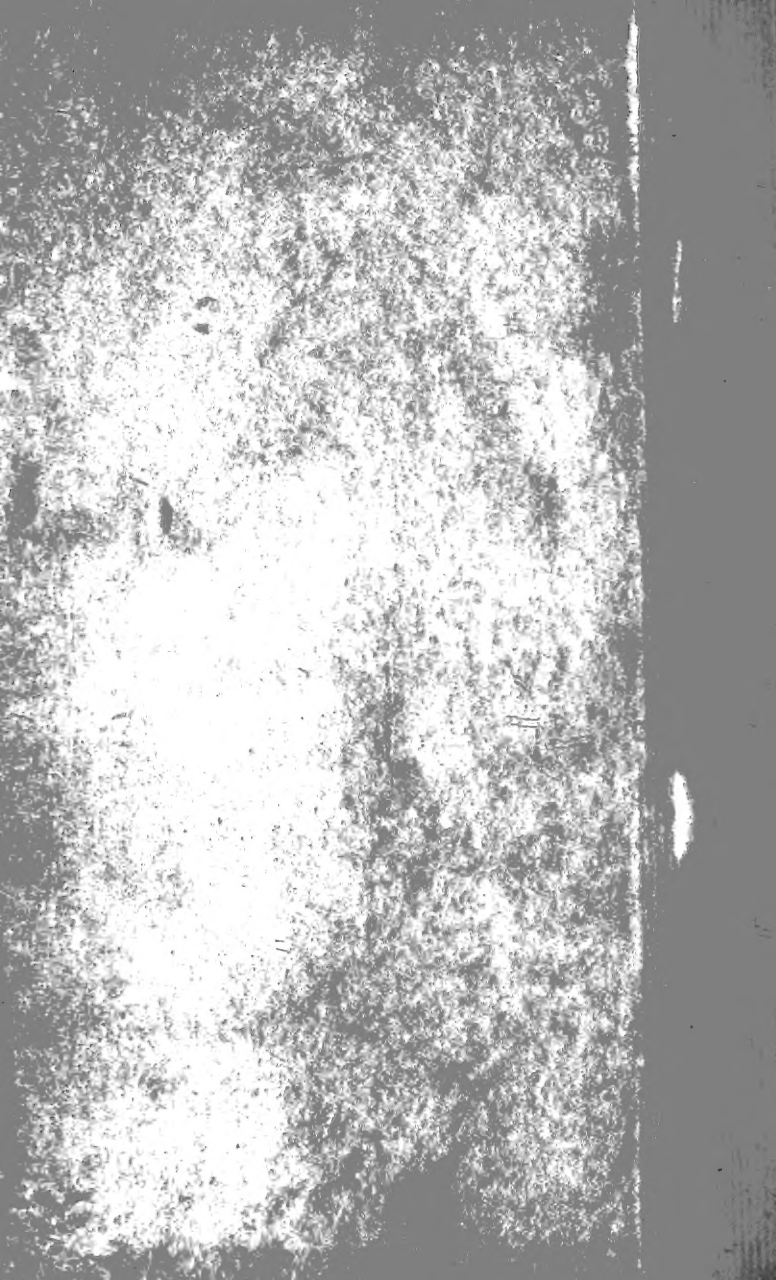


S.6a.

TRANSACTIONS OF THE NATURAL
HISTORY SOCIETY OF ABERDEEN.

1885.







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NATURAL
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TRANSACTIONS

OF THE

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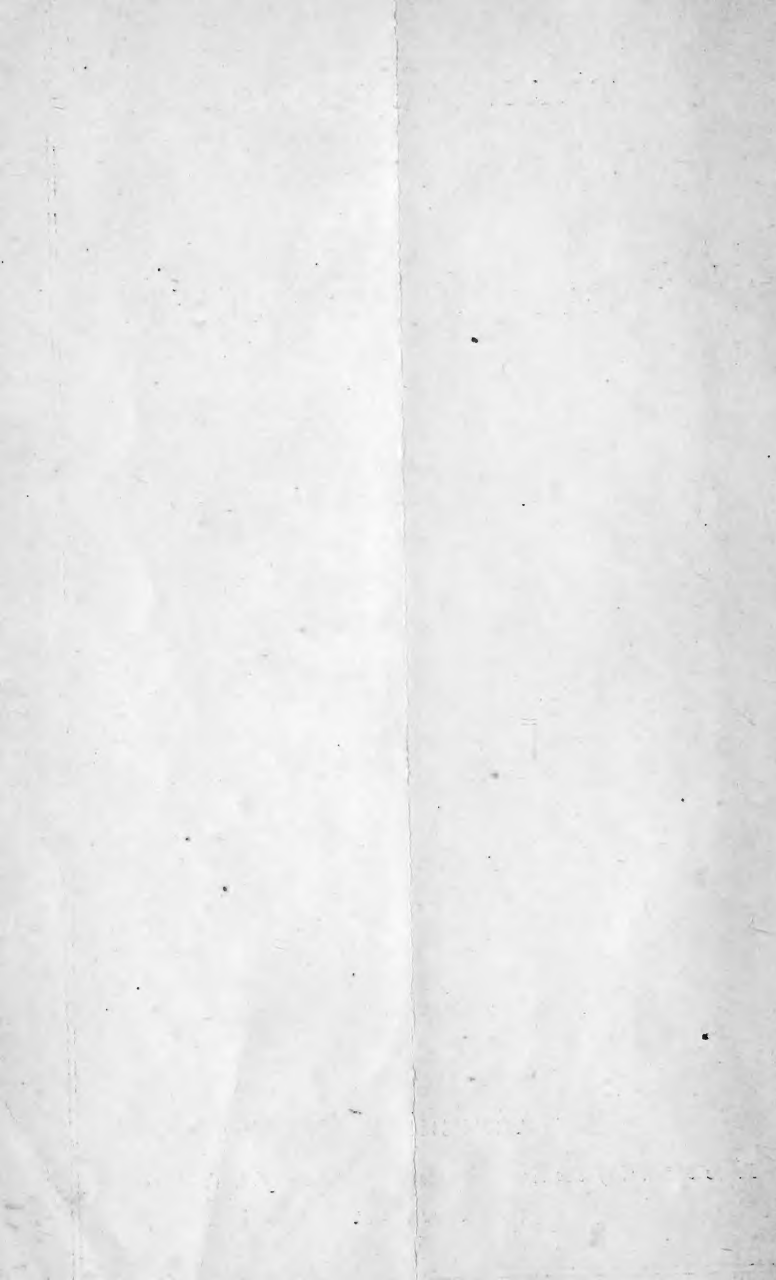
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ABERDEEN:

*To be obtained of the Secretary of the Society Mr. JOHN ROY,
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Perth

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INTRODUCTION

BY JOHN ROY,

(*Secretary of the Society.*)

Since the publication of the *Transactions* of the Aberdeen Natural History Society in 1878, papers have been read or Lectures delivered before the Society on the following subjects :—

Mr. J. Sim—"On the Sphagnaceæ of the District."

Mr. Taylor—"On the Sharks of our Seas."

Rev. Dr. Longmuir—"On the Growth of Peat."

Dr. Trail—"A Visit to Norway."

Mr. J. Roy—"On Fresh-Water Algæ."

Mr. J. Sim—"On Shetland and its Flora."

Mr. T. Sim—"On Proliferous Ferns."

Mr. George Sim—"On Herrings and Sprats."

Mr. (now Dr.) Walker—"On Cyclosis."

Mr. J. Roy—"On the Conjugatæ."

Mr. Duncan—"On the Botany of Ben-a-Chie."

Mr. R. Fergusson—"On a Diatomaceous Deposit near Dunrobin."

Mr. James Taylor—"On Coniomycetous Fungi."

Mr. George Sim—"On Herrings and other Fishes."

Mr. F. G. Ogilvie—"Geological Field Notes."

Dr. Trail—"On Leaf Fungi."

Dr. Struthers—"On the Rudimentary Hind Limb of the Greenland Right Whale."

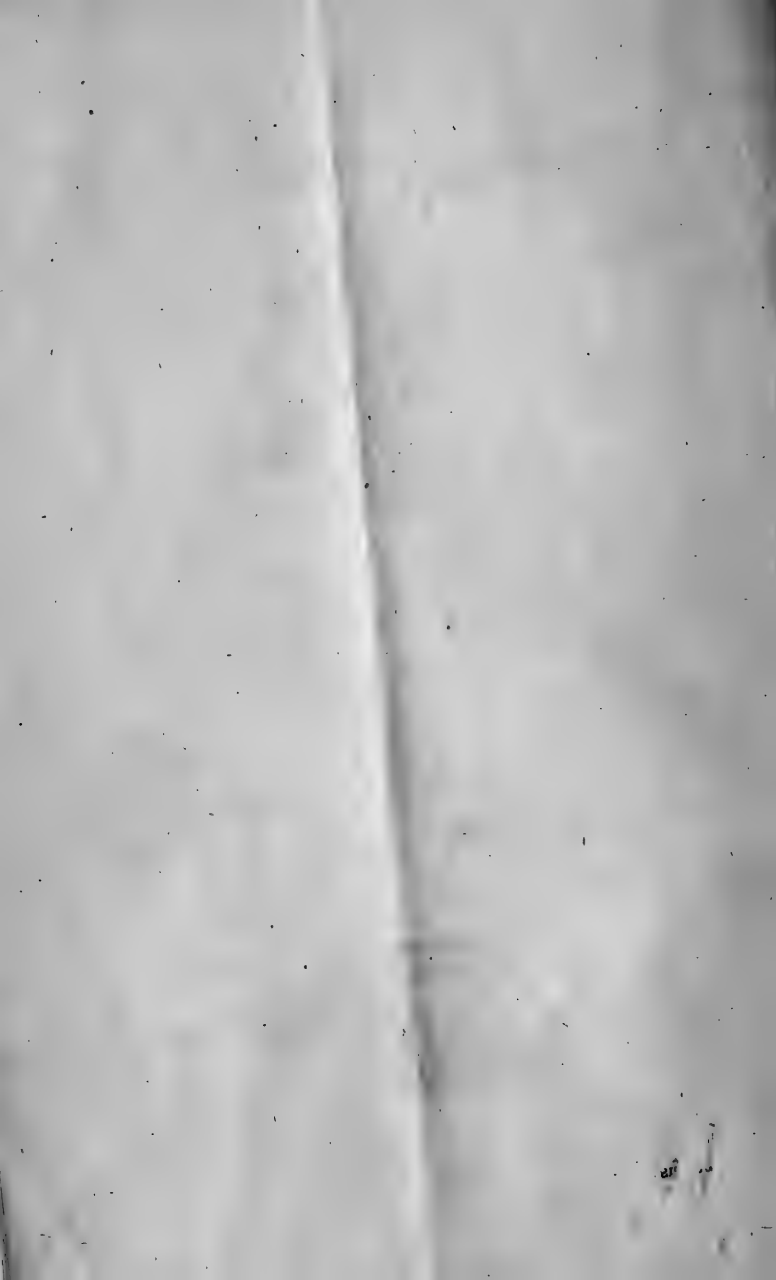
Mr. F. G. Ogilvie—"On the Rocks of Balgownie."

Mr. J. Sim—"On a Prostrate Form of the Common Rush found in Shetland."

- Mr. John Taylor—"A Sketch of the Life of John Duncan, the Alford Botanist."
- Mr. John Sim—"Notes on Certain New or Rare Hepaticæ found in the Strachan District."
- Mr. S. Burnett—"On the Habits, &c., of the Owls of this District."
- Mr. James Taylor—"On Populus Tremula."
- Dr. Trail—"On the Modes of Distribution of Seeds, with Special Reference to some Plants of N.E. Scotland."
- Dr. Ewart—"On Star Fish."
- Mr. John Taylor—"Notes and Observations of a Naturalist in the Counties of Aberdeen, Banff, and Kincardine."
- Mr. J. Roy—"Remarks on Maskell's *Desmidiæ of New Zealand*."
- Mr. F. G. Ogilvie—"On the Grouping of the Mountains of the Highlands, including a Sketch of the Geology of the Highlands, and of the Origin of the Highland Valleys."
- Mr. J. Roy—"On the *Desmidiæ* of the N.E. of Scotland, including a List of the Species Observed."
- Dr. Trail—"Alternation of Generations in the *Cynipidæ* and in their Galls on Oak."
- Mr. Bisset—"On the *Desmid* Flora of Arran."
- Dr. Nicholson—"On Granite."
- Mr. F. G. Ogilvie—"On the Geology of the Island of Kerrera, and the Neighbouring Coast North of Oban."
- Dr. Trail—"Recent Additions to the Galls of the N.E. of Scotland."
- Dr. Trail—"On some Leaf Fungi added to the Scottish Flora in 1882."
- Dr. Trail—"On some Groups of Animals and Plants which have yet to be wrought out in the N.E. of Scotland."
- Mr. J. Sim—"On the Growing of Plants in Moss."
- Dr. Cruickshank—"On an Excavation at Esslemont Avenue, with Special Reference to the Burrows of Earthworms in the Boulder Clay shown in the Section there."
- Rev. Dr. Keith—"Supplementary List of the Fungi of the Province of Moray."
- Dr. Nicholson—"On the Organisms which occur in Limestones."

- Dr. Trail—"Supplementary Notes on Galls and their Makers in 'Dee,' with a few from other Parts of Scotland."
- Dr. Trail and Mr. John Roy—"Additions and Corrections to the Records in Watson's 'Topographical Botany,' Ed. II. of Vascular Plants indigenous in the Counties of Forfar, Kincardine, Aberdeen, Banff, and Elgin."
- Dr. Trail—"List of Introduction Plants and 'Casuals' observed in N. E. Scotland, especially in 'Dee.'"
- Mr. James Taylor—"On *Sclerotium durum*, P. and some Allied Forms."
- Id.—"Notes on some Plants found along the Coast from Aberdeen to the South of Stonehaven."
- Mr. G. Sim—"Twenty Minutes on the Beach."
- Mr. S. Burnett—"Notes, chiefly Zoological, taken during Trips Abroad."
- Mr. John Roy.—Report on the Society's Excursions in the summer of 1884.
- Dr. Trail—"A Visit to Canada, in connection with the Meeting of the British Association in Montreal."
- Mr. A. Murray.—"On a Larva that eats the Leaves of the Garden Sun-flower."
- Dr. Nicholson.—"On Hydractinæ and their Allies, both Living and Fossil."
- Mr. John Roy.—"The Flora of Snow and Ice."
- Mr. F. G. Ogilvy.—"On the Grand Cañon of the Colorado."





SECOND SUPPLEMENTARY LIST OF FUNGI

FOUND WITHIN THE

PROVINCE OF MORAY.

BY REV. JAMES KEITH, LL.D.

(The former lists are published in the SCOT. NAT., Vol. II., IV., V.)

1. Agaricus L.

(1) Amanita.

1041. virosus, Fr. Birch wood above Railway Station at Grantown and at Dunphail. Aug., Sep.
1042. mippa, Batsch. In woods. Forres, Cawdor, Grantown. Aug., Sep.
1043. spissus, Fr. In woods. Rothiemurchus. Aug.

(2) Lepiota.

1044. Friesii, Lasch. In stubble field, Rafford. Sep. Rare.

(3) Armillaria.

1045. bulbiger, A. & S. In fir woods. Ord-ban, Rothiemurchus. Aug.
1046. robustus, A. & S. In fir woods. Forres, Grantown, Rothiemurchus.
Aug., Sep.
Mistaken for *A. aurantius*, Schæff., and published under that name in my first list.

(4) Tricholoma.

1047. sejunctus, Sow. In woods. Cawdor. Sep. (Crypt. Soc.)
1048. immundus, Berk. Among grass. Forres and Nairn. Sep.
1049. melaleucus, P. On grassy path. Ord-ban, Rothiemurchus. Sep.

(5) Clitocybe.

1050. tumulosus, Kalchb. On thistle roots. Forres. Sep.
1051. pithyophilus, Secr. In fir woods. Clunyhill, Forres. Sep.
1052. vermicularis, Fr. In fir woods. Chapelton Wood, Forres. Sep.

(6) Collybia.

1053. acervatus, Fr. On fir stumps, Rothiemurchus. Aug.
1054. clavus, L. On small sticks and potato stems in Greeshop Wood, Forres. July, Oct.
1055. plexipes, Fr. On the ground among beeches, Altyre Wood, Forres. Sep.
1056. ambustus, Fr. On burnt ground. Forres and Dunphail.

(7) *Mycena*.

1057. *strobilinus*, Fr. On wood, probably fir cone, buried in the ground, in Altyre Woods, Forres. July.
 1058. *proliferus*, Sow. In Manse Garden, Forres. July.
 1059. *speireus*, Fr. On mossy trunk of willow in Greeshop Wood, Forres. Oct.

1060. *pterigenus*, Fr. On dead brakes. Altyre Woods, Forres. Nov.

(8) *Omphalia*.

1061. *hepaticus*, Batsch. Altyre Woods. Sep. (Crypt. Soc.)

(9) *Pleurotus*.

1062. *acerosus*, Fr. In fir woods, Rothiemurchus. Sep.

(11) *Entoloma*.

1063. *jubatus*, Fr. Lawn at Brodie Castle, Forres. Aug.

1064. *majalis*, Fr. Altyre Woods, Forres. May.

(12) *Clitopilus*.

1065. *undatus*, Fr. On grassy banks, Rothiemurchus. Aug., Sept.

(13) *Leptonia*.

1066. *chalybæus*, P. In pastures. Forres and Grantown. Sep.

(14) *Nolanea*.

1067. *mamosus*, Fr. In pastures. Rothiemurchus. Aug.

(15) *Pholiota*.

1068. *radicosus*, Bull. In birch wood above Railway Station, Grantown. Sep.

1069. *pumilus*, Fr. In damp mossy spot, Grantown. Sep.

(16) *Hebeloma*.

1070. *asterosporus*, Q. On the ground. Rothiemurchus. Aug.

(17) *Flammula*.

1071. *flavidus*, Schæff. On fir stump. Dunphail. Oct.

1072. *inopus*, Fr. On fir stumps. Forres, Grantown, Rothiemurchus. Aug., Nov.

(18) *Naucoria*.

1073. *tenax*, Fr. In fir wood, Grantown. Aug.

