
ANNOTATED LISTS.

LIST OF STATIONS IN THE PORCUPINE MOUNTAINS.

See Fig. 3.

- Station I.—Beach of Lake Superior, Secs. 11 and 12, T. 51 N., R. 43 W.
 Station II.—North Slope of First Range, Secs. 11, 12, 13, 14, 15, and 16, T. 51 N., R. 43 W.
 Sub. 1.—Arbor Vitae Swamp at Foot of Slope, Secs. 11 and 12.
 Sub. 2.—North Slope, Secs. 11, 12, and 14.
 Sub. 3.—Clearing in the Saddle, Sec. 14.
 Sub. 4.—Aspen Zone about Clearing, Sec. 14.
 Sub. 5.—Aspen Zone at Top of Ridge bordering the Bare Mountain Top, Secs. 13, 14, 15, 21, T. 51 N., R. 43 W.
 Station III.—Top of the First Range and the Southern Escarpment, Secs. 13, 14, 15, and 21, T. 51 N., R. 43 W.
 Sub. 1.—West Slope of the Ridge on Secs. 13 and 14.
 Sub. 2.—Bare Mountain Top, Secs. 13 and 14.
 Sub. 3.—Zone of Pines crossing the First Range, Secs. 13 and 14.
 Sub. 4.—East Slope of the Ridge on Secs. 13 and 14.
 Sub. 5.—Mountain Top on Sec. 14 and 15.
 Sub. 6.—Mountain Top on Sec. 21.
 Station IV.—Carp River Valley on Secs. 13, 14, 23, and 24, T. 51 N., R. 43 W.
 Sub. 1.—Carp River, Secs. 14 and 24.
 Sub. 2.—Flood-plain, Sec. 14.
 Sub. 3.—Valley Slopes, Secs. 14 and 23.
 Sub. 4.—Peat Bog, Sec. 14, 23 and 24.
 Station V.—Carp Lake, Secs. 15, 21 and 22, T. 51 N., R. 43 W.
 Sub. 1.—Beach at West End of Lake, Secs. 21 and 22.
 Sub. 2.—Delta at East End of Lake, Sec. 22.
 Sub. 3.—Carp Lake, Sec. 22.
 Station VI.—Mountains between the Carp and Little Carp Drainage Systems, Secs. 21, 22, 23, 27, 28, and 34, T. 51 N., R. 43 W.
 Station VII.—Little Carp Drainage System, Sec. 2, T. 50 N., R. 44 W., and Sec. 34, T. 51 N., R. 43 W.
 Sub. 1.—Little Carp Lake, Sec. 2, T. 50 N., R. 44 W.
 Sub. 2.—Beaver Meadow along Little Carp River, Sec. 34, T. 51 N., R. 43 W.
 Sub. 3.—Little Carp River, Sec. 34, T. 51 N., R. 43 W.

LIST OF STATIONS ON ISLE ROYALE.

See Fig. 21.

- Station I.—Clearing on the Shore of Washington Harbor, Sec. 29, T. 64 N., R. 38 W.
 Station II.—Washington River, Sec. 29, T. 64 N., R. 38 W.
 Station III.—Trail along the Top of Greenstone Range, T. 64 N., R. 38 W.
 Station IV.—Washington Creek, Secs. 28 and 32, T. 64 N., R. 38 W.
 Station V.—Tamarack Swamp, Sec. 20, T. 64 N., R. 38 W.
 Station VI.—North Slope of Greenstone Range, Sec. 32, T. 64 N., R. 38 W.
 Station VII.—Lake Desor, T. 64 N., R. 32 W.
 Station VIII.—West End of Siskowit Bay, T. 64 N., R. 32 W.
 Station IX.—Southwestern End of Minong Trap Range, Sec. 30, T. 64 N., R. 39 W.
 Station X.—Washington Harbor, T. 64 N., R. 38 W.

NOTES ON THE PLANTS OF THE PORCUPINE MOUNTAINS AND ISLE ROYALE, MICHIGAN.

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This list has been prepared from the collections and field notes of Mr. N. F. Macduff, and the field notes of the writer. To Mr. Macduff, who devoted his time to collecting and listing the plants, many of the determinations and most of the annotations are due. The writer was able to add many localities to the list while locating the different stations. We are indebted to Dr. C. A. Davis and Mr. S. Alexander for the determination of the Pteridophytes and Spermatophytes in the herbarium, and to Prof. B. Fink for the determination of the Lichens. The nomenclature followed is that given in Britton's "Manual of the Flora of the Northern States and Canada," (1901). For the general habitat conditions and associations, reference should be made to the discussion of the stations on pp. 22-40, 48-52.

I. PORCUPINE MOUNTAINS.*

Lichens

1. *Amphiloma (Pannaria) languinosum* (Ach.) Koerb. Found only in shady places on the cliff face, III.
2. *Biatora lucida* (Ach.) Fr. Associated with *Amphiloma languinosum* on the cliff face, III.
3. *Cladonia alpestris* (L.) Rabenh. Occurs in mats, covering the talus blocks toward the bottom of the slopes where a slight soil has accumulated, III.
4. *Cladonia rangiferina* (L.) Hoffm. Abundant on the lower part of the talus slopes with *C. alpestris*, also on ledges of the cliff that possess a slight soil, III, and in the pine zone, III. 3.
5. *Endocarpum miniatum* (L.) Sch. Covering the rocks in very damp places on the banks of Carp creek, VI.
6. *Gyrophora (Umbilicaria) vellea* (L.) Nyl. Only found on the cliff face, III.
7. *Lecidea lactea* Flk. This species is one of the pioneer forms on rock habitats and was found associated with *Parmelia conspersa* and *Lecanora cinerea* on the mountain top, cliff face and talus slopes, III; also on the Middle Beach of Lake Superior, I.
8. *Lecanora conspersa*. With *Parmelia conspersa* and *Lecidea lactea* on ledges on the cliff, and on the talus slopes, III. Apparently a pioneer form in rock habitats.
9. *Lecanora cinerea* (L.) Sommerf. A pioneer form in rock habitats,

*A list of plants from the Porcupine Mountains was published by W. A. Burt in 1848. Jackson, 1st Sess. 31st Cong., Vol. 3, pp. 876-882.

occurring on the Middle Beach of Lake Superior, I, and on the mountain top, cliff and talus slopes, III.

10. *Parmelia conspersa* (Ehrh.) Ach. This is the most characteristic form on rock habitats in this region. It occurs abundantly on the Middle Beach of Lake Superior, I, and on the mountain top, cliff, and talus slopes, III.

11. *Peltidea (Peltigera) aphthosa* (L.) Ach. Found quite commonly on rocks in the pine zone, III. 3, and with the *Cladonias* near the bottom of the talus slopes, III.

12. *Stereocaulon coralloides* Fr. On the mountain top, cliff, and talus slopes, III.

13. *Sticta pulmonaria* (L.) Schau. Occasional on the trunks of fallen tamarack trees, IV. 4.

Ophioglossaceae Presl. Adder's-Tongue Family.

14. *Botrychium virginianum* (L.) Sw. In the climax forest, II. 2, IV. 3, VI.

Osmundaceae R. Br.

15. *Osmunda cinnamomea* L. Cinnamon Fern. Occasional in the alder thickets along Carp river, IV. 2.

16. *Osmunda claytoniana* L. Clayton's Fern. In hardwood forest, II. 2, VI, (Macduff).

Polypodiaceae R. Br. Fern Family.

17. *Polypodium vulgare* L. In exposed situations, occurring commonly on the Upper Beach of Lake Superior, I; on the bald areas on the mountain top, III. 2, 5, 6; in the aspen zone, II. 5, and III. 1, 4; in the pine zone, III. 3, and on the lower parts of the talus slope.

18. *Adiantum pedatum* L. Maiden-hair Fern. Common in the mesophytic forest, II. 2, IV. 3, VI.

19. *Pteridium aquilinum* (L.) Kuhn. Brake. In open places in the forest, II. 2, IV. 3, VI, becoming more abundant in the open woods toward the top of the ranges and on the foot of the talus slope. Especially abundant in the aspen zone bordering the mountain top, II. 5, III. 1, 4. Also in the pine zone, III. 3.

20. *Asplenium trichomanes* L. Spleenwort. In rock crevices on the mountain top, III. 2, 5, 6, and on ledges and in crannies on the cliff face, III.

