ var. <i>Curtisii</i>				5	6	7		Scarce.
„ <i>Pronuba</i>	1	2	3	4	5	6	7	Abundant everywhere, and very variable.
<i>Noctua glareosa</i>		2		4	5	6	7	Local, but common.
„ <i>augur</i>	1	2	3	4	5	6	7	Common everywhere up to 1200 ft.
„ <i>plecta</i>	1	2		4	5	6	7	Common.
„ <i>C-nigrum</i>	1	2	3	4	5	6	7	Abundant.
„ <i>brunnea</i>	1	2		4	5	6	7	„
„ <i>festiva</i>		2	3	5	6	7		„ rather local.
„ <i>conflua</i>		2	3	5	6	7		„
„ <i>Dahlii</i>		2		5	6			Rather common, though local.
„ <i>Rubi</i>		2	3	5	6			„ „
„ <i>umbrosa</i>		2		4	5	6		„ „
„ <i>Baja</i>	1	2	3	4	5	6	7	Abundant.
„ <i>neglecta</i>		2		5	6			Scarce and local.
„ <i>xanthographa</i>		2	3	4	5	6	7	Common.
ORTHOSEIDÆ—								
<i>Trachea piniperda</i>		2		5	6			Scarce and local.

<i>Pachnobia alpina</i>	3						Once in Braemar (Allin).	
<i>Taeniocampa Gothica</i>	1	2	3	4	5	6	7	Abundant.
" <i>rubricosa</i>	2		4	5				Local, but common.
" <i>instabilis</i>	2	3	4	5	6	7		Abundant.
" <i>stabilis</i>	2		5	7				Local, but common.
<i>Orthosia suspecta</i>			3	5				Rare, Braemar (Dr. White), Inverurie (Mr. Tait), Strath- don.
" <i>upsilon</i>				5				Twice at Inverurie (Mr. Tait).
" <i>lota</i>	2			5				Not uncommon at Inverurie (Mr. Tait).
" <i>macilentata</i>	2		5	6				" " "
<i>Anchocelis rufina</i>	2		5					Rare.
" <i>litura</i>	2	4	5	6				Common.
<i>Cerastis Vaccinii</i>	2		5					Local, but common.
<i>Scopelosoma satellitia</i>	2		5					" "
<i>Xanthia cerago</i>	1	2	4	5	6	7		Common: the var. <i>flavescens</i> sometimes occurs.
" <i>silago</i>	2		5	7				Scarce and local.
" <i>ferruginea</i>	1	2	3	4	5	6	7	Abundant.

COSMIDÆ—

<i>Cosmia trapezina</i>			5					Rare.
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HADENIDÆ—

<i>Dianthoecia capsincola</i>	1		5	6	7			Common in many places.
" <i>cucubali</i>			4	5				Scotston, Inverurie (Mr Tait).
" <i>conspersa</i>	1							On coast at Nigg.
<i>Polia Chi</i>	1	2	4	5	6	7		Common at rest on stones and trees.
<i>Dasypolia Templi</i>	1		4	5	7			Widespread, but nowhere com- mon.
<i>Epunda lutulenta</i>	2		5	6				Scarce and local.
" <i>nigra</i>	2	3	4	5	6			Common.
<i>Miselia Oxyacanthæ</i>	1	2	4	5	6			Rather scarce.
<i>Agriopis Aprilina</i>	1	2	5					" "
<i>Phlogophora meticulosa</i>	1	2	4	5	6	7		Common.
<i>Euplexia lucipara</i>	2		4	5	6			Not scarce.
<i>Aplecta herbida</i>				6				Once at Fyvie.
" <i>occulta</i>	2		5	6				Local and scarce.
" <i>tincta</i>			3					Abundant at Castleton.
<i>Hadena adusta</i>	1	2	3	4	5	6	7	" everywhere.
" <i>protea</i>			5					Once at Inverurie.
" <i>glauca</i>			3	5	6			Local, and rather scarce.
" <i>dentina</i>	1	2	3	4	5	6	7	Abundant everywhere.
" <i>chenopodii</i>	1		5					Local and rare.
" <i>oleracea</i>	1	2	4	5	6	7		Abundant everywhere.
" <i>pisi</i>	1	2	3	4	5	6	7	" "
" <i>thalassina</i>	2		4	5	6			Local, but not rare.
" <i>rectilinea</i>	2	3	5	6				" "

XYLINIDÆ—

<i>Cloantha Solidaginis</i>	2	3						Rare, Braemar (Hutchinson) Echt (Mr. Tait).
<i>Calocampa vetusta</i>	1	2	5	6				Local, but common.
" <i>exoleta</i>	1	2	4	5	6	7		Common.
<i>Cucullia umbratica</i>	2	4	5	6	7			Local, common in some places.

HELIOTHIDÆ—

Anarta Melanopa	3	Braemar, rare (Dr White).
„ cordigera	3	„ „ on Morroine Hill (Dr White).
„ myrtilli	1 2 3 5 6 6 7	On all moors.

PHALÆNOIDÆ—

Brephos Parthenias	1 3	Rare and local, Hazelhead near Aberdeen, & Braemar.
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PLUSIDÆ—

Abrostola Urticæ	4 5 6 7	Common.
Plusia chrysitis	1 2 5 6 7	Local, but not rare—Nigg, Muchalls, &c.
„ bractea	1 2 7	Scarce and local—Muchalls, Echt, Peterhead.
„ Festucæ	1 5 6 7	Scarce.
„ V-aureum	1 2 4 5 6 7	Not rare.
„ gamma	1 2 3 4 5 6 7	Abundant.
„ interrogationis	3 5 6 7	„ in Braemar, rare elsewhere.

GONOPTERIDÆ—

Gonoptera libatrix	1 2 5 7	Not rare.
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AMPHIPYRIDÆ—

Amphipyra tragopogonis	2 4 5	Local, but not rare.
Mania typica	2 4 5 6 7	Common.

STILBIDÆ—

Stilbia anomala	2 3 5	Scarce.
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EUCLIDIDÆ—

(Euclidia mi)	(1)	Near Aberdeen, Z. 2401.
„ glyphica		Rare, two specimens from somewhere near Aberdeen.

POAPHILIDÆ—

Phytometra ænea	2 3 5 6	Not uncommon.
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DELTOIDES.

HYPÆNIDÆ—

Hypæna proboscidalis	1 4 5 7	Common in many places.
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PYRALIDES.

PYRALIDÆ—

Pyralis farinalis	1	Once in Aberdeen (Mr. Tait).
Aglossa pinguinalis	5	„ at Daviot (Mr. Tait).

ENNYCHIDÆ—

Pyrausta purpuralis	3	7 Local but common.
Herbula cespitalis	1 3 4	„ „ not rare on the coast and in Braemar.
Ennychia cingulalis	3	Linn of Quoich, Braemar, common.

HYDROCAMPIDÆ—

Hydrocampa nymphaelis	4 6 7	Local but common, Scotston Moor.
„ stagnalis	4 6 7	„ „ Scotston Moor, River Don, near Old Aberdeen.

BOTYDÆ—

Botys verticalis	1 4	Local, but not uncommon, Shetlocksley (Mr. J. Rae).
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<i>Botys fuscalis</i>	1 2 3 4 5 6 7	Common everywhere.
<i>Pionea forficalis</i>	1 2 3 4 5 6 7	„ „ in gardens.
<i>Spilodes sticticalis</i>	4	Rare, once at Old Aberdeen.
<i>Scopula alpinalis</i>	3	Common in Braemar.
„ <i>lutealis</i>	1 2 3 4 5 6 7	Abundant in Lowlands.
„ <i>prunalis</i>	5	At Inverurie.
„ <i>ferrugalis</i>	4	Once on Scotston Moor.

SCOPARIDÆ—

<i>Stenopteryx hybridalis</i>	6	Rare.
<i>Scoparia ambigualis</i>	5	Not uncommon at Inverurie.
„ <i>pyralalis</i>	1 5	Common at Muchalls, scarce at Inverurie.
„ <i>muralis</i>	3 4 5	Local but common.
(„ <i>lineolalis</i>	(4)	Banks of the Don near its mouth, Z. 2402.)
„ <i>Crataegalis</i>	3 5	Braemar, Inverurie.
„ <i>atomalis</i>	1 2 3 4 6 7	Common everywhere
„ <i>alpina</i>	3	Glen Callater in Braemar.
„ <i>Scotica</i>	4	Once near Old Aberdeen.

CRAMBITES.

CRAMBIDÆ—

<i>Crambus pratellus</i>	1 2 3 4 5 6 7	Abundant.
„ <i>dumetellus</i>	3	Rare, Braemar (Dr. White).
„ <i>pascuellus</i>	1 4 7	Rather rare, near Aberdeen, Peterhead (Rev. J. Yuill).
„ <i>furcatellus</i>	3	Little Craigendall, Braemar, rather common at 2500 ft.
„ <i>margaritellus</i>	3 5 7	Local but common.
„ <i>pinetellus</i>	6	Scarce.
„ <i>myellus</i>	2 3 6	Rare, occurred singly.
„ <i>tristellus</i>	1 2 3 4 5 6 7	Abundant.
„ <i>culmellus</i>	1 2 3 4 5 6 7	„
„ <i>hortuellus</i>	1 5 6	Local and rare.

PHYCIDÆ—

<i>Phycis carbonariella</i>	3 5	Common on the hills.
(= <i>Pempelia fusca</i>)		
<i>Phycis abietella</i>	3 5	Rare.
(= <i>Nephopteryx abietella</i>)		
<i>Aphomia sociella</i>	2 4 5	Local but common.

TORTRICES.

CYMBIDÆ—

<i>Halias prasinana</i>	5 6	Not common.
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TORTRICIDÆ—

<i>Tortrix rosana</i>	6	
„ <i>ribeana</i>	5	Scarce.
„ <i>corylana</i>	4 5 6	Common.
„ <i>unifasciana</i>	5	Rare.
(„ ? <i>viburnana</i>	(4)	On the Banks of the Don near its mouth, Z., 2402.)
„ <i>icterana</i>	1 4	Local but common.
„ <i>viridana</i>	3 5	Near Ballater and at Kil drummy on Donside.
„ <i>ministrana</i>	6	
„ <i>adjunctana</i>	5	

Amphysa prodromaria (=Walkerana)	5			
Peroneasponsana (=favil- laceana)	5		Dark form common, lighter var. with dark fascia rare (Mr. Tait).	
„ mixtana	5		Scarce.	
„ comparana	3	5	Not common.	
„ Comariana (= Potentillana)		5	Rare.	
„ Caledoniana	3	5	Common.	
„ variegana		5	Local but abundant, the black var. cirrana occurs.	
„ hastiana		5	Once at Inverury.	
„ maccana	3		Braemar (Dr. White).	
„ ferrugana		5	6	Common.
„ aspersana		5		Local but common.
Teras caudana		5	6	„ abundant.
„ contaminana		4	5	Abundant on hedges.
Dictyopteryx Loefflingiana		4	5	Not uncommon.
„ Bergmanniana	3	4	5	Local, and not common.
Argyrotoza Conwayana		4	5	Scarce.

PENTHINIDÆ—

Penthina sororculana (=prælongana)	4	6			
„ Pruniana	4	5	Scarce.		
„ dimidiana (=ochromelana)		5	Bennachie (Mr. Tait).		
Spilonota neglectana		5	Rare.		
Pardia tripunctana	1	4	5	6	Common.

SERICORIDÆ—

Sericoris littorana	1					Rocks at Bay of Nigg.	
„ cespitana		4				Links at Aberdeen.	
„ lacunana		4	5	6		Common.	
(„ micana		(4)				Links at Aberdeen, Z., 2401.)	
Mixodia Schulziana	1	2	3	4	5	6	Common on moors.
„ palustrana	1	3	5	6			Not common.
„ rubiginosa (=Bouchardana)			5				Rare.
Euchromia arbutana		3					
Orthotænia antiquana	1						Muchalls.

SCIAPHILIDÆ—

Cnephasia politana (=lepidana)		5				Common.
„ musculana		5	6			Local but common
Sciaphila perterana		5				Scarce.
„ Virgaureana		4	5			Not common.
„ octomaculana		5				Local and not common.
Sphaleroptera icterana		5				Rare.

GRAPHOLITHIDÆ—

Bactra lanceolana	1	3	5	6		Common.
Phoxopteryx siculana	1	2	3	4	6	Abundant.
„ unguicana		3	5			Scarce.
„ biarcuana		5				Local but not uncommon.
„ myrtillana		3	5			Not scarce.

Phoxopteryx Lundana	1	3	5	6	Common.		
„ mitterbacheriana				6			
Graphopitha ramana		3	5		Abundant as larva in birch-		
(=Paykulliana)					catkins (Mr. Tait).		
„ cinerana		3			Plentiful at Braemar.		
„ nigromaculana			5		Local, not scarce.		
„ Penkleriana			5		Common.		
„ geminana			5		Local, not uncommon.		
Phlæodes tetraquetrana			5		Rare.		
„ immundana		3					
Pœdisca corticana			4	5	6	Not uncommon.	
„ ophthalmicana		3				Once at Braemar.	
„ occultana		3	5			Not common.	
„ Solandriana		3	6			Swarms at Braemar.	
„ semifuscana		3	5				
„ sordidana			5			Not common.	
Ephippiphora bimaculana			5			Common.	
„ Cirsiana				6			
„ scutulana	2	4	5	6			
„ trigeminana			5			Not common.	
Coccyx cosmophorana		3					
„ strobilana		3					
„ argyrana			5			Rare.	
„ Hyrciniana			5	6		Not common.	
„ ustomaculana		3					
„ Vacciniana			5			Not common.	
Pamplusia mercuriana							
(=monticolana)		3	5			Common.	
Retinia turionana		3					
„ pinivorana			5			Not common.	
„ duplana		4				Scotston Moor.	
Carpocapsa Pomonana		4				Once in Old Aberdeen.	
Endopisa pisana			5			Not common.	
Stigmonota coniferana		3					
Dicrorampha Petiverana		4				About Old Aberdeen, rare.	
„ herbosana	1		5			Common.	
(„ senectana		(4)				On the banks of the Don near its mouth, Z., 2402 ft.)	
(„ simpliciana		(4)				„ „ „	
Catoptria Ulicetana	1	2	3	4	5	6	Abundant among whins.
„ cana (Scopoli- ana?)			4	5			Once at Old Aberdeen, rare at Inverurie.
„ Hohenwarthiana			(4)	5			Not uncommon (Links at Aberdeen, Z., 2401).
Trycheris mediana	1		4	5			Local but common at Abdn., rare? elsewhere.
PYRALOIDÆ—							
Xylopoða Fabriciana	1	2	4	5	6		Common among nettles.
COCHYLIDÆ							
Eupœcilia maculosana			5				Common.
„ angustana	1	3					
„ ciliella var ruficiliana			4	5			Rare.
ArgyrolepiæBaumanniana			4				
„ Badiana	1	(4)	6				Near Aberdeen, Fyvie (Banks of the Don near its mouth, Z., 2402).

Argyrolepia Cnicana	1	5	Local but common.			
(Cochylis stramineana)		(4)	Links at Aberdeen, Z., 2401)			
Aphelia osseana (=prata)	1	3	5	6		

SUMMARY.

DIURNI	19	17	18	15	22	19	18	. . . . .	27
NOCTURNI	25	20	16	19	22	23	18	. . . . .	40
GEOMETRÆ	49	52	57	50	84	63	44	. . . . .	108
PSEUDO-BOMBYCES	5	9	7	3	10	8	5	. . . . .	10
NOCTUÆ	58	95	44	75	111	85	64	. . . . .	133
DELTOIDES	1			1	1		1	. . . . .	1
PYRALIDES	8	4	11	13	9	7	7	. . . . .	24
CRAMBITES	5	5	9	5	8	6	5	. . . . .	13
TORTRICES	17	5	29	31	68	25		. . . . .	99
	—	—	—	—	—	—	—		—
	187	207	191	212	335	236	162		455

The names and localities enclosed in brackets in the foregoing list are given on the authority of Mr. James C. Howden, in an article entitled "Capture of Lepidoptera in Scotland," in *Zoologist*, Vol. VII. (1849), pp. 2401-2.

In Macgillivray's "Natural History of Deeside," the following are mentioned:—

Pieris Sabellicæ, not uncommon along the Dee and the Don. (This is a variety of *P. Napi*.)

Thymele Tages (= *Thanaos Tages*). I have never seen an example from this district, but the species has been taken by Mr. Tait in Banffshire.

Leucoma Salicis, not uncommon. (Probably a mistake for *Arctia Menthastris* which is not mentioned in the list.)

Heliophobus popularis. Near Aberdeen, Mr. Clark. (Possibly *Mania typica* is meant.)

Harpalyce unilobata (= *Melanippe galiata*). Near Aberdeen, Mr. Clark. (Probably a mistake for *Melanippe montanata*.)

Order HEMIPTERA.

APHIDES COLLECTED IN THE NEIGHBOURHOOD OF ABERDEEN
IN AUGUST AND SEPTEMBER, 1877.

In this list I have followed the nomenclature adopted in Buckton's "British Aphides" as far as that work goes, and in Passerini's "*Aphididæ Italicæ*" for the remainder of the group. I have made use of the following contractions to indicate the conditions I have met with:—A. S., = all stages; L., = larva; P., = pupa; A. F., = apterous female; W. F., = winged female; M., = male.

- Siphonophora Rosæ*, Reaum. Abundant on *Rosæ* near Aberdeen; A. S.
- „ *granaria*, Kirby. In inflorescence of *Bromus mollis* near Old Aberdeen, 17th Aug., L. and A. F.
- „ *Pisi*, Kalt. On *Stellaria holostea*, and on *Epilobium montanum* at Rubislaw, and at Baggownie in shady places. The glaucous variety also occurred commonly, Aug., L. P. and A. F.
- „ *Rubi*, Kalt. On lower surface of leaves and on young shoots of *Rubus Idæus* and of *R. fruticosus* near Old Aberdeen, A. S.
- „ *Millefolii* Fab., in inflorescence of *Achillea millefolium* in Rubislaw Den, and at Cluny, on Donside, Aug., L. and A. F.
- „ *Solidaginis* Fab., abundant on *Solidago Virgaurea* at Baggownie in shady spots, A. F.
- „ *Sonchi* L. on *Hypochoeris radicata* round the capitulum, abundant in various localities near Old Aberdeen, L. P. and A. F.
- „ *olivata*, Buckton, on *Carduus arvensis* in Cluny, Aug., L. and A. F.
- Phorodon Humuli* Schr. abundant on *Prunus spinosa* at Banchory-Ternan, L. and A. F.
- Rhopalosiphum Lactuce*, Reaum. Common on *Sonchus oleraceus* at Old Aberdeen, Aug., L. and A. F.
- Myzus Cerasi* Fab. On *Prunus avium* at Old Bridge of Don, July and August, A. S. They assemble in multitudes under the young leaves at the tips of the twigs, and cause them to curl up by their suction.
- „ *Lychnidis* Koch. Common inside calyxes of abortive flowerbuds of *Lychnis diurna* on the banks of the Don above the Old Bridge, L. and A. F., varying in colour from red to black. August.
- „ *Ribis* L. abundant on gooseberries and red currants at Old Aberdeen throughout the summer, A. S.
- Drepanosiphum Platanoides* Schr. Abundant below leaves of *Acer pseudo-platanus* at Old Aberdeen, A. S. July to September.
- Megoura Viciae*, Buckton; on unripe pods and young shoots of *Vicia sepium* in Cluny, on Donside, Aug., A. F. and L.
- Aphis Euonymi* Fabr; on a spindle-tree (*Euonymus Europæus*) at Old Aberdeen; abundant under the leaves at the tip of the twigs.
- „ *Papaveris*, Fab; too abundant on *Beans* at Old Aberdeen in Aug., A. S.
- „ *Atriplicis* L., On *Chenopodium album* at Old Aberdeen, causing the leaves to become involute and distorted by their suction, September, L. and A. F.
- „ *Ranunculi*, Walker, Common under leaves of *Ranunculus acris*, and of *R. repens*, near Old Aberdeen throughout the summer, L. and A. F.
- Myzocallis Quercus*, Kalt. Occurs in small numbers below *Oak-leaves* at Banchory, Old Aberdeen, &c. September, A. S.
- „ *Coryli*, Goetze. Common on lower surface of leaves of *Hazel*, A. S.
- Cladobius populea*, Kalt. Abundant on twigs and on leaves of a tree of *Populus monilifera*? at Old Aberdeen, September, A. S. Those on the twigs were brown, on the leaves green or yellowish.