1074. *myosotis*, Fr. On the grassy margin of Loch Garten, Strathspey. Aug.

1075. *sobrius*, Fr. On grassy spots in woods. Altyre and Edinkillie. July.

2. *Tubaria*. W.S.

1076. *paludosus*, Fr. On Sphagnum, Grantown. Aug.

3. *Cortinarius*. Fr.(1) *Phlegmacium*.

1077. *claricolor*, Fr. In birch woods. Forres, Grantown, and Rothiemurchus.

1078. *turmalis*, Fr. In woods. Rothiemurchus. Sep.

1079. *cyanopus* (Secr). In woods. Forres, Cawdor, Grantown, Rothiemurchus. Aug., Sep.

1080. *serarius*, Fr. Greeshop Wood, &c., Forres. Sep.

(2) *Myxacium*.

1081. *mucifluus*, Fr. In fir woods, Grantown. Aug.

1081a. *delibutus*, Fr. In birch woods. Grantown and Rothiemurchus. Aug.

1082. *stillatitius*, Fr. The Bechan, Grantown. Aug.

(3) *Incloma*.

1083. *alboviolaceus* (Pers.). Among beeches in Altyre Woods. Sep.
 1084. *tophaceus*, Fr. Among birches. Ord-ban, Rothiemurchus. Aug.

(4) *Dermocybe*.

1085. *cinnabarinus*, Fr. In wood at Rothiemurchus. Aug.

(5) *Telamonia*.

1086. *impennis*, Fr. In meadows under alders. Waterford, Forres. Sep.,
 Oct.
 1087. *flexipes* (Pers.). Altyre Woods, Forres. Sep.
 1088. *incisus* (Pers.). Greeshop Wood, Forres. Sep.
 1089. *paleaceus* (Weinm.). Altyre and Greeshop Woods, &c., Forres. Sep.

(6) *Hygrocybe*.

1090. *leucopus* (Bull.). Fir woods, Grantown. Sep.
 1091. *scandens*, Fr. Greeshop wood, Forres. Oct.
 1092. *decipiens* (Pers.). Forres and Grantown. Sep., Oct.

4. *Hygrophorus*. Fr.

1093. *eburneus*, Fr. On Ord-ban, Rothiemurchus. Aug.

5. *Lactarius*. Fr.

1094. *rubescens*, Fr. Ord-ban, Rothiemurchus. Aug.
 1095. *hysginus*, Fr. The Duloch, Grantown, and Ord-ban, Rothiemurchus.
 Aug.

1096. *flexuosus*, Fr. Ord-ban, &c., Rothiemurchus. Aug.

1097. *pallidus*, Fr. Ord-ban, Rothiemurchus. Aug.

1098. *vietus*, Fr. Ord-ban, Rothiemurchus, Aug.

1099. *subdulcis*, Fr. The Bechan, Grantown. Aug.

1100. *helvus*, Fr. Castle Grant Woods, Grantown, and Ord-ban, Rothie-
 murchus. Aug.

1101. *picinus*, Fr. Ord-ban, Rothiemurchus. Aug.

1102. *fuliginosus*, Fr. The Bechan, Grantown, and Ord-ban, Rothiemur-
 chus. Aug.

7. *Russula*. Pers.

1103. *vesca*, Fr. Castle Grant Woods, Grantown. Aug.

1104. *Queletii*, Fr. In fir woods. Forres, Grantown, Rothiemurchus.
 Aug., Sep., Oct.

8. *Marasmius*. Fr.

1105. *porreus* (Pers.). Among oak leaves, Darnaway. Nov.

1106. *erythropus* (Pers.). Among leaves in mixed wood, Brodie. Sep.

1107. *saccharinus* (Batsch.). On decayed fern, Dunphail. Oct.

9. *Lentinus*. Fr.

1108. *Seoticus*, B. & Br. On birch stick above Cothall. Feb.

10. *Boletus*. Fr.

1109. *elegans*, Schum. Rothiemurchus. Aug.

1110. *flavidus*, Fr. In marshy ground in fir wood at Loch Morlich. Aug.

1111. *cyanescens*, Bull. The Bechan, Grantown. Aug.

11. *Polyporus*. Fr.

1112. *polymorphus*, Rostk. On a stick, Kinrara. Aug.

1113. *reticulatus*, P. On a piece of birch bark, Darnaway. Sep.

12. *Trametes*. Fr.

1114. *Pini*, Fr. On fir trees, Darnaway, Grantown, and Rothiemurchus.

13. *Hydnum*. L.

1115. *scabrosum*, Fr. In fir woods. Chapelton Wood, Forres, and at
 Rothiemurchus. Sep.

1116. *nigrum*, Fr. In fir woods. Rothiemurchus. Sep.
 1117. *melaleucum*, Fr. In Chapelton Fir Wood, Forres. Sep.
 1118. *udum*, Fr. On a stick, Darnaway. Sep.

14. *Cyphella*. Fr.

1119. *muscigena*, Fr. On mosses. Altyre. Sep.
 1120. *Capula*, Fr. On nettle stems, Greeshop Wood. July and Sep.
 1121. *gibbosa*, Lev. On old potato stem at Manse of Dyke. July.

15. *Clavaria*. L.

1122. *stricta*, P. Ord-ban, Rothiemurchus. Aug.
 1123. *argillacea*, Fr. Beside Scourie Bridge, Forres. Sep.

16. *Typhula*. Pers.

1124. *erythropus*, Fr. On dead stems of herbaceous plants in Greeshop Wood. Oct.
 1125. *Grevillei*, Fr. On leaves in Greeshop Wood. Oct.
 1126. *filiformis*, Fr. On leaves in Greeshop Wood. Oct.

17. *Pistillaria*. Fr.

1127. *quisquiliaris*, Fr. On fern stems, Dunphail. Oct.

18. *Physarum*. Pers.

1128. *sinuosum*, Bull. Cawdor. Sep. "Crypt. Soc."

19. *Craterium*. Trent.

1129. *mutabile*, Fr., (*C. aureum* Schum.) On a whin stick, Darnaway. Aug.

20. *Lamproderma*, Rtfki.

1130. *arcyrioides*, Somm. On decayed cabbage stalk, Forres, July.

21. *Enerthenema*. Bowm.

1131. *papillata* (Pers.). On a fir board, Rothiemurchus. Aug.

22. *Arcyria*. Hill.

1132. *cinerea*, Bull. On a stick, Darnaway. Sep.

23. *Septoria*. Fr.

1133. *Polygonorum*, Desm. On *P. Persicaria*, Forres. Sep.
 1134. *Epilobii*, West. On *E. montanum*, Dunphail. July.
 1135. *Ficariæ*, Desm. On *Ranunculus Ficaria*, Dunphail. July.

24. *Ascochyta*. Libert.

1136. *Pisi*, Lib. On pea leaves, Forres. May.
 1137. *Dianthi*, Berk. On *Lychnis* leaves, Forres. July.

25. *Excipula*. Fr.

1138. *strigosa*, Fr. On grass stem, Forres. June.

26. *Torula*. Pers.

1139. *graminis*, Desm. On grass, Forres. March.

27. *Sporochisma*. B. & Br.

1140. *mirabile*, B. & Br. On beech stump at Chapel of Blair, Forres. July.

UROMYCES Link.

1141. *Alchemillæ* (Pers.) On *Alchemilla Vulgaris*.
Uredo-spores (*Uredo Alchemillæ* Pers.) Greeshop. June.
Teleuto-spores (*Uromyces intrusa* Lev.) Grantown. Aug.
 1142. *Valerianiæ* (Schum.) On *Valeriana officinalis*.
Æcidio-spores (*Æc. Valerianacearum* Duby). At Dulsie. June.
Uredo-spores (*Lecythea Valerianæ* Berk.) Altyre. June.

PUCCINIA Pers.

1143. *Malvacearum* Mont. On Hollyhocks in Sanquhar Garden, Forres.
July.
1144. *Arenariæ* (Schum.) On *Stellaria uliginosa*. Forres. Aug., Sept.
1145. *Fergussoni* B. and Br. On *Viola palustris*. Cothall, near Forres.
July.
1146. *Suaaveolens* (Pers.) On *Cirsium arvense*.
Uredo-spores (*U. suaaveolens* Pers.) Forres. June.
Teleuto-spores (*P. obtogens* Tul.) Forres. July., Aug.
1147. *Umbelliferarum* D.C. On *Anthriscus sylvestris* and other *Umbellifera*.
Uredo- and *Teleuto*-spores. Forres. Aug.
1148. *Anemones* Pers. On *Anemone nemorosa*.
Æcidio-spores (*Æc. leucospermum*, D.C.) Dunphail and
Glenfernes. May and June.
Teleuto-spores. Common. June and July.
1149. *Galiorum* Lk. On *Asperula odorata* and *Galium aparine*.
Æcidio-spores (*Æc. Galii* Pers.) and *Uredo*-spores (*Trichobasis*
Galii Berk.) Dumphail and Blair Chapel. July.
Teleuto-spores. Sluie. Sept.
1150. *Pimpinellæ* (Strauss.) On *Pimpinella Saxifraga*.
Uredo- and *Teleuto*-spores. Aviemore. Sept.
1151. *Saniculæ* Grev. On *Sanicula Europæa*.
Æcidio-spores (*Æc. Saniculæ* Carm.) Grantown. Aug.
Teleuto-spores. Sluie. Sept.
1152. *Epilobii* D.C. On species of *Epilobium*.
Æcidio-spores. On *E. montanum*. Dunphail. July.
1153. *Flosculosorum* (A. & S.) On *Compositæ*.
Æcidio-spores. On *Crepis paludosa*. (*Æc. Crepidis* Wllr.)
Dulsie. June.
Uredo-, along with *Teleuto*-spores. On *Lapsana communis*
(*P. Lapsanæ* Fckl.); *Centaurea nigra* (*P. Centaureæ* D.C.):
Crepis virens and various *Hieracia* (*P. Hieracii* Mort.)
June-Sept.
1154. *Rubigo-vera* (D C.)
Uredo-spores (*Trichobasis rubigo-vera* Lev.) and
Teleuto-spores. On *Holcus*. Sept.
1155. *Poarum* Niel.
Æcidio-spores (*Æc. Tussilaginis* Pers.) On *Tussilago farfara*.
Common. June.
Teleuto-spores. On *Poa fluitans*. Grantown. Sept.

COLEOSPORIUM Lev.

1156. *Senecionis* (Pers.)
Æcidio-spores (*Peridermium Pini* Chev. & *P. aciculum* Link).
On *Pinus sylvestris* and *P. Austriaca*. Forres and Rothiemurchus.
May, June.
Uredo and *Teleuto*-spores. On *Senecio sylvaticus*. Scrapehard,
Forres. July.

CÆOMA.

1157. *Laricis* West. On Larch leaves. Rothiemurchus. June.

ÆCIDIDIUM Pers.

1158. *Compositarum* Mart. var. *Bellidis* D.C. On *Bellis perennis* at
Boat-o'-Birdge. July.

I am not aware that other forms of the two foregoing species have been discovered.

PROTOMYCES Ung.

1159. *Macrosporus* Ung. On stems and leaves of Goutweed (*Æg. Podagraria* L.) Sanquhar. June.
 1160. *Pachydermus* Thum. On leaf-stalk, midrib, and flower-stalk of *Taraxacum officinale*. Forres. May.

SYNCHYTRIUM De By.

1161. *Anemones* Woron. On leaves of *Anemone nemorosa*. Rothiemurchus. June.

USTILAGO Lk.

1162. *Salveii* B. & Br. On *Holcus* and *Triticum*. Forres. June, July.

SOROSPORIUM Rud.

1163. *Trientalis* Woron. On *Trientalis Europæa*. Chapelton Wood. Oct.

ENTYLOMA De By.

1164. *Ungerianum* De By. On *Ranunculus repens*. Dunphail, &c. July.
 1165. *Ficariæ* Fischer von Waldh. On *Ranunculus ficaria*. Common. May.
 1166. *Canescens* Schröt. (*Protomyces Fergussoni*, B. & Br.) On *Myosotis arvensis*. Waterford. Sept.

ISARIA Fr.

1167. *Intricata* Fr. On decayed *Agaric*. Dunphail. Nov.

SPOROBYBE Fr.

1168. *Alternata* Berk. On damp pasteboard. Forres. Sept.

MACROSPORIUM Fr.

1619. *Concinnum* Berk. On a basket for holding a sponge in my dressing-room. May.

RHINOTRICHUM Cda.

1170. *Repens* Preuss. On fallen trunk. Darnaway. Sept.

PERONOSPORA De By.

1171. *Pygmæa* Ung. On *Anemone nemorosa*. Dumphail. May.
 1172. *Gangliformis* Berk. On *Senecio sylvaticus*. Manachie. May.
 1173. *Viciæ* Berk. On *Vicia cracca*. Forres and Grantown. July, Aug.
 1174. *Calotheca* De By. On *Asperula odorata*. Dunphail. July.
 1175. *Arenariæ* Berk. On *Arenaria trinervia*. Greeshop Wood. June.
 1176. *Alsinearum* De By. On *Stellaria media* and *Cerastium vulgatum* Forres and Grantown. Aug.
 1177. *Effusa* Grev. On Spinach in Manse Garden, and on *Chenopodium* at the side of the railway at Forres, June, and at Grantown, Aug.
 1178. *Ficariæ* Tul. On *Ranunculus ficaria* at Dunphail, and on *R. acris* at Waterford. June.
 1179. *Affinis* Rossm. On *Fumaria officinalis* on the sloping side of railway opposite Greeshop. July.
 1180. *Urticæ* (Lib.) De By. On *Urtica urens* beside Sanquhar Garden. June.
 1181. *Arborescens* Berk. On *Papaver dubium* on sloping side of railway opposite Greeshop. June.
 1182. *Sordida* Berk. On *Digitalis*. Dunphail. July.
 1183. *Leptosperma* De By. On Leaves of *Pyrethrum inodorum* on slope of railway embankment behind Greeshop farm. July.

RAMULARIA Unger.

1184. *Rufibasis* (*Peronospora rufibasis* B. & Br.) On leaves of *Myrica gale*. Grantown. July—Sept.

1185. *Obliqua* (Cooke). On Dock leaves. Common. Summer.
 1186. *Veronicae* Fekl. On *Veronica montana*. Greeshop Wood. June.
 1187. *Heraclei* Oud. On *Heracleum*. Common. June—Aug.
 1188. *Pruinosa* Speg. On *Senecio Jacobæa*. Brodie. July.
 1189. *Malvæ* Fekl. On *Malva moschata* in Castle Grant garden. Aug.
 1190. *Calcea* Desm. On *Glechoma hederacea*. Chapel of Blairs, &c. July.

DACTYLIUM Nees.

1191. *Roseum* Berk. On an osier basket decaying on the ground. Forres. July.

SPOROTRICHUM Lk.

1192. *Sulfureum* Grev. Along with the preceding species.

SYZYGITES Ehrb.

1193. *Megalocarpus* Ehrb. On decaying Agarics. Forres. Sept.

ONYGENA (Pers.), Tul.

1194. *Equina* Pers. On decaying horse-hoofs and sheep-horns. Forres and Rothiemurchus. Aug.—Oct.

MORCHELLA Dill.

- * *Esculenta* Pers. var. *conica* Fr. Sluie, Rafford, Clunyhill, Sanquhar, and Rothiemurchus. May.

1195. *Semilibera* D.C. Greeshop Wood. May.

HELVELLA L.

1196. *Infula* Schæff. Sawdust opposite the Dell, Rothiemurchus. Sept.
 1197. *Atra* Kög. At the base of Ord Ban, Rothiemurchus. Aug.

MITRULA Fr.

1198. *Cucullata* Fr. On fir leaves. Clunyhill and Altyre Woods. Abundant. Nov.

LEOTIA Hill.

1199. *Circinans* P. Fir woods. Under Spruces near the Schoolhouse, and in abundance at corner of Ord Ban, Rothiemurchus. Aug.—Sept.

GEOGLOSSUM P.

1200. *Difforme* Fr. Rothiemurchus. Aug.

RHIZINA Fr.

- * *Undulata* Fr. In immense abundance at Rothiemurchus, where a plantation had been burned down eighteen months before. Aug., Sept., 1883.

PEZIZA L.

1201. *Cupularis* L. Darnaway. Sept.
 1202. *Xanthomela* Pers. Darnaway. Oct.
 1203. *Oocardii* (Kalch.) On wet rotten birch wood. Darnaway. Nov.
 1204. *Furfuracea* Fr. On Alder. Sanquhar and Greeshop. March.
 1205. *Bulbocrinita* Ph. On prunings. Greeshop. July.—Sept.
 1206. *Hirtococcinea* Ph. On moss in firwood. Rothiemurchus. Aug.
 1207. *Rhytismæ* Ph. On spots of old *Rhytisma* on Sycamore leaves. Greeshop. June.
 1208. *Edema* Desm. On Bramble leaves on decayed *Phragmidium bulbosum*. Forres. June.
 1209. *Leucophæa* Pers. On old stems of *Stachys sylvatica*. Greeshop. June.
 1210. *Nidulus* Schum. and Kunz. On rotten stems of *Spiræa ulmaria*. Greeshop. May.
 1211. *Pteridis* A. & S. On decaying leaves of *Pteris aquilina*. Rothiemurchus. June.

1212. *Nuda* Ph. On moss near Coilam Bridge, Rothiemurchus. Aug.
 1213. *Urceoliformis* Karst. On stems of *Vaccinium vitis-idaea*. Grantown.
 1214. *Subularis* Bull. On Angelica seeds. Greeshop. Oct.
 1215. *Echinophila* Bull. On Chestnut husks. Cawdor, Clunyhill, and Altyre. Sept.—Nov.
 1216. *Caucus* Reb. On catkins of Alder. Greeshop. Oct.
 1217. *Pallido-virescens* Ph. On roots of grass or some trailing stems. Greeshop.
 1218. *Coronata* Bull. On petioles. Greeshop. Oct.
 1219. *Scutula* Pers. On stems of *Spiraea ulmaria*. Greeshop. Oct.
 1220. *Electrina* Ph. & Pl. On decaying pine leaves. The perfect form was found by Mr. Plowright at Forres, in September, 1879. I had previously found the less perfect form (*Dacrymyces succineus* Fr.) at Grantown. It is this which is given under the name of *Fusarium pezizoides*, as No. 837 in my second list (See Grev. VIII., 154).
 1221. *Lacustris* Fr. On straw of *Phalaris arundinacea*. Greeshop wood. Nov.
 1222. *Palustris* Rob. On withered grass. Greeshop and Dumphail. June.
 1223. *Mercurialis* (Fekl.) On dead stems of *Mercurialis perennis*. Cothall and Greeshop. May.
 1224. *Ventosa* Karst. On Willow stump. Greeshop. July.
 1225. *Sphaeroides* Pers. On dead stems of *Lychnis diurna*. Greeshop. June.
 1226. *Xanthostigma* Fr. On old wood. Rothiemurchus and Forres. Common. Summer.
 1227. *Sordida* Fekl. On broom. Manachie. Jan.