21. *Polystichum lonchitis* (L.) Roth. Holly-fern. In rock crevices on the mountain top, III. 2, 5, 6; on ledges on the cliff face, and in front of the forest on the lower part of the talus slopes, III.

22. *Dryopteris spinulosa* (Retz) Kuntze. In the hardwood forest, II. 2. Common.

23. *Onoclea sensibilis* L. Sensitive Fern. In the alder thickets along Carp river, IV. 2, and on the banks of Carp creek, VI.

Equisetaceae Michx. Horsetail Family.

24. *Equisetum sylvaticum* L. In the forest in the valley of Carp river, IV. 3, and on Government Peak, VI, (Macduff).

25. *Equisetum littorale* Kuehl. On the delta of Carp river, V. 2.

26. *Equisetum fluviatile* L. On the submerged part of the delta in Carp Lake, V. 2; about the margin of Carp Lake, V. 1, and about the margin and on the delta of Little Carp Lake, VII. 1.

27. *Equisetum hyemale* L. About the shores of Carp Lake, V. 1, and on the delta, V. 2.

Lycopodiaceae Michx. Club-Moss Family.

28. *Lycopodium selago* L. Common in the aspen zone, II. 5; also found in the pine zone, III. 3.

29. *Lycopodium lucidulum* Michx. A common plant in the ground cover of the hardwood forest, II. 2; VI.

30. *Lycopodium clavatum* L. Running Pine. In the arbor vitae swamp, II. 1; in the hardwood forest, II. 2, and in the aspen zone, II. 5, III. 1, 4.

31. *Lycopodium complanatum* L. Common in the aspen zone, II. 5, III. 1, 4. Often extending out on the heath mats.

Pinaceae Lindl. Pine Family.

32. *Pinus strobus* L. White Pine. Large isolated trees occur through the hardwood forest, II. 2, IV. 3, VI. More abundant in the aspen zone, II. 5. Occurs principally as a scattered growth with *P. resinosa* on the heath mats on the mountain top, on the ledges on the cliff face, and on the talus slopes, III, forming belts of denser growth where the cliff face is broken by large ledges.

33. *Pinus resinosa* Ait. Red or Norway Pine. Associated about equally with *P. strobus* on the mountain top, cliff, and talus slopes, III. Not present in the hardwood forest.

34. *Pinus divaricata* (Ait.) Gord. Labrador or Gray Pine. Several specimens observed on the heath mat on the mountain top, III. 5.

35. *Larix laricina* (Du Roi) Koch. American Larch. Tamarack. Occasional in the cassandra and alder thickets along Carp river, IV. 2, in the broader portions of the flood-plain, and about the beaver meadow on Little Carp river, VII. 2; often forming in the last two habitats a zone with *Picea canadensis* and *Abies balsamea* between the alder thickets and the deciduous forest of the slopes. Predominates in peat bogs, forming a nearly pure stand, IV. 4.

36. *Picea canadensis* (Mill.) B. S. P. White Spruce. Occasional in the arbor vitae swamp, II. 1; in the tamarack swamp, IV. 4; in the coniferous zone behind the alder thickets in the valley of Carp river, IV, and about the beaver meadow on Little Carp river, VII. 2.

37. *Tsuga canadensis* (L.) Carr. Hemlock. This tree nearly always forms a small portion of the tree cover in the hardwood forest, II. 2, IV. 3, VI. Occasionally, as at the foot of the north slope of the first range and on the south slope of the second range, it predominates, forming dense forests with little underbrush.

38. *Abies balsamea* (L.) Mill. Balsam Fir. Widely distributed, occurring, but never predominating, in the climax forest, II. 2, IV. 3, VI. It also occurs with the Spruce and Tamarack in the coniferous society in the valley of Carp river, IV. 2; about the beaver meadow on Little Carp river, VII. 2, and in the tamarack, IV. 4, and arbor vitae swamps, II. 2; being more abundant in these coniferous societies.

39. *Thuja occidentalis* L. White Cedar. Arbor Vitae. This tree occurs in the rock crevices on the Upper Beach of Lake Superior, I; occasionally on the cliff face, III, and about the margins of Carp, V, and Little Carp Lakes, VII. It is more characteristic, however, of the swampy areas at the foot of the north slope, II. 1, and in the river valleys, IV. 2, where it forms a dense and almost impenetrable growth.

40. *Juniperus nana* Willd. Low Juniper. Characteristic of the "bald" areas of the mountain top, III. 1, 2, 4, 5, 6, spreading out from the crevices as circular mats over the rocks.

Taxaceae Lindl. Yew Family.

41. *Taxus canadensis* Marsh. Ground Hemlock. Forms, with young Sugar Maples, the principal undergrowth of the hardwood forest, II. 2, IV. 3, VI.

Naiadaceae Lindl.

42. *Potamogeton natans* L. Common Floating Pond-weed. Occasional in Carp river, IV. 1, and forms a well defined zone in shallow water about the margin of Carp Lake, V. 1.

Alismaceae DC. Water-Plantain Family.

43. *Sagittaria* sp. Arrow-head. Near the margin of the water on the mud flats, IV. 1, and delta, V. 2, of Carp river.

Vallisneriaceae Dumort. Tape-grass Family.

44. *Vallisneria spiralis* L. Tape-grass. Forms extensive mats in the shallow water at the west end of Carp Lake, V. 1, and occasionally about the margin of Little Carp Lake, VII. 1.

Gramineae Juss. Grass Family.

45. *Panicum xanthophysum* A. Gray. Slender Panicum. In the rock crevices on the mountain top, III. 2, 5, 6.

46. *Cinna latifolia* (Trev.) Griseb. Occasional in the hardwood forest, II. 2, IV. 3, and along the banks of Carp creek, VI.

47. *Agrostis hyemalis* (Walt.) B. S. P. Rough Hair-grass. On the delta of Carp river, V. 2, and in the beaver meadow on Little Carp river, VII. 2.

48. *Calamagrostis canadensis* (Michx.) Beauv. Blue Joint-grass. In the cassandra zone, on the dryer parts of the mud flats, IV. 2, and delta V. 2, of Carp river, and in the beaver meadow on Little Carp river, VII. 2.

49. *Deschampsia flexuosa* (L.) Trin. Wavy Hair-grass. In the cassandra zone, IV. 2, and on the delta, V. 2, of Carp river; also in the beaver meadow, VII. 2, on Little Carp river.

50. *Panicularia canadensis* (Michx.) Kuntze. Rattlesnake-grass. Cassandra zone, IV. 2, and delta, V. 2, of Carp river; also in the beaver meadow, VII. 2, on Little Carp river.

Cyperaceae J. St. Hil. Sedge Family.

51. *Dulichium arundinaceum* (L.) Britton. Dulichium. Near the submerged margins of the mud flats and deltas of Carp and Little Carp rivers.

52. *Scirpus cyperinus* (L.) Kunth. Wool-grass. In the cassandra zone and on the mud flats, IV. 2, and delta, V. 2, of Carp river; and on the mud flats and beaver meadow along Little Carp river, VII. 2. Also along the bank of Carp creek, VI.

53. *Carex monile* Tuckerm. A prominent sedge in the beaver meadow on Little Carp river, VII. 2.

54. *Carex riparia* Curtis. In the cassandra zone and on the mud flats,

IV. 2, and delta, V. 2, of Carp river. Also about the shore of Carp Lake, V. 1.

55. *Carex filiformis* L. In the cassandra zone, on the mud flats, IV. 2, and delta, V. 2, of Carp river; and in the beaver meadow and on the mud flats on Little Carp river, VII. 2.

56. *Carex crinita* Lam. On the banks of Carp creek, VI.

57. *Carex viridula* Michx. In the cassandra zone and on the mud flats IV. 2, and delta, V. 2, of Carp river; and in the beaver meadow and on the mud flats of Little Carp river, VII. 2.

58. *Carex pubescens* Muhl. Along the banks of Carp Creek, VI.

Araceae Neck. Arum Family.

59. *Spathyema foetida* (L.) Raf. Skunk Cabbage. Occasional in the alder thickets along Carp river, IV. 2, and along the banks of Carp Creek, VI.

Eriocaulaceae Lindl. Pipewort Family.