- Chaitophorus Aceris*, Koch. Abundant on *Acer campestre*s, Old Aberdeen, L. and A. F.
Pterocallis Tiliae L. Abundant on *Tilia Europaea*, Old Aberdeen, all summer, A. S.
 „ *Alni* Fab. Scarce on leaves of *Alder* at Banchory, A. S.
Phyllaphis Fagi L. Too abundant on leaves of *Beech* (*Fagus sylvatica*) which they cause to look seared and blackened, Seaton, near Old Aberdeen, September, L. and A. F.
Chermes Abietis L. Common everywhere in cone-like galls on Spruce (*Abies excelsa*).

Order ANOPLURA.

- Phthirus inguinalis*, Lach. . . . On man. . . . Aberdeen, &c.
Pediculus capitis Nitz. . . . „ . . . „
 „ *vestimenti* Nitz. . . . „ . . . „

Order MALLOPHAGA.

- Docophorus atratus* Nitz. . . . On the Rook (G. Sim), Aberdeen.
 „ *ocellatus* Nitz. . . . Hooded Crow (W. Robb), Nigg near Aberdeen.
 „ *semisignatus* Denny. . . . Raven (G. Sim), Belhelvie, do.
 „ *guttatus* Burm. . . . Magpie (G. Sim), Old Bridge of Don.
 „ *Cincli* Denny . . . Dipper (G. Sim), Aberdeen.
 „ *Lari* Denny. . . . Blackheaded Gull, Aberdeen.
 „ *platyrhynchus* Nitz . . . Goshawk, Hazlehead, near Aberdeen.
 „ *testudinarius* Denny. . . . Curlew (J. Huxley), Aberdeen.
 „ *fuscolliis* Burm, . . . Great Grey Shrike, Clatt, Aberdeenshire.
 „ *icterodes*, Nitz. . . . Goosander, Aberdeen.
 „ *platystomus* Burm. . . . Common Buzzard (J. Sim), Logie-in-Buchan.
 „ *Bassanæ* Denny. . . . Head of Gannet in collection of Mr. Dawson, Cruden, Aberdeenshire.
Nirmus fuscus Denny, . . . Goshawk, Hazelhead, near Aberdeen, and
 Rough-legged Buzzard (G. Sim), Donside.
 „ *sellatus* Burm, . . . Kittiwake (Wm. Robb), Aberdeen.
 „ *Numenii* Denny, . . . Curlew (J. Huxley), Aberdeen.
Goniocotes hologaster Burm, . . . Domestic Fowl, Fyvie.
Goniodes falcicornis, Nitz., . . . Peacock, Aberdeen.
 „ *dissimilis*, Nitz. ? . . . Domestic Fowl, Fyvie.
Colpocephalum flavescens, Nitz., . . . Rough-legged Buzzard (G. Sim), Donside.
 „ *subæquale*, Nitz., . . . Rook (G. Sim), Aberdeen.
 „ *importunum*, Nitz . . . Heron (W. Robb), Aberdeenshire.
 „ *Haliaëti* Denny, . . . Osprey (W. Robb), Fetternear.
Menopon pallidum Nitz., . . . Domestic Fowl, Fyvie.
 „ *transversum* Denny, . . . Kittiwake (W. Robb), Aberdeen.
Trinoton luridum Nitzsch, . . . Golden-eye Duck (W. Robb), Newburgh.

Order NEUROPTERA.

PSOCIDÆ.

- Stenopsocus cruciatus* L. . . . Stonehaven.
Elipsocus unipunctatus Müll, . . . Banchory, Old Aberdeen.

PERLIDÆ.

- Leuctra geniculata* Steph. . . . Aberdeen.

LIBELLULIDÆ.

- Sympetrum Scoticum*, Donov, . . . Abundant everywhere in the district.
Æschna juncea L., Scotston Moor, Fyvie, Braemar.
Calopteryx splendens Harr., . . . Fyvie.
Pyrrhosoma minium Harr., . . . Scotston Moor, Fyvie, Muchalls.
Ischnura elegans Lind., . . . Scotston Moor, Muchalls,
Agrion puella L., Scotston Moor.
 „ *cyathigerum*, Charp . . . Scotston Moor.

NEUROPTERA-PLANIPENNIA.

- Sialis lutaria* L. Donside, near Old Aberdeen,
 Muchalls, Stonehaven, Braemar.
 „ *fuliginosa* Pict., Braemar (Dr. White).
Sisyra fuscata Fab., Old Aberdeen.
Hemerobius micans Oliv, „ „
 „ *humuli* L., „ „, Banchory.
Megalomus hirtus L., Muchalls.
Chrysopa flava, Scop., Banchory.
 „ *vulgaris* Schn., Old Aberdeen, Parkhill.
Coniopteryx psociformis Curt., . . . Banchory, Glen Gairn.
Panorpa Germanica L., „ „, Ballater, Muchalls,
 Bridge of Don.

TRICHOPTERA.

- Phryganea striata*, L. Old Aberdeen, abundant.
 „ *varia*, Fab., Bishop's Loch, near Aberdeen,
 once.
 „ *obsoleta*, Hag., Old Aberdeen, once.
Limnophilus lunatus, Curt., . . . Aberdeen.
Stenophylax stellatus, „ Old Aberdeen.
Halesus auricollis, Pict., Braemar (Dr. White).
Ecclesiapteryx guttulata, Pict., . . . Old Aberdeen.
Chaetopteryx tuberculosa, „ . . . Near Aberdeen.
Odontocerum albicorne, Scop., . . . Den of Gight, Fyvie.
Leptocerum cinereus, Curt., . . . Donside, near Old Aberdeen.
 „ *aterrimus*, Steph., . . . „ „ „
 „ *albifrons*, L., „ „ „
Mystacides nigra L., Donside, near Old Aberdeen, abundant.
Tinodes lurida Curt., „ „ „
Polycentropus flavomaculatus Pict, . . . „ „ „
Cyrnus trimaculatus, Curt., . . . „ „ „
Rhyacophila dorsalis, Curt., . . . Banchory, Den of Gight.

In the appendix to the Natural History of Deeside and Braemar, the following species also are mentioned, but their occurrence requires to be corroborated:—

<i>Æshna varia</i> ,	Common (= ? <i>Æ. juncea</i> L.).
„ <i>grandis</i> ,	Much less common.
<i>Cordulegaster annulatus</i> ,	
<i>Gomphius vulgatissimus</i> ,	
<i>Libellula depressa</i> ,	Not uncommon.
„ <i>quadrimaculata</i> ,	„ (= <i>Platetrum depressum</i> .)
„ <i>conspurcata</i> ,	„ (= <i>L. fulva</i> .)
<i>Calepteryx Virgo</i> ,	General. (Probably a mistake for <i>C. splendens</i> .)
<i>Chrysopa Perla</i> ,	Not uncommon.
<i>Phryganea grandis</i> ,	Not scarce.
<i>Limnephilus rhombicus</i> ,	Common.

Order DIPTERA.

See my list of gall-making Diptera on page 78.

Order HYMENOPTERA.

ACULEATA.

Save the two first species and *Megachile circumcincta*, the following list is compiled from the observations of Dr. Wm. Bannerman, in 1872, and includes only species determined by him. It only forms a commencement to what will probably be found when the district is better worked.

<i>Formica rufa</i> L.,	Abundant in the woods above Ballater.
<i>Mutilla Europæa</i> , L.,	Once taken in Strathdon.
<i>Mellinus arvensis</i> L.,	Abundant throughout the district.
<i>Crabro cribrarius</i> L.,	Banchory.
<i>Vespa vulgaris</i> L.,	Common.
„ <i>Germanica</i> Fab.,	Near Aberdeen and Banchory, &c.
„ <i>rufa</i> L.,	
„ <i>sylvestris</i> , Scop.,	
„ <i>arborea</i> Smith,	
„ <i>Norvegica</i> , Fab.,	
<i>Halictus rubicundus</i> Kirby,	Everywhere.
„ <i>cylindricus</i> Fab.,	Male common on flowers.
„ <i>minutus</i> Kirby,	Banchory.
<i>Andrena helvola</i> L.,	Aberdeen.
„ <i>Laponica</i> Zett.,	Everywhere in spring.
<i>Megachile circumcincta</i> ,	Rared from cells found in sand on Murcar Links.
<i>Apathus vestalis</i> Fourc.,	Everywhere.
<i>Bombus muscorum</i> L.,	„
„ <i>senilis</i> Smith	Aberdeen.
„ <i>fragrans</i> Pall.,	„
„ <i>pratensis</i> L.,	Everywhere.
„ <i>lapidarius</i> L.,	„
„ <i>terrestris</i> Kirby	„
„ <i>lucorum</i> L.,	„
„ <i>hortorum</i> L.,	„
<i>Apis mellifica</i> L.,	„ (introduced.)

Dr. Bannerman had also several species of Hymenoptera aculeata unnamed from this district, and he had taken the

following species in Banffshire, near the borders of districts 6 and 7.

Crabro dimidiatus, Fab., Banff.	.
Odynerus spinipes L.,	„ .
„ trimarginatus Zett, „	„ .
Andrena Gwynana Kirby, „	„ .
„ analis Panz, Rothiemay.	„ .
Bombus Lapponicus Fab., „	„ .
„ senilis Smith, „	„ .
„ fragrans Pall, „	„ .

In the *Naturalist*, Vol. II., p. 39, in an account of the proceedings of the Natural History Society of Glasgow, on Oct. 7, 1851, occurs:—“Mr. W. Ferguson exhibited a nest of the hornet, taken from the roof of an outhouse in Aberdeenshire”. I have never seen the hornet in Scotland, and should like much to know whether it has been found in this district on any other occasion. As the usual habit of the hornet is to nest in holes in the ground, there may possibly be some mistake in the record quoted.

In the *Scottish Naturalist* (Vol. IV., pp. 10-11), Mr. Cameron has enumerated 89 species of sawflies (Tenthredinidæ), all, except one from Muchalls, taken in Braemar by Drs. Sharp and Buchanan White.

LIST OF ARANEIDÆ (SPIDERS) OF DEE,

BY PROF. JAMES W. H. TRAIL.



In this list I have followed the nomenclature adopted by Mr. Cambridge (the chief authority on the group in Britain), and published by him in the *Transactions of the Linnæan Society* (Vol. XXX., pp. 320-334), as the result of careful and continued investigation of types communicated to him by most European arachnologists. After the names adopted by Mr. Cambridge I have however added in brackets the names under which they have been described (chiefly by Messrs Blackwall and Cambridge), as British for the convenience of those who may possess works on British spiders.

The spiders enumerated below were all captured by myself, and were almost all (only a few of the larger species excepted) examined and named by Mr. Cambridge so that the correctness of the nomenclature is thus guaranteed. So far as I could I have followed the division of the district employed under Entomology, but information is completely wanting as to what species occur in Buchan, hence I have omitted districts 6 and 7.

Fam. DYSDERIDES.

Oonops pulcher. Templ.	. . 1	4	Between stones, along the cliffs at Nigg, &c.
Harpactes Hombergii Scop (=Dysdera Hombergii)	. 1		Among stones at Muchalls.
Segestria senoculata, Linn	. 1 2 3 4 5		„ „ „

Fam. DRASSIDES.

Micaria pulicaria Sund (=Drassus nitens Bl.)	. . 1		Muchalls, and Hazelhead woods, among stones.
Drassus Troglodytes Koch (=D. clavator Camb)	. .	4	Parkhill, once.
„ lapidicolens Walck.	. 1 2 3 4		Among stones, very common.
Clubiona terrestris Westr (=C. amarantha Bl.)	. . 1	3 4	Rather scarce.
„ pallidula Clerck (=C. epimelas Bl.)	. . 1		Muchalls, once.
„ comta C. Koch	. .	5	Inverury, once.
„ pallens C. Koch =C. diversa Cambr)	. .	5	Inverury, once by shaking dead grass, &c.
„ holosericea, De Geer (=deinognatha Cambr.)	. .	4	Murcar Links.
„ reclusa Cambr.	. . .	3	Braemar.

„ <i>voluta</i> Cambr.	3?	Locality doubtful.
<i>Chiracanthium nutrix</i> Westr . 1		Muchalls and Hazelhead woods.
<i>Hecarge maculata</i> Bl. 1 (= <i>H. spinimana</i> Bl.)		Hazelhead, Parkhill, and Inverury, in woods.

Fam. DICTYNIDES.

<i>Dictyna arundinacea</i> Linn . 1 2 3 4 5	Common on heather, &c., on moors.
(= <i>Ergatis benigna</i> Bl.)	

Fam. AGELENIDES.

<i>Amaurobius fenestralis</i> Stroem. 1 2 3 4 5	Very common under stones.
(= <i>Ciniflo atrox</i> Bl.)	
<i>Tegenaria Derhamii</i> Scop 4 5	In houses.
(= <i>T. civilis</i> Bl.)	
<i>Textrix denticulata</i> Oliv. 1 2 3 4 5	Very common under stones.
(= <i>T. Lycosina</i> Bl.)	
<i>Cryphoea sylvicola</i> C. Koch . 1	Hazelhead woods.
(= <i>Tegenaria sylvicola</i> Bl.)	

Fam. THERIDIIDES.

<i>Pholcomma gibbum</i> Westr 4	Murcar Links, Parkill woods, and Inverury, by beating.
(= <i>Theridion</i> Cambr.)	
<i>Theridion Sisypium</i> Clerck . 1 2 3 4 5	Common among heather, &c.
(= <i>Th. nervosum</i> Bl.)	
„ <i>denticulatum</i> 5	Inverury.
<i>Phyllonethis lineata</i> Clerck . 1 2 3 4 5	Common everywhere and very variable.
(= <i>Theridion lineatum</i> Bl.)	
<i>Neriere atra</i> Bl.= 4 5	Murcar Links and Inverury, among dead grass.
(<i>N. longipalpis</i> Bl. nec Sund.)	
<i>Neriere longipalpis</i> Sund. 4	Murcar Links.
„ <i>promiscua</i> Cambr. . 1	4 5 Hazelhead, Murcar Links and Inverury.
„ <i>dentipalpis</i> Reuss-Wid 1	4 Hazelhead and Murcar Links.
„ <i>graminicola</i> Sund. 2	Banchory.
„ <i>nigra</i> Bl. 4 5	Murcar Links and Inverury.
„ <i>longimana</i> C. Koch 4	Murcar Links.
(= <i>N. vagans</i> , Bl.)	
„ <i>rubens</i> Bl. 1 3	4 5 Common.
„ <i>dentata</i> Reuss-Wid 4	Murcar Links.
„ <i>fusca</i> Bl. 3	Braemar.
„ <i>agrestis</i> Bl. 1	Hazelhead.
„ <i>retusa</i> Westr 3	Braemar.
(= <i>N. elevata</i> Cambr.)	
„ <i>urcata</i> Cambr. 3 4	Murcar Links and on top of Cairn-na-Glaisha, at 3500 ft.
„ <i>bituberculata</i> Reuss-Wid 4	Murcar links.
„ <i>livida</i> Bl. 4	Parkhill woods.
„ <i>viaria</i> Bl. 4	„
„ <i>fuscipalpis</i> C. Koch . 1	Hazelhead woods.
(= <i>N. gracilis</i> Bl.)	
„ <i>cornigera</i> Bl. 4	Parkhill woods.
<i>Walckenaera brevipes</i> Westr . 1	4 5 Murcar Links, Hazelhead, and Inverury.

Walckenaëra punctata Bl. . .	4 5	M. Links and Inverury.
„ bifrons Bl. . .	5	Inverury.
„ antica Reuss-Wid	4	M. Links.
„ permixta Cambr.	4	M. Links.
„ pusilla. Reuss-Wid	3 5	Inverury and Braemar.
(=W. minima Cambr.)		
„ similis Cambr. . .	4	M. Links.
„ frontata Bl. . .	4 5	M. Links, Inverury.
„ acuminata Bl. . 1	3 4	Hazelhead, Braemar, Parkhill.
Pachygnatha Clerckii Sund . 1	3 4 5	Widespread, but not very common.
„ Degeerii Sund . 1 2 3 4 5		Common.
Linyphia leprosa Ohl. . . . 1		Hazelhead.
(=L. confusa Cambr.)		
„ tenebricola Reuss-Wid	4	Old Aberdeen, M. Links, and Parkhill.
(=L. tenuis Bl.)		
„ obscura Bl. . . . 1		Hazelhead.
„ alacris Bl. . . . 2	4 5	Park, Parkhill, Inverury.
„ luteola Bl. . . .	4 5	M. Links and Strathdon.
(=alticeps Bl. nec Sund)		
„ alticeps Sund 3		Braemar.
„ nigrina Westr . . . 1		Rocks at Nigg.
(=pulla Bl.)		
„ ericæa Bl. 4		M. Links.
„ circumspecta Bl. . . . 4		M. Links.
„ rufa. Westr. 3 4		Braemar and M. Links.
„ bicolor Bl. 1 4		Hazelhead and M. Links.
(=Nerienne bicolor Bl.)		
„ reticulata 3		Top of Cairn-na-glaisha, at 3500 ft., under stones.
„ clathrata Sund 4		Parkhill.
(=Ner. marginata Bl.)		
„ bucculenta, Clerck 4		Scotston moor, under stones.
(=Nerienne trilineata Bl.)		
„ triangularis Clerck. 1 2 3 4 5		Abundant.
(=L. montana Bl.)		
„ peltata, Reuss-Wid 4		Parkhill.
(=L. rubea Bl.)		
„ pusilla Sund 1 3 5		Hazelhead, Braemar, Inverury.
(=L. fuliginea Bl.)		
„ hortensis Sund 5		
(=L. pratensis Bl.)		
„ socialis Bl. 1 3		Hazelhead, Braemar.
Ero thoracica Reuss-Wid . . 1 2 4		Muchalls, Hazelhead, Ban-chory, Old Aberdeen.
(=Theridion variegatum Bl.)		

Fam. EPEIRIDES.

Meta segmentata Clerck . . . 1 2 3 4 5		Abundant.
(=Epeira inclinata Bl.)		
„ Merianæ Scop 1 4 5		Common among branches, heather, &c.
(=E. antriada Bl.)		
„ Menardi Latr. 4		Parkhill.
(=E. fusca Bl.)		
Tetragnatha extensa Latr . . 1 2 3 4 5		Abundant.

Cyrtophora conica Pall	5	Inverury once.
(=Epeira conica Bl.)		
Singa albovittata Westr	1 3	5 Hazelhead, Braemar, Inverury.
(=Epeira calva Bl.)		
Zilla atrica, C. Koch	1 3 4	Near Stonehaven, Ballater, Old Aberdeen Links.
(=Epeira calophylla Bl.)		
Epeira cucurbitina, Clerck	1 2 3	5 Wide spread, but rather scarce.
„ diademata, Clerck	1 2 3 4	5 Abundant.
„ scalaris Walck.	3	Braemar once.
„ cornuta, Clerck	1 2 3 4 5	Abundant.
(=E. apoclista Bl.)		
„ quadrata, Clerck	1 2 3 4 5	Common.
„ umbratica, Clerck	3	Braemar, scarce.

Fam. THOMISIDES.

Xysticus C. Koch, =Thomisus
Bl. ad partem

X. cristatus Clerck	1 2 3 4 5	Abundant.
„ viaticus C. Koch	1	Hazelhead.
„ erraticus Bl.	2	Banchory.
„ trux Bl.	4	Parkhill.
„ atomarius Panz.	1	Rocks at Nigg.
(=Th. versutus Bl.)		
Philodromus aureolus Clerck	3 5	Braemar and Strathdon.
„ elegans Bl.	4 5	Parkhill, Strathdon.

Fam. LYCOSIDES.

Ocyale mirabilis Clerck	3	Near Ballater, rare.
(=Dolomedes mirabilis Bl.)		
Pirata piraticus Clerck	5	Strathdon.
(=Lycosa piratica Bl.)		
„ leopardus Sund	1 3	Muchalls, Glengairn.
(=L. cambrica Bl.)		
Trochosa biunguiculata Camb	3	Braemar.
„ cinerea Fabr.	2	Banchory, rare.
(=L. allodroma Bl.)		
„ picta Hahn	4	Common among sandhills on coast.
„ terricola Thor.	3	Braemar.
(=L. agretyca Bl.)		
Lycosa amentata Clerck	1 4	Muchalls, Old Aberdeen.
(=L. saccata Bl.)		
„ agricola Thor.	4	M. links.
(=L. fluviatilis Bl.)		
„ Traillii Camb.	3	Braemar.
„ pullata Clerck (=L. obscura, Bl.)	1 4 5	Muchalls, Old Aberdeen, Strathdon.
„ nigriceps Thor. (=L. congener, Cambr)	1 4	Muchalls, Parkhill.
„ palustris Linn (=L. exigua Bl.)	3	Braemar.
„ monticola, Clerck	4	M. Links.
Tarentula pulverulenta Clerck	1 3	Hazelhead, Braemar.
(=L. rapax Bl.)		
„ andrenivora Walck	4	Scotston.
(=L. andrenivora Bl.)		
„ aculeata Clerck	3	Braemar.