HELOTIUM Fr.

1228. *Epiphyllum* Fr. On damp oak leaves. Darnaway. Sept.
 1229. *Sulfuratum* (Flo. Dan.) Ph. On fallen pine leaves. Cawdor, W. Phillips; Clunyhill, J. K. Sept.—Nov.
 1230. *Lutescens* (Hed.) Fr. On a piece of wood covered with moss. Manachie. Jan.
 1231. *Alniellum* (Nyl.) Karst. On catkins of Alder. Greeshop. Oct.

PATELLARIA Fr.

1232. *Discolor* Mont. On Alder sticks. Altyre and Greeshop. June—Oct.

CENANGIUM Fr.

1233. *Subnitidum* Cke. & Ph. On hazel at Chapel of Blairs. May.
 1234. *Pulveraceum* Fr. On a stick. Darnaway. Oct.

ASCOBOLUS Tode.

1235. *Viridis* Cur. On the ground in Greeshop wood. Oct.
 1236. *Subfuscus* Boud. On cat's dung. Forres. April.
 1237. *Microsporus* B. & Br. On cow's dung. Aviemore. Aug.

OMBROPHILA Fr.

1238. *Brunnea* Ph. On garden prunings. Greeshop. July.

ASCOMYCES M. & D.

1239. *Deformans* Berk. On Peach leaves in gardens. May, June.

PHACIDIUM Fr.

1240. *Dentatum* Fr. On Chestnut leaves. Clunyhill. Nov.
 1241. *Leptideum* Fr. On stems of *Vaccinium vitis-idaea*. Rothiemurchus. Aug.
 1242. *Tetrasporum* Ph. & Keith. On Juniper leaves. Manachie. June. (Gard. Chron., Sept. 4th, 1880.)
 1243. *Minutissimum* Awd. On Oak leaves. Dunphail. June.

EPHELIS Fr.

1244. *Radicalis* (Cooke) Ph. & Keith. *Rhytisma radicale* Cke. At the base of dead stems of *Rhinanthus cristà-galli*. Forres. Perfect fruit in May and June.

CLAVICEPS Tul.

1245. *Purpurea* Tul. Ascophore. In a frame in garden from *Sclerotia* sown the previous year. May.

HYPOCREA Fr.

1246. *Citrina* Fr. *Forma fungicola* Karst. On pores of *Polyporus betulinus*. Darnaway and Dunphail. Sept., Oct.

HYPOMYCES Tul.

1247. *Violaceus* Tul. On *Æthodium* in an old saw-pit at Cawdor, Sept. 29th, 1879, C. B. Plowright; and on *Æthodium* on heath at Rothiemurchus, Aug., 1884, J. K.
1248. *Chrysospermus* Tul. On decayed *Boletus* in Chapelton wood, Sept., 1879. Plowright and Stevenson; and at Daltulich, Sept., 1883, J. K.

ELEUTHEROMYCES Fckl.

1249. *Subulatus* Fckl. On decayed *Russula nigricans*. Chapelton Wood. Sept.

NECTRIA Fr.

1250. *Inaurata* B. & Br. On Holly twigs. Sluie. April.
1251. *Mammoidea* Ph. & Pl. On Currant stick. Greeshop. March.

XYLARIA Fr.

1252. *Pedunculata* Fr. On roe-deer's dung. Rothiemurchus. Aug.

HYPOXYLON Fr.

1253. *Concentricum* (Bolt.) On the stump of an old ash tree at Manse of Alves. July. Rare in this district.

The tree on the stump of which the specimens occurred had been one of a row on which the beeves killed for the use of the Duke of Cumberland's army, while encamped at Alves before the battle of Culloden, are said to have been suspended.

EUTYPA Tul.

1254. *Spinosa* Tul. On a hardwood stick. Darnaway. May.

DOTHIDEA Fr.

1255. *Trifolii* Fr. On *Trifolium medium*. Grantown. Aug. No fruit.
1256. *Tetraspora* B. & Br. On Whins, Manachie, Spring; and on Holly twigs, Sanquhar, Dec. Seems to occur most frequently on burnt whins.

DIATRYPE Fr.

1257. *Verrucæformis* Ehr. var. *Tocciaæana* De Not. On alder. Sanquhar. May.
1258. *Pyrrhocystis* B. & Br. On Hazel. Dunphail. May.

MELANCONIS Tul.

1259. *Modonia* Tul. On dead twigs of *Castanea vesca*. Clunyhill. Jan.

VALSA Fr.

1260. *Abietis* Fr. On Scotch fir. Mondole. March.
1261. *Cratægi* Cur. On Hawthorn. Forres. Nov.

1262. *Clypeata* (Fckl.) On dead Bramble stems at Scourie, near Forres. April.

CUCURBITARIA Gray.

1263. *Lauro-cerasi* Ph. & Pl. On Cherry laurel. Altyre. May. (Grev. vol. X., p. 72.)

FENESTRELLA Tul.

1264. *Bipapillata* Tul. On Beech twigs. Altyre. March.

MASSARIA De Not.

1265. *Fœdans* Fr. On Beech. Sanquhar. March.
 1266. *Eburnea* Tul. On Beech. Darnaway. July.
 1267. *Tiliæ* Ph. & Pl. On Lime twigs. Drumduan. May. (Grev., vol. X., p. 72.)

LOPHIOSTOMA De Not.

1268. *Hederæ* Fckl. On Ivy. Sanquhar. April.

SPHÆRIA Hall.

1269. *Superficialis* Curry. On Fir wood. Rothiemurchus. Aug.
 1270. *Scabra* Curry. On Broom. Manachie. March.
 1271. *Prætermissa* Karst. On Raspberry stalks. Dunphail. May.
 1272. *Pulviscula* Curry. On Wood. Rothiemurchus. Aug.
 1273. *Sordaria* Fr. On Fir Chips. Scourie. Nov.
 1274. *Velata* Pers. On Lime twigs. Clunyhill. June.
 1275. *Ditopa* Fr. Both forms. On Alder twigs. Waterford. June.
 1276. *Persistens* B. & Br. On Rose stems. Greeshop. June.
 1277. *Abbreviata* Cke. On Raspberry stems. Sanquhar. July.
 1278. *Herbarum* Pers. var. *Pisi* Sow. On old Pea straw. Forres. June.
 1279. *Nigrella* Fr. On Angelica stems. Greeshop. July.
 1280. *Tubæformis* Tode. On alder leaves. Waterford. May.

SORDARIA Winter.

1281. *Maxima* Nies. On rabbit's dung. Greeshop. July.
 1282. *Equorum* (Fckl.) Wint. On horse dung. Sanquhar. July.

SPHÆRELLA De Not.

1283. *Maculeformis* Pers. On Oak leaves. Common. June.
 1284. *Ditricha* (Fr.) On Birch leaves. Common. June.
 1285. *Anarithma* B. & Br. On *Ammophila*, Waterford. July.
 1286. *Proximella* Karst. On the axis of old fertile spikes of *Carex ampullacea*. Sanquhar. May.
 1287. *Rusci* De Not. On leaves of *Ruscus aculeatus*. Invererne and Altyre. July.

VENTURIA De Not.

1288. *Dickiei* (B. & Br.) De Not. On leaves of *Linnæa borealis* in Castle Grant woods, and at Rothiemurchus. Aug.

ORBICULA, Cooke.

1289. *Perichænoides* Cke. On old rafters of a barn, Forres. June. (Grev., vol. VIII., p. 10.)

STIGMATEA Fr.

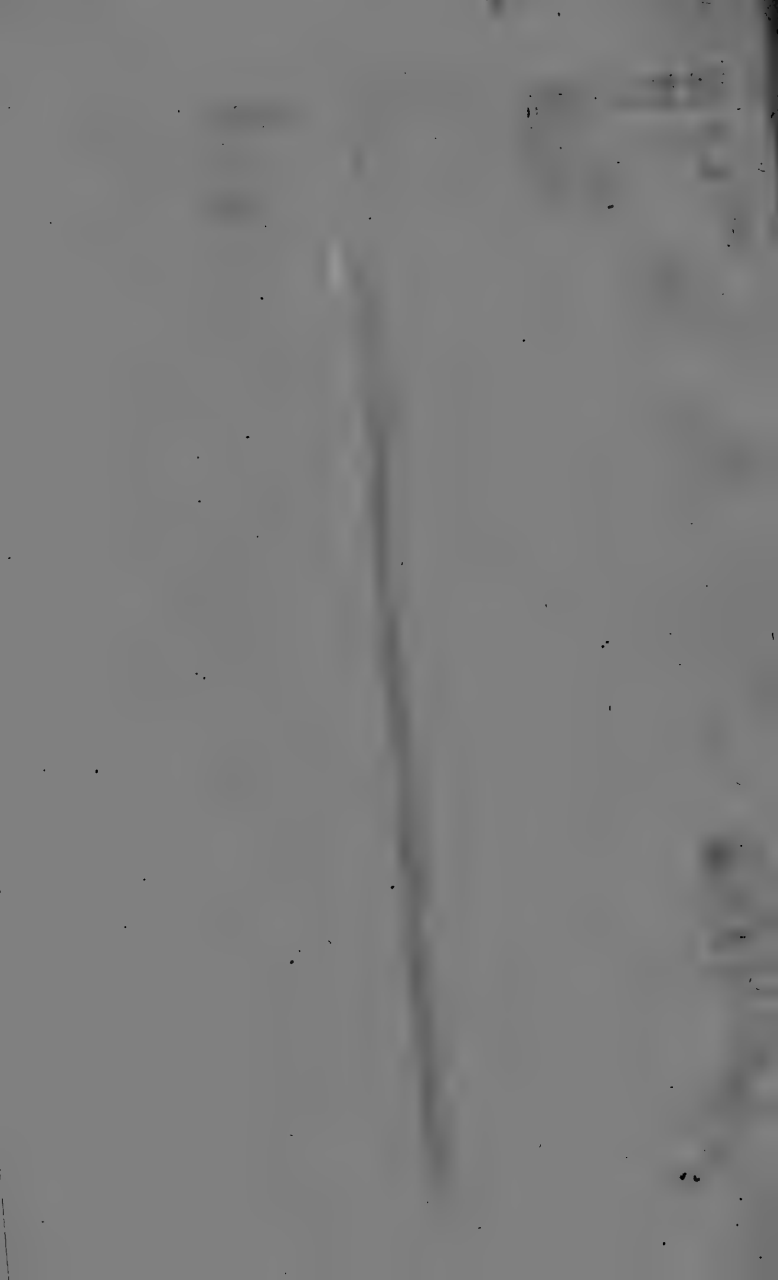
1290. *Chætodium* Fr. On Bramble leaves. Everywhere. Nov.

ISOTHEA Fr.

1291. *Saligna* Berk. On Sallow leaves. Cothall. May.

Omitted in proper place.

1292. *Russula fellea* Fr. Under Beech trees. Clunyhill, &c. Aug., Oct.
 1293. *Nidularia confluens* Fr. & Nord. On a piece of decayed fir wood.
 Forres. Aug., Sept.
 1294. *Septoria Hydrocotyles* Desm. On *Hydrocotyle vulgaris*. Rothie-
 murchus. Aug.
 1295. *Peronospora Potentillæ* De By. On *Alchemilla vulgaris*. Rothie
 murchus. Aug.



ADDITIONS AND CORRECTIONS TO
“TOPOGRAPHICAL BOTANY,”
ED. 2. FOR THE COUNTIES FROM FORFAR TO
ELGIN INCLUSIVE.

BY PROF. JAMES W. H. TRAIL AND MR. JOHN ROY.

On the publication of the new edition of H. C. Watson's well-known work recently we took the occasion to examine carefully the records for the divisions Forfar, Kincardine, South Aberdeen, North Aberdeen, Banff, and Elgin, and find that we are able to make several additions and corrections to the lists, as the results of our own investigations of several years' duration, or of information supplied to us on trustworthy evidence. We therefore present the following notes to the Society as a contribution towards a more complete acquaintance with the flora of the North-east of Scotland.

The following contractions are employed to economise space:—
F. = Forfarshire, K. = Kincardinshire, S. = South Aberdeenshire,
N. = North Aberdeenshire (i.e. Aberdeenshire north of the watershed east & west of Inverurie), B. = Banffshire, E. = Elginshire.

The above divisions are not really natural ones; but we have followed them because of their being employed in the book itself; and because this is hardly the suitable place to enter on a discussion as to the natural divisions of this part of Scotland.

The nomenclature employed below is that employed in “Topographical Botany,” and is used in order to render reference to that work more easy.

DICOTYLEDONS.

Thalictrum minus L., of this species var. *maritimum* alone occurs, so far as we are aware, in S., N., & B. We have found it also, but

rarely, at St. Cyrus in K., but in this county there are few localities suitable for it.

Ranunculus aquatilis, *peltatus* Fries, add K., & N.

R. fluitans L., in B., River Isla at Cairnie, (Rev. Dr. Keith).

R. Flammula L., var. *pseudo-reptans*, on Sands of Barry in F., (Fergusson).

R. reptans L., on marshy shores of Loch Strathbeg in N., (Trail).

R. hirsutus Curt., found (? casual) at Slains in N., by Mr. Duncan.

Caltha radicans Forst. has been re-discovered in F., by Mr. Sturrock.

Nuphar luteum Sm., var. *minus* Syme is found in S., in Loch Kinnord (and probably elsewhere) on Deeside, and also in the Corbie Loch a few miles north of Aberdeen.

N. pumilum Sm., recorded from K. & S., is probably recorded in error, the above variety having been mistaken for it.

Papaver Argemone L., is extremely rare in S., and is only a casual there.

P. Rhoëas L., is doubtfully indigenous in any part of the district, and cannot be regarded as more than a rare casual north of F. During twelve years we have only once met with it in K., (near Aberdeen), and have never seen specimens from anywhere north of K.

Fumaria densiflora DC. is not rare on the northern border of F., and therefore probably will be found also in K. It has also been found by Mr. Taylor in S., in the immediate vicinity of Aberdeen, and at Park on Deeside (by J. W. H. T.)

Coronopus Ruelii Gaertn., record for B. requires confirmation.

Cochlearia officinalis L., var. *alpina* Wats., add B., (Cairngorm).

Cardamine sylvatica Link., confirm record for F., & add S.

Arabis petraea L., add B., at Ballindalloch.

Helianthemum vulgare Gaertn., at Auchmedden in N.

Elatine hexandra DC. occurs in S., in Glen Callater, as reported in *Top. Bot.* (Roy).

Sagina subulata Wimm., add N., from marshy Links near Fraserburgh.

Cherleria sedoides L., add F. (Roy).

Cerastium trigynum Vill., add B., on Cairngorm.

C. semidecandrum L., add N.

C. tetrandrum Curt., add B., at Boyndie.

Malva moschata L., & *M. sylvestris* L., are both common in this district, but have no claims to be regarded as indigenous in K., or northwards.

M. rotundifolia L., though admitted as indigenous in Dickie's "Guide," has even less claim than the other two species, and is not even naturalised fully.

Geranium sanguineum L., is found at Collieston on the coast of N.

Rhamnus Frangula L., recorded for N., has no claim to be native.

R. catharticus L., along the Dee in K., & S., is almost naturalised.

Trifolium scabrum L. recorded from K., seems a very doubtful native, the next species having probably been mistaken for it; we have not seen the plant from K.

T. striatum L., is common at St. Cyrus, though not recorded by Dickie.

Lotus tenuis Kit. has been found in S., near Aberdeen (Trail), and at Dinnet (Roy). Its claim to be native is doubtful.

Astragalus Hypoglottis L., add B.

Ornithopus perpusillus L., has occurred in F. at Broughty Ferry, and in N. at Gight; but it may have been introduced in some way. It is rare.

Onobrychis sativa Lam. has been found in doubtful circumstances in F.

Lathyrus Aphaca L., is almost fully naturalised in S. at Clatt (Minto), and has been found (? casual) near Aberdeen (Trail).

L. sylvestris L., seems indigenous in K., on cliffs of St. Cyrus.

Lupinus perennis L., though not mentioned in British floras, deserves to be included among our well naturalised plants in Scotland at least; as it is very plentiful along the course of the River Dee on islands and shingle beds. It is equally abundant along the Tay.

Sibbaldia procumbens L. probably does not occur in N.

Potentilla procumbens Sibth., add S.

Rubus suberectus Anders, add S., (Trail).

R. plicatus W., & N., add K., & S., (Trail).

R. rhamnifolius W. & N., add S., (Trail).

R. thyrsoideus Wimm., add S., (Trail).

R. Radula Weihe, add K., (Trail).

R. corylifolius Sm., add K., and for var. *sublustris* add S., (Trail).

R. caesius L., add K., near Banchory Ternan (Sim).

Aremonia Agrimonioides L., thrives well and seems quite naturalised in a small plantation not far from Aberdeen, probably accidentally introduced. It does not seed however.

Rosa mollissima Willd., add F.

Epilobium alsinifolium Vill., add K.

Circaea lutetiana L., is recorded in *Top. Bot.* for K., S., & N.; and *C. alpina* is recorded for all these and for B. The only species seen by ourselves in or from the district is *C. intermedia* Ehrh., though this form has not previously been recorded from N.E. Scotland. It is assuredly the only form near Aberdeen, though both the others have been recorded in Dickie's "Guide" as found there.

Myriophyllum spicatum L., recorded from K., S. & B., has not been seen by us from any of these divisions, in which we have met with only *M. alterniflorum* DC. For this latter species add F., K. & B., to the records.