60. *Eriocaulon septangulare* With. Seven-angled Pipewort. Common on the shores of Carp Lake, V. 1.

Juncaceae Vent. Rush Family.

61. *Juncus effusus* L. Bog Rush. Common on the mud flats, IV. 2, and delta V. 2, of Carp river. Also abundant in the beaver meadow and on the mud flats on Little Carp river, VII. 2.

62. *Juncus tenuis* Willd. In the beaver meadow and on the mud flats of Little Carp river, VII. 2.

63. *Juncus canadensis* J. Gay. Canada Rush. In shallow water about the margin of Carp Lake, V, and Little Carp Lake, VII. 1.

Convallariaceae Link. Lily-of-the-valley Family.

64. *Clintonia borealis* (Ait.) Raf. Yellow Clintonia. A very common form in the hardwood forests, II. 2, IV. 3, VI.

65. *Vagnera racemosa* (L.) Morong. Wild Spikenard. In the hardwood forest, II. 2, IV. 3, VI.

Iridaceae Lindl. Iris Family.

66. *Iris versicolor* L. Larger Blue Flag. On the mud flats and in the cassandra and alder thickets along Carp river, IV. 2; also in the beaver meadow on Little Carp river, VII. 2, and in the arbor vitae swamps, II. 1.

Orchidaceae Orchid Family.

67. *Gyrostachys cernua* (L.) Kuntze. Nodding Ladies Tresses. On the shores of Carp Lake, V. 1; on the delta, V. 2, and occasionally in the cassandra zones on Carp river, IV. 2. Also in the beaver meadow on Little Carp river VII. 2.

68. *Peramium pubescens* (Willd.) Mac M. Downy Rattlesnake Plantain. Generally distributed through the hardwood forest, II. 2, IV. 3, VI; also occurring in the tamarack swamp, IV. 4.

Salicaceae Lindl. Willow Family.

69. *Populus grandidentata* Michx. Large-toothed Aspen. In the hardwood forest bordering the beach of Lake Superior, I, the clearing, II. 2, and

mountain top, II. 5, III. 1 and 4. Also on the lower part of the talus slope, III, and in burnings.

70. *Populus tremuloides* Michx. American or Quaking Aspen. The principal form of the forest bordering open localities; adjoins the beach of Lake Superior, I, the clearing, II. 4, and the mountain top, II. 5, III. 1 and 4. Also conspicuous on the lower part of the talus slopes, III, and in burnings, VI.

71. *Salix* spp. Willow. A number of willows occur in the alder and cassandra zones along Carp river, IV. 2; in the beaver meadow on Little Carp river, VII. 2, and in the aspen zone on the mountain top, II. 5.

Myricaceae Dumort. Bayberry Family.

72. *Myrica cerifera* L. Wax-myrtle. In the cassandra zone along Carp river, IV. 2.

Betulaceae Agardh. Birch Family.

73. *Ostrya virginiana* (Mill.) Willd. Iron-wood. Occasional in the hardwood forest, II. 2, IV. 3, VI.

74. *Corylus rostrata* Ait. Beaked Hazel-nut. In the woods on the lower part of the talus slopes, IV. 3; pushing out beyond the forest with the birches and often extending well up the slope, III.

75. *Betula papyrifera* Marsh. Paper or Canoe Birch. Throughout the climax forest, II. 2, IV. 3, VI. Also a prominent form on the lower part of the talus slopes, IV. 3.

76. *Betula lutea* Michx. Yellow Birch. Occasional through the forest II. 2, IV. 3, VI. More conspicuous in the hemlock forests.

77. *Betula glandulosa* Michx. Glandular or Scrub Birch. Common about the margin of the beaver meadow, VII. 2; with *Alnus incana* and several willows encroaching on the meadow.

78. *Alnus alnobetula* (Ehrh.) K. Koch. Green or Mountain Alder. A few shrubs occur in the aspen zone bordering the mountain top, III. 5.

79. *Alnus incana* (L.) Willd. Speckled or Hoary Alder. Nearly always present along streams, forming dense thickets. Along Carp river, IV. 2, between the cassandra and coniferous zones on wide parts of the flood-plain, and between the river and the forest where the flood-plain is narrow. Where a cassandra zone is present, there is nearly always a narrow strip of alders along the natural levees, separating the cassandra zone from the river. Also common about Carp Lake, V. 1; Little Carp Lake, VII. 1, and the beaver meadow, VII. 2.

Fagaceae Drude. Beech Family.

80. *Quercus rubra* L. Red Oak. A prominent form in the aspen zone, II. 5, III. 1, 4, bordering the mountain top. Also on the fine material at the top of the talus slope and on the ledges on the cliff face, III.

81. *Quercus macrocarpa* Michx. Burr Oak. In the aspen zone, II. 5, bordering the mountain top.

Nymphaeaceae DC. Water-lily Family.

82. *Nymphaea advena* Soland. Large Yellow Pond Lily. Abundant in Carp river, IV. 1, and near the margin of Carp Lake, V. 3.

83. *Castalia odorata* (Dryand.) Woodv. and Wood. Sweet-scented White

Water Lily. Several specimens were found in Carp river, IV. 1, which was the only locality in which it was observed.

Ranunculaceae Juss. Crowfoot Family.

84. *Caltha palustris* L. Marsh-marigold. In the alder thickets along Carp river, IV. 2; also common on the banks of Carp creek, VI.

85. *Coptis trifolia* (L.) Salisb. Gold-thread. Common in the hardwood forest, II. 2, IV. 3, VI, and in the tamarack swamp, IV. 4.

Sarraceniaceae LaPyl. Pitcher-Plant Family.

86. *Sarracenia purpurea* L. Pitcher-plant. Found commonly in the peat bog, IV. 4, and on a Sphagnum growth in the beaver meadow, VII. 2. Not observed elsewhere.

Rosaceae B. Juss. Rose Family.

87. *Opulaster opulifolius* (L.) Kuntze. Eastern Ninebark. Upper Beach of Lake Superior, I; in the aspen zone bordering the mountain top, II. 5, and on the rocky bluff at the east end of Little Carp Lake, VII.

88. *Spiraea salicifolia* L. American Meadow-sweet. In the cassandra zone on Carp river, IV. 2, and about the margin of the beaver meadow on Little Carp river, VII. 2.

89. *Rubus parviflorus* Nutt. White-flowering Raspberry. In the aspen zone about the clearing, II. 4, and mountain top, II. 5; in the open woods near the top of the slope, II. 2, and in burnings, VI. Very common in exposed situations. Locally known as the Thimbleberry.

90. *Rubus strigosus* Michx. Wild Red Raspberry. On the Upper Beach of Lake Superior, I; in the aspen zone about the clearing, II. 4, and on the mountain top, II. 5. Also at the foot of the talus slopes, III.

91. *Rubus nigrobaccus* Bailey. High Bush Blackberry. Frequent in the cassandra zone, IV. 2, especially near the margin of the alder thickets.

92. *Rubus hispidus* L. Running Swamp Blackberry. Common in the cassandra zone on Carp river, IV. 2, and in the beaver meadow, VII. 2.

93. *Comarum palustre* L. Marsh Cinquefoil. In the cassandra zone, IV. 2, and on the delta of Carp river, V. 2, and in the beaver meadow on Little Carp river, VII. 2.

94. *Dasiphora fruticosa* (L.) Rydb. In the cassandra zone, IV. 2, and on the delta, V. 2.

94a. *Potentilla argentea* L. Silvery Cinquefoil. In rock crevices on the Middle and Upper Beaches of Lake Superior, I.

95. *Sibbaldiopsis tridentata* (Soland.) Rydb. Common in the rock crevices on the mountain top and on the cliff face, and among the rocks on talus slopes, III.

Pomaceae L. Apple Family.

96. *Sorbus americana* Marsh. American Mountain Ash. Common on the Upper Beach of Lake Superior, I, and at the foot of the talus slopes, III. Also occurs on the rocky bluff at the east end of Little Carp Lake.

97. *Aronia nigra* (Willd.) Britton. Black Chokeberry. Occasional on the lower part of the talus slopes, III.

98. *Amelanchier canadensis* (L.) Medic. Juneberry. Common on the Upper Beach of Lake Superior, I; in the aspen zone bordering the mountain

top, II. 5, III. 1, 4; on the ledges of the cliff; at the bottom and top of the talus slopes, III, and in the tamarack swamp, IV. 4.