Fam. SALTICIDES.

Epiblemum scenicum Clerck	2	5 Banchory, Corgarff.
(= Salticus scenicus Bl.)		
Heliophanus cupreus Walck	1	Muchalls.
(= S. cupreus Bl.)		
Euophrys frontalis Walck (= S. frontalis Bl.)	1	Rocks at Nigg.
Attus falcatus Clerck (= S. coronatus Bl.)	3	Ballater.

HINTS ON COLLECTING SPIDERS.

The requirements in the way of apparatus are few, viz., several small bottles or tubes containing spirits of wine, into which the spiders are to be put, and a waterproof or umbrella to be used in shaking cut grass, fallen leaves, or other cover where spiders may be found. With these, and with a fair share of perseverance, the collector may count on being rewarded with not a few spiders when he has an hour or two to spare in the pursuit.

Spiders occur everywhere and at all seasons, though some localities are especially favoured by them, and the latter part of autumn is the time when they most abound. At that season they may sometimes be found in almost countless numbers when looked for, and at times even are a positive annoyance by the abundance of their webs on every shrub and herb. Everyone must often have noticed gossamer, the work chiefly of little black or brown species belonging to the genus *Walckenaëra*, and everyone must also have seen the makers of the gossamer floating on their webs, or running about over books, tables, and other articles indoors, as well as on palings, walls, and everywhere else out of doors.

To collect spiders successfully, one must acquire some knowledge of their habits, so as to know where to look for the various species; to aid beginners I shall subjoin a few hints on the habits of the chief groups. The *Lycosides* may be found running over the surface of the ground among the low herbage, chiefly on moors and commons; they may often be found carrying their egg-bag, which should always be put into the same bottle with the spider. One species (*Trochosa picta*) abundant on the sandhills along the coast departs from the usual habits of the family, as it makes burrows in the sand and lines them with a thin layer of silk. In the burrow it lives, never wandering more than a few inches from the entrance. It requires accordingly to be dug out.

The *Salticides* are generally to be found on palings, stones, &c., stationary, running, or leaping on their prey or if in danger.

The Thomisides are more usually to be found on low herbage especially about flowers, and are therefore most easily captured by sweeping, by beating herbage, or by shaking cut grasses over a waterproof or an umbrella. They are rather flat, broad spiders (crab spiders), usually pale-coloured. The same methods, especially the last, are very successful in yielding the species of the genera *Walckenaëra*, *Nerienne*, and *Linyphia*, which are almost all small, and are seldom brightly coloured, and which are in consequence very difficult to discriminate; in collecting them therefore all specimens should be put into the bottle to be worked over at leisure. Often a number of species (sometimes more than 20) may be shaken out of a single bundle of cut grass. The *Epeirides* may be known by their webs, which are very elegantly and regularly formed, with numerous radii crossed by meshes at nearly equal intervals. They spin their webs very frequently among whin bushes, or below overhanging banks, but themselves live in a silken nest a short distance from the net, with which they communicate by means of two or three threads. They are most easily found by tracing the thread from the net. A good many of the *Epeirides*—*e.g.*, *Epeira quadrata*, *E. diademata*, &c.—are among our largest, most common, and handsomest spiders, and cannot fail to have been noticed by everyone. The *Drassides* are mostly of average size, and are not conspicuous either in form or in colour, which is usually grey or brown. They usually live under stones or among cut grass, from which they may be shaken out. The nests of one or two species may often be found in the angle of broad grassy leaves (*e.g.*, of *Luzula sylvatica*) which have been bent down and spun in by the spider. The nest is generally composed of very compact white silken web. Under stones on almost every dyke one may find the following species—*Textrix denticulata*, *Amaurobius fenestralis*, and *Segestria senoculata*, as well as occasional specimens of *Oonops pulcher*, *Micaria pulcicaria* and other less common species.

After a successful day's hunt the bottles (2-drachm bottles are handiest) should be duly labelled with the locality and date, and with a number referring to a note-book, in which should be entered any remarks of interest on the contents—*e.g.*, mode of capture, notes of habits, and other points considered noteworthy (several tubes or pill-boxes should also be carried for special rarities, or for individual specimens with nest or young). The contents can then be examined at any future time, and the species determined when leisure allows. For permanent preservation there is no very ready mode yet devised. If the collector has numerous specimens of pretty large species, it is well to seal up some hermetically in tubes with spirits. The small species, or unique examples, may be mounted in fluid as microscopic ob-

jects. Mr. Cambridge suggests putting the species into tubes, into which a piece of paper bearing the name is put ; the mouth is then filled with a plug of cotton, and the tubes are afterwards arranged side by side in square glass bottles, which are filled with spirits, and have a mass of cotton in the centre to keep the tubes steady.

In conclusion, I would direct attention to the fact that our knowledge of the spiders of this district is still far from complete, and that there is room for no little work before it will be satisfactory. I trust that some one or more may be induced to take up the subject, or at least to favour me with a few bottle-fuls (duly labelled with date and locality), for which I should feel much obliged ; even though they contained only the commonest species, it would at least be an assistance to the determination of their distribution in this district.

GALLS AND THEIR MAKERS IN 'DEE'.

BY PROF. JAMES W. H. TRAIL, A.M., M.B., F.L.S.

It seems to me best to restrict my remarks in this paper to the galls and gall-makers that have been as yet observed in 'Dee,' though a notice of galls that would probably be found here if closely looked for, would prove of interest and value, and may possibly furnish material for a paper on a future occasion. The subject matter has been in great part published by me already in the 'Scottish Naturalist,' vols. I. & II., as I procured material for it, but the notes are so scattered that it seems likely to be of use to gather them up into systematic form, especially as they include almost all that is known on the occurrence of galls in the north of Scotland. I am happy to say that by the exertions of Messrs. Cameron and Binnie, our knowledge of the gall-makers about Glasgow has of late been largely increased, while the eastern border counties have been rendered almost classic ground to the naturalist by Mr. Hardy. The same, however, cannot be said of Scotland north of the Tay, as very much yet remains to be done ere we can hope for anything like a thorough knowledge of galls and their makers in the north.

Galls may be defined as outgrowths produced on some part of a plant by animal influence, for the purpose of yielding food and shelter either to the producer, or to the larva of the producer. They may be alterations of pre-existing parts of the plant, or they may be new growths, as will appear more fully farther on.

One of the best classifications of galls as such, irrespective of their makers, is that proposed by Frauenfeld (*Die Gallen*), and somewhat expanded by Schenck (*Nassauischen Cynipiden und ihrer Gallen, &c.*, pp. 6-12). In it galls are divided into three great classes which may be rendered in English by the terms—

1. *Open galls*—Those in which the central cavity of the gall is not entirely enclosed, an opening always remaining though sometimes very narrow.

2. *Closed galls*, in which the central chamber is completely shut in.

3. *Lid-bearing galls*, which open by means of a portion that

falls off like a lid when the occupant is mature; of this last class we have no representatives in this quarter. The second class are formed by beetles, flies, sawflies and gallflies, and are always tenanted by larvæ.

The first class embraces a somewhat heterogeneous assemblage formed by beetles, flies, hemiptera (chiefly aphides), and mites, and often are tenanted by the mature insects as well as by the larvae. The 1st class is subdivided—

a. Galls which consists only of deformed outer structures of the plant, usually the work of gall midges, of mites, or of aphides.

b. Galls which are situated in the inner tissues of the plant, but have not a closed chamber, though often there is hardly a trace of an opening. They are caused by gallmidges (Cecidomyidæ) by Trypetidæ, or by Aphides.

2. The *closed* galls are also divided into two great groups, viz.,

c. With a clearly defined larval cell or cells, the wall consisting of a defined tissue harder and closer than the rest of the gall. The makers belong to the gall-flies (Cynipidæ).

d. With undefined larval-cell, there being no distinct tissue surrounding the cell; these galls are the work of beetles, sawflies (Tenthredinidæ), or gall-midges.

Galls may also be regarded from the side of the plants on which they occur; and this mode of looking at them has the advantage of aiding beginners in their search for these productions, and in identifying them when found. I shall, therefore, follow the order of the plants (in English floras) in the arrangement of these notes, but will add a list of the gallmakers under their different orders as far as I have been able to identify them. The localities mentioned in each case are those in which I have myself gathered the galls, unless otherwise stated.

NAT. ORDER CRUCIFERÆ.

Brassica oleracea L, forma *acephala* (= Kail.)

„ *campestris* L (= Turnip.)

„ *Sinapis*trum Boiss (= Wild mustard or Charlock.)

Thlaspi arvense L (Field Penny-cress.)

Raphanus Raphanistrum L (= Runchock or Wildradish).

In all these species the galls are alike, being hemispheres $\frac{1}{8}$ — $\frac{1}{2}$ inch diameter, projecting from the root or from the stem, just above or below the surface of the ground. They have thick fleshy walls surrounding a central cell. Sometimes two or more are united. They are formed by beetles, viz., *Ceuthorhynchus sulcicollis*, Gyll, and its allies. All of them are common near Old Aberdeen, those on cabbage and turnips in winter and spring, on the other plants in June and July.

NAT. ORD. CISTINEÆ.

Helianthemum vulgare Gärtner, (= Common rock rose) galls of *Diplosis Helianthemii*, Hardy (gall-midge) terminal, ovate, rather over $\frac{1}{4}$

inch long, light grayish green, the undersides of its component leaves being exposed. Between the leaves among the hairs lie one or more of the larvæ. The galls are common at Muchalls, in Glengairn, near Balmoral, in Strathdon, &c.

NAT. ORD. VIOLACEÆ.

Viola canina L. subsp.

One or both lobes of the hind margin are rolled up, and become hard, fleshy, and smooth, and usually purple in colour. Each roll is occupied by one (rarely more) larva of *Cecidomyia*; I have not succeeded in rearing the insect. The galls are abundant on Old Aberdeen and Murcar Links, and I have also found them in Strathdon.

NAT. ORD. CARYOPHYLLACEÆ.

Cerastium glomeratum Thuill. Apical, the basal half of the terminal leaves becomes hard, swollen, and fleshy, and yellowish-red in colour; they enclose a central cavity in which live several orange-coloured larvæ of a *Cecidomyia*. The larvæ spin small white cocoons in which they pass the winter as pupæ; I have not succeeded in rearing the insect. The galls are abundant near Old Aberdeen, at Rubislaw, and at Torry near Aberdeen, and at Muchalls. They are not conspicuous. Mr. Binnie has reared the insect from galls found on *C. glomeratum* (= *C. viscosum* L.) at Glasgow, and has named it *Cec. Cerastii* (Proc. of Nat. Hist. Soc. of Glasgow, Vol. III., part II., 1877).

Stellaria media L. (= Chickweed). Mr. Sim tells me that he found galls on this plant near Stonehaven some years ago; he described them as being round, smooth, green, about half the size of a pea, and situated about $\frac{1}{3}$ of the distance from the end of the stem. I have never seen galls on this plant, and should be much obliged for specimens.

Stellaria Holostea, L. (= Greater Stitchwort). Apical, the terminal leaves becoming hard, somewhat swollen, semi-conduplicate, and closely imbricate; they also become yellowish green in colour, and are readily detected. Between the leaves live a good many individuals of *Aphis*. The galls are common near Old Aberdeen and at Muchalls.

NAT. ORD. HYPERICINEÆ.

Hypericum pulchrum L. (= St. John's Wort), terminal or axillary, reaching a size of $\frac{3}{4} \times \frac{1}{8}$ inch. The basal $\frac{2}{3}$ of the leaves are swollen, inflated, fleshy, red, and smooth, with the midrib prominent. Between the leaves live several orange larvæ of *Cecidomyia serotina*; Winnertz? These galls were found in Braemar by Dr. White who sent me specimens.

NAT. ORD. GERANIACEÆ.

Geranium sanguineum L. (= Bloody Cranesbill) terminal, forming very conspicuous masses $\frac{1}{4}$ to 1 inch in diameter composed of the altered leaves; the segments become thickened, and fleshy, and the margin's becoming revolute they form irregular tubes nearly smooth externally and green or yellowish with their tips deep red; internally the tubes are loosely filled with white hairs among which live multitudes of a pale green mite, *Phytoptus Geranii*. The galls are common at Muchalls and elsewhere on the Kincardineshire coast, in July and August.

NAT. ORD. SAPINDACEÆ.

Acer pseudoplatanus L. (= Plane tree). From the upper surface of the leaf project numerous 'nailgalls,' cylindrical, or rather swollen upwards, $\frac{2 \times 1}{16}$ inch, externally smooth and bright red; they open on the lower surface in a small pit by a narrow hole blocked up with projecting transparent simple unicellular hairs; the interior above is smooth. Galls examined 7/6/75 showed no occupants; others examined 10/7/75 showed multitudes of a mite, *Phytoptus* (*Ceratoneon vulgare* Bremi = *Volvulifex Aceris* Amerling). The galls are common on some trees at Banchory-Ternan.

NAT. ORD. LEGUMINOSÆ.

Ulex Europæus L. (= Whin, Furze, or Gorse). The galls are altered flowerbuds and resemble externally a flowerbud much enlarged and inflated; they are oval, about $\frac{2}{3} \times \frac{1}{4}$ inch, externally green, and covered with pubescence which is whitish towards the base but brown towards the tip of the gall. In the interior is a large cavity in which there is not a trace of the inner whorls of the flower, but the walls are lined with a short white pubescence. Each is tenanted by one larva of *Cecidomyia* (*Asphondylia*) *Ulicis* Trail. (E. M. M. XI. 225, described by Mr. Verrall.) The galls are common on Scotston moor, on the Links, at Nigg, &c. They have been recorded by Mr. Binnie from near Glasgow, and by Mr. Verrall from near London.

Cytisus Scoparius Link (= Broom). A.; the gall is a distorted pod which remains green and seldom grows large; part of it towards the base becomes inflated forming an oval swelling about $\frac{1}{3} \times \frac{1}{8}$ inch, with rather thin walls, and no trace of the seeds. Each gall contains from 2 to 10 larvæ of *Cecidomyia* (*Asphondylia*) *Sarothamni* Law. They are abundant around Aberdeen, at Banchory-Ternan, in Glengairn, at Alford, at Inverurie, on Scotston moor, &c.

B.; The gall is a flowerbud which remains green, though more than half the size ($\frac{1}{4} \times \frac{1}{8}$ inch) of a mature flower bud, it is smooth externally and oval in form. It arises from the axil of a bract among the flowers on a flower-bearing branch, (often 2—3 on a single branch), and frequently shows sepals surrounding its base, but no other part of the flowers can be distinguished. The central cavity is pretty large, and is tenanted by one (or more?) larva of *C. Sarothamni*; common at Banchory-Ternan, and on Scotston moor.

C.; tubular galls arise in the axils of the leaves towards the tips of the apical branches; they are budlike, $\frac{2-3}{8} \times \frac{1}{2}$ inch, flattened cylindrical, externally green, and smooth or somewhat ribbed; they are bilabiate and open above, and on longitudinal section present a smooth-walled cell below, while the walls are lined with white hairs above, decreasing towards the entrance. Each cell is tenanted by 1 orange larva of a species of *Cecidomyia*. The galls are common at Muchalls, at Rubislaw, at Banchory-Ternan, at Inverury and on Scotston moor.

Trifolium repens L (= White Clover). One (or more) of the leaflets remains folded (conduplicate) and becomes hard, rather fleshy, and inflated towards the midrib; the inflated part is yellowish-green, but the gall is not at all conspicuous; each is tenanted by one white or reddish larva of *Cecidomyia Trifolii*, Fr. Law. The galls are abundant near Old Aberdeen.

Anthyllis Vulneraria L (= Wound-wort, or Kidney vetch). The gall is

not conspicuous consisting only of a flowerbud which becomes somewhat inflated, and remains unopened while the other buds in the head are in flower, but externally differs little from an ordinary flowerbud. It also becomes fleshy and hard, (the calyx alone excepted); each contains several orange larvæ from which I have reared *Cecidomyia (Diplosis) Loti, De Geer*. The galls are common on the sandhills along the coast.

- Lotus corniculatus** L. (= Crowsfoot, or Bird's-foot-trefoil). A. The galls like those on the last mentioned plant are deformed flowerbuds which either do not flower at all, or produce a very much distorted flower. They become much inflated ($\frac{1}{3} \times \frac{1}{2}-\frac{1}{4}$ inch) ovate, fleshy, smooth externally, and deep red on the side most exposed to light, elsewhere yellowish. Internally all the organs are present, but they are much thickened, and between them live several larvæ of *Cecidomyia (Diplosis) Loti, De Geer*. (Sometimes a larva of one of the Tortrices? is also to be found inside as an inquiline). The galls are abundant on the sandhills along the coast; I have also found them at Muchalls, and in Glengairn.
- B.; The galls are terminal, and consist of an ovate cluster of imbricate leaflets which are slightly thickened and fleshy, but do not otherwise differ from young healthy leaves. The gall is about $\frac{1}{2} \times \frac{1}{3}$ inch. It contains one or more reddish orange larvæ of *Cecidomyia (Loti De Geer?)*. Occurs along with the last.
- Lotus major** Scop (Narrow-leaved Bird's-foot-trefoil).—On this plant I have found galls like A. on *L. corniculatus*, *L.* consisting of swollen flowerbuds which become hard and fleshy, deep red on the side exposed to the light, and usually do not attempt to flower. They enclose several orange larvæ of a *Cecidomyia* (probably *C. Loti De Geer*). At Murcar, near Aberdeen, in August.
- Astragalus hypoglottis** L. (= Purple Milkvetch).—The gall consists of the leaves of the terminal (or axillary) buds, the leaflets of which remain folded (conduplicate), and become hard, fleshy, and somewhat inflated; externally they are light green, and usually are covered with whitish hairs. Each leaflet is inhabited by one or more larvæ of *Cecidomyia (Onobrychidis, Bremi?)*. The galls are conspicuous as they form masses sometimes over $\frac{1}{2}$ inch in diameter, sometimes so compact that the individual leaflets can be made out only with some difficulty. They are abundant on the coast south from the bay of Nigg.
- Vicia sylvatica** L. (= Wood-vetch).—The galls consist of individual leaflets, which are affected as in the last species, but less markedly so; the swelling and thickening is but slight; their colour is reddish-brown, tinged with green. Frequently several leaflets on one leaf are affected, and it is usually the middle leaves that are attacked. Each leaflet contains several white larvæ of *Cecidomyia (Onobrychidis Bremi?)*. Not uncommon at Muchalls in August.
- Vicia Sepium** L. (= Bush-vetch).—The galls like those on *Astragalus hypoglottis*, form a terminal mass, the leaflets in which are folded upwards, inflated, hard, fleshy, and green, or greenish-yellow. Each contains one or more white or orange larvæ of *Cecidomyia (Onobrychidis, Bremi?)*. I have found these galls on *V. sepium* at Banchory-Ternan, and at Braes of Gight in Fyvie.
- Vicia Cracca** L. (Tufted-vetch).—A. gall quite similar to that just described on *V. sepium*. I have found it near Aberdeen, at Muchalls, and at Ballater.
- B. Galls of *Apion Gyllenhallii, Schk.* They are swellings of the stem

just above a node, or of the base of a branch, or of the base of a petiole or of a peduncle; the part affected becomes swollen till it reaches about twice its normal diameter, but hardly alters in appearance otherwise. The walls are thin, and enclose a rather large cavity, in which lives a white larva. The galls are not rare in various localities near Aberdeen, and also at Cluny, on Donside, in July and August, during which months the beetles emerge from them.

Lathyrus pratensis L. (= Meadow-vetch).—The galls are leaflets affected as in *Vicia*, but are usually of rather larger size, and are reddish brown in colour. They are usually found in sets of 3 in the axils of the leaves towards the tip of the stem. Each contains two or three orange larvæ of *Cecidomyia*. The galls are common at Muchalls in autumn.

NAT. ORD. ROSACEÆ.

Prunus communis Huds. var. *spinosa* L. (= Sloe, Blackthorn) A.—The galls are usually situated along the margin, more rarely scattered over the lamina. They project on both surfaces, are more or less irregular in form, but (unless two or more are united) seldom exceed $\frac{1}{8}$ inch in diameter. They are naked, and reddish-brown above, paler below. They open on the upper surface by a narrow slit, the margins of which are sparingly covered with simple hairs. The central cavity is lined with hairs, among which live numerous mites *Phytoptus* (= *Cephaloneon confluens*, *Bremi* = *C. hypocrateriforme*, *Bremi*). The galls are common almost wherever the plant grows.

B., 'Nail Galls,' obovate, attached by a narrow base to the upper surface of the leaf, in size about $\frac{1}{16}$ — $\frac{1}{8} \times \frac{1}{12}$ inch, reddish-brown, wrinkled, somewhat downy, and open by a small hole on the lower surface. They are lined with hairs, among which live *Phytoptus* (= *Ceratoneon attenuatum Bremi*). Usually several galls occur on a leaf. They are less common than the last.