Callitriche platycarpa Kuetz., add F. and N.

C. hamulata Kuetz., add F., in Loch of Rescobie (Roy).

C. autumnalis L., add S., in Loch of Park, & B., at Mortlach.

Sedum Rhodiola DC., add B., on seashore at Gamrie (Gregor).

S. Telephium L. var. *fabaria* Koch, well naturalised in K., S. & N.

S. anglicum Huds. formerly grew near Aberdeen in S., (Roy), (as a ? casual.)

S. reflexum L. is well naturalised in many places in S., e.g., at Aboyne & near Aberdeen.

S. album L. grows on wall-tops in Stonehaven in K., but is not native.

Saxifraga Hirculus L., recorded with doubt from S., must be excluded.

S. oppositifolia L., add B., in Glen Avon (Bisset).

S. caespitosa L. is not recorded from S., though noted in "Dickie's guide" from Ben-na-buirid, on Prof. Macgillivray's authority.

Eryngium maritimum L., recorded from K. and N., is now extinct in these districts, so far as may be assumed after a careful examination of the localities for it. The record can hardly have been an error.

Smyrniium Olusatrum L. is not rare among old buildings in various places in the counties from K. to B., but is scarcely naturalised.

Cicuta virosa L. The record for this species from S. is erroneous.

Aethusa Cynapium L., though recorded from all the divisions, is only a weed in gardens in this part of Scotland. It is common in many gardens, however, and may be considered naturalised.

Anthriscus vulgaris Pers., add B. This plant is very local with us.

Sambucus Ebulus L., recorded from all the divisions as native, in all its localities occurs suspiciously near ruins, and must be looked on as a very doubtful native of the North-east of Scotland.

Viburnum Opulus L., recorded from S. with doubt, also occurs in K., but is probably only naturalised in both counties.

Linnaea borealis Gronov., add N.

Galium Cruciata Scop. is extremely local in S., and its records for N. & for B. are very doubtful.

Knautia arvensis Coult. is rare in S., N., & B.; and is but a doubtful native in any of these divisions.

Sonchus asper Hoffm., add S. & N.

Hieracium alpinum L., add B.

H. holosericeum Bach., add B. (Roy).

H. nigrescens Willd., add B. (Roy).

H. murorum L., add B.

H. caesium Fries, add B. (Roy).

H. vulgatum Fries, add B.

H. prenanthoides Vill., add F., K., & E. (Gordon).

H. corymbosum Fries, add K. & S. (Trail).

Taraxacum officinale Wigg., vars. *erythrospermum* and *laevigatum*, add S. The latter var. is confined to sandhills along the coast.

Solidago Virgaurea L., add N.

Senecio viscosus L., add B., at Portsoy (Bisset).

Tanacetum vulgare L., recorded for all the divisions, is not native in North-east Scotland, though well naturalised throughout.

Arctostaphylos alpina Sprong, is recorded from F. & S., but its occurrence in either is extremely doubtful so far as we know.

Gentiana Amarella L., add B.

Erythraea Centaurium Bors. was wrongly recorded from S.

Cuscuta europæa Murr. is not even naturalised in S.

Veronica saxatilis L. recorded for B. requires confirmation.

V. polita Fries is a corn-field weed in S.

V. Buxbaumii Ten. is well naturalised and common in K., S., N., B., & E.

Linaria vulgaris Mill. is well naturalised in several places in K., S., and N.

L. Cymbalaria Mill. is naturalised on various old walls near Aberdeen.

Lycopus europæus L., add S., on Shore of Loch Kinnord (Roy); it is very rare in both K. & S.

Lamium album L. is common in many places in K., and S., and at Portsoy in B.

L. intermedium Fries, add K.

Galeopsis versicolor Curt add E.

Myosotis palustris With., add K., at Arbuthnott (Trail), and N., at Ellon.

Anchusa sempervirens L. is quite naturalised in various localities in F., K., S., B., & E.

Asperugo procumbens L. is naturalised in one locality in N.

Symphytum officinale L. is naturalised here and there in K., S., & N.

Cynoglossum officinale L. occurs in B., in Den of Boyne (introduced).

Plantago media L. has been found at Drumoak in S., but is a doubtful native there, as well as in N.

Chenopodium urbicum L., *C. intermedium*, and *C. rubrum* L. are recorded from S., as are also *Atriplex laciniata* Sm. (arenaria Woods), and *A. littoralis*, but probably all have been recorded in error; none is native, so far as our information goes.

Rumex conspersus Hart., add K., at St. Cyrus.

R. sanguineus L., add N. & B.

Euphorbia Peplus L. add K.

Humulus Lupulus L. is almost naturalised here and there in F., K., & S.

Betula alba L., add N.

Salix ambigua Ehrh., S., between Aboyne and Tarland (Roy).

S. Lapponum L., add B., on Cairngorm.

MONOCOTYLEDONS.

Neottia Nidus-avis Rich., add E., at Nairn (Miss Grant).

Listera ovata Br., add N.

Orchis incarnata L., add K. & S.

Habenaria bifolia Bab., add F. & K.

H. chlorantha Bab., add F.

Malaxis paludosa Sw., add E., near Nairn (Croall).

Narcissus Pseudo-narcissus L. is naturalised in K. at Banchory Ternan, and in N. near Old Deer, in places where it was originally planted.

Allium vineale L., add N., at Collieston.

A. oleraceum L. occurs at St. Cyrus in K., apparently quite indigenous.

Gagea lutea Ker. has been found in S. near Balmoral, and in E. at Nairn.

Scilla verna Huds. occurs in E., at Covesea (Miss Johnstone).

Polygonatum multiflorum All. and *P. officinale*, All., both recorded from S., are quite unknown to us from this district, except the former as a casual introduction.

Tofieldia palustris Huds. requires confirmation as found in E.

Anacharis Alsinastrum Bab. is well naturalised in numerous pools in F., K., & S.

Potamogeton obtusifolius M. & K., add S., in Loch of Kinnord.

P. nitens Web., add S., in the River Don.

P. natans L. (segr.), add K. & N.

Typha latifolia L., is well naturalised in one or two localities in S. & in N., at Drumblade (Barker).

Luzula arcuata Hook., needs additional confirmation for F.

Rhynchospora alba Vahl, given for all the counties, has not been seen by us from the district.

Scirpus fluitans L., add B.

Carex leporina L., add B. (Prof. Balfour).

C. remota L., very local; add S., at Drumoak.

C. intermedia Good, add S., between Aberdeen & Ellon.

C. paniculata L., add K. & B.

C. acuta L. was recorded from the counties in error for *C. aquatilis*.

C. flava L., (segr.), add F. & K., var. *lepidocarpa*, add F. & K.; var. *Æderi*, add K.; var. *minor* Townsh., add S. (Trail).

C. vaginata Tausch., add B., found on Cairngorm, by G. Don.

C. sylvatica Huds., add K., at Fettercairn.

C. vesicaria L., very scarce, add F. & K.

Sesleria cœrulea Scop. is not known to occur in S.

Aira uliginosa Weihe, add B.

Melica uniflora Retz. seems erroneously recorded from S.

Sclerochloa distans Bab., add S., on sand hills along the coast.

S. rigida Link., is common on waste ground in S., near Aberdeen (casual?)

Poa laxa Haenke, add F.

P. stricta Lindb., add F. Both species are found in Canlochan.

Poa nemoralis L., add B.

Lolium italicum Braun is common in hayfields : and has naturalised itself in many places in the counties in question.

L. temulentum L., add E. (Gordon).

Polypodium calcareum Sm., has been found in an old quarry on Scotston Moor, but probably introduced ; it is now extinct there. Its record for N. is probably erroneous.

Allosorus crispus Bernh., add N., at Culsalmond.

Polystichum lobatum Sw., add B., in Glenrinnies.

Lastrea Oreopteris Presl., add N. & B.

L. spinulosum Presl., confirm records for F. & K.

Asplenium viride Huds., add B.

Hymenophyllum Wilsoni Hooker, is found on Ben-na-chie, in S., not in N.

Lycopodium annotinum L., add K.

L. inundatum L., add K. in Strachan, & S. in several localities (Roy).

Selaginella selaginoides Gray., add N. & B.

Equisetum variegatum Schl., add S., at mouth of River Ythan.

(Since the above was in print, I have been able to add the following to the above list :—

Ranunculus Drouettii, add N., from Loch of Strathbeg.

Viola sylvatica, v. *Reichenbachiana*, S., near Aberdeen.

Fumaria capreolata v. *Boraei*, K., at Benholme.

Viola tricolor L., subsp. *Curtisii* Forst., S., on Links near Aberdeen.

Mentha sativa v. *subglabra*, S., at Loch of Skene.

Polygonum aviculare L., v. *agrestinum* and v. *arenastrum*, S., near Aberdeen,

Triticum repens L. var. *littorale*, S. and N., along sandy beach.

J. W. H. T.

LIST OF INTRODUCED PLANTS & CASUALS

OBSERVED IN N.E. SCOTLAND, ESPECIALLY IN "DEE,"

BY PROF. JAMES W. H. TRAIL.

My original intention in making up the following list was merely to put together the results of personal records, made either personally during botanical excursions during a good many years, or from the examination of various collections that have passed through my hands for verification, with a view to supplement the additions and corrections recorded in the preceding paper by Mr. Roy and myself. As the work progressed it seemed to me advisable to modify the design and to include all the casuals of whose occurrence in the district I could find a reliable record. Dickie's "Botanist's Guide to the Counties of Aberdeen, Banff and Kincardine" has been the chief source of information, apart from my personal observations; but in respect to certain plants I have found myself compelled to differ from his conclusions as regards their claim to be included among indigenous species in this part of Scotland. It must, however, be remembered that such questions are by the very nature of the case very hard to decide beyond dispute. There is good reason to believe that many species admitted without controversy or mark of doubt into the British floras were originally introduced, undesignedly, by man. Very patent instances are met with among the weeds of cultivated ground, such as poppies, some sparges, several speedwells, and others too numerous to specify. Certain other plants may hardly be considered weeds of cultivated ground, yet are seldom, if ever, seen at a distance from human habitations, and delight especially to grow on ruins or on ground rich in nitrogenous substances, the result of human occupancy of the ground, *e.g.*, on dung-stances. Nettles, the goose-foots and oraches, and various others belong to this group.

All such plants, when left to struggle for existence with other plants, unaided by the interference of mankind, are apt to be crushed out of the situations formerly occupied by them : and they thereby are shown to have been unable in the first instance to have spread as unaided colonists into the sites now tenanted by them.

The fact of wide diffusion of any plant in a given locality is not in itself sufficient to allow us to infer therefrom its native origin, or rather its having arrived in that locality at a distant period unaided by man : for some species are so well fitted to survive in the struggle that in a few years they establish themselves, and may oust the original occupants. This is peculiarly the case where the conditions in a locality have been changed by man by deforesting or by cultivation, and where plants accustomed to these conditions elsewhere are accidentally, or intentionally introduced by him. In such cases the immigrants may in a few years spread so widely and become so abundant that they would be readily regarded as native to the locality, were we not able frequently, through fortunate circumstances, to trace their past histories and migrations. Examples of such immigrants in our own neighbourhood are *Mimulus luteus*, *Veronica Buxbaumii*, *Ægopodium Podagraria*. *Lupinus perennis*, and grasses employed in agriculture, e.g., several of the *Serrafalcus* group of *Bromus*, and *Lolium italicum*.

Another source of serious uncertainty in determining the claims of not a few species to rank among our indigenous plants arises in the facts that in the middle ages plants of Southern Britain or of other lands were frequently cultivated, especially in the gardens attached to the religious establishments, because of their real or supposed medicinal virtues or as pot herbs ; and that a large proportion of them were discarded at a later period in favour of species of greater value or beauty from distant lands. On thus falling into disrepute, the fact that they had once been cultivated was after a time forgotten, and their extraneous origin fell out of view in the case of such as had succeeded in naturalising themselves. Probably the species introduced in this way are more numerous than we are aware of.

But even in the case of species in whose introduction man had no part, direct or indirect, the claim to be regarded as indigenous depends largely on the length of time they have been in the

country, and on their adaptability to the conditions of existence in it. We cannot regard any species as having originated in Britain, though certain species present varieties not yet met with in other countries. Hence the question of what should be included within the limits of the British Flora is one that cannot be settled on any hard and fast lines, but must be recognised as open to considerable differences of opinion. Probably all floras are slowly receiving additions independent of human agency.

By noting carefully the first appearance in a locality of plants previously unknown in it, and by endeavouring to trace out the mode of their introduction, whether by man, consciously or unconsciously, or by agencies independent of him, we may aid in arriving at a knowledge of the laws that regulate the development of the flora of that locality, and may be able to apply these to floras in the wider range.

We may also learn something of the laws that enable certain forms to prevail in the struggle for existence, if we observe which of the new-comers can hold their ground or increase, and note specially the conditions under which they do so; and we may also be able to detect the causes whereby others die out and disappear even under the most apparently favourable circumstances. It is hoped that this list may be of some interest in this direction.

An analysis of the subjoined list will show a considerable addition to the "casuals" recorded in Dickie's "Guide." A few of these are not very rare, and are striking species; but most of them are, as might be supposed, merely sporadic; and only a small proportion seem able or likely to establish themselves. Most die out in a year or two.

A moderately careful scrutiny will show that the casuals noted are divisible into a few great groups in respect to their introduction into our district. These groups are:—

1. Trees or shrubs intentionally introduced into plantations.
These may not spread, or may produce ripe seeds, which may be dispersed by wind (poplars and willows), or by birds (service-tree, &c.).
2. Introduced as part of, or with, field crops—beans, tares, grasses.
3. Grown in gardens or pleasure grounds for beauty, or as culinary herbs, thence spreading by stolons or seeds, or thrown out among garden weeds or rubbish.

4. Accidental introductions with imports (in wool, in Esparto grass, &c., or in other commercial produce), in ballast, or in agricultural operations. Operations of magnitude—*e.g.*, making railways, or war, may also introduce plants.
5. A few appear sporadically, their mode of introduction being doubtful, but probably not due to human agency.

In the list, for completeness, will be included the names of all the ascertained species introduced in any of the above ways into the N.E. of Scotland, even when already mentioned in the preceding paper. Where only the name is given, without other particulars, the reader is referred to that paper for further information about the plant. Specimens of all the species mentioned below are included in a herbarium formed by myself in this district, except those quoted solely from the "Botanist's Guide."

The following abbreviations are employed below for the sake of brevity of reference:—(*D.*), Dickie's "Botanist's Guide;" (*J.T.*), Prof. J. W. H. Trail; (*T.E.*), Mr. Thomas Edward of Banff; (*J.R.*), Mr. John Roy.

DICOTYLEDONS.

Ranunculus aconitifolius L. (flore pleno), in Den of Craigston, Turiff.

R. hirsutus Curt.

Eranthis hiemalis L., Alford, on Donside (J. T.), and in a plantation in the grounds of Duff House, near Banff (T. E.) introduced.

Helleborus fœtidus L., Rubislaw Den, near Aberdeen (J. T.), introduced.

H. viridis L., Rubislaw Den (D.)

Aquilegia vulgaris L., a common escape along the Dee, also near Aberdeen and elsewhere.

Berberis vulgaris L. is widely distributed, but cannot be considered indigenous. It has either been planted, or has grown from seed from introduced plants.

Papaver somniferum L. is not rare on rubbish heaps, but dies out.

P. Rhœas L.

Meconopsis cambrica Vig. is occasionally found at Banchory and elsewhere.

Corydalis lutea D.C., has been gathered on a wall beside Raeden

- near Aberdeen (Mr. Robert Davidson), and at Peterculter House (D.)
- Brassica Rutabaga* D.C. and *B. Rapa* L. both are frequent escapes beside the margins of fields and streams.
- Sinapis alba* L., was found near Aberdeen and at Dunottar.
- Koniga maritima* Br. is recorded ("British Flora") from coast near Aberdeen.
- Erysimum Cheiranthoides* L., was found (J. T.) on a recently-stripped bank beside a road in the village of Banchory-Ternan. The plants were abundant, but were very stunted.
- Hesperis matronalis* L. is not rare as an escape or outcast from gardens; Rubislaw (T. E.), Park (T. E.), Slains (J. T.)
- Neslea paniculata* Desv. A fine plant, bearing flowers and fruit, found on rubbish on bank of the Don, near Aberdeen, in July 1883 (J. T.)
- Camelina sativa* Crantz, occasionally near Aberdeen—e.g., at Raeden (R. D.), and on reclaimed bed of river Dee (T. E.)
- Lunaria biennis* L., escape in hedge near Old Aberdeen in 1876 (J. T.)
- Reseda odorata* L., outcast on rubbish heap in sandpit near Aberdeen.
- R. lutea* L., formerly on the Inch, near Aberdeen (D.)
- R. luteola* L., though given by Dickie as native in N.E. Scotland, is so sporadic, that its appearance can be accounted for only on the supposition of its introduction with agricultural seeds. In the summer of 1877 I met with it in six or seven localities around Aberdeen, but I have not seen it here in any other year.
- Viola cornuta* L., plentiful in 1877 on a rubbish heap at Rubislaw (J. T.)
- Saponaria officinalis* L., occasionally found as an escape, or a relic of former cultivation—e.g., at Peterhead (Dr. J. H. Walker), near Aberdeen, at Alford, and at Strachan (D.)
- S. Vaccaria* L., as an escape or casual sandpit in 1878 (J. T.), and on old bed of River Dee in 1883 (T. E.)
- Silene anglica* L., casual, in old bed of the Dee in 1883 (T. E.)
- Lychnis coronaria* Lam., escape, on bank of the Dee above Bal-later (J. T.), in August 1879.
- Claytonia perfoliata* Don grows as a weed in a garden near King's

- College, Old Aberdeen (J. T.), and also near Ballater (Mr. Brebner).
- Malva sylvestris* L., *M. moschata* L., and *M. rotundifolia* L., *vide supra*.
- M. borealis* Wallm. was found, in 1883, in old bed of the Dee (T. E.)
- Linum usitatissimum* L. is frequent by roadsides and in waste places, as a relic of former culture, or as a casual introduction.
- Hypericum calycinum* L., near Church of Banchory-Ternan (D.)
- Geranium phaeum* L., an escape, or intentionally introduced, Kingcausie and elsewhere.
- G. striatum* L., two plants in Rubislaw Den (July, 1877, J. T.), casual?
- G. lucidum* L., common on old walls, in Rubislaw Den and elsewhere (J. T.)
- Oxalis stricta* L. is a weed in gardens in Peterhead (1876, Dr. J. H. Walker).
- O. corniculata* L. is a weed in gardens in Old Aberdeen (1879, J. T.)
- Rhamnus catharticus* L., and *R. Frangula* L., *vide supra*.
- Euonymus europaeus* L., at Gight, in Aberdeenshire (A. Ogston, July, 1860).
- Medicago sativa* L., on railway embankment near Dubton, in Forfarshire, (1879, J. T.); near Banff (T. E.), escape from cultivation.
- M. denticulata* Willd., formerly on the Inch at Aberdeen, from ballast.
- M. falcata* L., ordinary and dwarf forms on old bed of Dee at Aberdeen (T. E., 1883), casual.
- Melilotus officinalis* Willd. of this a fine plant grew (1883, J. T.) on a roadside near Scotston Moor; also on the Inch at Aberdeen (D.)
- Trifolium hybridum* L. is to be met with in almost all clover fields, introduced in farm seed.
- T. agrarium* L. is not rare in K.—e.g., in St. Cyrus, in fields or on the edges of fields; well naturalised.
- Ornithopus perpusillus* L.
- Lotus tenuis* Kit.