99. *Crataegus* sp. Thorn-apple. Occasional on the cliff face and on the fine material at the top of the talus slopes, III.

Drupaceae DC. Plum Family.

100. *Prunus pumila* L. Dwarf Cherry. On the Upper Beach of Lake Superior, I, and in burnings, VI.

101. *Prunus pennsylvanica* L. f. Wild Red Cherry. Common on the lower parts of the talus slopes and on the finer material at the top, III, Also occurs on the ledges of the cliff, III, and in burnings, VI.

Papilionaceae L. Pea Family.

102. *Lathyrus maritimus* (L.) Bigel. Beach Pea. Upper and Middle Beaches of Lake Superior, I.

103. *Lathyrus ochroleucus* Hook. Cream-colored Vetchling. Upper Beach of Lake Superior, I.

Anacardiaceae Lindl. Sumac Family.

104. *Rhus glabra* L. Scarlet Sumac. In the aspen zone about the clearing, II. 4, and mountain top, II. 5. Also scattered over the talus slopes, III.

105. *Rhus microcarpa* (Michx.) Steud. Northern Poison Oak. On the talus slopes and cliff face, III.

Aceraceae St. Hil. Maple Family.

106. *Acer saccharum* Marsh. Sugar or Rock Maple. The principal forest tree of the region, forming, with a small portion of Balsam Fir, Basswood and Hemlock, the climax forest of the region, II. 2, IV. 3, VI.

107. *Acer spicatum* Lam. Mountain Maple. Occurs as a scattered undergrowth in the hardwood forest, II. 2, IV. 3, VI; becoming more abundant in the open woods toward the talus slopes, III, mountain top, II. 5, and beach of Lake Superior, I.

Rhamnaceae Dumort. Buckthorn Family.

108. *Ceanothus americanus* L. New Jersey Tea. A prominent plant in the heath society on the mountain top, III. 2, 5, 6, and at the foot of the talus slope. Also occurs on the finer material at the top of the talus slope and on ledges of the cliff.

Vitaceae Lindl. Grape Family.

109. *Parthenocissus quinquefolia* (L.) Planch. Virginia Creeper. Occasional on the talus slopes and cliff face, III.

Tiliaceae Juss. Linden Family.

110. *Tilia americana* L. Basswood. Occasional in the hardwood forest, II. 2, IV. 3, VI.

Hypericaceae Lindl. St. Johns-wort Family.

111. *Hypericum ellipticum* Hook. Pale St. Johns-wort. On the delta, V. 2, and in the cassandra zone, IV. 2, on Carp river; and in the beaver meadow on Little Carp river, VII. 2.

Violaceae DC. Violet Family.

112. *Viola* spp. A number of species of violets occur in the forest, II, 2, IV. 3, VI., and in the alder thickets, IV. 2.

Eleagnaceae Lindl. Oleaster Family.

113. *Lepargyrea canadensis* (L.) Greene. Canadian Buffalo-berry. Upper Beach of Lake Superior, I.

Onagraceae Dumort. Evening-primrose Family.

114. *Chamaenerion angustifolium* (L.) Scop. Fire-weed. In the clearing, II. 3, at the foot of the talus slopes, III, and almost universally in burnings, VI.

115. *Onagra biennis* (L.) Scop. Common Evening-primrose. In the rock crevices on the mountain top, III. 2, 5, 6. Also on ledges on the cliff face.

Haloragidaceae Kl. and Garke. Water-milfoil Family.

116. *Myriophyllum* sp. Water-milfoil. The common aquatic plant in Carp river, IV. 1, Carp Lake, V. 3, and Little Carp Lake, VII. 1.

Araliaceae Vent. Ginseng Family.

117. *Aralia nudicaulis* L. Wild Sarsaparilla. Common throughout the forest, II. 2, IV. 3, VI.

Umbelliferae B. Juss. Carrot Family.

118. *Heracleum lanatum* Michx. Cow-parsnip. Common in the clearing, II. 3.

Cornaceae Link. Dogwood Family.

119. *Cornus canadensis* L. Low or Dwarf Cornel. Generally distributed, occurring in the hardwood forest, II. 2, VI; in the aspen zone, II. 5, and extending, to some extent, on the heath mat beyond the aspen zone on the mountain top, III. 2, 3, 5, 6. Also common in the tamarack swamp, IV. 4.

120. *Cornus circinata* L'Her. Round-leaved Dogwood. Common in the aspen zone, II. 5, about the mountain top; and at the bottom and top of the talus slopes, III.

121. *Cornus stolonifera* Michx. Red-osier Dogwood. Quite common in the alder zone along Carp river, IV. 2, Carp Lake V. 1, Little Carp Lake, VII. 1, and in the beaver meadow on Little Carp river, VII. 2.

Pyrolaceae Agardth. Wintergreen Family.

122. *Chimaphila umbellata* (L.) Nutt. Pipsissewa. Prince's Pine. Occasionally in the hardwood forest, II. 2, and in the pine zone, III. 3.

Monotropaceae Lindl. Indian-pipe Family.

123. *Monotropa uniflora* L. Indian-pipe. In damp shady places in the climax forest, II. 2, IV. 3, VI.

Ericaceae DC. Heath Family.

124. *Ledum groenlandicum* Oeder. Labrador Tea. Common in the tamarack swamp, IV. 4.

125. *Chamaedaphne calyculata* (L.) Moench. Dwarf Cassandra. Forming dense thickets in the wider parts of the flood-plain of Carp river, IV. 2. Also present, but not forming extensive thickets, about the beaver meadow on Little Carp river, VII. 2.

126. *Epigaea repens* L. Trailing Arbutus. Occasionally seen in the pine zone on the mountain top, III. 3.

127. *Gaultheria procumbens* L. Creeping Wintergreen. A common plant in the undergrowth of the aspen zone, II. 5, III. 1 and 4, and in the heath mats on the bald areas, III. 2, 5, 6.

128. *Arctostaphylos uva-ursi* (L.) Spreng. Red Bearberry. The principal heath plant in the aspen zone, II. 5, III. 1, 4, and in the mats on the mountain top, III. 2, 5, 6. Also occurs on ledges of the cliff, at the bottom and top of the talus slopes, III, and on the Upper Beach of Lake Superior, I.

Vacciniaceae Lindl. Huckleberry Family.

129. *Vaccinium uliginosum* L. Great Bilberry. Upper Beach of Lake Superior, I, and in the aspen zone on the mountain top, II. 5.

130. *Vaccinium canadense* Richards. Canada Blueberry. In a moist ravine through the hardwood forest in the valley of Carp river, IV. 3, and in the tamarack swamp, IV. 4.

131. *Vaccinium pennsylvanicum* Lam. Dwarf or Low-bush Blueberry. A prominent form in the undergrowth of the aspen zone surrounding the mountain top, II. 5, and in the heath mat on the bald areas, III. 2, 5, 6. Also on ledges on the cliff face, at the top and bottom of the talus slopes, III, and on the Upper Beach of Lake Superior, I.

132. *Vaccinium nigrum* (Wood) Britton. Low Black Blueberry. Associated with *V. pennsylvanicum* in the aspen zone on the mountain top, II. 5, III. 1, 4; on the bare top, III. 2, 5, 6; on ledges on the cliff face, and on the talus slopes, III.

132. *Chiogenes hispidula* (L.) T. and G. Creeping Snowberry. Common in the tamarack swamp, IV. 4.

Oleaceae Lindl. Olive Family.

134. *Fraxinus americana* L. White Ash. Occasional in the tamarack swamp, IV. 4; with the conifers and alders in broad portions of the flood plain of Carp river, IV. 2, and about the beaver meadow, VII. 2.

135. *Fraxinus nigra* Marsh. Black Ash. Associated with *F. americana*.

Asclepiadaceae Lindl. Milkweed Family.

136. *Asclepias incarnata* L. Swamp Milkweed. Occasional in the cassandra zone, IV. 2, and on the delta, V. 2, of Carp river. Also in the beaver meadow on Little Carp river, VII. 2.

Labiatae B. Juss. Mint Family.

137. *Scutellaria* sp. Skulleap. An unidentified species of this genus occurs commonly in the alder thickets along Carp river, IV. 2, and along Carp creek, VI.