Prunus Padus L. (= Bird Cherry).—The galls are quite like B. on *P. communis*, save in being slighter and naked; they are formed by the same species of mite. On a bushy plant growing beside the Dee, at Banchory, overshadowed by other bushes, I found a form of this gall more slender than usual ($\frac{1}{6}$ — $\frac{1}{5} \times \frac{1}{12}$ inch), and quite green. The galls are abundant at Banchory, in Glengairn, and in Braemar.

Spiræa Ulmaria L. (= Queen of the Meadow, or Meadow Sweet).—The galls are scattered irregularly over the lamina, and are top-shaped, the rounded part projecting from the upper surface, the sharp apex projecting below; the upper part is green or yellowish and smooth, or slightly wrinkled. The galls are about $\frac{1}{12}$ — $\frac{1}{8}$ inch in diameter. Each is occupied by one red larva of *Cecidomyia Ulmaria Bremi*. They are abundant almost everywhere.

Rubus fruticosus L. (= Bramble).—Some of the pinnæ remain folded (conduplicate), and become somewhat thickened here and there along their midribs; each inflated portion is occupied by one or more orange larvæ of a *Cecidomyia*. They occur, in autumn, near Aberdeen.

Potentilla Tormentilla Sibth. (= Tormentil).—The gall is a swelling on the stem, situated usually just above a node. It is irregularly rounded externally, but varies in form, as several are often united. The surface is slightly pubescent, and is purplish-brown, and wrinkled when dry. On section it is found to contain one or

more oval cells, each about $\frac{1}{2}$ inch long, surrounded by a compact cell wall, outside which is a thicker layer of looser and somewhat fibrous tissue. Each cell is inhabited by a larva of *Zenophanes Potentillæ*, Vill. Dr. Vice gave me a specimen, found by him on Brimond Hill.

Rosa spinosissima L. (= Scotch Rose) A., Galls of *Rhodites spinosissima*, Gir.—There are several chief varieties. *Var. a.*, the simplest form, is a round gall, about $\frac{1}{8}$ inch diameter, situated on a leaflet projecting above and below, smooth, and bright red above; each contains a single central cell, closely surrounded by a broader layer of looser, but woody tissue. Sometimes the whole leaflet is so altered that only a narrow dentated fringe remains to indicate the margin. *Var. b* is the same as *Var. a.*, save in being larger, more irregular in form, and containing several cells. *Var. c* is situated on the young twigs, and may contain one or more cells. *Var. d* is situated on the calyx of the fruit, from which it projects as a roundish or obovate body, $\frac{1}{8}$ - $\frac{1}{2}$ inch in diameter, and containing one or more cells. Each cell contains one larva. The galls are very conspicuous, and may be found from August to October on the bushes, or during the winter and spring on the ground. They occur on Murcar Links, at Muchalls, at Banchory, from Ballater to Balmoral, &c. Mayr states (*Die Europ. Cynipiden-Gallen*, p. 16), that these galls also occur on *Rosa canina* L., but I have never found them on this species.

B. These galls are globular, about $\frac{3}{8}$ inch diameter, smooth, bright red, and contain a pretty large cell, tenanted by one larva of *Rhodites (Eglanderia, Hart.?)* They are attached to the upper side of the leaflets by a narrow base. They occur rather sparingly on Murcar Links, at Banchory, Abergeldie, &c.

Rosa villosa L. (= Villous Dog Rose). } As the galls on these species
Rosa Canina L. (= Common Dog Rose.) } are identical, I shall describe them together.

A. Galls of *Rhodites Eglanderia, Hart.* Externally like B. on *Rosa spinosissima*, but sometimes a few bear bristles, and are sometimes dark-green in colour; the walls are very thin, and yield to pressure. These galls are common wherever the plants grow. Sometimes they are attacked by inquilines when they increase in size, become somewhat flattened and irregular in shape, and their walls become hard, thick, and irregular, and enclose several cells, while the central cavity becomes very small. This abnormality was described by me as possibly distinct in the *Scot. Nat.*, I., 125 (c).

B. ('Bedeguar') Galls of *Rhodites Rosæ* L. They are situated on the midribs of the leaflets, on the petioles, or on the branches; in the former situations they are usually one-celled, in the latter they form masses $\frac{1}{2}$ to $1\frac{1}{2}$ inches in diameter. They are covered externally with long, mossy-looking branched green, yellow, or red filaments, soft when young, but afterwards stiff and erect. They consist of a rather hard, woody tissue, amidst which are situated one or more (often many) cells, each occupied by one larva. They are much infested by parasites and inquilines. These galls are sometimes abundant where they occur, as at Muchalls, Stonehaven, Banchory, Alford, &c.

C. Galls of *Cecidomyia Rosæ, Bremi.* They are like those of *C. trifolii* on *Trifolium repens* in origin, and much the same in appearance, but the inflated part is reddish-brown. Each contains one (or more) white larva. They are common at Muchalls, at Banchory, in Strathdon, above Ballater, &c.

Pyrus aucuparia Gaertn. (= Rowan, or Mountain-ash). The galls are blisters on the leaves, projecting chiefly below, but more noticeable on upper surface, at first as small yellow spots, which increase in size, and finally become brown and wrinkled; below they are dull yellowish green. The space between the upper and lower surfaces is hollow, and is nearly filled with interlaced threads, among which live numbers of mites = *Phytoptus* (= *Typhlodromus Pyri* Scheut?). The patches are not large individually, but are usually very numerous on a leaf, and produce an appearance not unlike some forms of skin disease (e.g. Eczema). They are common in July and August at Parkhill, Denmore, Hazelhead, Banchory, Braes of Gight, &c.

Pyrus Aria L. (White Beam-tree). On the leaves occur galls quite like those just described as occurring on *P. aucuparia*; they are probably the work of the same species of mite, *Phytoptus*. They were abundant on a small tree in Rubislaw Quarries in August.

Crataegus Oxyacantha L. (= Hawthorn or White thorn). Here and there the margins of the leaves are rolled downwards and thickened, forming pale greenish yellow tubes lined with hairs among which live mites, = *Phytoptus* (= *Erineum Oxyacanthæ* Am.) These galls are not uncommon at Banchory and elsewhere.

NAT. ORD. UMBELLIFERÆ.

Pimpinella Saxifraga L. (= Burnet-Saxifrage) inflated seeds. One or both seeds become inflated, rounded, and about $\frac{1}{2}$ inch diameter; they are smooth, green, thin walled, and contain a large cell in which lives one (or more) larva of *Cecidomyia* (*Asphondylia*) *Pimpinellæ* Löw. Usually several occur in each umbel, and are very readily detected; they occur during the months of August and September. I have found them at Braes of Gight and at Banchory in abundance.

Heracleum Sphondylium L. (= Cow Parsnip). The segments of the young root- or stem-leaves remain folded and somewhat distorted, but without further change, and in hollows near the chief vein live several white larvae of *Cecidomyia Heraclei* Kalt? The galls? are not uncommon at Muchalls, near Old Aberdeen, &c., during the summer.

NAT. ORD. RUBIACEÆ.

Galium verum L. (= Lady's Bed-straw). There are several distinct forms of galls on this plant, most of them common.

- A. Galls of *Cecidomyia Galii*, Winn. occur on the stems about the nodes, usually in groups of three or more, forming pretty large masses, from the midst of which leaves, flower-buds, &c., frequently grow; separate galls are $\frac{1}{2}$ — $\frac{1}{3}$ inch in diameter, and are rounded, flattened, or somewhat irregular; externally they are yellowish green, or pink, smooth and shining as if greasy; when mature they split open irregularly, but the mark is apparent some time before; their substance is soft externally and rather loose, a denser dark green layer surrounding the cell which is small; each is tenanted by one or two orange larvae. The galls are common everywhere, especially in dry spots, throughout summer.
- B. The galls occur singly in the axils or form a mass at the end of the stems in which the individual galls are indistinguishable. They are readily distinguished from A. by their smaller size, dull

green or dull reddish and opaque surface, thinner but more compact walls, and larger cell; they split open like A., and are also probably the work of *C. Galii, Winn.* They are common during the summer and autumn at Muchalls, and on the Links.

- C. Projects from the stem, usually a short distance above a node; consists of a cone flattened laterally with the apex turned downwards; it is about $\frac{1}{2}$ inch long; the outer surface is green, naked, and wrinkled; the sides of the cone are very thin; each is tenanted by one white larva of *Cecidomyia*; they are common at Muchalls, near Old Aberdeen, &c., in June and July.
- D. Terminal, being a tuft of leaves spirally imbricated, the outer ones green and fresh, the inner withered; in the centre live several larvae of *Cecidomyia*. The galls are not uncommon near Old Aberdeen, at Muchalls, &c., in the latter part of summer and autumn.
- E. The galls are altered flowerbuds; they are terminal or are dispersed among the flowers and fruits on a flowerstalk; they are ovate, $\frac{1}{12}$ — $\frac{1}{2} \times \frac{1}{6}$ — $\frac{1}{3}$ inch, green, naked, much wrinkled, and inclose a very irregular and narrow cavity, in which live multitudes of mites = *Phytoptus*. These galls are very abundant all along the coast, in Braemar, in Strathdon, &c.
- F. The leaves in the 2 or 3 uppermost whorls are all affected; the margins become revolute till they meet below the midrib; the leaves become thickened and slightly distorted in appearance, and the colour changes to a yellowish green. On microscopic examination, the interior of the tubes formed by the revolute margins is found to be studded with short conical hairs, between which there live mites in considerable numbers (*Phytoptus*); not uncommon near Old Aberdeen in September. The effect produced by the mites is so slight, that it is readily overlooked.

Galium palustre L. (= Marsh Bedstraw).

- A. Terminal, composed of a rosette (about $\frac{1}{6}$ — $\frac{1}{8}$ inch across) of leaves which are slightly fleshy, smooth, and purplish in colour. Among the leaves live one or two white or orange larvae of *Cecidomyia Galii Winn* (?). The galls are common at Banchory, in September.
- B. Terminal, differ from A in being smaller, the leaves being short, broad, and imbricated over a nearly round fleshy body in the centre, which contains a rather large cavity, in which live several larvae of *Cecidomyia Galii Winn.*; common beside the Loch of Park and at Cluny, on Donside, in July and August.

Galium boreale L. (= Northern Bedstraw).

- A. Terminal or axillary, ovate, $\frac{1}{2}$ — $\frac{1}{6} \times \frac{1}{12}$ — $\frac{1}{8}$ inch; the leaves composing it are closely imbricate, green, and covered with short pale hairs; each gall is occupied by one reddish orange larva of *Cecidomyia*; often several galls occur on one stem. They are common in August and September, in various places along the Dee, e.g., at Ruthrieston near Aberdeen; at Banchory; in Braemar, &c.
- B. The galls consist of a swelling of the stem just above a node, usually irregularly ovate, the broad end below, but bulging chiefly to one side of the stem; about $\frac{1}{2}$ — $\frac{1}{3} \times \frac{1}{2}$ — $\frac{1}{3}$ inch; surface nearly naked, coarsely striated longitudinally; cell rather large, with thin walls; each is inhabited by one larva of *Cecidomyia*, occur sparingly in Braemar.

Galium Aparine L. (= Goose-grass or Cleavers).

- A. Situated like A. and B. on *Galium verum*, on the stem, either at a node, or at the apex. When at a node, they usually include both

stem and branches in a mass, about $\frac{1}{4}$ — $\frac{1}{2}$ inch across, but] without checking their growth; when terminal, they are much larger (up to $1\frac{1}{2} \times 1$ inch), and consist of a mass of stunted and deformed branches, leaves, flower stalks, flowers, and fruit; they are green, but bear a whitish pubescence; they are fleshy, and enclose numerous cells, each occupied by a deep orange larva of *Cecidomyia Galii*, Winn. I have found the galls in August, in hedges, at Kettock's Mill beside the Don, and also near Banchorry.

- B. The leaves, especially towards the apex of the stem are affected and become circinate, or involute on one or both sides, forming irregular tubes, which have a blistered look, and are yellowish green externally; internally they are nearly naked, and are tenanted by numerous individuals of *Phytoptus*. The diseased plants have a look about them readily recognisable even from some distance. I have found these galls in abundance near Muchalls, in August.

Galium saxatile L. (= Heath Bedstraw).

- A. These galls resemble E., on *G. verum* on a smaller scale, being flower buds or fruits swollen or inflated ($\frac{1}{16}$ — $\frac{1}{12}$ inch), and tenanted by *Phytoptus* in small numbers. Occurred sparingly on Murcar Links in August. I have found galled leaves, as on *G. Aparine* (B.), rather common in Orkney, and near Glasgow, but I have not yet detected them in Dee.
- B. Very similar to A. in appearance, size, and internal structure, but is tenanted by one or more orange larvæ of *Cecidomyia*, instead of by mites. It occurs in the same locality as A.

NAT. ORD. VALERIANEÆ.

Valeriana officinalis L. (= Valerian). The galls resemble those on *Rubus*, the midribs of the leaves and leaflets being twisted and thickened, and the leaflets continuing crowded together, with their margins at the base slightly involute and thickened, and pale yellowish green in colour, about and within the bases of the leaflets live several white larvæ of *Cecidomyia*. They can spring two or three inches when touched. The galls occurred in the end of June near Stonehaven, and also beside the Don near Aberdeen.

NAT. ORD. COMPOSITEÆ.

Centaurea nigra L. (= Black Knapweed). Galls of *Trypeta solstitialis*, L.; they are deformities of the ovary, and are very hard and woody, irregularly oval, about $\frac{7 \times 3}{16}$ inch, brownish, and densely covered with short white hairs, enclosing a cell which is wider below, and opens by a small hole at the upper end. Each is tenanted by one larva, about $\frac{5 \times 2}{16}$ inch, truncated in front, strongly ringed and white, save the first two segments, which are horny and dark brown. The flies are easily reared in confinement. Usually only one or two galls occur in each flowerhead, and cause no change in the appearance of the head. They are most easily detected by squeezing the heads between one's finger and thumb. They occur commonly beside the Dee at Banchorry, in August, but I have not found them elsewhere in the district.

Achillea Ptarmica L. (= Sneezewort Yarrow).

- A. Galls terminal, consisting of an abortive and distorted flower shoot, and forming a rounded mass, $\frac{1}{4}$ — $\frac{3}{8}$ inch across, reddish grey and woolly-looking, and half sunk among a circle of leaves;

they are formed of soft woolly tissue, among which are small cavities, each inhabited by one orange larva of *Cecidomyia* (*Hormomyia*) *floricola* Winn. They are common at Banchory, near Aberdeen, Strathdon, Braes of Gight, &c., in autumn.

- B. Occur towards the tip of the stem among the leaves, usually 2 — 6 on each stem; they seem to be abortive leaves; they are ovate, acute, about $\frac{1}{2} \times \frac{1}{2}$ inch, sessile, partly reddish brown, partly greenish, and single celled, and each occupied by one larva of a *Cecidomyia*, that I have not succeeded in rearing. They are common in Autumn, near Aberdeen, at Scotston, Parkhill, &c.

Achillea Millefolium L. (= Yarrow or Millfoil).

- A. Like A. on *Achillea Ptarmica*, but smaller usually, and wants the reddish tinge; it is the work of the same species *C. floricola* Winn. The galls occurred near Aberdeen.
- B. Occur singly on the stem in the axils of the leaves, or two or more close together on the lower part near, or just below ground. They are triangularly ovate (the side next the stem largest and slightly concave), blunt, about $\frac{1}{2} \times \frac{1}{2}$ inch, naked, smooth, and green or purplish-brown. When they reach maturity they split open at the top irregularly. The walls are thick and fleshy, and enclose a small cavity lined with silky hairs, and occupied by one larva of *Cecidomyia* (*Hormomyia*) *Millefolii* Löw. I have found galls near Aberdeen and near Balmoral, in August and September.

Senecio Jacobæa L. (common Ragwort or Wild Tansy).

” *aquaticus* Huds (Marsh Ragwort or Marsh Tansy).

The galls consist of flowerheads, which become swollen to twice their natural size, and fleshy, and remain green like the buds, either never flowering or only showing the tips of the corollae. On making a section, a pretty large cavity is found above the receptacle, and in it are several reddish-orange larvæ of *Cecidomyia Jacobæa* Löw. I have found them in August, commonly on *S. Jacobæa*, in Glen Gairn, Strathdon, and at Braes of Gight, and on *S. aquaticus*, beside the Dee near Aberdeen, on Scotston Moor, and at Braes of Gight. On the latter plant they do not reach so great a size as on the former.

Hypochæris radicata L. (= Cat's ear) consists of a deformity of an ovary, which becomes globular, about $\frac{1}{2}$ inch in diameter, brown, and traversed longitudinally with muricated ridges. The walls are thin, and enclose a cavity inhabited by one white larva of *Trypeta*? I have found the galls once or twice in the end of July on the Old Aberdeen Links.

Hieracium sylvaticum Sm. (= Wood Hawkweed) galls of *Aulax Hieracii Bouché* (*Aulax Sabaudi*, Hart.). They are rounded swellings of the stem, $\frac{1}{2}$ - $\frac{2}{3}$ inch in diameter, and are usually situated where the stem divides into peduncles, which then rise out of the mass, as do also usually one or more leaves; the surface is hairy, but loses the hairs after a time. On section they show compact-walled round or oval inner cells, sunk in a loose pithy tissue. These galls are pretty common in a hollow among the sandhills on Murcar Links in autumn.

Hieracium boreale, Fries. A. Galls of *Aulax Hieracii Bouché*. They are like galls of *A. Hieracii* on *H. sylvaticum* in structure and in appearance, but are usually larger ($\frac{1}{2}$ - $1\frac{1}{4}$ inch across), and are sometimes situated on the peduncle, just below or including the lower part of the flowerhead, or (rarely) project from the receptacle among the flowers. I have found these galls common in August and September beside the Dee at Banchory, and in Glen Gairn.

- B. The gall, like that in *Hypochaeris radicata*, is a swollen ovary, oval, $\frac{1}{6} \times \frac{1}{12} - \frac{1}{8}$ inch, blunt at the ends, surface with four blunt longitudinal ridges, between which are less distinct ridges, hairy; walls hard and woody, enclosing a cell inhabited by a larva of *Trypeta*. Two occurred in a flowerhead gathered at Banchory in August; the affected flowerhead was not altered externally.

NAT. ORD. CAMPANULACEÆ.

Campanula rotundifolia L. (= Bluebell or Harebell). A. Galls of *Cecidomyia Campanulæ* Müller. They are axillary and single, or form a terminal mass irregularly rounded in form, and seldom $\frac{1}{2}$ inch across, with leaves and peduncles growing out of it; the single galls are globular or ovate, and beaked, and enclose a single cell; the masses enclose several cells, each tenanted by one orange larva; externally they are smooth, naked, and green, or dull brownish-green; the walls are compact, but are rather thin. The larvæ also occur in swollen seed vessels. The galls are common in August and September at Muchalls, on the sandhills along the coast, at Scotston, in Braemar, in Glen Gairn, and in Strathdon. They are most numerous usually on stunted plants in sandy places.

- B. Galls of *Gymnetron Campanulæ*, L. They are seed capsules which become much inflated, and irregularly rounded or gibbous and fleshy, but otherwise do not differ in appearance from healthy capsules; the flower is either abortive or it is distorted; each capsule is occupied by one or two black larvæ, which become pupæ in the gall; the beetles emerge the following summer. They occur commonly on the cliffs along the Kincardineshire coast in autumn, and I have also found them sparingly near Kintore.

NAT. ORD. ERICACEÆ.

Vaccinium Vitis-Idæa L. (Cowberry or False Cranberry). Terminal, composed of swollen fleshy imbricate leaves, externally red, smooth, and shining; they enclose a single central cavity; the maker is unknown. I found some specimens in July, 1871, on Morroine Hill, in Braemar, but unfortunately lost them. I should be much obliged for specimens from anyone who may find it. Mr. Cameron has bred from galls on this plant *Nematus crassipes*, Thoms. var. *Vacciniellus* Cam. E. M. M. XII., 190.

NAT. ORD. OLEINEÆ.

Fraxinus excelsior, L. (Ash Tree). Galls of *Cecidomyia (Diplosis) botularia*, Winn. They are situated in the leaflets on the chief vein, and are oval or elongate, projecting chiefly below; they open by a cleft along the vein, bounded by swollen margins, which keep it shut while fresh; the surface is green, smooth, and naked; the texture is fleshy, and they shrivel a good deal in drying; each contains one larva or more, according to its length. The galls are not uncommon in the autumn on trees at Banchory, and at Bridge of Gairn, near Ballater.