Onobrychis sativa Lam.

Vicia sativa L., *V. Faba* L., and *Pisum sativum* L. all occur not uncommonly on the borders of fields or by roadsides as escapes.

Lathyrus Aphaca L.

Lupinus perennis L.

Prunus Cerasus L. has been introduced here and there, probably by birds.

P. Avium L. occurs along the Dee and the Don, probably similarly brought.

Spiraea Filipendula L. (flore pleno), on roadside near Cults (1877, J. T.); St. Cyrus Cliffs (D.)

Potentilla argentea L., once in old bed of the Dee (1883, T. E.)

Aremonia agrimonioides L.

Fragaria elatior Ehrh., outcast or escape at Balgownie, near Aberdeen.

Pyrus Malus L., Deeside (1860, A. Ogston, planted or casual (?))

P. Aria Hooker is not rare (Rubislaw, Culter, &c.) in shrubberies; planted, or dispersed by birds from fruit of planted trees.

Crataegus Oxyacantha L. is common in hedges, &c., similarly dispersed.

Sedum Telephium L., var. *fabaria*, is widely dispersed, as an outcast.

S. anglicum Huds., *S. reflexum* L., *S. album* L., *vide supra*.

Sempervivum tectorum L., on roofs of houses near Aberdeen, and in Midmar; introduced.

Ribes Grossularia L. is frequent by roadsides, &c.; probably planted in some districts, but dispersed by birds frequently.

R. rubrum L., beside the Dee, at Banchory-Ternan (J. T., 1883), Midmar (D.)

R. alpinum L., Mortlach (D.)

Saxifraga umbrosa L., Alford and Knockspock, Dunideer (D.)

S. Geum L., Den of Knockspock (D.)

UMBELLIFERAE.—This Order includes a number of species formerly cultivated, or accidentally introduced as garden weeds, and that, from their power of reproduction by stolons as well as by seeds, have established themselves in a good many places, or

even pretty generally, near old gardens, or beside roads. It is now hardly possible to distinguish the introduced from the truly indigenous species. *Carum Carui* L. is occasionally met with near houses as an escape.

Æthusa Cynapium L. is a common weed in gardens near Aberdeen:

Levisticum officinale Koch was once found by me (1876) near Ellon.

Ægopodium Podagraria L. is now a most abundant weed in gardens and on roadsides in the district around Aberdeen, and probably elsewhere. It was cultivated in the Middle Ages because of its medicinal virtues.

Peucedanum Ostruthium Koch, in Rubislaw Den (J. T.); at Gight, (A. Ogston, 1860); parishes of Skene and Echt (D.); formerly cultivated.

Smyrniolum Olusatrum L., around Aberdeen (D.); Corbie Den (A. Ogston); Inverugie Castle, and Old Churchyard of Ratray, near Peterhead (J. T.); formerly cultivated as a pot-herb and for salad, and now semi-naturalised.

Myrrhis odorata L. is common and wide-spread in suitable localities; it was formerly cultivated as an aromatic stimulant, and as a pot-herb.

Coriandrum sativum L. is recorded from the Inch at Aberdeen (D.)

Apium graveolens L., Craiglug, near Aberdeen (D. *vide* Dr. Murray).

Viburnum Opulus L.

Sambucus nigra L. is of frequent occurrence, but not indigenous.

S. Ebulus L.

Lonicera Xylosteum L. is recorded from Alvah, in Banff (D.)

Valeriana pyrenaica L., found on the banks of the Deveron about a mile above Banff (T. E., 1883), was probably planted there.

Onopordon Acanthium L., an escape, near Culter Station (1879, J. T.)

Carduus eriophorus L., near Loch Kinnord, as an escape (1877, J. T.)

C. Marianus L. is sometimes found on rubbish near Aberdeen; outcast (?)

Centaurea Scabiosa L., Rubislaw (A. Ogston, 1860); casual (?)

Calendula officinalis L. (flore pleno), in sandpit near Aberdeen ; an outcast (1883, J. T.)

Matricaria Parthenium L., frequent, and almost naturalised ; formerly cultivated.

M. Chamomilla L. is occasionally met with as an outcast.

Tanacetum vulgare L. is common as an outcast or escape, now almost naturalised, near Aberdeen, at St. Cyrus, &c. ; formerly cultivated as a tonic, and as a flavouring herb for cookery.

Anthemis arvensis L. is rare with us, and its claims to rank as indigenous are doubtful ; at Ferryhill (A. Ogston, 1860), near Rubislaw in a corn-field (J. T., 1884) ; common in counties south of Forfar.

A. tinctoria L., once on a rubbish heap on Old Aberdeen Links. (1875, J. T.)

Achillea tomentosa L. is recorded from Auchlunkart, in Banff (D.)

Artemisia Abrotanum L., on the sandy beach about a mile north of Donmouth ; probably carried by water to where it grew (1876, J. T.)

Senecio saracenicus L. is naturalised beside Burn of Culter, as an outcast or escape from neighbouring garden (J. T.) ; see also (D.)

Doronicum Iardalianches L. is naturalised in numerous places—e.g., on bank of Don above Old Bridge, and at Echt, &c. (J. T.) ; see also (D.)

Petasites fragrans Presl. is a common weed (formerly cultivated) in gardens in Old Aberdeen, and seems to hold its ground well.

Cichorium Intybus L., occasionally in many places (D.) ; in old bed of the Dee, near Aberdeen (1883, T. E.)

Helminthia Echioides Gaertn., once on reclaimed bed of Dee (1883, T. E.)

Lactuca muralis Fres. was found on a wall beside public road near Banchory-Devenick Church, in August, 1883 (T. E.) ; native (?)

Hieracium aurantiacum L., recorded in (D.)

Cumpanula Rapunculus L., near Aberdeen (A. Ogston, 1860.)

C. Trachelium L., Peterhead (1876, Dr. J. H. Walker.)

Fraxinus excelsior L., and *Ligustrum vulgare* L., are both common.

in the district, and well established; but they are not indigenous.

Vinca major L., well naturalised, in Rubislaw Den (J. T.)

V. minor L. is so common and wide-spread in suitable localities as about to seem indigenous.

Polemonium cœruleum L., in Rubislaw Quarries (A. Ogston, 1860), (D.)

Cuscuta Epilinum Weihe, see (D.)

Solanum Dulcamara L. is found in numerous localities (D.), Peterhead (J. H. W.), Banchory-Ternan (J. T.)

Hyoscyamus niger L. occurs here and there, beside ruins—e.g., at Dunottar Castle; or by roadsides, as in Nigg (J. T.)

Verbascum Thapsus L., occasionally around Aberdeen, at St. Cyrus, &c. (J. T.); see also (D.); escape or outcast.

Scrophularia vernalis L., on a garden wall and as a weed in Old Aberdeen (J. T.); near Manse of Alford (D.)

Linaria vulgaris L. is well naturalised in many places; near New Bridge of Don, on the north bank of the river, it bears cleistogamous flowers.

L. repens Ait. is recorded from Ballater, Auchindoir, and Alford (D.)

L. purpurea L. has been established on top of the wall in College Bounds, Old Aberdeen, bounding the garden of the Latin Manse (J. T.)

L. Cymbalaria Mill. grows well on walls around Aberdeen (J. T.)

Mimulus luteus L. is thoroughly naturalised along the whole lower part of the Don, along the Ythan, along the Bervie, &c. (J. T.)

Veronica polita Fr.

V. Buxbaumii Ten.

Lamium maculatum L. was brought me from Den of Craigston near Turriff (May, 1877) by Mr. J. K. Ledingham.

Teucrium Chamaedrys L. has long grown (escaped from former cultivation) on the wall of the old garden of Rubislaw, near Aberdeen.

Mentha viridis L. is recorded from Castle Fraser, and from Glen Callater (D.).

Ballota nigra L., near Keig, and at Castle Forbes (D.).

Pulmonaria officinalis L. was sent from a park at Duff House,

near Banff. It was formerly cultivated as medicinal in Britain.

Lithospermum arvense L., confounded with *L. officinale* in the Guide, is a doubtful native. It has been found in old bed of the Dee (T. E. 1883), and near Bridge of Don (J. R.).

L. officinale L., Banchory-Ternan (J. T.); also a doubtful native.

Anchusa sempervirens L.

Borago officinalis L., on rubbish heap on the Links (1878, J. T.), also in Methlie and Cullen (D.).

Echinosperrum Lappula Lehm. was found, as a casual, in a sand pit near Old Aberdeen (1878, J. T.).

Symphytum asperrimum Bieb. was found on roadside at Echt (1879, J. T.).

S. officinale L., probably a relic of former cultivation.

Cynoglossum officinale L.

Beta vulgaris L. is recorded from Inch at Aberdeen (D.).

Chenopodium Bonus-Henricus L. is not rare near houses and by roadsides; formerly cultivated as a pot-herb.

Atriplex littoralis L., on Inch near Aberdeen (D.).

Polygonum Bistorta L. grows in many places, but is probably a relic of former cultivation. It easily establishes itself.

Urtica dioica L. and *U. urens* L. are markedly associated with man, though now far too abundant, especially the former species, hence we infer that they have probably been introduced unwittingly in past ages by man into the North of Scotland.

Parietaria officinalis L. is not very scarce on old ruins (D.), on which it had once been planted. I have it from Inverugie, and from Tolquhon Castle.

Humulus Lupulus.

Ulmus montana Sm. and *U. suberosa* Ehrh. are not rare, but only as planted trees, or descended from planted trees.

Castanea vulgaris L. is not scarce, e.g. at Benholme, Cults, &c.; but only where originating from planted trees.

Fagus sylvatica L., though very common, has no claim to be native.

Carpinus Betulus L., to this the same remarks apply.

Populus alba L. and *P. nigra*, L. are both rather common, but nowhere native.

Salix, of this genus several species have been introduced, and may now be found apparently wild on the banks of rivers, in shrubberies, and elsewhere; but I have nothing to add to previous records (D.).

CONIFERÆ.

Of these plants a good many species, e.g. *Pinus austriaca*, *Abies alba*, *A. nigra*, &c., are to be met with in plantations; but the only introduced species that are sufficiently diffused and abundant to appear to be natives are:—

Abies excelsa DC.

A. pectinata DC.

Larix europæa L.

MONOCOTYLEDONS.

Typha latifolia L., recorded (D.) from Loch of Park, is abundant there, and also occurs in one or two other localities where planted.

Narcissus Pseudo-Narcissus L.

Arum maculatum L. is quite naturalised near Aberdeen at Seaton, in Rubislaw Den, &c.

Anacharis Alsinastrum Bab. is well naturalised in Rubislaw quarries and burn, at Culter, near St. Cyrus in the North Esk, and elsewhere. The mode of introduction is uncertain. It no longer grows on the Old Aberdeen Links.

Polygonatum multiflorum All. has been found at Monymusk (A. Ogston, 1860), and is recorded from other places (D.).

P. officinale All.

Asparagus officinalis L., near Peterhead (A. Ogston, 1860).

Ornithogalum umbellatum L., found (escaped) in wood above Old Bridge of Don (A. Ogston, 1860).

Allium oleraceum L. is probably indigenous on a wooded bank at Stone of Morphie in K., beside the North Esk.

Digitaria sanguinalis Scop. is recorded as once found on the Inch at Aberdeen, introduced in ballast (D.).

Setaria viridis Beauv. has same record, and has been noted by Mr. Roy, as has also *Setaria verticillata* Beauv.

Phalaris canariensis L. is very frequent on rubbish heaps and elsewhere near houses, but does not seem to perpetuate itself at all.

Alopecurus agrestis L., recorded from Kettock's Mill and the Inch (D.).

Polypogon monspeliensis Desf. has been obtained from Stonehaven by Mr. Roy, probably introduced in ballast.

Avena flavescens L. is a doubtful native, as its appearances are such as to suggest its introduction among farm seeds.

A. sativa and *A. strigosa* Schreb. are both rather frequent near houses and beside roads; but neither holds its ground a second year.

Glyceria aquatica Sm. is recorded at Breda, and thence down the Don (D.), and has been found at Gight (A. Ogston).

Bromus arvensis L., *B. secalinus* L., and *B. commutatus* Schrad. all occur in grass fields, on river banks, and by roadsides; but all seem to be introduced with farm seeds.

B. rubens L. was sent me by Mr. Tait, gathered from ground at Inverurie where esparto grass is spread when first imported.

Hordeum murinum L. is included among indigenous plants by D., but its claims are very questionable. I have a specimen from Cults (A. Ogston, 1860).

Lolium temulentum L. is recorded (D.) from various parts of the district; but I have not met with it.

L. italicum Braun is very common in grass fields, having been introduced for agricultural needs.

Anthoxanthum Puellii, observed of late years in several districts of Britain in grass fields, and may probably be found with us also, as an introduction among agricultural seeds. It differs from *A. odoratum* in being smaller and annual, and in some minor structural details of the spikelets; in other respects they are much alike. *A. Puellii* is described in the Feb. "Journal of Botany," 1884.

FILICES.

Polypodium calcareum Sm.

I have to add the following to the above :—

Geum macrophyllum Willd., naturalised on a roadside near Aberdeen (J. T.)

Aster bellidiflorus N. ab E., on roadside at Perclay, near Aberdeen (? outcast) (J. T.)

Trachystemon orientale Don, among grass in the park at Duff House near Banff in 1883 (T. E.)

Veronica paniculata Pall., once (? outcast) in a sand-pit near Old Aberdeen (J. T.)

SCOTTISH GALLS.

By PROF. JAMES W. H. TRAIL.

DURING the past two seasons I have met with a number of galls not previously recorded by myself from Scotland, though a few of them have been published as Scottish by Dr. Greville ("Scottish Cryptogamic Flora," &c.), or by Mr. Cameron. Dr. Buchanan White has also, with his usual kindness, sent me several that he had found in Perthshire or in Forfarshire. Most of the galls described below are the work of Mites (*Phytoptus*), or of *Anguillulidæ*, and are by no means conspicuous; but a few are sufficiently readily seen to prove that even among the larger galls in Scotland there are still some remaining to be discovered, even in localities that might be supposed to be well wrought. I shall be glad of any assistance, however little, in working out the distribution of Scottish galls.

THALICTRUM MINUS, var. **MONTANUM**, Wallr.—Carpels galled by *Cecidomyia Thalictri* H. Lw., were rather common on the shore of Loch Rannoch at Kinloch Rannoch in September, 1882. The carpel becomes swollen to twice or thrice the natural size, and becomes ovate or nearly globular. Its colour changes through yellowish to brown. In other respects externally it does not differ much from a ripe healthy carpel in appearance. On section the walls are found to be about the usual thickness of those of a ripe carpel; but the seed is absent, and its place is occupied by one or two orange coloured larvae of the midge, which pupate in the ground. Most of the galls in the beginning of September were empty. Usually only one carpel in a flower is galled, the rest remaining untouched; but sometimes two or more may be affected. Mr. Fitch has recorded similar (?) galls on *Th. flexuosum* as found by Dr. Power in Scotland. (*Ent. Monthly Magazine*, vol. xviii p. 116.)

CARDAMINE PRATENSIS L.—The flower-buds are galled by *Cecidomyia Cardaminis* Winn. They become deformed and

swollen, reaching 8 or 9 mm. in diameter. They never open, but remain of a rounded or ovate form. All parts of the bud become thick and fleshy, the outer sepals usually enlarging more than the inner. The sepals remain green, or they may be reddish-brown in part. The apical half of the petals is visible, of a dull purple-red colour, with a border of the usual shade. The orange-red larvae lie between all parts of the flower-bud, there being often as many as 20 or 30 in a bud. They pass into the ground to pupate. These galls were very common in June, 1882, and again in 1883, in damp places on Scotston Moor, near Aberdeen; usually from 2 to 6 of the lower buds in each inflorescence were galled. Mr. Peter Inchbald has recorded in the "Entomologist" his finding these galls in England in 1882, and again in 1883.

VIOLA LUTEA Huds.—The margins of the leaves are rolled spirally upwards and inwards, usually along the whole length of the leaf, sometimes along only a part of the leaf on one side. The tube thus formed may reach 1mm. in diameter. On transverse section there are found to be 2 or $2\frac{1}{2}$ turns in the spiral. The galled portion is rather fleshy in texture, and the surface is somewhat uneven, and is paler green than the rest of the leaf, but the gall is very inconspicuous. In the tube lie several mites of the genus *Phytoptus*.

I have met with these galls on a hill beside Glen Callater, in Aberdeenshire, at 2000 feet above the sea, and on Ben Lawers, in Perthshire, at 3500 feet above the sea; in both cases in autumn, 1882. Dr. Fr. Thomas (*Nova Acta Leop. Carol. Akad* xxxviii., p. 282), has described similar galls on *V. silvestris* from Germany and from the Tyrol, where I have myself found the latter gall near Salzburg.