Scrophulariaceae Lindl. Figwort Family.

138. *Melampyrum lineare* Lam. Narrow-leaved Cow-wheat. In the aspen zone bordering the mountain top, II. 5, III. 1, 4.

Lentibulariaceae Lindl. Bladderwort Family.

139. *Utricularia cornuta* Michx. Horned Bladderwort. On the beach of Carp Lake, V. 1.

Rubiaceae B. Juss. Madder Family.

140. *Galium triflorum* Michx. Sweet-scented or Fragrant Bedstraw. Common in the more open woods near the top of the first ridge, II. 2.

Caprifoliaceae Vent. Honeysuckle Family.

141. *Viburnum opulus* L. High Bush-cranberry. Along the banks of Carp river, IV. 2, and about the shores of Little Carp Lake, VII. 1.

142. *Viburnum pauciflorum* Pylaie. Few-flowered Cranberry-tree. On Carp river in the cassandra zone, IV. 2, and tamarack swamp, IV. 4; also about the shores of Little Carp Lake, VII. 1.

143. *Linnaea americana* Forbes. American Twin-flower. Of general distribution throughout the hardwood forest, II. 2, IV. 3, VI; becoming more abundant toward the top of the slopes and in the aspen zone bordering the mountain top, II. 5.

144. *Symphoricarpos pauciflorus* (Robbins) Britton. Low Snowberry. In the aspen zone bordering the mountain top, II. 5, III. 1, 4.

145. *Lonicera oblongifolia* (Goldie) Hook. Swamp Fly-Honeysuckle. In the shrub zone of the tamarack swamp, IV. 4.

146. *Lonicera ciliata* Muhl. American Fly Honeysuckle. In the hardwood forest, II. 2, and VI.

147. *Diervilla diervilla* (L.) Mac M. Bush Honeysuckle. Common in the aspen zone bordering the clearing, II. 4, and mountain top, II. 5, III. 1, 4. Also occurs on the lower part of the talus slopes, III.

Campanulaceae Juss. Bell-flower Family.

148. *Campanula rotundifolia* L. Harebell. In the rock crevices of the Middle and Upper Beaches of Lake Superior, I, and mountain top, III. 2, 5, 6. Occasional on ledges of the cliff and on the talus slopes, III.

149. *Campanula aparinoides* Pursh. Marsh Bellflower. In the cassandra zone, IV. 2, and on the delta, V. 2, of Carp river; and in the beaver meadow on Little Carp river, VII. 2.

150. *Lobelia spicata* Lam. Pale Spiked Lobelia. In the rock crevices of the Middle Beach, and on the thin soil on the Upper Beach of Lake Superior, I.

Compositae Adans. Thistle Family.

151. *Eupatorium purpureum* L. Joe-pye-weed. In the cassandra zone IV. 2, and on the delta, V. 2, of Carp river; and in the beaver meadow on Little Carp river, VII. 2.

152. *Solidago bicolor* L. White Goldenrod. In the rock crevices and on the thin soil of the mountain top, III. 2, 5, 6.

153. *Solidago erecta* Pursh. Slender Goldenrod. In the crevices on the bare mountain top, III. 2, 5, 6. The specimens collected, according to Dr. C. A. Davis, are not typical but are nearest to this form.

154. *Solidago uliginosa* Nutt. Bog Goldenrod. Common in the cassandra zone, IV. 2, and on the delta, V. 2, of Carp river, and in the beaver meadow of Little Carp river, VII. 2.

155. *Solidago neglecta* T. and G. Swamp Goldenrod. Middle and Upper Beaches of Lake Superior, I, and in the beaver meadow on Little Carp river, VII. 2.

156. *Solidago juncea* Ait. Early or Sharp-toothed Goldenrod. Common in the aspen zone, II. 5, and on the bare mountain top, III. 1, 2, 4, 5, 6.

157. *Euthamia graminifolia* (L.) Nutt. Associated with *S. juncea*, II. 5, III. 1, 2, 4, 5, 6.

158. *Aster divaricatus* L. White Wood Aster. Apparently of general distribution in the hardwood forest, II. 2, IV. 3, VI.

159. *Aster macrophyllus* L. Large-leaved Aster. Occasional in damp shady woods, II. 2, IV. 3, VI.

160. *Artemisia caudata* Michx. Tall or Wild Wormwood. Occasional in the aspen zone surrounding the mountain top, II. 5, III. 1, 4.

2. ISLE ROYALE.

Polypodiaceae R. Br. Fern Family.

1. *Polypodium vulgare* L. In the rock crevices on the end of the Minong Trap Range, IX, and in the rock crevices and on the shingle beach at Siskowit Bay, VIII.

2. *Adiantum pedatum* L. Maiden-hair Fern. Occasional in the Balsam Fir and Spruce woods, VI.

3. *Pteridium aquilinum* (L.) Kuhn. Brake. In the coniferous forest on the north side of the Greenstone Range near the shore of Lake Desor. Also about the margin of the clearing, I.

4. *Phegopteris phegopteris* (L.) Underw. On the shores of Siskowit Bay, VIII.

Equisetaceae Michx. Horsetail Family.

5. *Equisetum arvense* L. On the shore of Siskowit Bay, VIII, and on the shores of the islands in Lake Desor, VII.

Lycopodiaceae Michx. Club-moss Family.

6. *Lycopodium obscurum* L. Ground Pine. In the tamarack and spruce woods in the valley of Washington river, II.

7. *Lycopodium annotinum* L. On the beach at Grace Harbor; with the heaths on the Minong Trap Range, IX, and in the coniferous forest, VI.

8. *Lycopodium clavatum* L. Running Pine. In the coniferous and deciduous forests, VI, and III; on the beach at Grace Harbor, and on the Minong Trap promontory, IX.

9. *Lycopodium complanatum* L. In the alder thickets along Washington river, II. and with the heaths on the Minong Trap promontory, IX.

Isoetaceae Underw. Quillwort Family.

10. *Isoetes* sp. Among the rocks in shallow water about the islands in Lake Desor, VII.

Pinaceae Lindl. Pine Family.

11. *Pinus strobus* L. White Pine. Large isolated trees occur scattered through the forest, III, and VI. Young trees occur on the jutting promontories on the southwestern end of the island, IX. A few trees also occur with *P. resinosa* on a small strip of rock beach on the north shore of Lake Desor, VII.

12. *Pinus resinosa* Ait. Norway or Red Pine. Large trees occur occasionally in the coniferous forest on exposed slopes, VI. A few trees were also found on the rocky promontory, IX, and with *P. strobus* on a small strip of exposed beach on the north shore of Lake Desor, VII.

13. *Larix laricina* (Du Roi) Koch. Tamarack. Occurs along the flood-plains of the streams, where the valleys are broad, II, IV. It becomes more abundant in bogs, forming a nearly pure stand, V. Also occurs occasionally in the old beach pools on the Minong Trap promontory, IX.

14. *Picea canadensis* (Mill.) B. S. P. White Spruce. Generally distributed. It occurs with the Tamarack and Black Spruce on the flood-plains, II, IV, and forms an important part of the coniferous forest of the slopes, VI, but becomes less abundant toward the top of the higher ridges, III. With the Balsam Fir and Paper Birch, it succeeds the heaths and Arbor Vitae on the rocky promontories, IX.

15. *Picea mariana* (Mill.) B. S. P. Black Spruce. This tree is associated with the Tamarack and White Spruce on the flood-plains of the streams, II, IV. It also occurs occasionally in the old pools on the Minong Trap promontory, IX.

16. *Abies balsamea* (L.) Mill. Balsam Fir. This tree is generally distributed, occurring in the river valleys, II, IV, and on the ridges, III, VI. It apparently forms, with the White and Yellow Birch and White Spruce, the principle forest of the island.

17. *Thuja occidentalis* L. White Cedar. Arbor Vitae. This tree is most abundant in the valleys along streams, IV, where it occasionally forms dense growths. It is also found, however, on the shores of Lake Desor, VII, and about Washington Harbor, X; while on the Minong Trap promontory, IX, it is the first tree to gain a foothold, and may be seen growing in the crevices, nearly prostrate on the rock.

18. *Juniperus nana* Willd. Low Juniper. Common on the rock surfaces of the Minong Trap promontory, IX.