NAT. ORD. PLANTAGINÆ.

Plantago lanceolata L. (Common Plantain or 'Carldoddies'). Galls of *Mecinus pyraster* Herbst. They are situated on the scape, usually $\frac{1}{2}$ to 1 inch from the head; in general there is only one on each scape, but sometimes two occur close together; sometimes, but rarely, they occur on the petiole; they are oval, tapering to both

ends, about $\frac{1}{4}$ - $\frac{3}{8}$ \times $\frac{1}{12}$ - $\frac{1}{8}$ inch, are externally like the other portions of the scape with the five ribs of the scape very strongly marked on them, and enclose a rather large cell; each is occupied by a blackish larva which passes through its metamorphoses in the gall; they seem to be much subject to the attacks of parasites. The galls are abundant on the sandhills along the coast during the summer, and also occur at Braes of Gight.

NAT. ORD. SCROPHULARINÆ.

Veronica Chamædrys, L. (= Germander Speedwell). Galls of *Cecidomyia Veronica Bremi*. They consist of the terminal bud, which becomes pinkish-grey, a broadly-ovate mass about $\frac{1}{4}$ inch in diameter, composed of closely imbricated leaves densely covered with pale woolly hairs; between the leaves occur numerous reddish-orange larvæ of the midge: The galls are abundant throughout the district during autumn. Mites also occur in all the galls.

Veronica Serpyllifolia, L. (Thyme-leaved Speedwell). The galls are flower buds which become dilated and swollen, reaching a size of $\frac{1}{12}$ - $\frac{1}{10}$ inch in diameter, and remain in an abortive state, never opening. The colour is paler than usual, but there is no other very noticeable change externally. The parts of the flower internally become thickened and fleshy, and between them live one or more larvæ of *Cecidomyia*. Several galls occur in each inflorescence usually. In Rubislaw Den, near Aberdeen.

Rhinanthus crista-galli L. (= Yellow Rattle). The whole plant, or part of it, is stunted, twisted, and has the leaves crowded together, but otherwise they hardly differ from those of a healthy plant; among the bases of the leaves live numerous larvæ of a *Cecidomyia* that I have not yet succeeded in rearing. Affected plants are common on Scotston Moor in July. This can hardly be ranked as a true gall, as the result produced by the presence of the larvæ is so slight.

NAT. ORD. LABIATÆ.

Thymus Serpyllum L. (= Thyme) A. The whole plant assumes a woolly appearance and a more compact habit, and the leaves are all thickly covered with white woolly hairs, especially the ends of the branches where round knobs (bud-galls) about $\frac{1}{4}$ inch in diameter are found. Between the leaves live multitudes of mites — *Phytoptus* (= *Calycophthora Serpylli* Am.), and sometimes one or more orange larva of *Cecidomyia*. The galls are abundant everywhere.

B. A flower bud becomes inflated to about twice the ordinary size and never flowers, but undergoes little change of form or of appearance. On removing the calyx a sac appears, ovate, blunt, $\frac{1}{8}$ - $\frac{1}{6}$ inch, green with the narrow end pink, thin walled, and enclosing a large cell inhabited by an orange larva of *Cecidomyia*. These galls are common in July on the sandhills on Old Aberdeen Links, but are very inconspicuous, and have to be sought for. Frequently from two to twelve of the flowers on a stalk are affected.

NAT. ORD. POLYgoneÆ.

Polygonum viviparum, L. (= Viviparous Bistort). Galls of *Cecidomyia Persicaria* L.; they consist of the leaf margins which become revolute, thick, fleshy, and reddish-brown or yellow. Usually both margins are affected along part or the whole of the leaf. The larvæ (orange) undergo their metamorphoses (at times at least) in

the galls. They occur at Braemar, where Dr White first detected them. The same species of midge produces similar galls in Perthshire on *Polygonum Persicaria* L., and on *P. amphibium* L., but I have not seen specimens on either plant from this district.

NAT. ORD. URTICEÆ.

Urtica dioica L. (= Common Nettle), galls of *Cecidomyia Urticæ* Perris. The galls chiefly occur on the leaves at the apex of the stem, one on each side of the midrib at the base of the leaf; sometimes they occur on the leafstalks or on the peduncles of the flowers, or sometimes the apex of the stem bears a mass of them. They are irregularly globular, about $\frac{1}{4}$ inch in diameter, brownish-green above, pale green below, rough and hairy, fleshy, and contain a single cell, usually occupied by several white larvæ. When the galls are situated on the leaves they project from both surfaces. They are abundant everywhere.

NAT. ORD. SALICINÆÆ.

Populus tremula L. (= Aspen) A., galls of *Cecidomyia (Diplosis) Tremulæ* Winn. They form swellings on the petiole anywhere from its base to where it joins the blade of the leaf, sometimes even encroaching on the leaf blade; they are seldom situated on the twigs. They are irregularly rounded, about $\frac{1}{4}$ inch in diameter, more or less tapering at the ends, and usually more projecting at one side; the surface is smooth, and reddish or yellowish green; the sides are thick, hard, and woody, and the cell is rather small; when the larva is mature the gall splits open at the top. The galls are not scarce in the Den of Maidencraig, near Aberdeen, in Glen Gairn, and in Braemar in July and August.

- B. Galls of *Phytoptus* (= *Heliaceus Populi* Kirch.). They are situated in pairs on the upper surface just where the leafstalk joins the leafblade, less often they stand singly or in threes; they are irregularly rounded, $\frac{1}{8}$ - $\frac{1}{2}$ inch in diameter, surface naked, wrinkled, and green or reddish brown; the walls are fleshy, and enclose an irregular cavity in which live multitudes of the mites. I have found them common at Ballater, in Glen Gairn, and in Braemar throughout summer.
- C. Galls of *Batoneus Populi*, Kirch. They form irregularly rounded masses $\frac{1}{2}$ -3 inches in diameter, attached to the branches at the base of young twigs, or to the trunk underground. When fresh they are green or red, are covered with a downy pubescence, and are rather fleshy; after a time they become hard, dry, and friable; they contain many irregular cavities in which live multitudes of the mites. These galls are common during the summer in Braemar, and at Inver, near Balmoral.
- D. *Erineum* growths on the leaves on the lower surface (= *Erineum Populinum*, Pers.), indicated on the upper surface by one or more raised blisterlike yellowish-green patches, readily seen. On the under surface is a recess lined with short hairs (reddish or brownish in colour), among which live mites, *Phytopti*. Affected leaves are abundant at Inver, near Balmoral, in August.

Salix fragilis L. (= Crack Willow, or Withy) } Galls of *Nematus gallicola*,
alba L. (= White Willow) } West. and Steph.

" (vide Sc. Nat. II. pp. 11-15, pl. 1). The galls are very noticeable on the leaves, either singly or in a row along each side of, but not touching, the midrib; they are oval, usually about $\frac{1}{3} \times \frac{1}{2}$ inch, and project chiefly below; the central cavity is at first small and

- irregular, but the fleshy walls are eaten by the larva till at last only a thin shell is left, through which it eats its way, and goes underground to spin up. The galls on *S. fragilis* are usually naked, rather rough, and bright red above, paler below; those on *S. alba* are usually hairy below and pale green above. These galls are common in the district almost wherever the plants grow.
- Salix caprea* L. (= Common Sallow or Sauch) A., galls of *Cryptocampus Saliceti* Fall. = *C. mucronatus* Hart. They are swellings of the leaf stalks (usually in their basal half), which become nearly twice their proper thickness. The galls are usually oval, tapering at both ends, about $\frac{1}{3}$ inch long, and their surface is smooth, green, and shining; the sides are thick and rather hard, and the cavity is small and irregular at first, but is enlarged by the walls being eaten away by the inmate. I have seen these galls only on one bush in Glen Gairn in August.
- B. Galls of *Nematus gallicola*, Westw. and Steph., like those on the leaves of *Salix fragilis*, but smaller, green, and projecting rather less from the leaf. I found them at Fyvie in July, but they are not very common.
- C. Galls of *Nematus pedunculi*, Hart. These galls are round, $\frac{3}{16}$ - $\frac{1}{8}$ inch in diameter, attached to the midrib below, but appearing on the upper surface of the leaf; the surface is nearly naked, or is thinly covered with short whitish hairs, and is red or green in colour; the walls are fleshy, and when the larva is mature the gall is a mere shell containing a cell filled with frass. They are common in Glen Gairn in August.
- D. Twiggalls of *Cecidomyia salicina*, Schrk? They are $\frac{1}{4}$ - $\frac{3}{4}$ \times $\frac{1}{4}$ - $\frac{1}{2}$ inch, naked, slightly ridged longitudinally, and brown (when dry). On section they are found to be chiefly composed of a swelling of the pith, in which there are numerous oval cells, each tenanted by one larva. They occur occasionally near Aberdeen.
- E. 'Rosette galls,' the work of *Cecidomyia Rosaria*, Löw probably, but I have not succeeded in rearing the maker. The galls are situated at the ends of the branches, and consist of a bud, the leaves of which remain sessile and crowded, forming a conspicuous rosette an inch or more across. On section there is found to be a cavity in the heart of the gall, filled almost with hairs, amongst which lives one or more larvæ. They occur in August near Aberdeen.
- F. consist of masses grouped together along the midrib, and are a development from the midrib and chief veins; they are rarely separate, but when they are so they are conical, the base projecting very slightly on the upper surface, the apex below, $\frac{1}{12}$ - $\frac{1}{8}$ inch in diameter, sparsely haired, dark green above, pale green below; walls hard and woody, enclosing a cell which opens at the apex to allow the escape of the larva when mature. The maker is perhaps *Cecidomyia Capree* Winn. The galls are common.
- G. Galls of *Cecidomyia Capree* Winn. They are small bodies scattered over the blade of the leaf usually on the side veins, sometimes in considerable numbers; they are conical (about $\frac{1}{16}$ inch in diameter), the base appearing on the upper surface, the apex projecting below; colour, pale yellowish green; walls hard and woody, enclosing a very small cell, tenanted by one larva. The galls occur rather commonly in Glen Gairn in August.
- H. Galls of *Phytoptus*. They are scattered irregularly over the surface of the leaf, from which they project as irregularly rounded masses $\frac{1}{16}$ - $\frac{1}{12}$ inch in diameter, deep red, naked, and covered with small

warts; on the lower surface they show a small opening surrounded by woolly hairs, sometimes projecting slightly, but usually sunk in a hollow of the leaf. The inner cell is irregular in form. The sides are covered with small warts. Each is inhabited by a number of mites. The galls are rather common in Glen Gairn in autumn.

Salix cinerea L. (Grey Willow or Sallow) A., galls of *Nematus pedunculi* Hart. They are like C. on *S. caprea* (formed by the same insect), but are more woolly and usually smaller in size. They are common near Aberdeen.

B. Rosette galls similar in every way to those on *S. caprea* (E.) near Aberdeen.

C. Galls of *Cecidomyia salicis* Schrk? The galls are swellings on the twigs, sometimes so slight as to be imperceptible till the insect has emerged; they usually occur just below the buds, and on section show a long narrow cell, $\frac{1}{4} \times \frac{1}{16}$ inch, and are inhabited by one or two larvæ; usually several cells occur in a twig. They occur not uncommonly near Aberdeen.

Salix aurita L. (Round-eared Sallow) A. Galls of *Nematus pedunculi* Hart, like the galls of this species on *S. caprea* (C).

B. Rosette galls, like E. of *S. caprea*.

C. Like F. of *S. caprea*.

D. Like G. of *S. caprea*—galls of *Cecidomyia Capreae* Winn.

E. *Phytoptus*-galls, like H. on *S. caprea*.

All these galls are common in many places in the district.

Salix repens L. (Dwarf Silky Willow) A., galls of *Nematus*. They are round, or slightly flattened, $\frac{1}{2}$ inch in diameter, attached to the lower surface of the midrib, but appearing on the upper surface of the leaf on a level with it; smooth, naked, greenish on one side, red elsewhere. Occupant, a saw-fly larva, common in Glen Gairn, Braemar, Strathdon, &c.

B. Twiggalls of *Cryptocampus pentandrae* Retz? They are swellings $\frac{1}{4}$ - $\frac{1}{2} \times \frac{1}{12}$ - $\frac{1}{4}$ inch, rounded or oval, tapering to both ends; their surface is like that of an ordinary twig. On section they are found to enclose a single cavity, in which lives one saw-fly larva. They were sent me from Braemar by Dr. White, in September.

C. *Phytoptus*-galls, like H. on *Salix caprea*. Occur in Glen Gairn.

Salix nigricans Sm. (Dark-leaved Willow). Bean galls situated in pairs on the leaves, one on each side of the midrib; they are green, naked, and shining; the maker is a saw-fly (*Nematus*). They are rather common in Glen Callater.

Salix phylicifolia L. (Tea-leaved Willow) A. Bean galls on the leaves occurring in pairs, one on each side of the midrib; they are oval, about $\frac{1}{2} \times \frac{1}{8}$ inch, and do not project from the leaf on the lower surface; their surface is naked, slightly wrinkled, and dark green with streaks of reddish-brown; the walls are rather leathery, and enclose an irregular cavity tenanted by a saw-fly (*Nematus*?) larva. Abundant in July and August in Glen Gairn, in Braemar, and in Corgarff.

B. Pea galls similar in form and in attachment to those of *N. pedunculi*, (B) on *S. caprea*. They are about $\frac{1}{2}$ inch in diameter, surface smooth or slightly warty, and bright green. Maker, a saw-fly (*Nematus*). Abundant in same localities as last (A).

Salix viminalis L. (Osier), galls of *Cecidomyia marginem-torquens*, Bremi. The margins of the leaf, for a length of an inch or more on one or both sides, are revolute (sometimes even to the midrib), thickened,

fleshy, hard, yellowish, and smooth, forming a tube in which live usually several of the orange larvæ. When distinct, the galls are usually about $\frac{1}{4} \times \frac{1}{16}$ inch. They are common around Old Aberdeen.

Salix Lapponum L. Beangalls like A. on *S. phylicifolia*, but smaller ($\frac{1}{4} - \frac{1}{8}$ inch), somewhat pubescent, and green or red. The maker is a saw-fly. They are common in Glen Callater in July and August.

Salix arbuscula, L. Beangalls like those just described, but projecting more from the leaf, and smooth. They occurred on one bush on Little Craighendal.

Salix herbacea L. Peagalls like those (B) on *S. phylicifolia*, but smaller ($\frac{1}{8} - \frac{1}{16}$ inch in diameter), and bright red in colour. Maker, *Nematus herbaceæ*, Cameron. They occur singly on the leaves, but often a good many on a plant; they are not uncommon in Glen Callater in July.

Salix purpurea L. (Purple Osier) A., galls of *Nematus Vollenhoveni* Cameron. They are peagalls about $\frac{1}{4}$ inch in diameter attached to the midrib below, but also showing slightly through the leaf; they are naked, smooth, and green or yellowish green, often redcheeked, or covered with small warty yellow tubercles; the walls are rather thin; each is tenanted by one larva; often from two to six galls occur on a leaf. They are common at Rubislaw, near Aberdeen, and at Strachan, near Banchory, in July.

B. Galls of *Cecidomyia Salicis* Schrk. They are swellings of the younger twigs, and sometimes reach a length of $\frac{1}{2}$ to 2 inches, and a breadth four or five times greater than normal; they are rounded or oval in form, green, naked, and smooth or wrinkled. On section the wood tissue of the twig seems unchanged, the pith alone being enlarged and hollowed out into oval cells, separated by narrow partitions. These galls are common at Strachan, near Banchory. From galls gathered in the beginning of May I reared the insects in the end of May.

NAT. ORD. CUPULIFERÆ.

Quercus Robur L (Oak).—The galls on this tree are so numerous as to require sub-division into groups for convenience of reference. I therefore divide them into—1, galls of Cynipidæ (gall-flies), and 2, galls of Cecidomyidæ (gall-midges).

Div. 1, Galls of Cynipidæ, *Sub. div.*, Budgalls on trunk.

A. Galls of *Trigonaspis megaloptera* Panz. They are attached to the trunk anywhere from a little under the ground to about six feet up the trunk, either singly or in groups (but not grown together), and can usually be made out to be placed on a rudimentary branch, though often apparently sessile. They are usually sunk among the moss, with which their bright red colour forms so vivid a contrast that they are readily detected. They are spherical, usually with a short, wart-like tip, $\frac{1}{16} - \frac{1}{8}$ inch diameter (irregular from pressure, when in groups) smooth and velvety, naked; walls thick and juicy, shrivel up after escape of insect, cavity small. Appear in May, insects emerge in June. Common in Corbie Den, at Culter, and in Parkhill woods.

Sub-div., Budgalls on the Branches.

B. Galls of *Cynips Kollari* Hart. These galls, well-known in England by the name of 'Devonshire Galls,' are believed to have been in-

roduced into Devonshire, where they first appeared in Britain, about forty years ago. Since that time they have spread northwards, and are now common in various places in the southern half of Scotland. Dr. Vice told me, in April, 1875, that he had seen specimens a few days before on a small tree at Culter; and Mr. Taylor has given me two galls found by him this year at Kingcausie. I have myself seen them abundant at Murtle, and also found one at Parkhill. They are very like marbles, scattered singly, or in small groups, on the younger twigs, $\frac{1}{2}$ -1 inch in diameter, smooth, or bearing a few warty knobs. They are soft at first (till September), but gradually become harder, and those gathered in winter retain their form perfectly. On section, they are found to consist of a thin, hard rind, enclosing a thick layer of rather loose and soft tissue, closely united to a more compact but undefined cell-wall; the central cell is small.

- c. Galls of *Aphilothrix gemmæ* L. (*Cynips fecundatrix* Hart)—‘Artichoke galls’. They resemble miniature artichokes in appearance ($1 \times \frac{2}{3}$ inch), as they are composed of an acorn cup, the scales of which are closely imbricate, enlarged, and covered with short, pale hairs, but have brown margins. In the centre is an inner gall, about $\frac{1}{3}$ inch long, in which is a rather large larval-cell. The inner gall drops to the ground in autumn, and the insect emerges next year; the outer gall remains on the branch in a withered state often for more than a year. These galls are common at Banchory, near Ballater, at Parkhill, and at Inverurie.
- d. Galls of *Andricus terminalis*, Fabr. They are generally known as ‘Oak-apples,’ on account of their forming masses from $\frac{1}{4}$ inch to 3 inches across, covered when fresh with smooth soft skin yellowish in colour, save on the side exposed to the sun, where it is red. They are usually situated on the ends of the branches (less frequently they are axillary, and are small); they are irregularly rounded or oval. The skin is very thin, and covers a fleshy mass, towards the centre of which there are many well-defined small oval larval-cells, formed of hard, compact tissue. The galls appear in early summer, but remain on the branches for a year or more. Old galls consist only of the mass of cells, the soft parts having fallen away. They are very subject to attacks of parasites and inquilines. They occur abundantly at Banchory, and near Ballater.
- e. Galls of *Andricus infusator* Hart. They are terminal (rarely axillary), swellings on the young branches, ovate, about $\frac{1}{4} \times \frac{1}{5}$ inch, smooth externally, or with leaf-scales, or small leaves, attached to them, and have a small hole at the blunt apex, closed by a thin membrane. The walls are thin, and enclose a large cavity, at the bottom of which is a dark brown very thin walled ovate inner gall (about $\frac{1}{2} \times \frac{1}{8}$ inch), in which lives the larva. These galls I found plentiful on an oakbush near Ballater. Their formation, as Herr Mayr suggests, is owing to the female depositing an egg in the terminal bud, whereby the bud is checked in its growth, while the surrounding parts grow up and cover it.

Sub-div., Leaf Galls.

- f. Galls of *Biorhiza renum*, Hart. They are attached to the side-veins on the lower surface of the leaf (usually in pairs, one on each side of the vein), usually many occurring on a leaf. They appear in September, and at first are very small ($\frac{2-4 \times 1-2}{64}$) and kidney-shaped. In October they swell to three or four times their former

size, become globular, and readily fall off the leaf. They are smooth, naked, green (becoming paler), and are thin walled. They are common in Parkhill woods. The insects pass the winter in the galls, from which they emerge next summer.