STELLARIA HOLOSTEA, L.— }
CERASTIUM TRIVIALE Lk.— } On these two plants, as has been indeed already noted in this magazine (*vol. iv., p. 13*), under the former plant, on which especially they abound, one finds pseudo-galls formed of short and stunted shoots, the leaves of which remain more or less closely imbricated and semi-duplicated, fleshy, and yellowish-green in colour. They are the work of a species of *Aphis*, named *Brachycolus Stellariæ Hardy*. The galls are found on the plants above-mentioned during the summer; but in autumn the insects migrate to different grasses. I have found them on *Holcus mollis* and on *Agrostis alba* near Aberdeen, and on these they form similar pseudo-galls. These Aphides are widely distributed on the Continent of Europe, and

I have met with them on *Cerastium* near Bergen, in Norway, and in the Brenner Pass in the Tyrol; in this, latter locality I have seen the galls on the *Stellaria* also. The insects are described and figured in Buckton's "*British Aphides*" (vol. ii., p. 147, t. lxxxv., figs. 1, 2, and 3). They are usually numerous in each gall, between the leaves. I have seen them only in the apterous state.

STELLARIA GRAMINEA L.—Some clumps of this plant near Fortingall, in Perthshire, were found in the month of September 1882, much attacked by mites (*Phytoptus*). Almost every shoot was affected; the leaves on the apical part and the bracts on the flower-shoots becoming conduplicate, slightly swollen and fleshy, with a yellowish tinge in the green colour as compared with the normal condition. Each leaf becomes somewhat sickle-shaped with the mid-rib along the convex edge, or spirally twisted once or twice. The outer (*i.e.*, lower) epiderm is little if at all altered in structure, nor are the middle cells of the leaf much changed; but the cells of the inner epiderm become less marked from those of the mesophyll, nor are hairs developed on them. The mites are numerous in the folded leaves. Similar galls on *S. glauca* have been described by Dr. Thomas from Brandenburg, in Germany (*Giebel's Zeitschr.*, 1877, p. 362).

TILIA EUROPAEA L., GRANDIFOLIA Ehrh. :—

a. Nailgalls of a mite (*Phytoptus*), the galls being named *Ceratoneon extensum* Bremi (*Sc. Nat.*, vol. iv., p. 203), sent me from Dunkeld by Dr. White; abundant in autumn 1882 on some trees between Aberfeldy and Kenmore, in Perthshire.

b. *Erineum tiliaceum* Pers. (*Sc. Nat.*, vol. v., p. 204), white hairy patches on back of leaf; the makers (*Phytoptus*) live among the hairs.

c. ? *Erineum bifrons* Lepell. S. Farg. of Fee's "*Memoire sur les Phylériées*," p. 41, no. 32, is the work of a species of *Phytoptus*. The galls are situated in the axils of the larger nerves of the leaf frequently in pairs along the mid-rib, or singly along the large lateral nerve, where these emit branches outwards. As many as 30 or 40 may be seen on one leaf, but usually they are less numerous. They form rounded hard knobs above, 2 or 3 mm. in diam., and covered with a close coat of short pale brown unicellular simple hairs. On the lower surface there stands a dense tuft of similar hairs; and on separating these one finds an opening between them, leading into a hollow, from the interior of which the hairs arise. The mites live between the hairs. These galls were de-

tected in abundance by Dr. White on the same trees as the two former, near Aberfeldy, in September. They are also found in Germany (Dr. Thomas in *Giebel's Zeitschr*, 1869, p. 336), and in Austria (Dr. Fr. Loew, in *Verh. Z. B. Ges. Wien* xxiv., p. 506). Dr. Thomas is of opinion that the gall is the same as Amerling's *Malotrichus Tiliae*.

VICIA SEPIUM L. :—

a. Galls of *Cecidomyia Onobrychidis* Bremi (*Sc. Nat.* ii., 70), composed of a mass of conduplicate fleshy leaflets, the mass being either terminal or axillary.

b. Galls of *Apion Gyllenhallii* Schrk., quite similar to those of the same insect on *V. Cracca* L. (*Sc. Nat.* iv., 169). They form swellings on the stem, or branches, or petioles, or peduncles just above a node, or above the base of the part affected, if that is a lateral member. The gall becomes about twice as thick as the normal diameter of the part, but does not otherwise differ much from it in appearance. Its walls are thin, and enclose a space in which the larva lives. The galls are local, but are not rare in one or two places near Aberdeen in August.

PYRUS AUCUPARIA Gærtn :—

a. Blister or pustule-galls in the leaves, the work of a species of mite (*Phytoptus*), (*Sc. Nat.*, ii., 79); very common in many parts of Scotland.

b. *Erineum Sorbi* Kunze, also the work of a species of *Phytoptus*, forms irregular patches on the lower surface of the leaf, more or less densely covered with blunt cylindrical or slightly clavate hairs, incurved at the tip, pale yellowish when young, but passing through yellowish-brown to rusty or dark brown when mature. The mites live between the hairs. The patches are usually from 3 to 12 mm. across. Greville records this *Erineum* from Kinnordy and elsewhere ("*Sc. Crypt. Flora*," t. 263, f. 1). I have found it on Deeside from Banchory to Ballater, and Dr. White has met with it in Perthshire. Both the *Erineum* and the blister galls often may be found on the same leaflet, but usually they occur apart.

PYRUS MALUS L., ACERBA D.C. (Crab-apple) :—

Erineum pyrinum Pers., like the last the work of a species of *Phytoptus*, forms irregular patches on both surfaces of the leaves, but most abundantly on the lower surface. Often the patches coalesce so as to extend along the nerves, or even to cover almost the entire surface. They have a velvety aspect, due to consisting

of a close growth of short hairs, at first pale, but changing to rusty brown. The hairs are from three to five times as long as the leaf is thick, simple, usually rather twisted or hooked near the tip, blunt, and thin walled. Between them live the mites. Dr. White sent me specimens in June, from Dalguise, on the banks of the Tay in Perthshire; and I also met with it near Kenmore in September. It is recorded by Greville (l.c., I, t. 22, *Flora Edin.*, p. 449), on *P. Malus* and on *P. communis* from Craigie Hill, near Edinburgh. Possibly this gall is the work of the same mite as causes *E. Sorbi*.

GALIUM PALUSTRE L. :—

(a) Galls of *Cecid. Galii* Winn., consisting of a terminal rosette of leaves (*Sc. Nat.* I, 156).

(b) Galls of *Phytoptus*, in form of leaves of the upper whorls being convolute along the margins, or from the tip, so as to form tubes of a yellowish, reddish, or brownish-green colour, inside which the mites live. The appearances presented are very similar, though on a smaller scale, to those seen in *G. Aparine* (*Sc. Nat.* IV, 15, b), and on *G. verum* (l.c. p. 204, e); and are very probably the work of the same species of mite.

GALIUM SAXATILE L. :—

I have already (*Sc. Nat.* IV., p. 15 and p. 169), described three forms of galls from this plant, viz. :—

(a) *Phytoptus* galls like those described from *G. palustre*;

(b) Flowerbuds, or fruits swollen and tenanted by mites (*Phytoptus*.)

(c) Flowerbuds swollen and tenanted by larvæ of *Cecid. Galii* Winn.

To these I have now to add a fourth gall, very common in Braemar, from about 800 to 3500 feet above the sea level, and also in Perthshire at the same elevation.

(a) This gall also is the work of a species of *Phytoptus*, and comes nearest to (b), but differs from it in aspect decidedly. The flower-buds alone are attacked, but frequently the whole inflorescence is affected, and remains short and stunted, forming a rounded mass. Sometimes the gall remains green, though usually it becomes reddish brown in colour. Each inflorescence forms a mass about 5mm. in diameter. The flowers open, but all their parts are slightly fleshy and remain abortive, with no marked differences in colour.

I could not find any trace in Braemar of gall (a), but in autumn of 1882 I found them near Aberdeen, and had previously found

them in Orkney. Of gall (*d*) I did not find any trace either near Aberdeen or in Orkney. The latter gall has been described from various localities on the Continent. The mites live in the flowers.

LEONTODON AUTUMNALIS L. :—

On this plant I found mite-galls on the leaves in considerable numbers in the beginning of October, 1883, among low growing grasses on the cliffs of the Kincardineshire coast near Aberdeen. The galls consist of the leaf-margins altered so as to become thickened, fleshy, and dull red or purple. The surface of the gall is covered with abundant red hairs, which give it a slightly velvety appearance. Very frequently the margin of the leaf is rolled upwards and inwards, in some cases for the greater part of its length. Occasionally the galls are hardly larger than a pin's head, but usually they are over an inch in length; but they are never conspicuous. On microscopic examination of the gall, the mites are to be found in small numbers among the hairs. On section the tissues in the interior of the leaf are found little altered, though the epiderms on both surfaces are much modified, and the hypoderm is thickened, and has its cells slightly enlarged and modified in shape. I can find no previous record of the occurrence of galls on this plant.

HYPOCHOERIS RADICATA L. :—

(*a*) Galled ovary (*Sc. Nat.* IV, 16.)

(*b*) Leaf-galls caused by *Anguillulidæ* belonging to the genus *Tylenchus*, Externally they are small thickenings, usually near or around the mid-rib, about 2 to 5 mm. long by twice the thickness of the mid-rib. The surface differs little from that of the rest of the leaf, save in its yellowish green colour. In structure it much resembles the gall (*b*) on *Hieracium Pilosella* next to be described. The galls were not rare on a spot on the Links north of Aberdeen in August, and one specimen was found in Rannoch in September, 1882. Eggs and young animals were common enough in the galls at that season.

HIERACIUM PILOSELLA L. :—

(*a*) Galls of mites (*Phytoptus*), being inrolled leaf-margins, are exceedingly common on the Links north of Aberdeen in autumn, though local apparently. Frequently several of the leaves in a rosette remain small, with the pale lower surface visible owing to the margins continuing to be closely involute from the base even to the tip of the leaf usually, though at times only in spots here and there. Not seldom almost every leaf on some of the smaller

plants is attacked, and the plant soon withers up. The affected leaves are rather thick and fleshy, but are little altered in colour, though conspicuous from the exposure of the lower surface. The margins usually make one and a half or two turns, forming a tube in which one finds a few mites. The inner tissues of the leaf are very little altered, beyond being slightly hypertrophied in the cellular tissues, and the epiderm is far less modified than in *L. autumnalis*. The mites are of rather large size for the genus *Phytoptus*. There are no hairs specially developed in the interior of the tube. I had observed similar deformities on *H. Pilosella* in Perthshire, and elsewhere in Scotland, before I had recognised their origin. They have been recorded from Germany and Switzerland (Thomas and Schlechtendal), and from Austria (F. Loew).

(b) Leaf-galls of *Tylenchus* sp.? They are very inconspicuous, and consist of a spot in the leaf, usually towards the margin, about 2 to 4mm. across, irregular in outline, about twice as thick as a healthy leaf, hence slightly prominent on both surfaces; differing but little in aspect from rest of leaf, except in being slightly paler, or sometimes reddish-brown.

The differences brought about by the gall-makers can be understood only by a comparison with a healthy leaf in section. The latter shows, from above downwards, the epiderm, then two or three layers of rather closely packed palissade cells, elongated at right angles to the surface, then two or three layers of irregularly branched cells, elongated in directions nearly parallel to the surface, and showing large intercellular spaces among them. Among these cells lie the fibrovascular bundles, usually close below the palissade layers. Then comes the lower epiderm, bearing numerous and variable branched hairs.

In the galls the loose mesophyll below the palissade layers seems to be the first part attacked. The cells become less regular in form, and lie with the long axis in any direction, and are separated by wider interspaces. The next cells attacked are the lower palissades, and the upper palissades soon follow, the cells all resembling those of the loose mesophyll, without differentiation of the tissues as in the healthy leaf. Neither epiderm nor fibrovascular bundles undergo any noticeable change in structure. The interspaces were well filled in August with eggs and young worms; but neither males nor females could be found, hence there may be a doubt as to the maker of the gall being a *Tylenchus*. These galls are common on the Links near Aberdeen, but I have

not found them associated with diseased *Hyp. radicata*, though the plants are often common in the same spot. The galls on the two are, however, so much alike that one may fairly enough suppose them to be the work of the same species.

HIERACIUM VULGATUM Fries:—

On this plant I have found, near Aberdeen and near Dumfries, galls so similar in every respect to the galls of *Phytoptus* on *H. Pilosella*, (and like these galls the work of *Phytoptus*), that I can hardly doubt that they are the work of the same species of mite. They differ from the galls described above only in their rather larger size, and in absence of hairs and consequent greener colour.

CAMPANULA ROTUNDIFOLIA L.:—

a. Galls of *Cecidomyia Campanulæ* Muell., consisting of a swollen fleshy bud or group of buds, that never develop fully (“*Sc. Nat.*” I., 187).

b. Galls of *Gymnetron Campanulæ*, consisting of swollen ovaries (“*Sc. Nat.*” L.c.) Both these galls are common in the district near Aberdeen in July and August.

c. Galls of a mite (*Phytoptus*), consisting of a very inconspicuous inrolling upwards of the margin of the leaf, usually from base to tip on each side, so as to form a roll or tube about 1 mm. in diam., and slightly fleshy, but not differing otherwise in appearance from other parts of the leaf. Inside the tube the mites may be found. In July I found these galls in the neighbourhood of Aberdeen, and in September in Rannoch in Perthshire. Mr. Hardy, the well-known naturalist of Berwick, recorded the results of his own observations on the work of mites in Berwickshire in the *Zoologist* a number of years ago, including among them this gall. It has also been recorded from Switzerland and from Germany by Dr. Thomas (in *Schweizer Milbengallen*, 1872).

VACCINIUM VITIS-IDAEA L.:—

I formerly described briefly (*Sc. Nat.*, i., 158) galls on this plant found by me in Braemar; but could offer no conjecture as to the maker, as the galls had been lost. In the autumn of 1882 I again have found these galls in Braemar; and have found in each a few yellow larvae of a *Cecidomyia* between the involute imbricate red fleshy leaves of the terminal buds.

Mr. Cameron describes (*E.M.M.*, xii., 190) a Saw-fly, *Nematus crassipes* var. *Vacciniellus* Cam. reared by himself from galls on *V. Vitis-Idaea*, but does not describe the gall, which I have not myself met with.

GENTIANA CAMPESTRIS L. :—

In August 1882 I found, in Braemar, two plants of this species bearing flowers tenanted by small pale yellow larvae of a *Cecidomyia*. Some of the flowers were abnormal in having buds growing in the axils of the petals and from the centre of the ovary; but the larvae also were present in other buds which differed from the normal condition only in having the parts of the flower slightly swollen and fleshy, with the sexual organs ill developed. Larvae were numerous inside the ovaries, the seeds in which were quite abortive or else ill developed; and they were also present in small numbers between the other parts of the flowers. Dr. Dickie has described (*Edinb. Bot. Soc. Trans. ii.*, pp. 192-196) abnormal flower-buds like the above from near Aberdeen; but he makes no mention of the presence of larvae in those found by him.

PLANTAGO LANCEOLATA L. :—

a. Galls of *Mecinus pyraster* Herbst (*Sc. Nat. ii.*, p. 252, and *iv.*, p. 16), oval swellings of the scape near the top, less often of the petiole. These weevil-galls are not rare in a good many places in the North-east of Scotland.

b. Galls of one of the *Anguillulidæ* (? *Tylenchus* sp.), so similar in structure to those just to be described on *P. maritima* that it is needless to describe them on both plants. They are of larger size on *P. lanceolata*, occasionally almost extending from edge to edge of a leaf; and are less markedly different in colour from the rest of the leaf, than they are in *P. maritima*. I have found these galls in one or two localities near Aberdeen, from May till October; also at Banchory Ternan on Deeside, and at Rescobie in Forfarshire.

PLANTAGO MARITIMA L. :—

Galls of *Tylenchus* (? sp. n.) in the leaves and leaf-stalks, seldom in the scapes. Possibly they may be the work of the same species as makes the second kind of galls just mentioned on *P. lanceolata*, as the galls are so similar on the two plants. On *P. maritima* they are conspicuous, as they enlarge the part attacked to as much as four times the normal breadth, and usually assume a pale yellowish green, less often a red or purple shade. There is often marked distortion in the structure of the galled parts. The deviations from the healthy state caused by the gall will be best understood after a brief sketch of the transverse section of a healthy leaf. A normal section shows a very regular arrangement of its tissues, viz., the epiderm all round the mesophyll, which is

made up of oval thin-walled cells, lying so that their long axis is at right angles to the surfaces. Usually about 9 layers of cells can be made out between the epiderms, those in the middle usually being rounder and smaller than the others. There is no distinction recognisable into palissade cells and loose layers, and the interspaces, though numerous, are all small and nearly equal. The fibro-vascular bundles lie in a row in the middle layers of the leaf, and are hardly at all altered in the galls. One can usually distinguish a mid-rib, and on each side of this two lateral bundles; and between the five large are several smaller bundles.

The galls differ from the above in structure almost solely in the mesophyll, of which only a part may be altered, or the gall may extend the full breadth of the leaf. At times the galls reach 15mm. in breadth, but they are in general considerably smaller. On making a transverse section of a gall, one finds the cells of the mesophyll much elongated and irregular in form, assuming the type known as branched parenchyma, so that large intercellular spaces are formed. In these spaces lie numerous "worms," which I was able, after examining all stages and both sexes, to refer to the genus *Tylenchus* of Bastian, but they differ from any species of which I can find descriptions in Bastian's *Monograph on the Anguillidae* (*Trans. Linn. Soc., vol. xxv*). The epiderms of the galls have fewer stomata in proportion, and their cells are hardly so regular as in the healthy leaf. The galls are abundant on the coast of Kincardine all summer and autumn.

VERONICA OFFICINALIS L. :—

Flowerbuds galled by *Cecidomyia* (? *Veronica Bremi*), quite similar to those already described by me (*Sc. Nat., iv., 170*) on *V. Serpyllifolia*. The buds swell to twice or thrice their normal size, and remain unopened or open but slightly. They may be rather pale green, or the petals may show slightly and of the usual colour. The parts of the flower become slightly thickened and fleshy, and remain abortive, at least in function. The larvæ, yellow or orange in colour, live between them; and one finds cocoons in the galls occasionally. I have these galls from Bourtie in Aberdeenshire, found in the end of August 1883. The galls on *V. Serpyllifolia* are rather common near Aberdeen.