Taxaceae Lindl. Yew Family.

19. *Taxus canadensis* Marsh. Ground Hemlock. This is one of the most characteristic forms of the Isle Royale forest. It forms a dense and almost impenetrable undergrowth throughout the coniferous woods, VI, but it is not as abundant in the flood-plain societies, II, IV. In the bogs it may be nearly or entirely wanting, and in the deciduous forest along the top of the Greenstone Range, III, it is often replaced over small areas by *Corylus rostrata*.

Sparganiaceae Agardh. Bur-reed Family.

20. *Sparganium eurycarpum* Engelm. In the margin of Washington river near its mouth, II, and about the shores of Lake Desor, VII.

Gramineae Juss. Grass Family.

21. *Phragmites phragmites* (L.) Karst. Reed. Along the margin of Washington river near its mouth, II, and about the shores of Lake Desor, VII.

Cyperaceae J. St. Hil. Sedge Family.

22. *Carex intumescens* Rudge. Along Washington river, II.
 23. *Carex retrorsa* Schwein. Along Washington river, II.
 24. *Carex trisperma* Dewey. Along Washington river, II.
 25. *Carex tribuloides* Wahl. Along Washington river, II.

Araceae Neck. Arum Family.

26. *Spathyema foetida* (L.) Raf. Skunk Cabbage. In alder thickets, along Washington river, II, and Washington creek, IV.

Juncaceae Vent. Rush Family.

27. *Juncus effusus* L. Soft or Bog Rush. Along the shore of Washington river, II.

Convallariaceae Link. Lily-of-the-Valley Family.

28. *Clintonia borealis* (Ait.) Raf. In the forests on the flood-plain of Washington river, II, and on the adjacent ridges, III, VI.

29. *Vagnera racemosa* (L.) Morong. Wild Spikenard. In the alder thicket near the mouth of Washington creek, IV.

30. *Vagnera trifolia* (L.) Morong. Three-leaved Solomon's Seal. Found commonly in the alder thickets along Washington river, II, and Washington creek, IV.

31. *Streptopus amplexifolius* (L.) DC. In the alder thicket along Washington creek, IV.

32. *Salomonía biflora* (Walt.) Britton. Hairy Solomon's Seal. In moist places in the coniferous forest, VI.

Iridaceae Lindl. Iris Family.

33. *Iris versicolor* L. Large Blue Flag. In low places about the shores of Lake Desor and on the smaller islands, VII.

Orchidaceae Lindl. Orchid Family.

34. *Listera convallarioides* (Sw.) Torr. On the shores of Siskowit Bay, VIII, and Grace Harbor.

35. *Peramium pubescens* (Willd.) MacM. Downy Rattlesnake Plantain. Common in the coniferous forest, VI.

Salicaceae Lindl. Willow Family.

36. *Populus grandidentata* Michx. Large-toothed Aspen. In burnings and on the margin of clearings. Found in the large clearings at Siskowit

Bay, VIII, and Washington Harbor, I; and on the cliffs along the northwest shore of the island.

37. *Populus tremuloides* Michx. American Aspen. This tree occurs in the same conditions as *P. grandidentata* but is more abundant. It was abundant in the burnings and clearings at Siskowit Bay, VIII, and Washington Harbor, I. It also occurs on the rocky promontories at the southwest end of the island, IX, on the cliffs along the northwest shore of the Isle, and on the smaller islands in Lake Desor, VII. It prefers dry open habitats and is one of the first trees to encroach on the clearings.

38. *Salix* spp. Willow. Several undetermined willows occur in the alder zone along the streams, II, IV, and about Lake Desor, VII.

Betulaceae Agardh. Birch Family.

39. *Corylus rostrata* Ait. Beaked Hazel-nut. As underbrush through the forest, III, VI, with the Ground Hemlock. Often forming in small areas a nearly pure stand.

40. *Betula papyrifera* Marsh. Paper or Canoe Birch. Of general distribution, being a prominent form in the coniferous and deciduous forests, although it predominates in neither. It is the chief deciduous tree on this part of the island, owing to its general distribution.

41. *Betula lutea* Michx. f. Yellow Birch. This birch is of general distribution in the forests of the slopes, VI, and river valleys, II, but is apparently more abundant in the former.

42. *Alnus incana* (L.) Willd. Speckled or Hoary Alder. Forms extensive thickets along the streams, II, IV, about the shores of the Isle, and on low ground around Lake Desor, VII.

Santalaceae R. Br. Sandalwood Family.

43. *Comandra livida* Richards. Recorded by Mr. Macduff as occurring in an alder thicket near the mouth of Grace creek.

Nymphaeaceae DC. Water Lily Family.

44. *Castalia odorata* (Dryand) Woodv. and Wood. Sweet-scented White Water Lily. In a small shallow bay at the west end of Lake Desor, VII. The only place observed.

Ranunculaceae Juss. Crowfoot Family.

45. *Caltha palustris* L. Marsh-marigold. This species seemed to be characteristic of the alder thickets, II, IV.

46. *Coptis trifolia* (L.) Salisb. Gold-thread. Of general distribution in the river valleys, II, IV, and V, and on the slopes, III and VI.

Saxifragaceae Dumort. Saxifrage Family.

47. *Mitella nuda* L. Occasional in the Tamarack and Spruce forests along Washington river, II, and in the Balsam and Spruce forests of the slopes, VI.

Rosaceae B. Juss. Rose Family.

48. *Opulaster opulifolius* (L.) Kuntze. Eastern Ninebark. About the shores of Siskowit Bay, VIII; on the Minong Trap promontory, IX, and about the shores of the islands in Lake Desor, VII.

49. *Spiraea salicifolia* L. Willow-leaved or American Meadow-sweet. This shrub was found along Washington river, II, between the alder and sedge zones, where the latter was well developed.

50. *Rubus parviflorus* Nutt. White-flowering Raspberry. In sunny spots in the woods, III, VI, also along the shore of Washington Harbor, X.

51. *Rubus arcticus* L. Arctic Raspberry. In the bogs, IV, and V. Apparently not common.

52. *Rubus strigosus* Michx. Wild Red Raspberry. In burnings and clearings, Siskowit Bay, VIII, and at Washington Harbor, I.

53. *Potentilla argentea* L. Silvery or Hoary Cinquefoil. On the shingle beach at Siskowit Bay, VIII.

54. *Sibbaldiopsis tridentata* (Soland.) Rydb. Three-toothed Cinquefoil. On the shingle beach and in the rock crevices at Siskowit Bay, VIII, and in the rock crevices on the Minong Trap promontory, IX.

55. *Dasiphora fruticosa* (L.) Rydb. Shrubby Cinquefoil. In the rock crevices on the Minong Trap promontory, IX.

Pomaceae L. Apple Family.

56. *Sorbus americana* Marsh. American Mountain Ash. In rocky exposed situations, especially about the shores of the island and on the islands in Lake Desor, VII.

57. *Amelanchier canadensis* (L.) Medic. June-berry. On the shore at Siskowit Bay, VIII, and Grace Harbor; also in burnings and clearings, and on the small islands in Lake Desor, VII.

Drupaceae DC. Plum Family.

58. *Prunus pumila* L. Sand Cherry. In the clearing at Siskowit Bay, VIII, and on the rocky bluffs along the northwest shore of the island.

59. *Prunus pennsylvanica* L. f. Wild Red Cherry. On the islands in Lake Desor, VII.

Papilionaceae L. Pea Family.

60. *Lathyrus maritimus* (L.) Bigel. Beach Pea. On shingle beaches in the bays on the southwest end of the island (Macduff).

61. *Lathyrus ochroleucus* Hook. Cream-colored Vetchling. As the last.

62. *Empetrum nigrum* L. Black Cranberry. With the heaths on thin soil on the Minong Trap promontory, IX.

Aceraceae St. Hil. Maple Family.

63. *Acer saccharum* Marsh. Sugar or Rock Maple. Only found on the top of the Greenstone Range, III, where it predominates in a narrow strip along the crest of the ridge. This is the only hardwood forest on the south end of the island, and it is reported by Mr. Hollinger to extend the length of the island.

64. *Acer spicatum* Lam. Mountain Maple. This shrub is generally distributed as undergrowth in the forest, III, VI, with *Taxus canadensis* and *Corylus rostrata*. Although more abundant than the latter, it does not form as large a proportion of the undergrowth as the former.