- G. Galls of *Dryophanta divisa* Hart. Like the last, they are attached to the side veins on the lower surface, but they occur singly, though each leaf usually bears several. They are flattened spheres $\frac{1}{8}$ to $\frac{1}{4}$ inch in diameter, light green, yellowish, or reddish, smooth, or slightly warty. The walls are hard and woody, but thin. These galls are common almost wherever oaks occur.
- H. Galls of *Andricus curvator*, Hart. They occur in the lamina (on the mid rib or side veins), or on the leaf stalk, in which case they usually remain attached to the branch when the leaves fall; when in the lamina, they project on both surfaces. They are irregularly rounded, about $\frac{1}{4}$ inch across, smooth, and yellowish-green above, deeper green below. The walls are hard and woody, retaining their form when dried, but they are rather thin. They contain an inner gall about the size and form of a whin-seed, brown, and very thin walled; it is rather loosely attached to some point on the outer gall. Sometimes two, or more, of these galls are united, and they then have a common cell, in which are two, or more, inner galls. The larvæ live in the inner galls; the insects emerge in July. These galls are common in many places in this district, Muchalls, Banchory, Ballater, Parkhill, &c.
- I. Galls of *Neuroterus numismatis* L. (= *N. Reaumuri* Hart). Commonly known as 'Silkbutton galls'. They are situated on the lower surface of the leaf, often in large numbers. They are round, about $\frac{1}{8}$ - $\frac{1}{6}$ inch across, flat, depressed in the centre, and are covered with adpressed silky brown hair, so that they closely resemble a small, silk-covered button. They contain a central cell, in which the larva lives, and in which it undergoes its metamorphoses, after the galls fall from the leaf. They are abundant in autumn at Banchory, Parkhill, Inverury, &c.
- J. Galls of *Neuroterus lenticularis* Ol. (= *N. Malpighii* Hart.) known as 'Oak Spangles' from their form. They occur sometimes in immense numbers on the lower surface of the oak leaves. They are round disks at first, very flat, with only a small raised knob in the middle of the exposed surface; they gradually become thicker, and during the winter, when living on the ground, their thickness is nearly = half their diameter ($\frac{1}{2} \times \frac{1}{12}$ inch). They are attached to the leaf by a very narrow pedicel, and fall off when mature. The surface next the leaf is smooth; the other surface is covered with tufts of short, rusty pubescence. The galls are abundant wherever oaks occur in the district.
- K. Galls of *Spathogaster baccharum* L. 'Currant-galls'. They are globular, about $\frac{1}{4}$ inch in diameter, attached to the lower surface of the leaf, projecting slightly above also, or to the catkins, in which case they look like a bunch of white currants. They are smooth, naked, semi-transparent, green, or red in part or entirely. The walls are very thick and fleshy; the wall of the cell is hardly distinct from the general substance of the gall. These galls appear in May, and the insects emerge in June and July, after which the galls shrivel up and drop off. They are abundant at Muchalls, near Aberdeen, Banchory, Parkhill, &c., &c.
- L. Galls of *Spathogaster vesicatrix*, Schlechtendal. These galls are sunk in the substance of the leaf, at first forming merely a round disk

about $\frac{1}{2}$ - $\frac{1}{8}$ inch diameter; afterwards they project in a low cone on both surfaces, and enclose a pretty large cell, as the walls are very thin. When mature they are readily detected, being much paler than the rest of the leaf; but before maturity they are green, and very difficult to find, the readiest eye-mark being the radii, which pass from a small knob in the centre to the circumference; the radii are less regular on the lower surface; both surfaces are naked. These galls are not uncommon on oaks beside the Dee, at Banchory; the insects emerge in the beginning of July.

Andricus quadrilineatus, Hart. For the description of this species, see O, under 'Catkin-galls'. They sometimes occur on the midribs of the leaves, in which case there is generally a gap in the lamina opposite the gall. The form on the leaves has been described by Schlectendal as a distinct species, under the name of *Cynips marginalis*.

Sub-div., Galls on the Male Catkins.

Spathogaster baccarum L. Vide L, under 'Leaf-galls'.

- M. Galls of *Andricus ramuli* L. (= *Teras amentorum*, Hart). They are generally called 'cotton galls,' on account of their great resemblance to a ball of white cotton $\frac{1}{2}$ -1 inch in diameter. Each ball is made up of a multitude of small, hard, woody galls, about the size of whin seed, which are covered with long, flat, dry, twisted hairs, like cotton fibres. Sometimes galls occur singly on the catkins. They appear in the end of May and in June; the insects emerge in July. They are common at Banchory, and near Ballater.
- N. Galls of *Andricus amenti* Gir. They originate from the anthers, are ovate, acute, sessile, about $\frac{1}{16}$ — $\frac{1}{12} \times \frac{1}{24}$ inch, marked with a slight furrow down the middle on each side, indicating the connective. The surface is brown, and is covered with very short, stiff hairs; the walls are very thin. Several galls usually occur on each catkin. They occurred to Dr. Vice and myself rather commonly at Ballater in June.
- O. Galls of *Andricus quadrilineatus* Hartig. There are usually four or five of these galls on each catkin (sometimes they occur on the midrib of the leaf); and they are oval, about $\frac{1}{2} \times \frac{1}{4}$ inch, and when fresh are naked, green, and smooth, or very faintly striated; on section, a woody inner gall (rather large-celled) is found to be closely surrounded by and united to a green, fleshy outer layer. On drying, the outer layer shrivels up, and striæ appear forming a net-work, the variations of which, in depth and regularity, have been considered to warrant the conclusion that they belong to distinct species. They occur, in June, at Muchalls, near Aberdeen, at Banchory, and at Ballater, and will probably be found elsewhere when sought for.

Div. 2. Galls of Cecidomyidæ.

- P. These galls are simply portions of the margins (especially the tip of the segments) which become folded against the back of the leaf, thickened, fleshy, and yellowish-green; they are hardly seen at all from the upper surface. Usually several are found on a leaf. Each cavity so formed is tenanted by one or more whitish or orange larvæ of *Cecidomyia* (*Diplosis*) *dryobis* Fr. Löw. They are common in many localities on Deeside, and elsewhere, in June and July.

Fagus sylvatica L. (— Beech). Galls of *Cecidomyia* (*Hormomyia*) *piligera*

Löv. They occur on the upper surface of the leaf (usually on each side of the midrib) in small numbers, and resemble rifle-bullets in form. They are $\frac{1}{8} \times \frac{1}{32}$ inch, green at first, becoming brown, apparently smooth, but really covered with adpressed short hairs which are said to become erect when the gall is mature, but I have never seen them so), walls thin, and composed of compact tissue. On the lower surface they are covered with a raised scale-like piece of epidermis. When mature they fall off, leaving scars on the leaf, and the midge appears next year. The galls are common in autumn near Aberdeen, at Banchory, at Parkhill, at Inverurie, &c.

Corylus Avellana L. (Hazel). The galls are leaf-buds which become swollen, rounded, $\frac{1}{8}$ - $\frac{3}{4}$ inch in diameter, with enlarged imbricate leaf-scales, and abortive leaves, all covered with a thick coating of greyish-white, transparent hairs, among which live multitudes of mites—*Phytoptus* (= *Calycophthora Avellane* Amer.). The galls are mostly at or near the ends of the twigs. They are abundant at Banchory in May and June.

NAT. ORD. BETULACEÆ.

Betula alba L. (Birch.)

- A. Swellings on the midribs, including the origins of the chief veins, and most conspicuous below, $\frac{1-2}{4} \times \frac{1-2}{32}$ inch, nearly cylindrical, but pointed at both ends, smooth, wall thin, cavity large, inhabited by a whitish larva of a *Cecidomyia*? They occur in Braemar, and in the Parkhill woods, rather sparingly in autumn.
- B. A blister of the lamina, projecting on both surfaces so as to form a pretty large cell. The galls are usually connected with the midrib, or with one of the large veins, are round, $\frac{1}{16}$ - $\frac{1}{8}$ inch in diameter by $\frac{1-3}{32}$ inch deep (but frequently two or three are united), surface covered with short hairs like the rest of the leaf. The colour above is green, in the centre surrounded with a purple ring, below green only; walls thin. Each is tenanted by a larva of a *Cecidomyia*, which leaves the gall when mature by a small hole through the lower surface. The galls are common in July at Banchory, in Braemar, in Parkhill woods, at Braes of Gight, &c.
- C. Buds at the tips of the branches, swollen, and tenanted by larvæ of *Cecidomyia*. Not uncommon on the same bushes as the last.
- D. Bud-galls of *Phytoptus*. They are buds the leaf-scales of which become greatly enlarged (as in the Hazel) owing to the attacks of mites, the leaf-scales also become covered on both surfaces, except near their base, with a thick coat of silky adpressed hairs. The bud thus becomes much larger than the normal size (reaching $\frac{1}{2}$ inch, or more, in diameter), and loses entirely its glossy appearance, so that it is readily observable, especially after the fall of the leaf. Under the microscope the basal part of each scale is found to be covered with small spherical papillæ. Multitudes of whitish mites are to be seen, especially between the central leaf-scales. The galls occur singly, or there may be several on a branch, and ultimately there result from the irritation thus caused the 'Witch-knots,' so frequent on birches everywhere. Miss Ormerod was the first to point out the cause of these curious growths (*Entomologist*, X., 83-86, with figures).
- E. Leaf-galls caused by *Phytoptus*. These are scattered over the lamina, sometimes to the number of 50, or more, on a leaf, usually

separate from one another; they occur seldom on the petiole. The gall projects on both surfaces as a conico-cylindrical wart $\frac{1}{3}$ - $\frac{1}{5}$ inch diameter, with a naked surface, at first green, or red and smooth, afterwards becoming brown and wrinkled. The walls are thin in proportion, but hard and firm, and enclose a rather large cavity, which communicates with the exterior by a narrow pore below, nearly closed by hairs. In the cavity live numerous whitish or pale reddish-yellow mites. The galls are readily detected, on grasping the leaf, by their hard, shotty feel. Abundant on a small bush at Banchory in September.

- F. *Erineum* growths, forming patches $\frac{1}{3}$ - $\frac{1}{5}$ inch across, irregular in form, situated on the upper surface of the leaf, and then red-purple in colour (— *Erineum roseum* Schultz.), or on the lower surface when the patches are white (— *E. betulinum*. Schum.). On microscopic examination the patches are found to be composed of small, rounded bladders, suddenly contracted below into the stalk, and transparent. Among these live numbers of mites—*Phytoptus*—of very small size. The patches are very common throughout the summer on leaves of birches, almost everywhere.

Alnus glutinosa L. (Alder or Arn.).

- A. (— *Cephaloneon pustulatum* Bremi). Galls scattered over the upper surface of the leaves, irregularly obconical, about $\frac{1}{10}$ inch in diameter, point of attachment very narrow, surface naked, wrinkled, reddish-yellow; central cavity irregular, opening by a small hole on the lower surface; tenanted by multitudes of mites—*Phytoptus*. Common throughout the summer everywhere.
- B. Galls on the upper surface of the leaf in the axils of the chief veins along the midrib, in pairs divided by the midrib. They appear on the upper surface as green or reddish knobs about $\frac{1}{10}$ inch in diameter, and attached by a very broad base; the surface is naked and wrinkled. Below they have a wide opening, nearly filled with short, whitish hairs, which extend a little way along the midrib and chief vein; among the hairs live the mites—*Phytoptus*. These galls are as common as the former, and often occur on the same leaf with them.
- C. *Erineum alneum*. Persoon, caused by *Phytoptus*. Like most *Erinea*, it occurs on the lower surface of the leaves, between the veins, where it appears as patches, irregular in form, $\frac{1}{6}$ - $\frac{1}{2}$ inch across, at first yellowish-white, but becoming rusty or red round the margins, the colour extending gradually all over the patch. To the naked eye it seems to be made up of closely-packed little vesicles, but under the microscope it is found to consist of membranous vesicles much and irregularly lobed, and supported on a thin stalk; each lobe ends in a slight dilatation. Among the vesicles occur the mites, rather few in number in the examples that I have seen. The patches sometimes are large, and nearly cover the whole lower surface; on other leaves they are small and scattered; there is a slight projection on the upper surface, opposite the growth. Common at Banchory-Ternan in September.

NAT. ORD. CONIFERÆ.

Pinus sylvestris L. (Scotch Fir). Galls of *Oribata geniculata* Latr. They are swellings on the branches usually just below the origins of the twigs, rarely terminal (sometimes several occur on a branch), rounded or elliptical, $\frac{1}{4}$ - $\frac{1}{2}$ inch in diameter; internally they have a woody centre, surrounded by swollen bark, in which are numerous

irregular cavities, in which live multitudes of the mites. The galls occur at Ballater and at Inverurie.

Abies communis L. (Spruce Fir), galls of *Chermes (Adelges) Abietis*, L. They are swellings at the base of the young branches (which are stunted) resembling small green cones (sometimes only one side of the branch, sometimes all round it), about $1 \times \frac{2}{3}$ inch, or smaller; they are made up of imbricate leaves, which remain short, and become scale-like, ovate, and fleshy, and enclose between them small cavities in which live the Aphides. The galls remain on the tree for a long time in a woody condition with the scales gaping. They are abundant throughout 'Dee,' and are to be found in a fresh state in early summer.

A smaller and more compact form occurs at the tips of the twigs, usually two or three occurring close together. It seems to be the gall of *Chermes (Adelges) strobilobius*, Kalt.

Juniperus communis L. (Juniper), galls of *Cecidomyia (Hormomyia) Juniperina* L. On the tips of the branches, in the form of an ovate cone composed of three modified leaves, which become scale-like, about $\frac{1}{3} \times \frac{1}{6}$ inch, or rather more, but retain their green colour; they meet closely along the edges; inside these are three other much smaller leaves, which enclose a cavity in which the larva lives. The galls retain their form when dry; they appear in May and June, and the midges emerge in June and July. They are common on Deeside from Banchory upwards, and also in Corgarff and in Strathdon.

MONOCOTYLEDONS.

NAT. ORD. GRAMINEÆ.

Agrostis canina L. Mr Walker, this summer, gave me a specimen of this plant, gathered by him near Kingcausie, on the main axis of whose panicle near the top, just where branches were given off, a swelling occurred; the gall is very small, $\frac{1}{16}$ — $\frac{1}{8}$ inch, irregularly oval (including the base of the branches), naked, nearly smooth, and purple. It opens by a small hole on the upper surface among the branches. On section it was found to contain a pretty large irregular cavity, the sides of which bore transparent filaments and small warts. Careful examination of the single dried specimen showed no occupants, but it is probably the work of mites—*Phytoptus*.

Triticum repens L. (Couchgrass). The gall is a cylindrical swelling at the tip of the stalk, composed of the closely imbricated leaf sheaths, the axis remaining very short; the gall reaches a length of $1\frac{1}{2}$ inches by $\frac{3}{16}$ — $\frac{1}{4}$ inch in the middle, but tapers to each end. It usually emits several leaves; it is seldom less than six inches above ground. On section a small cell is found in the centre of the axis, enclosed among the leaf-sheaths, and in it lives one white larva of *Eurytoma*, which insect is probably the maker of the gall. These galls appear in autumn in abundance near Aberdeen, and at Banchory. To rear the insect it is best to collect the galls in spring, as the larva passes the winter in them.

Triticum junceum L. The gall is like that on *T. repens* in structure, but is stouter ($1-1\frac{1}{4} \times \frac{3}{8}$ inch), is less apt to emit leaves, and is usually close to the soil. It is abundant on the sandhills along the coast.

ACOTYLEDONS.

NAT. ORD. FILICES.

Pteris Aquilina L. (Common Bracken), galls of *Cecidomyia Pteridis* Müll. These are pinnules, one or both margins of which are revolute,

thickened, fleshy, and yellowish-red, afterwards becoming black; each is occupied by one orange larva. Frequently a great part of the pinnules on a pinna are attacked. These galls are common in August in various places round Aberdeen.

Athyrium filix-fœmina Bernh. } The galls on these species are identical
Nephrodium filix-mas Rich. } in structure, being fronds that continue circinate, the pinnae never expanding, so that they form balls $\frac{1}{2}$ to 2 inches in diameter. In the centre of the ball the tip of the frond is found to form a black decaying mass, in which live one or more larvæ of a species of *Anthomyia* (?) but I am not aware that the fly has yet been reared. I have found these pseudo-galls abundant at Parkhill, and also near Stonehaven, from June till October.

Mr. Roy tells me that he has seen specimens of the following galls on Deeside, but I have not myself met with them yet:—

Rhododendron ferrugineum L. The galls occur either singly on the leaves, or in groups at the apex of a branch; they are fleshy, smooth, about the size of a raspberry, and bright red in colour. On section they are found to consist of a spongy white substance. Maker unknown. I should be obliged for specimens from anyone who may find it in the district.

Quercus Robur L. Galls of *Neuroterus fumipennis* Hart?—‘Smooth Spangles.’ In situation, size, and form, they resemble the common ‘Oak-spangles,’ the galls of *Neuroterus lenticularis* Ol. (vide supra, J.), but are easily distinguished by their being smooth and naked, bright green when below the leaf, red when (rarely) on the upper surface; when dried they become purple. They seldom occur in any number on a leaf.

GALL-MAKERS IN ‘DEE.’

The makers of the galls described in the fore-going paper belong to the following groups of Articulata:—

Order I. INSECTA—

Hymenoptera.

- a. Chalcididæ (only genus, *Isosoma*).
- b. Cynipidæ (Gall-flies).
- c. Tenthredinidæ (Saw-flies).

Diptera

- d. Cecidomyidæ (Gall-midges).
- e. Trypetidæ.

Coleoptera

- f. Curculionidæ (Weevils).

Homoptera

- g. Aphidæ (Green flies).

Order II. ARACHNIDA—

Acarida

Phytoptus, Duj.

CHALCIDIDÆ—

Isosoma

galls on *Triticum repens*, and on *T. junceum*.

CYNIPIDÆ—

<i>Cynips</i> (<i>Dryophanta</i>) <i>divisa</i> Hart,	on <i>Quercus robur</i> L. (Oak) gall	G.
<i>C.</i> (<i>Aphilothrix</i>) <i>gemma</i> L.	“ “ “	C.
<i>C.</i> <i>Kollari</i> Hart	“ “ “	B.
<i>Biorhiza</i> <i>renum</i> Hart	“ “ “	F.

Neuroterus numismatis Ol.	on Quercus robur L. (Oak) Gall I.	
" lenticularis Ol.	" " " "	J.
Andricus curvator Hart.	" " " "	H.
" inflator Hart.	" " " "	E.
Andricus ramuli L.	" " " "	M.
" amenti Gir.	" " " "	N.
" quadrilineatus, Hart.	" " " "	O.
" terminalis, Fab.	" " " "	D.
Spathogaster baccarum, L.	" " " "	K.
" vesicatrix, Schl.	" " " "	L.
Trigonaspis megaptera, Pz.	" " " "	A.
Rhodites Rosae, L.	on Rosa canina, L. and R. villosa L. gall B.	
" Eglanteriæ, Hart.	" " " "	A.
" and on Rosa spinosissima, gall B.		
" spinosissimæ, Gir. on Rosa spinosissima L. gall A.		
Aulax (Xenophanes) Potentillæ, Vill, on Potentilla Tormentilla Sibth.		
" Hieracii, Bouché, on Hieracium sylvaticum Sm., and on H. boreale Fries.		

TENTHEDINIDÆ (make galls on Salices only).

Nematus gallicola, Westw, and Steph (=N. Saliceti Fall.=N. Vallisneri) on S. fragilis L., on S. Alba L., and on S. caprea L. gall B.	
" pedunculi Hart.=? N. ischnocerus Thoms. on S. caprea (C), on S. cinerea (A), and on S. aurita (A).	
" Vollenhoveni, Cameron, on S. purpurea L.	
" herbaciæ, Cameron, " S. herbacea L.	
" femoralis, Cameron " S. nigricans L.	
" =?N. ischnocerus Thoms.	
" cinerei, Retz. Thoms. " S. nigricans L.	
Cryptocampus Saliceti Fall. " S. Caprea L. (A)	
" =C. mucronatus Hart.	
" pentandræ Retz. " S. repens L. (A ?)	
" =? C. Populi Hart.	
" =C. medullarius Hart.	

CECIDOMYIDÆ—

Cecidomyia Rosaria, Löw ?	" Salix Caprea (E), on S. cinerea (B), and on S. aurita (B).
" cerastii, Binnie	" Cerastium glomeratum Thuill.
" salicis, Schrk.	" S. purpurea L. (B), S Caprea ? (D), and S. cinerea ? (C).
" Persicariæ, L.	" Polygonum viviparum L.
" marginem torquens Bremi	" Salix viminalis L.
" Galii, Winn.	" Galium verum (A & B ?), on G. palustre ?, and on G. Aparine (A).
" Veronicæ, Bremi	" Veronica chamædryis (L).
" Urticæ, Perris	" Urtica dioica L.
" Ulmaricæ, Bremi	" Spiræa Ulmaria L.
" serotina, Winn.	" Hypericum pulchrum L.
" Rosæ, Bremi	" Rosa canina L, and on R. villosa L (C).
" Onobrychidis, Bremi	" Vicia cracea, L, on V. sepium L, and on V. sylvatica L.