PEDICULARIS SYLVATICA L. :—

Galls of mites (*Phytoptus sp.*) sometimes are very numerous towards the tips of the shoots; in some plants distorting almost every leaf on at least the upper half of the stem, in others being confined to only a few of the upper leaves, rarely occurring on

only a single leaf. Not rarely the sepals also are attacked, but without marked injury to the development of the flower. Plants when severely attacked become very much changed in appearance. The affected parts are of a dull purple-red or brown-red, somewhat thickened and fleshy, revolute, and generally more or less covered with grey hairs; and they may also be more or less stunted in size. On transverse section the mesophyll is found to be but little changed; but the epiderms are loosened from it, and the cells exposed to light are filled with coloured cell-sap, usually purplish-red. From the epiderm cells hairs grow out, generally simple, consisting of a row of cylindrical cells, the last cell of the row being bluntly rounded. There may be up to 15 cells in each hair. The hairs are often a little twisted, owing to slight irregularities in the form of the cells; occasionally they arise so close together as to seem to fork at the base. They are pale or coloured according to the exposure they undergo to light. The mites live in small numbers among them. I met with these galls in considerable numbers in the end of June on Scotston Moor, near Aberdeen, this year. Similar galls have been described by Dr. Thomas as occurring on *P. palustris* in Thuringia.

RUMEX ACETOSELLA L. :—

Flowers galled by *Cecidomyia Rumicis* H. Loew. The buds become considerably swollen and rather fleshy, are orange-red in colour in most cases, and remain closed. The sexual organs abort; and one or more orange larvæ, or white cocoons may be found in each flower-bud. Many flowers are attacked usually on a plant; and the galls in 1883 were extremely abundant near Aberdeen. Owing to their small size, one is apt to overlook them. The midges are very easily reared from them. This insect is included in Walker's "*Insecta Britannica*," III., p. 100.

ULMUS MONTANA Sm. :—

a. Galls of *Tetraneura Ulmi* L. form rifle-bullet-shaped bodies arising from the upper surface of the leaf ("*Sc. Nat.*," V., p. 216).

b. Galls of *Schizoneura Ulmi* L., consisting of fleshy distorted revolute leaves, which shelter, in the pouch formed by them, a large number of the Aphides amidst a quantity of secretion ("*Sc. Nat.*," V., p. 216).

c. Mite-galls in the leaves, the work of *Phytoptus*. They are very inconspicuous when young, but are readily detected after a time by causing the leaf around them to die and to become brown in spots about 4 or 5 mm. across, very closely resembling the spots

so frequently produced on leaves by fungi; indeed it was while examining the spots in search of fungi that I detected their true cause. The young gall is lenticular in form, projecting very slightly from both surfaces of the leaf, slightly more so below, where the orifice is situated. The gall is usually from .5 to 2.5 mm. across, and is about twice as thick as the leaf around it; but its surface hardly differs from that of the leaf in colour, though it is at times yellowish-green. However, in course of time the colour changes through yellow to brown as the tissue dies. On microscopic examination the palissade cells are seen to be hardly altered, but the cells of the tissue below them become much enlarged, and leave large interspaces among them; and in the interspaces the mites live. Before the fall of the leaves the mites may be found crawling over them, having abandoned the galls through the opening below. Frequently a leaf bears many galls; and on some trees hardly a leaf can be seen free from them. I have found them abundantly in Aberdeenshire, Forfarshire, and Perthshire, and have no doubt that they will be found almost wherever looked for.

ULMUS CAMPESTRIS L. :—

Galls of *Phytoptus*, doubtless the same species as makes the galls just described on *U. montana*, are common in the same localities as the latter, and are exactly similar in all respects. They have been described from this tree from Gotha, Wurzburg, and the Tyrol by Dr. Thomas, and from Weidling in Austria by Dr. Fr. Loew.

JUGLANS REGIA L. :—

Erineum Juglandinum Pers. was sent me in the month of June by Dr. Buchanan White from Perthshire, where he had gathered it. It is made by a species of *Phytoptus*, like the other *Erinea*. Greville described it under the name *E. subulatum* in his *Monograph* of the genus (p. 75, t. II., f. 4), and under the name *E. Juglandis* D. C. in his "*Flora Edin.*" (p. 450), and in his "*Scot. Crypt. Flora*" (V., t. 263, f. 2), recording its occurrence near Edinburgh. The gall is situated on the lower surface of the leaves, and consists of a patch of yellowish-gray hairs, very closely packed together; the outlines of the patch are bounded by nerves of the leaf, and it is thus often quadrangular in form, and may be as much as 20 mm. in its long diameter. The hairs are slender, simple, and pale, seldom showing any marked irregularity in form. The patches generally lie in depressions of the lower surface, to

which correspond irregular convexities, of a paler or more yellowish-green colour than the rest, on the upper surface. The mites live among the hairs.

QUERCUS ROBUR L. :—

w. Galls of *Aphilothrix solitaria* Fonsc., already recorded by Mr. Cameron from near Glasgow ("Fauna and Flora of the West of Scotland, p. 16), and by my self as sent me from Perth (*Scot. Nat.*, IV., p. 17), were found by me in 1882 at Ballater on Deeside. I here describe the fresh galls. They are ovate budgalls usually sessile, with a few small scales around the base, narrowed abruptly near the tip, where they end in a sharp prominent point. Their surface is nearly smooth, and is green or greenish-brown. In size they vary from 6 to 9 by 4 to 5 mm. On section the wall is thin; but in it one can distinguish a hypoderm of thin-walled cells, and an inner layer of polygonal cells with thick pitted walls. The central cavity is rather large, and is lined with thin-walled cells that contain protoplasm and starch as food for the larva apparently. The insects emerged in August.

x. Galls of *Aphilothrix albopunctata* Schla., already described in this Magazine.

y. Galls of *Aphilothrix collaris* Hart. were found by me in June 1882, at Parkhill, north from Aberdeen, and also at Banchory Ternan on Deeside. They belong to the group of budgalls, and are very inconspicuous, as they remain hidden among the scales. The gall is spindle-shaped or ovate, 4 by 2 mm., and ends in a conical point. Its surface is brown, and its wall is thin and dry. All those found were empty. This gall is said by Adler to be the work of the spring brood of *Andricus curvator* Hart., which is very common in Britain, and has already been described ("Sc. Nat.," I., 193, c).

z. Galls of *Aphilothrix autumnalis* Hart. have been already recorded by Mr. Cameron from near Glasgow. I found one or two specimens beside the Dee near Aberdeen in October 1882. The gall is ovate, 3.5 by 2.5 mm., and ends in a minute wart. The surface is brown and smooth, with faintly marked longitudinal ridges. The outer layers of the wall in the fresh state are slightly fleshy, and adhere closely to the hard inner shell. The gall is very inconspicuous among the scales. In the end of autumn it falls to the ground. Adler believes it to be the work of the "alternate generation" of the insect that makes the "Silk Cotton gall of the oak"—viz., of *Andricus ramuli* L., already described in these notes ("Sc. Nat.," II., p. 128, o).

FAGUS SYLVATICA L. :—

Descriptions of galls on this tree will be found in earlier volumes of this Magazine (*I.*, p. 235, and *VI.*, p. 256-57), the makers being gall-midges. In September 1883, I found in Shambellie woods near Dumfries two forms of mite-galls, neither of which had been previously found by me in Scotland, though one of them (*Erineum fagineum*) was recorded in Greville's "*Scot. Crypt. Flora*" (t. 250, f. 1) from the Southern counties, and is said by him to be of frequent occurrence.

c. Erineum fagineum Pers. (E. lacteum Fries) consists of patches of short velvety hairs crowded together here and there on the lower surface of the leaf, at first pale dirty white or gray, afterwards passing into some shade of brown, or less frequently of red or purple. The spots are seldom large, and are usually slightly sunk in hollows of the leaf, occupying the inter spaces between the nerves. There is seldom any marks of their presence, except an occasional slight discolouration on the upper surface of the leaf. Several patches may exist on a leaf, but they show no tendency to fuse together, and are usually a little distance apart. The hairs are short, pyriform or obovate, and shortly stalked, with a thin membranous cell wall marked with longitudinal folds. This gall has been recorded from numerous localities on the continent of Europe.

d. Legnon circumscriptum Bremi; the galls of this mite consist of the involute and slightly thickened margins of the leaves, sometimes extending almost entirely around the leaf, but usually only in parts of from 5 to 50 mm. in length. The affected portions form tubes not exceeding 1 mm. in diameter, and generally on cross section show about $1\frac{1}{2}$ turns. The interior of the tube contains some hairs, the usual marginal hairs of the leaf, among which live the mites, as usual belonging to the genus *Phytoptus*. The tissue of the gall is slightly more fleshy than that of the healthy leaf, but the colour is little changed, though becoming brown and dry rather earlier than the rest of the leaf. These galls were abundant on the same trees, and often on the same leaves as the *Erineum*; probably they are not rare in Scotland in certain localities, though so inconspicuous as to be readily overlooked.

AGROSTIS ALBA L. :—

a. Galls of *Tylenchus*? on the leaves ("*Sc. Nat.*," *VI.*, 17).

b. Pseudogalls of *Brachycolus Stellariæ Hardy* on the young leaf-shoots, quite similar to, but less conspicuous than those on

HOLCUS MOLLIS L.

In both these grasses in autumn one very frequently finds shoots remaining short, stunted, and clubbed, the leaves being crowded and showing a tendency to become fleshy at the base. Between the bases of the leaves are numbers of wingless long-bodied Aphides, of the species mentioned above (see Buckton's "*British Aphides*," Vol. II., 147-8, pl. LXXXV., f. 1-3). The galls on *Holcus* are extremely common in many places; on *Agrostis* they are less frequent. In spring one meets with similar pseudogalls, formed by the same insects, on *Stellaria Holostea* and on *Cerastium*, as already noted under these plants.

FESTUCA OVINA L.

In August, 1882, and again in July, 1883, I found in various localities in Braemar, and on the Links near Aberdeen, stem-galls on this grass. They are not readily observed, as the plants affected show hardly a trace of injury in the parts exposed to view. I have never found more than one gall on a stem; and it is situated always near the base of one of the lower internodes of the flowering culm. The whole circumference is affected, but growth is more rapid on one side, so that the culm becomes bent and the gall bursts through the lower part of the leaf-sheath. Its surface is smooth or nearly so, its colour dull brownish yellow. In size the galls do not seem to exceed 8 by 3 mm. They taper at each end into the culm, but more gradually upwards. On section the wall is found to be thin but compact, and the central space is rather large. Each gall contains one hymenopterous larva, about 4 mm. long and 1 mm. thick, of a honey-yellow colour.

APPENDIX.—Additions to "GALLS and their makers in DEE," including species already recorded in "The Scottish Naturalist," since the publication of my paper in Trans. Abdn. Nat. Hist. Soc., 1878. (*References to these records in the "Scottish Naturalist" are given in brackets.*)

I have thought it desirable to supplement the list of galls new to Scotland, in the preceding paper, with an account of the additions recorded by myself at intervals from the north-east of Scotland since 1878, and which have not as yet been brought together for "Dee." They are as follows, enumerating the plants, as before, in the botanical arrangement for convenience of reference :

CAKILE MARITIMA L.:—

Near junction of root and stem there are lateral swellings about the size of half a pea, and very similar in appearance and in structure to the galls of *Ceuthorhynchus*, formerly noticed as so common on Turnip and Cabbages; and like them, the work of a weevil belonging to that genus. The galls are to be found on the sandy beach near Donmouth, north from Aberdeen, in July. (*IV.*, p. 13).

EROPHILA VERNA L.:—

The galls on this plant, previously recorded by me (*l. c.*, *VI.*, p. 13), were sent me by Dr. White from Perthshire. In May 1884, I found these galls on plants on the links north of the Don, near Aberdeen. They are small oval or roundish swellings at the junction of the root and of the stem, usually concealed in the rosette of leaves; they seldom exceed 3 or 4 mm. in diameter. Their wall is thin, with a relatively large space tenanted by a larva, apparently that of *Ceuthorhynchus Drabae* Lab. Owing to its position and minute size, the gall is probably far more common than it would at first sight seem to be.

HELIANTHEMUM VULGARE Gaertn.:—

Besides the Midge-gall described in my former paper in our "Transactions," another gall has been found by me, consisting of a shortened and mal-formed condition of the leaves and buds on one or more of the twigs, or even on the greater part of the plant. The epiderm of all the affected parts is covered with short gray hairs, which coating renders the galls moderately conspicuous despite their small size individually. They are the work of mites of the genus *Phytoptus*, and are quite distinct in appearance from the galls of *Cecidomyia (Diplosis) Helianthemis* Hardy, just referred to. They are not uncommon on a small area near the highest part of Scotston Moor, near Aberdeen; but I have not met with them elsewhere, nor have I met with them before autumn. (*VI.*, p. 14).

TILIA EUROPÆA L.:—

Rolled, thickened, red, fleshy margins of the young leaves, usually on the young shoots; each is occupied by one or more reddish-orange larvae of gall-midges (*Cecidomyia*). On one or two trees in Old Aberdeen, in July. (*V.*, 214).

On this tree Dr. White has found, in Perthshire, swellings varying in dimensions from the size of hemp-seed to that of a small pea; these swellings occur on the flower-stalk at the bract, or where

the pedicels are given off, or they may be swollen flower-buds; the texture is fleshy. They are probably the work of *Cecidomyia floricola* Rudow, (VI., 255).

ACER PSEUDO-PLATANUS L.:—

Besides the mite-galls known as *Ceratoneon vulgare*, described in the former paper, an *Erineum* (*E. acerinum* D. C.), is found in scattered patches of a dark rusty brown all over the lower surface of the leaf. These patches are, at first, pale yellowish-white, but soon change colour. They usually do not exceed 5 to 12 mm. across; but at times they coalesce, so that the whole lower surface may be almost entirely covered with the elongated clubbed and twisted hairs. These patches are common in Scotland. (V., 214).

PRUNUS AVIUM L.:—

A pseudo-gall is formed at the tips of the young branches by the attacks of one of the Aphides (*Myzus Cerasi*), the leaves being so altered as to become fleshy, and to curl up, thereby forming spaces for the protection of the insects. These pseudo-galls are found near Aberdeen in spring and early summer. (V., 215).

PRUNUS PADUS L.:—

On this plant, in addition to the well known "nail-galls," described previously, one finds in many parts of Scotland, chiefly in autumn, patches of the mite-gall, *Erineum Padi* Grev. (*E. padinum* Duv.). This gall is much like *E. acerinum* just described, but the patches are usually less regular in outline, and the hairs are of a different form, being straight, clavate, and warty over the club. The patches vary with age from pale yellowish brown to deep rusty brown. (VI., 16-17).

RIBES RUBRUM L., and R. NIGRUM L.:—

Present pseudo-galls, the result of attacks of a species of Aphis (*Rhopalosiphum Ribis* Buckton), the leaves becoming distorted and red, and enclosing irregular cavities below, in which the insects live sheltered. They are common near Aberdeen, and probably almost throughout the country. (V., 215).

The buds of R. NIGRUM are also attacked by mites in Stirlingshire, as recorded in the Transactions of the local Nat. Hist. Soc.; and I have been told that the bushes are considerably destroyed in some places near Aberdeen; but the galls have not yet fallen under my own observation. The buds reach a size twice or thrice as large as in their healthy condition, but do not open; and the bushes languish or even die from the injuries sustained.

LONICERA PERICLYMENUM L.:—

The edges of the leaves are attacked by gall-mites, in conse-

quence of which they become furrowed quite close to the edge usually, though occasionally as much as 5 mm. from the edge. The furrow is open above, and is wavy in outline, and in it the mites live. The gall is very inconspicuous; but is abundant on the plants infested with it. I have found it only at Cawdor near Forres, but it will be found, beyond doubt, in other parts of Scotland when looked for. (V., 215).

ARTEMISIA ABROTANUM L., *Southernwood* :—

On a shrub of this species, in a garden in Old Aberdeen, I found, in October 1884, the younger leaves bearing numerous small galls. Each gall is nearly cylindrical, attached by the base and by one side to the surface of the leaf, and ending in a conical free tip above. The free wall is very thin. The surface is like that of the leaf, but the gall is slightly yellowish or dull reddish green. The central cavity is occupied by an orange red larva of a *Cecidomyia* (sp. ?) The galls are usually situated near the origin of the chief lobes of the leaf. I have not been able to find any gall recorded for the above plant.

TANACETUM VULGARE L.:—

Has the edges of the lobes of its leaves rolled by mites into narrow tubes, either in spots, or, in the young leaves, in almost their whole length. The galled parts become covered with silky white hairs, so that they are rather conspicuous. Dr. White has sent me the galls from Perthshire. (VI., 256.)

CHENOPODIUM ALBUM L., ATRIPLEX PATULA L.,
and A. BABINGTONII Woods :—

All bear pseudo-galls, consisting of pale involute fleshy leaves. Protected in these are numerous Aphides (*A. Atriplicis* L.), in all the stages of development. These deformities are very common in most places. (VI., 16.)

ULMUS MONTANA Sm.:—

Very commonly bears pseudo-galls of an Aphis, (*Schizoneura Ulmi* L.). They are similar in structure to those of the Aphides generally, consisting of a leaf that becomes spirally revolute on one side, so as to enclose a space occupied by the Aphides, which live in the midst of a white powdery secretion and clear drops of fluid. The outer surface becomes yellowish or may remain rather green; and the gall is fleshy and rather brittle. (V., 216.)

At Cawdor, near Forres, I found once the galls of another species of Aphis (*Tetraneura Ulmi* L.), and in the autumn of 1883

I found dried remains of the same gall on a tree near Dumfries. Like the last galls they occur on the leaves, from the upper surface of which they arise as oval bodies, about 12 by 6 mm. in size, attached by a narrow neck to the leaf. The surface is smooth or furrowed longitudinally, and is yellowish green; the leaf around is spotted with yellowish red, and bears patches of hairs like an *Erineum* below. (V., 216.)