Rhamnaceae Dumort. Buckthorn Family.

65. *Rhamnus alnifolia* L'Her. In the alder thickets, II, IV.

66. *Ceanothus americanus* L. New Jersey Tea. With the heaths on the Minong Trap promontory, IX.

Violaceae DC. Violet Family.

67. *Viola* spp. Violet. A number of species of violets were observed in the woods and alder thickets, but, as they were not in bloom, they were not identified with certainty.

Haloragidaceae Kl. and Garcke. Water-milfoil Family.

68. *Myriophyllum* sp. An unidentified species was abundant in Washington river near the mouth, II.

Araliaceae Vent. Ginseng Family.

69. *Aralia nudicaulis* L. Wild Sarsaparilla. Generally distributed throughout the forests of the slope, III, VI, and river valleys, II, IV.

Cornaceae Link. Dogwood Family.

70. *Cornus canadensis* L. Dwarf Cornel. Generally distributed through the forests of the slopes, III, VI, and in the forest of the river valleys, II, IV, V. It also occurs with the heaths on the Minong Trap promontory, IX.

71. *Cornus stolonifera* Michx. Red-osier Dogwood. Occasional in the tamarack-spruce forests of the river bottoms, II, IV, V. Also about the shore of Lake Desor, VII.

Pyrolaceae Agardh. Wintergreen Family.

72. *Chimaphila umbellata* (L.) Nutt. Pipsissewa. Prince's Pine. In damp woods, III, and VI.

Monotropaceae Lindl. Indian-pipe Family.

73. *Monotropa uniflora* L. Indian-pipe. Occasional in shady situations in the forest, III, VI, and in the tamarack and spruce woods in the river valleys, II, IV and V.

Ericaceae DC. Heath Family.

74. *Ledum groenlandicum* Oeder. Labrador Tea. In the tamarack-spruce forest, on the flood-plain of Washington river, II, and on the Sphagnum in old pools on the Minong Trap promontory, IX.

75. *Andromeda polifolia* L. Wild Rosemary. In the tamarack and spruce woods on the flood-plain of Washington river, II.

76. *Chamaedaphne calyculata* (L.) Moench. Dwarf Cassandra. On the Sphagnum growth in old rock pools on the Minong Trap promontory, IX.

77. *Arctostaphylos uva-ursi* (L.) Spreng. Red Bearberry. On the thin soil on the outer end of the Minong Trap promontory, IX. With the other heaths, it follows the crevice grasses and sedges.

Vacciniaceae Lindl. Huckleberry Family.

78. *Vaccinium pennsylvanicum* Lam. Dwarf or Low-bush Blueberry. Distribution as the last.

79. *Chiogenes hispidula* (L.) T. and G. Creeping Snow-berry. Common in the low tamarack-spruce woods along Washington river, II, and Washington creek, IV. Also in low spots in the slope forest, VI, and tamarack swamp, V.

Oleaceae Lindl. Olive Family.

80. *Fraxinus nigra* Marsh. Black Ash. Occasional in the tamarack and spruce woods on the flood-plain of Washington river, II, and in the bog, V.

Asclepiadaceae Lindl. Milkweed Family.

81. *Asclepias incarnata* L. Swamp Milkweed. Occasional in the grass and sedge zone along Washington river near its mouth, II.

Caprifoliaceae Vent. Honeysuckle Family.

82. *Viburnum opulus* L. High Bush-cranberry. In the tamarack and spruce woods, II, and about the shores of the islands in Lake Desor, VII.

83. *Viburnum pauciflorum* Pylaie. Few-flowered Cranberry-tree. In a bog near the mouth of Grace creek (Macduff).

84. *Linnaea americana* Forbes. American Twin-flower. Of general distribution throughout the forest, II, III, VI.

85. *Lonicera oblongifolia* (Goldie) Hook. Swamp Fly-honeysuckle. In the slope forest, VI, (Macduff).

86. *Lonicera ciliata* Muhl. American Fly-honeysuckle. Occasional in the slope forests, VI, (Macduff).

87. *Diervilla diervilla* (L.) MacM. Bush Honeysuckle. In the clearings at Siskowit Bay, VIII, and Washington Harbor, I.

Campanulaceae Juss. Bell-flower Family.

88. *Campanula rotundifolia* L. Harebell. In the rock crevices on the Minong Trap promontory, IX, and in the rock crevices and on the shingle beach at Siskowit Bay, VIII.

89. *Lobelia spicata* Lam. Pale Spiked Lobelia. In the rock crevices on the Minong Trap promontory, IX.

Compositae Adans. Thistle Family.

90. *Eupatorium purpureum* L. Joe-Pye-Weed. Among the sedges along Washington river, II. Also on the Sphagnum in the abandoned rock pools, IX.

91. *Euthamia graminifolia* (L.) Nutt. Bushy or Fragrant Goldenrod. On the shores of Siskowit Bay, VIII, and in the rock crevices on the Minong Trap promontory, IX.

ANNOTATED LIST OF THE MOLLUSCS OF THE PORCUPINE MOUNTAINS AND ISLE ROYALE, MICHIGAN.

BRYANT WALKER AND A. G. RUTHVEN.

This list has been prepared from the collections and field notes made by A. G. Ruthven. The species of *Pisidium*, *Sphaerium* and *Vertigo* were identified by Dr. V. Sterki, the Slugs by Dr. H. A. Pilsbry, and the remainder of the collection by Bryant Walker.

1. PORCUPINE MOUNTAINS.

1. *Agriolimax campestris* (Binn.). This species was found among the fallen leaves in the hardwood forest, II. 2, and under a pine log in the aspen zone on the mountain top, III. 1.

2. *Pallijera hemphilli* (W. G. Binn.). As represented by the collections, this slug is quite generally distributed. It was found among the fallen leaves in the deciduous forest, II. 2; beneath a fallen pine log in the pine zone, III. 1, and under the bark of a tamarack log, IV. 4.

3. *Zonitoides arborea* (Say). III. 1. A number of specimens of this species were taken under fallen pine trees among the bearberry and huckleberry bushes in the aspen zone. IV. 4. Several specimens were found beneath the bark of decaying tamarack and cedar logs in the tamarack swamp. VI. A few specimens were taken in the moist humus about the roots of ferns on the bank of Carp creek, and among the moist decaying leaves on higher ground.

4. *Zonitoides milium* (Mse.). III. 2. Individuals of this species were collected in the dry earth about the roots of the New Jersey tea on the mountain top; in the humus about the roots of an arbor vitae in the cedar swamp, II. 1, and in the humus in the hemlock woods, II. 2.

5. *Zonitoides exigua* (Stimp.). II. 2. A number of individuals were found among the fallen leaves in the hemlock and maple woods. Several were also found in decaying cedar and tamarack logs in the tamarack swamp, IV. 4.

6. *Vitrea ferrea* (Mse.). IV. 4. A few individuals of this species were taken in a fallen tamarack log in the peat bog.

7. *Vitrea indentata* (Say). II. 2. Under dead moist leaves in the hardwood forest. III. 1. Under fallen logs and in the soil in the aspen zone on the mountain top. III. 2. In the dry earth in crevices and held by the roots of the heath plants on the bare mountain top, and among the roots of the New Jersey tea in the aspen zone, III. 4. Also found under the bark of fallen tamarack logs in the tamarack swamp, IV. 4.

8. *Vitrea multidentata* (Binn.). III. 1. Several specimens were taken under the bark of a fallen pine in the aspen zone at the top of the first range.

9. *Pyramidula alternata* (Say). II. 3. Specimens of this form were found crawling about on a log in the clearing, early in the morning while the dew was heavy.

10. *Pyramidula striatella catskillensis* Pils. This species was collected

among the damp leaves in the woods toward the bottom of the slope, II. 2, and near the top under fallen pine logs among the heath plants, III. 1. It was also found in the tamarack swamp, IV. 4, in decaying arbor vitae and tamarack logs.

11. *Pyramidula asteriscus* (Mse.). IV. 4. Two were found beneath the bark of fallen tamarack trees in the peat bog. This is the only station at which this species was taken.