Cecidomyia Trifolii, Fr. Löw	„ Trifolium repens L.
„ Pimpinellæ, Löw	„ Pimpinella Saxifraga L.
(=Asphondylia Umbellatarum Fr. Löw)	
„ Campanulæ, Müll.	„ Campanula rotundifolia L.
„ Pteridis, Müll.	„ Pteris aquilina L.
C. (Diplosis) Loti, De Geer	„ Lotus corniculatus L, and on Anthyllis vulneraria L.
„ Jacobææ, Löw	„ Senecio Jacobææ L, and on S. aquaticus, Huds.
„ botularia, Winn.	„ Fraxinus excelsior L.
„ Helianthemi, Hardy	„ Helianthemum vulgare Gärtn.
„ dryobia, Fr. Löw	„ Quercus Robur L. (P).
„ Tremulæ, Winn. (=C. polymorpha, Bremi?)	„ Populus tremula L.
C. (Asphondylia) Ulicis, Trail	„ Ulex Europæus L.
„ Sarothamni, Löw	„ Cytisus Scoparius Link.
C. (Hormomyia) Juniperina L.	„ Juniperus communis L.
„ piligera, Löw	„ Fagus sylvatica L.
„ floricola, Winn	„ Achillea ptarmica (A), and on A. millefolium (A).
„ Caprææ, Winn	„ Salix caprea (G), and on S. aurita (D).
„ Millefolii, Löw	„ Achillea Millefolium L. (B)!

In addition to the above, species not yet identified make galls on the following plants in 'Dee'—

Viola canina L.	Valeriana officinalis L.
Astragalus hypoglottis L.	Achillea ptarmica L (B).
Lathyrus pratensis L.	Veronica serpyllifolia L.
Rubus fruticosus L.	Rhinanthus cristagalli L.
Heracleum sphondylium L.	Salix caprea L. (F).
Galium verum L. (C. and D.)	„ aurita L. (C).
„ boreale L.	Betula alba L. (A, B, C).
„ saxatile L.	

TRYPETIDÆ—

Trypeta solstitialis L. on Centaurea nigra L.

Galls made by Trypetidæ also occur on Hypochæris radicata L, and on Hieracium boreale Fries (B).

CURCULIONIDÆ—

Apion Gyllenhalii, Schrk.	on Vicia cracca L.
Mecinus pyraister, Herbst	„ Plantago lanceolata L.
Gymnetron campanulæ, L.	„ Campanula rotundifolia L.
Ceuthorhynchus sulcicollis, Gyll	„ Brassica oleracea L, and on B. campestris L.
„ contractus, Marsh	} are the probable makers of the galls on B. sinapistrum Boiss, and on Raphanus Raphanistrum L.
„ assimilis, Payk.	

APHIDÆ—

Chermes (Adelges) Abietis L. on Abies communis L.

„ „ strobilobius Kalt „ „ „

One of the Aphidæ also makes pseudo galls on Stellaria holostea L.

ACARIDA—

All the gall-making mites in this district belong to the genus *Phytoptus*, Dujardin, but owing to their very small size (rendering the compound microscope necessary even to see them) and to their uniformity of aspect, the various species have not been described or named, though the diversity of the galls gives ground for believing that there must be many species could we but distinguish them. Most of the galls have received names, and these names I will employ for accuracy of reference, as the galls are readily recognisable. Many of those which consist only of a growth of hair-like filaments from parts of the leaf were regarded by the earlier botanists as fungi, and were described by Fries and others on the Continent, and by Greville in Scotland as such, under the generic name *Erineum*. Fée, in a monograph on *Erineum*, showed that they were of animal origin, and described many new species. Amerling, Bremi, Kirchner, Thomas, and others have also described many new forms of mite-galls on the Continent, but very little has been done in the matter in this country. I have found the following galls in this part of Scotland—

Phytoptus	Geranii	on	<i>Geranium sanguineum</i> L.
"	(=Ceratoneon vulgare	,,	<i>Acer pseudo-platanus</i> L.
	Bremi = <i>Volvulifex</i>		<i>Aceris</i> , Am.
"	(=Cephaloneon con-	,,	<i>Prunus spinosa</i> L (A).
	fluens, Bremi)		
"	(=Ceratoneon attenu-	,,	" " (B), and on
	tum, Bremi)		<i>P. Padus</i> L.
"			<i>Pyrus Aucuparia</i> Gærtn, and
			<i>P. Aria</i> L.
"	(=Erineum <i>Oxyacanthae</i>),	,,	<i>Crataegus Oxyacantha</i> L.
"			<i>Galium verum</i> L (E) and (F).
"			" <i>Aparine</i> L (B).
"			" <i>saxatile</i> (A).
"	(=Calycophthora Ser-	,,	<i>Thymus Serpyllum</i> L (A).
	pylli, Am.)		
"	(= <i>Heliazeus Populi</i>	,,	<i>Populus Tremula</i> L (B).
	Kirch)		
"	(= <i>Batoneus Populi</i>	,,	" " (C).
	Kirch)		
"	(= <i>Erineum Populinum</i> ,	,,	" " (D).
	Pers.)		
"		,,	<i>Salix caprea</i> (H), on <i>S. aurita</i>
			(E), and on <i>S. repens</i> (B).
"	(=Calycophthora Avel-	,,	<i>Corylus Avellana</i> L.
	lanæ Am.)		
"	(=Erineum <i>roseum</i> Sch.	,,	<i>Betula alba</i> L (E).
	+ <i>E. betulinum</i> , Sch.)		
"		,,	" " (E).
"		,,	" " (D).
"	(=Cephaloneon pustu-	,,	<i>Alnus glutinosa</i> L (A).
	latum, Bremi.)		
"	(=Erineum <i>alneum</i> , Pers.)	,,	" " (C).
		,,	" " (B).
"	(=Oribata <i>geniculata</i> ,	,,	" " "
	Latr.)		<i>Pinus sylvestris</i> L.

Natural Order.	Number of gall-bearing genera.	Number of gall-bearing species.	Number of kinds of galls.	Gall-makers.						
				Gall-fly.	Saw-fly.	Typeta.	Gall- midge.	Beetle.	Aphis.	Mite.
1 Cruciferae	3	5	5					5		
2 Cistineae	1	1	1				1			
3 Violeae	1	1	1				1			
4 Caryophyllaceae	2	2+1?	2+1?				1		1	
5 Hypericineae	1	1	1				1			
6 Geraniaceae	1	1	1							1
7 Sapindaceae	1	1	1							1
8 Leguminosae	8	11	15				14	1		
9 Rosaceae	7	19	18	7			4			7
10 Umbelliferae	2	2	2				2			
11 Rubiaceae	1	5	14				10			4
12 Valerianeae	1	1	1				1			
13 Compositae	5	8	11	2		3	6			
14 Campanulaceae	1	1	2				1	1		
15 Ericaceae	1	1	1							
16 Oleineae	1	1	1				1			
17 Plantagineae	1	1	1					1		
18 Scrophularineae	2	3	3				3			
19 Labiatae	1	1	2				1			1
20 Polygoneae	1	1	1				1			
21 Urticaceae	1	1	1				1			
22 Salicineae	2	14	34		16		12			6
23 Cupuliferae	3	3	18	15			2			1
24 Betulaceae	2	2	9				3			6
25 Coniferae	3	3	3				1		1	1
26 Gramineae	2	3	3							1?*
27 Filices	3	3	3				1†			
	58	96	155	24	16	3	68	8	2, 29	

In the above analysis I have enumerated as distinct galls all occurring on distinct species of plants, even when the work of a single species of insect, hence the number of galls here enumerated must not be held to denote as great a number of gall-makers. Undoubtedly there are still many galls to be discovered in this district however, so that the total number of gall-makers is probably much above that given here.

Conclusions drawn from this analysis, in regard to the makers of galls, would be defective if not corrected by a wider knowledge, yet a careful examination of it gives some interesting results, one or two of which I may perhaps be permitted to point out. In the first place we see that by far the majority of gall-makers belong to comparatively few orders of insects or to mites, and that of these the gall-midges (Cecidomyidæ) hold the first rank, both in number of plants attacked by them, and in number of galls caused by them, but many of the galls belong

* 2 *Isosoma* galls.

† 2 *Anthomyia*?

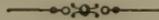
to the group pseudo-galls. Next in importance in both respects come the gall-mites (Phytoptus), but almost all their productions are pseudo-galls or open galls. The Aphididae cause very few galls with us, and these are also pseudo-galls or open galls. The remaining gall-makers all cause true galls, and are confined to a limited number of natural orders of plants; the Saw-flies (Tenthredinidæ) being restricted in 'Dee' to the genus *Salix*; the Gall-flies (Cynipidæ) chiefly attacking the Oak, but some also occurring on the Roses, on *Potentilla*, and on *Hieracia*; the Trypetidæ I have found only in the carpels of some *Compositæ*; while the Beetles (curculionidæ) have their headquarters in the roots of *Cruciferae*, with three species attached to plants of other orders—one in the stem of *Vicia Cracca*, one in the scape of *Plantago lanceolata*, and one in the seed vessel of *Campanula rotundifolia*.

LIST OF THE CRUSTACEA

OF THE

NORTH-EAST COAST OF SCOTLAND,

BY GEORGE SIM.



To prevent confusion, and at the same time to render justice to those who have preceded him in this branch of study, the writer thinks it best first to enumerate those species which have come under his own observation, the sphere of his labours being the coasts of the counties of Banff, Aberdeen and Kincardine, and to conclude with the names of his predecessors, mentioning where the results of their labours may be found.

One point in this subject which may be here adverted to, is the great necessity of a new and thoroughly revised edition of "Bell's British stalk-eyed Crustacea." That this is an admirable and useful work cannot be disputed, but there is a want of order in it which is very troublesome. What is required is a regular system of description, always beginning with the same organ, let it be head or tail, legs or carapace, no matter which, but let the beginning be always at the same place, and follow a regular order throughout the whole work, with say, the distinctive characters of each species placed in italics, so that they may be seen at a glance. As it is, the descriptions of scarcely two species begin at the same point, and in some instances, it is nearly impossible to see in what they differ. For this reason, and also that descriptions might be added of the many new genera and species discovered since the publication of the above mentioned work, few we think will deny that a new edition is a desideratum.

The following abbreviations have been used to indicate the frequency or otherwise of the various species. Common, c. Very Common, v. c. Frequent, f. Rare, r. Occasional, o. Rather Rare, r. r. Very Rare, v. r.

STALK-EYED CRUSTACEA.

Order DECAPODA.

- Brachyura.*
- Stenorhynchus phalangium.* Bell. c.
 „ *tenuirostris.* Leach. F.
Inachus Dorsettensis, Leach. v. c.
 „ *Dorynchus* „ o.
- Hyas araneus.* Edw. v. c.
 „ *coarctatus.* Leach. v. c.
- Cancer Pagurus.* Linn. v. c.
Pirimela denticulata. Leach. R.
- Carcinus Mænas.* Leach. v. c.
Portumnus variegatus. Leach. F.
Portunus puber. Leach. R. R.
 „ *depurator.* Leach. R. R.
 „ *marmoreus?* Leach. V. R.
 „ *holsatus.* Fabr. v. c.
 „ *pusillus.* Leach. c.
- Ebalia Pennantii.* Leach. F.
 „ *Bryerii.* „ o.
- Atelecyclus heterodon.* Leach. v. c.
Corystes Cassivelaunus. Leach. V. R.
- Anomoura.*
- Lithodes Maia.* Leach. F.
- Pagurus Bernhardus.* Fabr. v. c.
 „ *Prideauxii.* Leach. R.
 „ *Cuanensis.* Thompson. R.
 „ *Lævis.* do. F.
 „ *Thompsoni.* Bell. c.
- Porcellana longicornis.* Edw. c.
Galathea squamifera. Leach. v. c.
 „ *strigosa.* Fab. v. c.
 „ *nexa.* Embleton. F.
 „ *dispersa.* Spence Bate. F.
 „ *Andrewsii.* Kinahan. F.
- Munida Rondeletii.* Bell. R.
- Macroura*
- Callianassa subterranea.* Leach. F.
Gebia deltura. Leach. F.
- Homarus vulgaris.* Edw. c.
Nephrops norvegicus. Leach. F.
- Crangon vulgaris.* Fabr. v. c.
 „ *spinus.* Leach. R.
 „ *trispinus.* R.
 „ *bispinus.* v. R.
- Leptopodiadae.*
- Maiadae.*
- Canceridae.*
- Portunidae.*
- Leucosiadae.*
- Corystidae.*
- Homoladae.*
- Paguridae.*
- Porcellanadae.*
- Thalassinadae.*
- Astacidae.*
- Crangonidae.*

- Nika edulis*. Risso. V. R. *Alpheidæ.*
- Hippolyte spinus*. Sowerb. R. *Palæmonidæ.*
 ,, *varians*. Leach. R.
 ,, *Cranchii*. Leach. C.
 ,, *Whitei*. Thompson. R.
Pandalus annulicornis. Leach. F.
 P. ? V. R.
Palæmon varians. Leach. R.
Acanthocaris Livingstoneana, n. sp.* Three specimens found.
Lophogaster typhica. Sars. O.
Rhoda Jardineana, n. sp. One specimen found.* *Diastylidæ.*
- Diastylis Rathkii*. Kroyer. S.
 ,, n. sp. One specimen found.
 ,, n. sp.? Several specimens found. *Mysidæ.*
- Mysis Chamæleon*. J. V. Thompson. V. C.
 ,, *vulgaris*. J. V. Thompson. V. C.
 ,, *Griffithsiæ*. Bell. V. R.
 ,, *spiritus*. Norman. C.
 ,, ? V. R.
- Thysanopoda Couchii*. Bell. C.
Thysanoessa borealis. Norman. F.
 ,, *Aberdonensis*, n. sp.† F.
- SESSILE-EYED CRUSTACCA.
- AMPHIPODA. *Orchestiides.*
Saltatoria.
Talitrus Locusta. Linnæus ?
Orchestia littorea. *Stegocephalides.*
- Natatoria*.
Montagua Pollexiana. S. Bate,
 ,, *Norvegica*. ,, *Lysianassides.*
- Lysianassa Atlantica*? M. Edwards.
Anonyx denticulatus. S. Bate.
 ,, *minutus*? Kroyer. *Ampeliscides.*
- Ampelisca Gaimardii*. Kroyer. *Phoxides.*
- Grayia imbricata*? S. Bate.
Sulcator arenarius. S. Bate.
Liljeborgia pallida? S. Bate.
Iphimedia obesa. Rathke.
Acanthonotus Owenii. S. Bate. *Gammarus Corniger* of Fabricius.
Gammarides.
- Dexamine Vedlomensis*.
Atylus Swammerdamii. S. Bate.
Calliope læviuscula?
Melita obtusata. Leach.
Amathilla Sabini.

* For Figures and descriptions, see *Scottish Naturalist* for 1872, p. 182, &c.

† For figure and description, see *Scottish Naturalist* for 1872, p. 133.

Gammarus marinus. Leach.	<i>Gammarides.</i>
" locusta. Fabricius.	
" pulex. Desmarest.	
Megamocera Othonis? S. Bate.	
" Alderi. S. Bate.	<i>Podocerides.</i>
Amphithoë littorina. S. Bate.	
Podocerus Variegatus. Leach.	
Cerapus difformis. S. Bate.	
Corophium longicorne. Latreilla.	<i>Hyperides.</i>
<i>Hyperina.</i>	
Lestrigonus exulans. Kröyer.	
Hyperia oblivia. Kroyer.	
" " n. s.	
ISOPODA.	<i>Bopyrides.</i>
<i>Normalia.</i>	
Bopyrus Squillarum. Latrielle.	<i>Ægides.</i>
Cirolana spinipes.	
Eurydice pulchra. Leach.	<i>Asellides.</i>
Jæra albifrons. Leach.	
" Nordmanni. Bate and Westwood.	
Janira Maculosa. Leach.	
Limnoria lignorum. White.	<i>Arcturides.</i>
Arcturus longicornis. Westwood.	<i>Idoteides.</i>
Idotea tricuspidata. Desmarest.	
" pelagica. Leach.	
" emarginata. Fabricius.	
" linearis. Latrielle.	<i>Oniscides.</i>
Ligia oceanica. Fab.	
Porcellio scaber. Lat.	
Oniscus asellus. Linn.	
Armadillo vulgaris. Lat.	

The foregoing list of the Orders Amphipoda and Isopoda is far from complete, and gives but a faint idea of the riches of the district, or the number of species obtained by the writer, as he has almost as many more as those named above, that he has not yet identified. Of the names of previous observers, the first is that of Dr. David Skene who died in 1777, and who appears to have devoted considerable time and attention to the subject, and whose manuscript is still preserved in Marischal College. Second, the Rev. Dr. Gordon of Birnie, whose list will be found in the "Zoologist" for 1852; his name is also to be seen in the pages of Bate and Westwood's admirable work on British Sessile-eyed Crustacea. Third, the Rev. Walter Gregor in the "Naturalist" 1855, page 172, under the title of W. Fourth, the late Mr. Robert

Dawson, schoolmaster, Cruden, who contributed to Bate and Westwood's work. And lastly Mr. Thomas Edward of Banff whose labours in this department of science are now known to everyone, and whose name figures so largely in the "Naturalist" and the work already referred to by Messrs. Bate and Westwood.

NOTE.—In the Annals and Magazine of "Natural History," 5th Series, Vol. I., pages 409-11 (May, 1877), Mr. Spence Bate has described and named a new species, from specimens sent to him by me from Aberdeen, *Diastylis bimarginatus* and *Lestrigonus spinidorsalis*.

G. S.

CATALOGUE OF FISH

FOUND IN THE VICINITY OF ABERDEEN,

BY THE LATE DR. DYCE AND GEO. SIM

With English, Scientific, and Local Names.

ACANTHOPTERYGII.

PERCIDÆ.

The Perch	<i>Perca fluviatilis.</i> Linn.	
Great Weaver	<i>Trachinus draco.</i> Linn.	"Muckle Stanger."
Lesser Weaver	" <i>vipera.</i> Cuv.	"Stanger."
Plain Red Mullet	<i>Mullus barbatus.</i> Linn.	
Mullet with hard cheeks		
The Red Gurnard	<i>Trigla cuculus.</i> Linn.	} "Gowdie."
Sapphirine Gurnard	" <i>hirundo</i> "	
Gray Gurnard	" <i>Gurnardus.</i> "	"Crownier."
Short-spined Cottus	<i>Cottus scorpius.</i> Bloch.	} "Gunpluckers."
Father Lasher	" <i>bubalis.</i> Cuv.	
Fabricius's Sea-bullhead	" <i>grœnlandicus.</i> Cuv.	

This is a doubtful species, some believe it to be but a variety of *C. bubalis*, while others hold it to be a good species. Among the latter was the late Mr. Couch, to whom I sent some specimens, which he pronounced to be the genuine *C. grœnlandicus*. I am inclined, however, to hold to the former belief, because the distinguishing features are not always all present. Examples have been found in which only the papillæ above the lateral line, and the spinous processes on the pectoral fins were present while in others the white spots along the belly were the only distinguishing feature. Indeed examples have been caught, possessing some one only of each of the so-called specific characters, thus leading me to hold the opinion above indicated.—G. S.

The Armed Bullhead	<i>Aspidophorus</i> Euro- <i>pæus.</i> Cuv.	"Muller's Thumb."
The Bergylt	<i>Sebastes Norvegicus.</i> Cuv.	"Jerus'lem Had- dock."
The Rough-tailed Stickle- back	<i>Gasterosteus trachurus.</i> Cuv.	} "Bansticle, Bandie"
Half-armed Stickleback	" <i>semiarmatus.</i> Cuv.	
Smooth-tailed Stickleback	" <i>leivurus.</i> Cuv.	
Fifteen-spined Stickleback	" <i>spinachia.</i> Linn.	

SCLENIDÆ.

The Maigre	<i>Sciœna aquila.</i> Cuv.
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SPARIDÆ.

The Sea Bream	<i>Pagellus centrodon- tus.</i> Cuv.	"Perch."
Ray's Bream	<i>Brama Raii.</i> Cuv.	

SCOMBERIDÆ.

The Mackerel	<i>Scomber scomber.</i>	Linn.	
The Tunny	„	<i>thynnus.</i>	Linn.
The Scad	<i>Caranx trachurus.</i>	Linn.	“orse Mackerel.” “Rock Herring.”
The Dory	<i>Zeus faber.</i>	Linn.	“Johneey Dory.”

MUGILIDÆ.

Thick-lipped Gray Mullet	<i>Mugil chelo.</i>	Cuv.
The Atherine	<i>Atherina presbyter.</i>	Cuv.

GOBIOIDÆ.