POPULUS NIGRA L.:—

On this plant I found at Birnie, near Elgin, galls the work of Aphides (*Pemphigus bursarius* L.), were found on the petioles as green, irregularly conical, naked, wrinkled growths, about 8-12 by 58mm. in size; they open by an irregular fissure at the tip of the cone, giving access to a space surrounded by a fleshy wall. (V., 217.)

QUERCUS ROBUR L.:—

In addition to the numerous oak-galls previously described by me, I have found in the valley of the Dee, in May, galls of *Aphilothrix albopunctata* Schl., a species already recorded as Scottish by Mr. Cameron. They are sunk in the buds, projecting only a little from among the bud scales; hence they are difficult to find. In June they fall to the ground. They are oval or ovate, and measure 5-6 by 3-4mm. The surface is naked, smooth, and green or brown with numerous short white streaks. The wall is rather thick, and shows an inner wall closely adherent to the softer outer wall. (VI., 16.)

FAGUS SYLVATICA L.:—

In my former paper (l. c., p. 74-75), I described the galls on beech leaves that occur very commonly in many parts of the country, and assigned them to *Hormomyia piligera* on account of their form, like miniature rifle-bullets, though they do not bear the coating of hairs ascribed to the galls of that insect. I have since found galls that quite agree with the type of *H. piligera* H. Lw. at Forres and at Glamis. Those formerly described by me agree very well with Bremi's description of his *Cecid. tornatella*, but he did not succeed in rearing the insects. It is doubtful whether his species is really distinct from *H. piligera* H. Lw. (VI., 256-7.)

JUNCUS LAMPROCARPUS Ehrh.:—

Frequently bears pseudo-galls of a Homopterous insect, called *Livia Juncorum* Latr. The buds at the tip of a stem, or on the

short branches at the lower internodes, become considerably enlarged, and each galled bud may reach as much as 3cm. in length by 4-6mm. in breadth; usually several such enlarged buds arise side by side, so that the whole mass may exceed 3cm. in diameter. The bases of the leaves are much widened, and overlap one another, enclosing spaces tenanted by the insects. The leaves remain abortive beyond the sheath frequently. These growths are not rare in suitable localities throughout the country. (VI., 257.)

AGROSTIS ALBA L.:—

On this grass galls are often found to occur in a locality on the coast south from Aberdeen, in autumn. They are situated in the leaf-blade close to where it joins the leaf sheath usually; less often they are found scattered over the blade, but do not exceed two or three in a leaf. They are oval or linear dull red-purple swellings about 2.5 by 1.2mm.; and in the interior contain an irregular closed cavity, formed, as it seems, by the separation of the cells at that part. In the space so formed live a number of Anguillulae belonging to the genus *Tylenchus* Bastian. Similar galls have been described from Germany on *A. canina* and on *Festuca ovina* (VI., 17-18.)

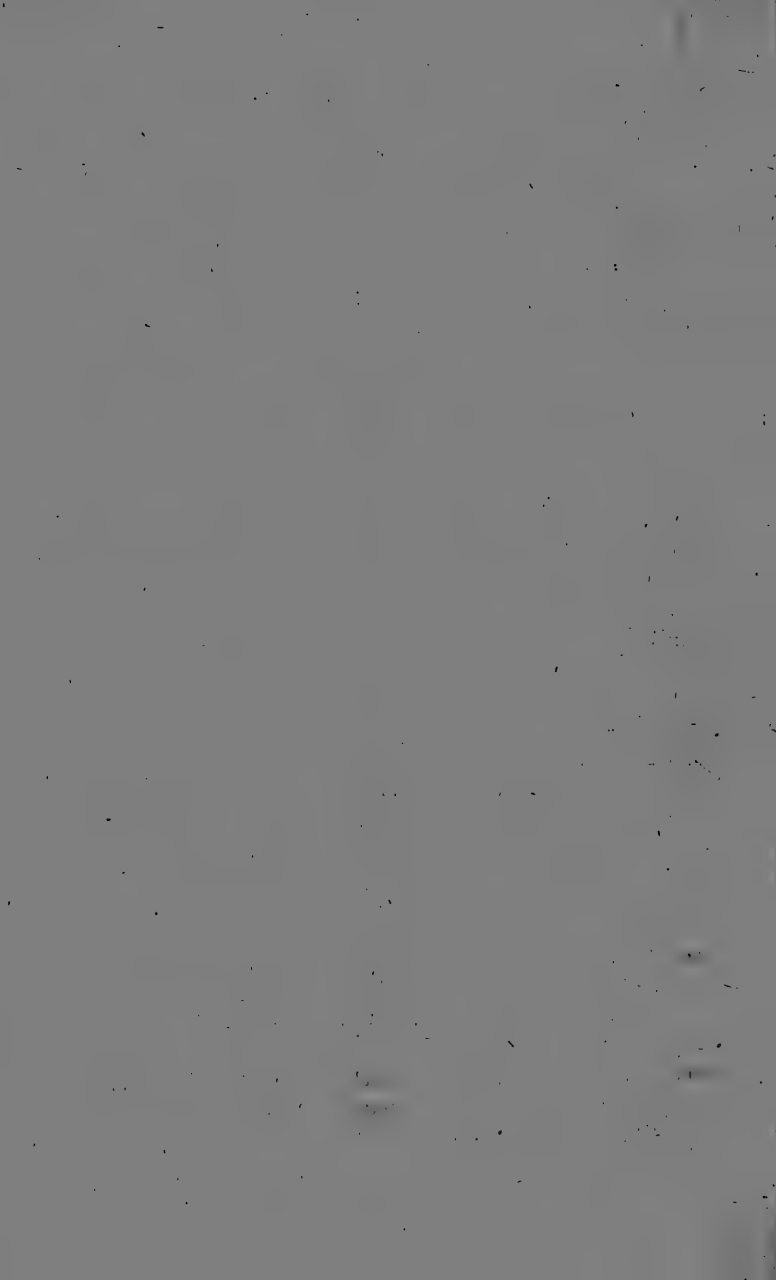
ELYMUS ARENARIUS L.:—

Has swellings on the finer rootlets, often close to the tip as nearly round bodies, $\frac{1}{2}$ -1 $\frac{1}{2}$ mm. in diameter, or less often forming spindle-shaped swellings, which may be 3 by 2mm. in size. The healthy rootlets do not exceed $\frac{1}{2}$ mm. in diameter, hence the galls are readily distinguished, though of the same pale colour as the roots. On section the gall is found to be chiefly made up of an enlargement of the cellular tissue. In the interior of the gall live the makers, belonging, like those on *A. alba*, to the genus *Tylenchus*: not, as suggested by Karl Muller of Berlin, in 1883, ("neue Helminthocidien," p. 12), to the genus *Heterodera* Schmidt. I have examined the mature female, which is a true *Tylenchus*, Common on sandy beach near Aberdeen. (VI., 18-19.)

The following corrections or remarks fall to be made as an appendix to my former paper (1878). They are largely due to information kindly communicated to me by Dr. Franz Loew, of Vienna, and such corrections are indicated by (F.L.):—

HYPERICUM PULCHRUM L. The gall (57) appears to be the work of *Cecidomyia Hyperici* Bremi, and not of *C. serotina* Winn (F.L.).

- ASTRAGALUS HYPOGLOTTIS L. (59). Determination confirmed.
(F.L.)
- POTENTILLA TORMENTILLA L. (60). The gall is the work of
X. estophanes brevitarsis Thoms. (= *X. Tormentillæ* Schlecht)
(F.L.)
- PIMPINELLA SAXIFRAGA L. (62). The gall-maker has been re-
ferred to the subgenus *Asphondylia* of the genus *Cecidomyia*
by Dr. Loew.
- HERACLEUM SPHONDYLIIUM L. (62). The insect that corrugates
the leaves has been reared by Dr. Loew, and has been
named by him *Cecidomyia corrugans*.
- GALIUM PALUSTRE L. (63A). The terminal rosette of leaves is the
work of *Cecidomyia galiicola* F.Lw., not of *Cec. Galii*
H. Loew (F.L.)
- SENECIO JACOBÆA L. and S. AQUATICUS L. (65). Dr. Loew
points out that the larvæ of *Cecid. (Diploisis) Jacobææ* H.
is said by H. Loew and by Kaltenbach not to distort the
flower-heads, and he suggests that the swellings found
among us may be due to working of mites.
- GALIUM SAXATILE L. (64A) Dr. Loew suggests that these galls in
flower-buds are rather the work of *Cecidomyidæ* than of
mites (*Phytoptus*), but observation does not confirm this
view.
- RHODODENDRON FERRUGINEUM L. (78). When I wrote the notice
of the supposed galls on this plant, I had not myself had
the opportunity of examining them, but specimens were
since brought me by Dr. Russell from near Stonehaven.
They are caused by a fungus called *Exobasidium Rhodo-*
dendri Cramer, and should not be included among galls
made by animals.
- SALIX CAPREA L. (69, D). These twig-galls are the work of *Cecido-*
myia Salicis Schrk. (F.L.)
(69, H.) These mite-galls have been named *Cephaloneon*
umbrinum by Bremi (F.L.)
- PINUS SYLVESTRIS L. (76). The swellings on the branches are
caused not by *Oribata geniculata* Latr., but by mites of the
genus *Phytoptus* (F.L.)



PRELIMINARY
 LIST OF THE ECHINODERMATA
 OF THE
 NORTH-EAST COAST OF SCOTLAND,
 BY GEO. SIM.

THE following is offered not as a complete catalogue of the Echinodermata of the north-east coast of Scotland, but merely as list of such local species as the writer has identified beyond doubt. Others there are, the names of which have not been determined; but it has been considered better to exclude all such from the list. The arrangement and nomenclature followed is in accordance with that excellent publication, the *Revised List of British Ophiuroidea*, by W. E. Hoyle, naturalist to the "Challenger" Commission, in so far as it extends—*i.e.*, to the end of the *Ophiurida*, the remainder being taken from Forbes' *History of British Starfish*. In order to make the list useful to those not in possession of Mr. Hoyle's paper, Forbes' names are placed on the right of each page in italics:—

ASTROPHYTIDÆ.

Astronyx Lovéni. Müll. and Tr.

OPHIURIDÆ.

- | | |
|--|------------------------------|
| Amphiura Chiajii, Forbes. | <i>Ophiocoma punctata.</i> |
| A. filiformis, Forbes (O. F. Müller); | <i>Ophiocoma filiformis.</i> |
| A. elegans, Norman (Leach); | <i>Ophiocoma neglecta.</i> |
| Ophiocnida brachiata, Lyman (Montagu); | <i>Ophiocoma brachiata.</i> |
| Ophioglypha albida, Lyman (Forbes); | <i>Ophiura albida.</i> |
| O. lacertosa, Lyman (Pennant); | <i>Ophiura texturata.</i> |
| Ophiopholis aculeata, Gray (O. F. Müll); | <i>Ophiocoma bellis.</i> |
| Ophiothrix pentaphyllum, Ljn. (Pennant); | <i>Ophiocoma rosula.</i> |

ASTERIDÆ.

Urasteriæ.

Uraster glacialis Lin. Ag.

U. rubens Lin. Ag.

U. hispida? Penn.

Solasteriæ:

Cribella oculata Pennant.

C. rosea Muller, now known as *Stricaster roseus*.

Solaster endeca Lin.

S. papposa Lin.

Goniasteriæ.

Palmipes membranaceus, Retz.

Goniaster Templetoni. Thompson.

G. equestris Gemlin.

Asteriæ.

Asterias aurantiaca Linn.

Luidia fragillissima, Forbes.

In addition to the foregoing, the following have been observed by the Rev. Dr. Gordon of Birnie and T. Edward of Banff:—

Ophiactis Ballii, Ltk. (Thomps); *Ophiocoma Ballii*).

Ophiocoma nigra., Müll and Tr.

(O. F. Müll); *Ophiocoma granulata*.

Uraster violacea Müller.

When we consider that eleven only of the Ophiuridea are enumerated in the above list, and that "it appears that the number of Ophiuroids known to inhabit British seas has been more than doubled during the past twenty years" (the number now standing at thirty-four), we may safely predict that the north-east coast will yet furnish further additions to this interesting class of animals.

ADDITIONS TO
 CATALOGUE OF FISH
 FOUND IN THE VICINITY OF ABERDEEN,
 BY GEO. SIM.

SINCE the publication in 1878 (*Trans., Aberd. Nat. Hist. Soc.*, pp. 89-93) of the above Catalogue, the following additional species have fallen under my observation:—

Pilchard,	<i>Clupea Pilchardus</i> Donovan.
Jura Sucker,	<i>Lepadogaster Gouanii</i> Günth.
Rainbow Wrasse,	<i>Coris julis</i> Günth.
Great Fork-beard,	<i>Phycis Blennoides</i> Günth.
Drummond's Echiodon,	<i>Fierasfer dentatus</i> Cuv.
Basse,	<i>Labrax lupus</i> Yarrell.
Striped Red Mullet,	<i>Mullus surmuletus</i>
Bank's Oar-fish,	<i>Regalecus Banksii</i> Günth.
Angel-fish,	<i>Rhina squatina</i> Günth.
Thrasher,	<i>Alopias vulpes</i> Swainson.

The following corrections must be made on the Catalogue:—

The Green-streaked Wrasse (*Labrus lineatus*, Don), p. 90, is no longer regarded as more than a variety of the Ballan Wrasse (*L. maculatus*, Bloch).

The Burbot (*Lota vulgaris* Jenyns), p. 91, is recorded in Dr. Dyce's list of fishes shown at the meeting of the British Association in Aberdeen in 1859. I have long doubted the fact of this species being found in this district; and having gone over the Dyce collection of fish in the University Museum, I find my doubt strengthened, as there is in that collection a specimen with the label, "Burbot," and with the locality given as "Aberdeen Bay." As the Burbot is a fresh-

water fish, it is not likely to be found in that locality; but in any case, the specimen in question is only an immature example of the common Ling (*Molva vulgaris*). In a MS. note, Dr. Dyce says that he had never seen more than two examples of the Burbot in Aberdeen Market; and we may assume the specimen to be one of these. There is then, I think, indisputable evidence that he was mistaken as to the identity of the species.

The Smooth Hound (*Mustelus levis*), p. 93, must, I think, be removed from our list, as there is no satisfactory evidence of its occurrence in the district.

ADDITIONS TO LIST OF THE CRUSTACEA

OF THE
NORTH-EAST COAST OF SCOTLAND

(Trans. Aberd. Nat. Hist. Soc., 1878, pp. 84-88.)

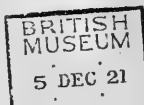
BY GEO. SIM.

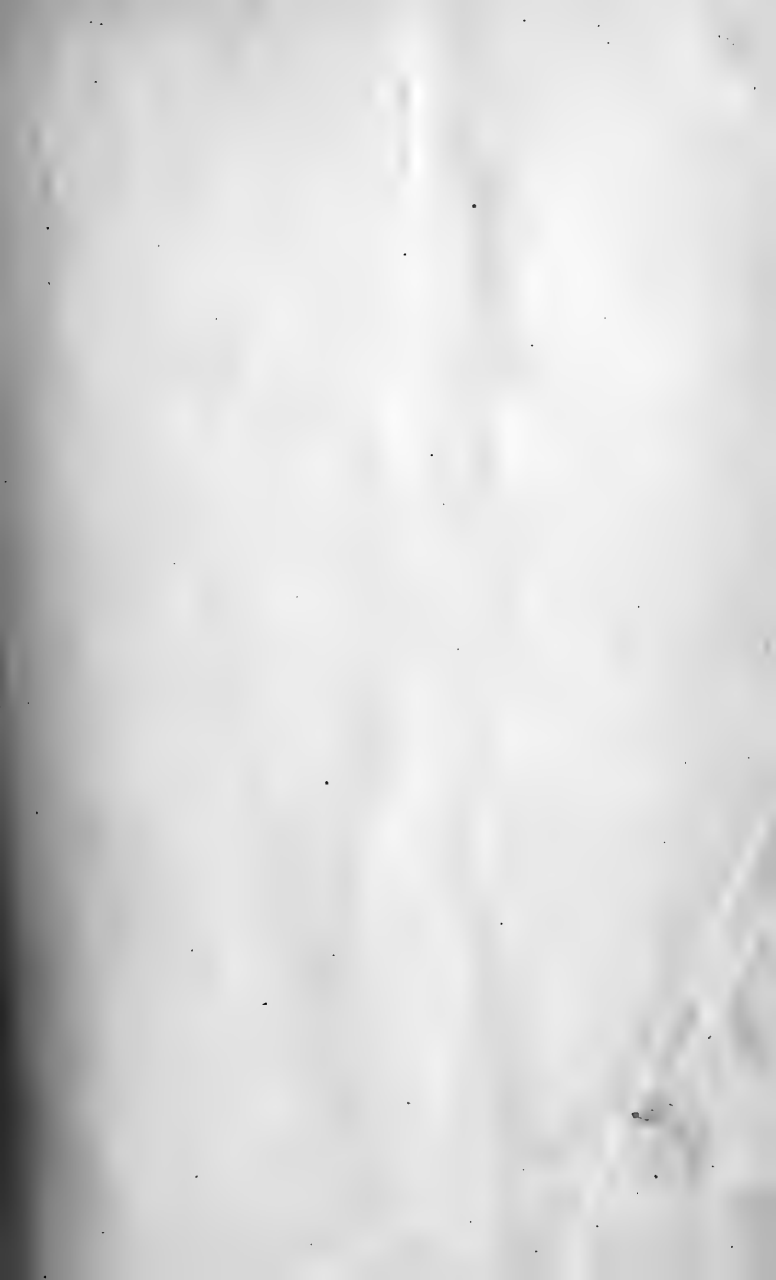
STALK-EYED CRUSTACEA.

Pagurus ulidianus, } from stomach of Craig Fluke (*Pleuronectes*
Calocaris Macandrea, } *cynoglossus*)
Hippolyte pandaliformis, } from stomach of Poor Cod (*Gadus*
Hippolyte Sp. ? } do. do. [*minutus*).
Diastylis bimarginatus.

SESSILE-EYED CRUSTACEA.

Bathyporeia ? from stomach of haddock.
Corophium Ronellii, from stomach of Armed Bullhead (*Aspidophorus Europæus*).
Caprella acanthifera, from cod's stomach.
Cirolana Cranchii, from stomach of Poor Cod.
Arcturus gracilis, from haddock's stomach.





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