The Shanny	<i>Blennius pholis.</i>	Linn.	
Crested Blenny	„	<i>palmicornis.</i>	Cuv.
Spotted Gunnel	„	<i>gunnellus.</i>	Linn.
Viviparous Blenny	„	<i>viviparus.</i>	Bloch.
The Wolf-fish	<i>Anarrhichas lupus</i>		“Butter Fish.” “Guffer-eel.”
The two-spotted Goby	<i>Gobius bipunctatus.</i>		“Cat-fish.”
		Yarrell.	
The one-spotted Goby	„	<i>unipunctatus.</i>	Parnell.
			Cuv.
Speckled Goby	„	<i>reticulatus.</i>	“Donlie.”
Gemmeous Dragonet	<i>Callionymus lyra.</i>	Linn.	“Balle’eries, Ler- ries.” “Messenger.”
Fishing Frog	<i>Lophius piscatorius.</i>		“Cathie.”
		Linn.	

LABRIDÆ.

The Ballan Wrasse	<i>Labrus maculatus.</i>	Bloch.
Green-streaked Wrasse	„	<i>lineatus.</i>
		Don.

MALACOPTERYGII ABDOMINALES.

CYPRINIDÆ.

The Minnow	<i>Cyprinus phoxinus.</i>	Cuv.	“Minnon.”
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ESOCIDÆ.

The Pike	<i>Esox lucius.</i>	Linn.	“Gade.”
The Gar-fish	<i>Belone vulgaris.</i>	Cuv.	“Green-ben,” or “Green-bane.”
The Saury Pike	<i>Scomberesox saurus.</i>	Cuv.	

SALMONIDÆ.

It has been considered advisable to name only those of the Salmonida, which are admitted by all to be good species; that there may be other species in the district is very likely, but the opinions held on the subject are so much at variance that in the meantime the above course is considered the best.

The Salmon	<i>Salmo salar.</i>	Linn.	When foul, “Kelts.”
The Salmon-trout	„	<i>trutta.</i>	Linn.
The Common Trout	„	<i>fario.</i>	Linn.
			“River, Burn, or Yellow Trout.”

The Argentine	<i>Scopelus Humboldtii.</i>	Cuv.
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This beautiful little fish is cast on our beach in great abundance in the months of January, February, and March.

CLUPEIDÆ.

The Herring	<i>Clupea harengus.</i> Linn.	At beginning of season when taken with what the fishers call "dandy lines," they are called "Dandy Herrin'."
The Sprat	" <i>sprattus.</i> Linn.	"Garvie, Garvock." "Rock Herrin'."
The Twite shad	<i>Alosa finta.</i> Cuv.	
The Alice Shad	" <i>communis.</i> Cuv.	

SUBBRACHIALES.

GADIDÆ.

The Cod	<i>Morrhua vulgaris.</i> Cuv.	
The Speckled and Green Cods are not now believed to be good species, the former not being even named by Mr. Couch.		
Haddock	<i>Morrhua œglefinus.</i> Cuv.	Pronounced "Hathock." After spawning, "Gamrels," or "Camrels." Those of about five inches long are known as "Nockies".
The Bib	" <i>lusca.</i> Flem.	"Skelchie," or "Skelach."
The Poor Cod	" <i>minuta.</i> Flem.	
The Whiting	<i>Merlangus vulgaris.</i> Cuv.	Pronounced "Fittin." Small ones taken in the month of June and July (when in quantity) are called "Dargs."
Coalfish	" <i>Carbonarius.</i> Cuv.	"Colmies."
The Pollock	" <i>pollachius.</i> Cuv.	"Lythe."
The Hake	<i>Merluccius vulgaris.</i> Cuv.	"Herrin' Hake."
The Ling	<i>Lota Molva.</i> Cuv.	"Kellin."
Burbot	<i>Lota vulgaris.</i> Jenyns.	
Three-bearded Rockling	<i>Motella vulgaris.</i> Cuv.	
Four-bearded Rockling	" <i>cimbria.</i> Parnell.	
Five-bearded Rockling	" <i>quinquecirrhata.</i> Cuv.	
Seven-bearded Rockling	" _____?	
In reference to this fish it must be stated that only one example has been taken, and whether it is a distinct species is an open question. Still if three, four, and five barbels are sufficient to make species, why not seven? The barbels are situated thus: two in front of each eye arising from the same base, two at the nostrils, and one on the chin.		
Mackerel Midge	<i>Motella glauca.</i> Jenyns.	
Torsk	<i>Brosmius vulgaris.</i> Cuv.	
Lesser Forked beard	<i>Raniceps trifurcatus.</i> Flem.	

PLEURONECTIDÆ.

The Plaice	<i>Pleuronectes platessa.</i> Linn.	"Plash Fluke."
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The Flounder	<i>Pleuronectee Flesus.</i> Linn.	"Fluke," "Begger Fluke," "Fresh- water Fluke."
Common Dab	„ <i>limanda.</i> Linn.	"Sattie."
Lemon Dab	„ <i>microcephalus.</i> Flem.	
Long Rough Dab	„ <i>limandoides.</i> Jenyns.	"Bastard Sattie."
The Pole, or Craig Fluke	„ <i>Pola.</i> Lacep.	
The Holibut	<i>Hippoglossus vulgaris.</i> Flem.	Known as "Tur- bot," the young are called "Bir- dies," the old when of very dark colour are called "Blacksmiths."
The Turbot	<i>Rhombus maximus.</i> Cuv.	"Roden Fluke."
The Brill	„ <i>vulgaris.</i> Cuv.	"Siller Fluke."
Muller's Topknot	„ <i>hirtus.</i> Yarrell.	
The Whiff	„ <i>megastoma.</i> „	
The Sole	<i>Solea vulgaris.</i> Cuv.	"Sole Fluke."

CYCLOPTERIDÆ.

The Lump sucker	<i>Cyclopterus lumpus.</i> Bloch.	"Paddlecock."
The Unctuous sucker	<i>Liparis vulgaris.</i> Flem.	
Montagu's sucking fish	„ <i>Montagui.</i> Flem.	

APODALES.

MURENIDÆ.

The Conger	<i>Conger vulgaris.</i> Cuv.	"Evil-eel."
Anglesey Morris	<i>Leptocephalus Morrisii.</i> Penn.	This is now believed to be the young of the Conger.

ANGUILLIDÆ.

The Sand-eel	<i>Ammodytes Tobiannus.</i> Cuv.	"San'ils."
The Sand-Launch	„ <i>Lancea.</i> Cuv.	"Ornals."

LOPHOBRANCHII. SYNGNATHIDÆ.

The Great Pipe-fish	<i>Syngnathus Acus.</i> Bloch.	} Known by the fish- ermen as "Young Green Beans," <i>i.e.</i> "Young Garfish."
The Deep-nosed Pipe-fish	„ <i>Typhle.</i> Linn.	
Æquoreal Pipe-fish	„ <i>æquoreus.</i> Linn.	
The Snake Pipe-fish	<i>Syngnathus ophidion.</i> Bloch.	

PLECTOGNVTII. GYMNODONTIDÆ.

The Short Sun-fish	<i>Orthogoriscus mola.</i> Cuv.
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CHONDROPTERYGII. STURIONIDÆ.

The Common Sturgeon	<i>Acipenser Sturio.</i> Linn.	Now regarded as a variety of the common Sturgeon
Broad-nosed Sturgeon	„ <i>latirostris.</i>	

SQUALIDÆ.

The Small-spotted Dog-fish	<i>Scyllium canicula.</i> Cuv. }	"Blin' E'es."
Large-spotted Dog-fish	" <i>Catulus.</i> Cuv. }	
The Porbeagle	<i>Lamna Cornubica.</i> Cuv.	
The Spinous Shark	<i>Echinorhynchus spinosus.</i> Blainville.	
The Common Tope	<i>Galeus vulgaris.</i> Cuv.	
The Smooth Hound	<i>Mustelus Lævis.</i>	
The Picked Dog-fish	<i>Spinax acanthias.</i> Cuv.	"Sea-dog."
The Greenland Shark	<i>Scymnus borealis.</i> Flem.	
The Long-nosed Skate	<i>Raia chagrinea.</i>	"Lang-nosed Dinnan."
	Montagu.	
The Skate.	" <i>batis</i>	"Dinnan," or "Blunt-nosed Dinnan."
The Sharp-nosed Ray	" <i>oxyrhyncha.</i>	"The Doctor."
	Montagu.	
The Homely Ray	" <i>maculata.</i> "	"The Eel-pot."
This species is known by the dealers in our market by the name "Leachie".		
The Thornback	" <i>clavata.</i> Willughby.	"Thorny."
The Starry Ray	" <i>radiata.</i> Don.	

By most British authors this is looked upon as rare in British waters. Such, however, is not the case; it requires only to be looked for. No writers with whose works I am acquainted, with the exception of Dr. Parnell, have written from personal observation, consequently everything appeared rare which but seldom found its way into their study. At Aberdeen, this species is quite abundant, their time of appearance being from the beginning of May to the end of July. This season (1877) I have taken note of all brought to market, and from May 14 to July 31 one hundred and seven were seen, fourteen being the highest number seen in one day.

PETROMYZIDÆ.

The Lamprey	<i>Petromyzon marinus.</i>	
	Linn.	
The Lampren	" <i>fluviatilis.</i> Linn.	"Nine-e'd Eel."
The Pride	" <i>branchialis.</i> Linn.	
The Myxine	<i>Myxine Glutinosa.</i> Linn.	

Called by the fishermen *heelacks*. It may here be mentioned that they in reality mean *eelacks*, they, like Cockneys, always putting the *h* where it ought not to be, and omitting it where it should occur; thus, hook by them is pronounced "ooke" or "uoke," air, "hair," apples, "happles," and so on.

ON THE
BRITISH SPECIES OF THE GENUS SPHAGNUM,

BY

MR. JOHN SIM.

THE Sphagna are bog-mosses which beautify our marshes and moorlands, and are a peculiar and interesting class of plants. To the utilitarian mind they are of interest as the principal producers of peat-mosses which supply fuel to so many households in rural districts; to the microscopist the leaves, cortical cells, and organs of fructification yield objects of great beauty; and to the common observer there is much to attract the eye and to interest the mind in the great variety of colour, from the deepest green or yellow to the darkest red or purple, and in the beauty and diversity of form, from the tiny stem with its fascicles of drooping branches to the dense cushion-like masses, or the long straggling stems growing in the streamlets or filling up the shallow pools of the marshes.

Scientific botanists find in the Sphagna many peculiarities. Unlike most plants they are not attached to their place of growth by rootlets, nor is their nutriment drawn in by such, but part of each fascicle of branches is disposed of in a drooping manner, closely surrounding the stem. By these branches fluids are supposed to be carried upwards through the cortical cells to nourish the plant. Nor is their true place in the vegetable kingdom easily assigned to the Sphagna. They are now regarded as standing between the Hepaticæ on the one hand and the true mosses on the other, though generally included among the latter in botanical systems; but I think they are sufficiently distinct from both to form a family by themselves. The great tendency to vary in form, and the absence of prominent characters by which the species might be distinguished, has rendered the group very perplexing to students, hence authors have come

to very different conclusions regarding them. Dawson Turner, in his '*Muscologia Hibernica*,' in 1804, enumerated only 3 species. Bridel Brideri in his '*Bryologia Universa*,' in 1827, raised the number of species to 7. Wilson, in the '*Bryologia Britannica*,' in 1855, gives 9 species divided into the sections *obtusifolia* and *acutifolia*. Schimper, in his '*Synopsis Muscorum Europaeorum*,' 2nd ed., enumerates 20 species divided into 6 sections; and Milde, in the '*Bryologia Silesiaca*,' (1869), has reduced the number to 16 species, under 4 sections. Braithwaite, in the '*Sphagnaceae Britannicae exsiccatae*,' gives 17 species and 36 varieties, divided into 4 sections.

All these, as well as many other systems that might be mentioned, only show the difficulty of discovering any good simple natural system of arrangement, the need of which becomes more evident when we think of the number of varieties and forms in some of the species. For example, in *S. acutifolium* we find 11 named varieties, and some of these varieties show a large number of forms varying in an unbroken series from the most slender to the most compact, yet all maintaining the characters of the variety. But in addition to the great diversity observed in each species and variety, we see great resemblance between some of the varieties of distinct species, e.g., a squarrose variety occurs in several species besides *S. squarrosus*, and the character is fully as well marked in some forms of *S. compactum*, *S. cymbifolium*, *S. acutifolium*, and (less frequently) *S. molle* and *S. z reinum*, as in *S. squarrosus* itself. Notwithstanding these difficulties I think that in the annexed table the arrangement of them is so much simplified that the collector will be able to distinguish the species with the aid of a good pocket lens, as he gathers them.

The sections are based entirely on the characters of the stem-leaves, and the minor divisions on easily observed characters in the plants generally. It may be objected that this is a reversion to an artificial system, and this may be in so far true as the groups are based on variations of a single organ, but yet the groups are natural enough, indeed fully as much so as in the so-called natural systems, and in the study of cryptogamic plants the simpler the plan of grouping the more natural is the result generally found to be. In *Sphagna*, for instance, the knowledge of the exact form of the cells, and of the exact form of the cell-walls is very interesting to those who have time and means to acquire it, but it is not necessary for the classification of the species, and should be dispensed with if more easily employed characters can be found sufficient for the purpose, and these are I think to be found in the stem-leaves as already mentioned.

As regards the number of species, I believe it is of little im-

portance in the case of well marked permanent forms whether they be accounted varieties or species, provided the distinctive characters be recognised and pointed out, but I think the excessive multiplication of species is troublesome, and not at all useful. However the permanent forms are numerous, and ought to be noticed, and I have included them in the table, treating the specific names of some authors as sub-sectional names, each of which includes several forms which may be regarded as species, sub-species or varieties, as botanists choose to value them. In each case I have given the author's name where I could find it, and the most prominent and important characters of each form. In all cases I have adopted what I believe to be the oldest name, but my knowledge of the literature on *Sphagna* is less than my knowledge of the plants themselves, and I shall be glad of information on this point if older names exist, and shall accept them where satisfied that they are older.

In concluding these remarks on their classification, let me say a few words on the separation of two species that have always been classed together. *S. molle* I have separated from *S. compactum*. In the former the stem-leaf is very large, tapering to both ends, truncate and toothed; in the other it is very small, ovate, concave in some cases, and slightly fimbriated, but this last character can be observed only with pretty high powers. The branch leaf of *S. molle* is acute and toothed, of *S. compactum* it is obtuse and cucullate. Both grow in large close tufts, but in *S. molle* the stems are fine and delicate, in *S. compactum* rigid and strong. Hence I see no good reason for retaining them in the same section even, though the cell formation of both is pretty much alike.

The collection* before you was made entirely about Strachan, and shows the district to be rich in *Sphagna*, only a few of the rarer species of the British list being absent. A few words on the localities of some of the rarer forms may be of interest. Perhaps the rarest in the collection is *S. molle*, which I first found on Dalfrø, but have since got on Cairn o' Mount, Clachnaben, and Cammus More. *S. arctum* I have found only on the lower end of Dalfrø, or Doup of Becky, and it seems to be rare, the same form having only once before come into Dr. Braithwaite's hands. Another rarity, *S. riparium*, I found not unfrequent on the higher ground, such as Clachnaben, Cairn o' Mount, and the higher part of Dalfrø. The large yellow form of *S. teres* seems to be rare; I have found it only in Dalbreck and Powlair. *S. squarrosum* I got first on Scotston moor, and

* Presented by Mr. Sim to the Botanical Museum in Marischal College.—J. W. H. T.

have since found on Scolty, and at Potarch, Powlair, and Dalbreck. Fertile plants of *S. rigidum*, Dr. Braithwaite tells me, had not been found since 1832, but I have found it in fruit on Dalfro every year for the last 5 or 6 years, and also at Powlair last year; the tall squarrose form, so far as I know, occurs here only on Scolty. *S. tenue* I have met with only at Logie-Coldstone; *S. luridum* and *S. lætevirens*, *Brthw.*, on Clachnaben. *S. populosum* and *S. Austini* are, I believe, neither of them very scarce, but as I am not very familiar with them, I can at present only mention as localities—for the former Dalfro and Inverey, and for the latter Glen Dye. Most of the remaining *Sphagna* are so common as not to require notice of special localities.

In the following synopsis S.l. signifies stem-leaves and B.l. branch-leaves.

SYNOPSIS OF BRITISH SPHAGNA.

Section I. FIMBRIATA, stem leaf, obtuse and fimbriated.

- A. Cymbifolia. S. l. large, fimbriated all round margin, with fibres in the cells. B. l. large hooded, sometimes fimbriated, cells prickly towards the apex, and cortical cells with spiral fibres.
- (1) *S. Austini*, *Sull.*, Fibres in basal cells of stem leaves.
 - (2) — *papillosum* *Lindb.*
 - (3) — *cymbifolium* *Ehrh.*, Fibres in apical cells of stem leaves.
- B. Squarrosa. S. l. slightly bordered below, fimbriated at the rounded apex, without fibres. B. l. generally squarrose above the middle and much contracted, composed of small cells; cortical cells without fibres, and often without pores.
- (4) *S. squarrosum* *Persoon*, plant large.
 - (5) — *squarulosum*, plant small.
 - (6) — *teres*, *Angstrom*, soft, often not squarrose.
 - (7) — *subteres*.
 - (8) — *Lindbergii*, *Schimper*, cells small as in Sect. II. G. S. l. sometimes acute and hooded, but generally flattened and fimbriated.
- C. Imbricata. S. l. much bordered, fimbriated at apex (No. 8 might be united to this group).
- (9) *S. strictum* *Lindb.*, dioecious, S. l. fimbriated only at rounded apex.
 - (10) — *fimbriata*, *Wilson*, monoecious, S. l. much broader at apex, and sometimes fimbriated slightly above the margin.

Section II. ACUTA. S. l. acute or acuminate, and toothed.

- D. Mollia. S. l. fibres throughout the cells, leaves broad in the middle tapering towards both ends, apex toothed.
- a. B. l. like S. l., or slightly narrower.
 - (11) *S. molle*, *Sull.*, caespitose, plant fine.
 - (12) — *arctum*, *Brthw.*, plants very dense.
 - b (13) — *Angstromii*, *Martin*, B. l. obtuse and concave.

- E. ACUTIFOLIA. S. l. widely bordered, sometimes toothed. B. l. acute, sometimes squarrose.
- (14) *S. patulum*, S. l. with white fibres.
- (15) — *rubellum*, Wilson, Dioecious, red. B. l. secund.
- (16) — *ambiguum*, Br., Dioecious, plants tall and slender. S. l. obtuse or toothed, with fibres.
- (17) — *fuscum*, Dioecious, S. l. destitute of fibres.
- (18) — *tenu*, Dioecious, pinkish, whole plant fine and delicate.
- (19) — *purpureum*, S. l. short, acute, widely bordered. B. l. secund, purple.
- (20) — *late-virens*, Brthw., always green.
- (21) — *deflexum*, S. l. large, point recurved, no fibres.
- (22) — *luridum*, branches equal, directed upwards.
- (23) — *elegans*, Br., leaves never secund. S. l. destitute of fibres.
- (24) — *acutifolium*, Ehrh.
- F. CRISPA. S. l. ovate or cuncate ; cells much smaller than in the other sections, and elongated with fine fibres.
- (25) *S. cuspidatum*, Ehrh., branches cuspidate and long.
- (26) — *falcatum*, branches cuspidate and falcate.
- (27) — *plumosum*, closely branched. B. l. long and spreading, toothed along the margins.
- (28) — *brevifolium*.
- (29) — *intermedium*, Hoffm., leaves recurved, long, acute.
- (30) — *pulchrum*, B. l. oblong, abruptly acuminate.
- (31) — *riparium*, branches very long and drooping.
- (32) — *Wulfi*, Girgens, branches very short, and numerous in each fascicle.
- G. SUBSECUNDA, S. l. often bluntish, or toothed with fibres.
- (33) *S. contortum*, branches contorted, sometimes cuspidate, stem black, with single layer of cortical cells.
- (34) — *obesum*, as above, but branches not contorted.
- (35) — *auriculatum*, branches cuspidate, leaves slightly squarrose at tip.
- (36) — *laricinum*, Spruce, double layer of curved porous cortical cells.
- (37) — *subsecundum*, Schimper, leaves secund.
- H. TENELLA. Leaves ovate, concave, and moderately acute ; stem small, soft, and flaccid ; cells much larger than in F and G, cortical cells, large, porous, curved.
- (38) *S. molluscum* Bruch., S. l. ovate, when flattened blunt and toothed. B. l. roundish-ovate, concave, more or less acute.
- (39) — *longifolium*, whole plant stronger and leaves larger than in last.
- Section III. OVATA, S. l. small, ovate, concave, sometimes slightly fimbriated.
- (40) *S. compactum* Bridel, B. l. large, concave, and hooded.
(*S. squarrosum*, leaves very squarrose.)
- (41) — *rigidum*, stem rigid and brittle.

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