12. *Helicodiscus lineatus* (Say). Among the damp fallen leaves in the hardwoods, II. 2; near the bottom of the slope, III. 1; in fallen tamarack logs in the tamarack swamp, IV. 4; in the damp humus about the roots of ferns on the banks of Carp creek, VI. This species seems to prefer a damp habitat, and the dead shells found in the crevices of the cliff face and among the talus blocks were probably blown there.

13. *Acanthinula harpa* (Say). III. 2. A number of specimens were collected in the dry soil held by the grasses and heath plants on the mountain top. This is one of the characteristic molluscs of this exceedingly dry and exposed habitat.

14. *Punctum pygmaeum* (Drap.). II. 1. A few specimens were collected in the damp humus among the roots of an arbor vitae in the swamp. II. 2. Found to occur quite abundantly among damp leaves in the hardwood forest. III. 1. A few individuals were found under fallen logs among the huckleberry bushes in the aspen zone. III. 2. Several taken in the dry earth about the roots of New Jersey tea on the mountain top. IV. 4. A few found beneath the bark of fallen tamarack trees in the peat bog.

15. *Sphyradium edentulum* (Drap.). II. 2. Among the damp leaves in the hardwood forest; also found under fallen pine trees in the aspen zone, III. 1, and in decaying tamarack and arbor vitae logs in the tamarack swamp, IV. 4.

16. *Polygyra albolabris* (Say). III. 1. Several specimens were taken beneath fallen logs in the aspen zone on the mountain top, and among the damp leaves in the hardwood forest, VI.

17. *Polygyra* sp. [young, probably *albolabris* (Say)]. III. 2. In the dry earth about the roots of the bearberry on the mountain top.

18. *Polygyra fraterna* (Say). II. 3. On a log in the clearing after a heavy dew. VI. Among the damp leaves in the forest.

19. *Strobilops virgo* (Pils.). Found in the damp leaves of the hardwood forest near the bottom of the slope, II. 2; under logs in the aspen zone near the top, III. 1; in the dry earth among the roots of the heath plants on the mountain top, III. 2, and among the roots of the blueberry in the aspen zone, III. 4. It was also found in decaying tamarack logs in the tamarack swamp, IV. 4; a few in the humus beneath a hemlock on II. 2, and in the moist loam about the roots of ferns on the banks of Carp creek, VI.

20. *Bifidaria curvidens* (Gld.). This species was taken under logs in the aspen zone on the mountain top, III. 1, and on the bald areas, III. 2, in the dry earth held by the heath plants.

20a. *Vertigo gouldii* Binn. Taken in the Porcupine Mountains, and at Limestone Mountain in the summer of 1903. These specimens have only recently been identified and with the following species constitute the forms listed in the 1903 list as *Vertigo* sp. (Sixth Report Mich. Acad. Sci. 1904, p. 190).

20b. *Vertigo ventricosa elatior* Sterki. See 20a.

21. *Cochlicopa lubrica morseana* (Doh.). This species was only found in damp leaves in the hardwood forest, II. 2, and in the moist humus on the banks of Carp creek, VI.

22. *Euconulus chersinus polygyratus* (Pils.). II. 2. Among the damp leaves in the hardwood forest. III. 1. Under fallen logs in the aspen zone about the mountain top. III. 2. In the dry soil in rock crevices and among grass roots near the brink of the precipice. VI. In the loam on the bank of Carp creek.

23. *Succinea avara* Say. III. 2. A few shells were found in crevices in the rock on the brink of the cliff. These specimens were probably blown here as the animal is said to prefer a damp habitat.

24. *Carychium exile* H. C. Lea. II. 2. Several individuals of this form were taken in a very moist place among fallen leaves in the hardwood forest. Also found in very wet humus about the roots of ferns on the banks of Carp creek, VI.

25. *Limnaea decollata* Migh. Occurs quite frequently in the rock pools of the Middle Beach, and behind projecting outcrops on the Lower Beach of Lake Superior, I, where they were protected from the full force of the waves.

26. *Limnaea desidiosa* Say. I. Occurs quite numerous in the rock pools of the Middle Beach, and has been dredged in Lake Superior at a depth of 8 to 13 fathoms (Baker).

27. *Physa* sp. (too young to identify). IV. 1. Found on the under side of lily pads in Carp river.

28. *Physa sayii?* Tapp. (young specimen). VI. Found in very damp leaves on the bank of Carp creek.

29. *Physa ancillaria* Say. var. I. In the rock pools of the Middle Beach of Lake Superior.

30. *Planorbis campanulatus* Say. Taken on the under side of lily pads and among the leaves of submerged water plants on Carp river, IV. 1, and on the larger stones forming the bottom near the shore of Carp Lake, V. 1.

31. *Planorbis bicarinatus striatus* Baker. V. 1. Found on the stones composing a strip of shingle beach on Carp Lake.

32. *Planorbis exacuus* Say. IV. 1. Taken on the under side of water lily leaves in Carp river.

33. *Planorbis parvus* Say. I. This species was found in several of the pools on the Middle Beach of Lake Superior, both on the bare rock and in the slight algal growth that lines the sides. It was also found among the leaves in the bottom of a pool formed by a spring in the forest, II. 2, and in considerable abundance on the under side of the larger rocks that lie loosely in the bed of Carp creek, VI. Dredged in Lake Superior at a depth of 8-13 fathoms (Baker).

34. *Planorbis deflectus?* Say. (immature). V. 1. Found on the small stones forming the bottom of Carp Lake just off shore. VII. 3. On the submerged sticks of a beaver dam on Little Carp river.

35. *Planorbis hirsutus* Gld. IV. 1. Among the leaves of a submerged aquatic plant in Carp river, about two feet below the surface of the water.

36. *Ancylus parallelus* Hald. IV. 1. On the stems and under side of lily pads in Carp river.

37. *Valvata tricarinata* (Say). V. 3. Among the leaves of submerged aquatic plants in Carp Lake.

38. *Amnicola limosa* (Say). IV. 1. Abundant on the stems and under side of lily pads, and among the leaves of submerged aquatics in Carp river. Also common on the stems and among the leaves of submerged aquatic plants in Carp Lake, V. 3.

39. *Anodonta marginata* Say. V. 1. Occurs quite numerous in Carp Lake, just off shore on a bottom of either silt or pebbles, and in considerable

numbers among the rushes on the delta of Little Carp river, VII. 1. VII. 3. One specimen was also taken on a mud flat in Little Carp river, near the lake.

40. *Sphaerium simile* (Say). V. 1. This species was found in the mud at the outlet of Carp Lake, and on the mud flats of Little Carp river, VII. 3.

41. *Sphaerium rhomboideum* (Say). V. 1. Partially buried in the fine silt covering the bottom of Carp Lake just off shore.

42. *Pisidium* sp. V. 2. Beneath a partly submerged log on the delta of Carp river.

43. *Pisidium* sp. (immature). II. 2. Among the leaves in a spring pool in the hardwood forest.

2. ISLE ROYALE.

1. *Agriolimax campestris* (Binn.). Among fallen alder leaves on a wet flat along Washington river, II, and in the humus of the cedar swamp, IV.

2. *Agriolimax?* (specimen mutilated). VIII. One specimen taken on the under side of a stone in shallow water at Siskowit Bay.

3. *Pallijera hemphilli* (W. G. Binn.). IV. A specimen of this slug was found in swamp humus on Washington creek.

4. *Vitrina limpida* Gld. VI. Several specimens were taken in decaying spruce logs in the coniferous forest. Found also in the damp fallen leaves, in the deciduous forest, III.

5. *Zonitoides arborea* (Say). II. On Washington river among the fallen leaves in an alder thicket on a wet mud flat, and among the leaves and under the bark of fallen spruce and birch trees on dryer ground. III. Found among the leaves and under the rocks in the deciduous forest. IV. A few specimens taken in the humus of a cedar swamp on Washington creek. V. Collected in the moss in the tamarack swamp. VI. Several found beneath the bark of fallen spruce trees in the coniferous forest.

6. *Zonitoides milium* (Mse.). Specimens of this form were collected among the leaves and in fallen birch logs in the deciduous forest, III; in the moss of the tamarack swamp, V, and beneath the bark of fallen spruce trees, VI.

7. *Vitrea binneyana* (Mse.). II. Taken among the fallen leaves in an alder thicket on a mud flat on Washington river, and in the moss in the coniferous forest bordering the river. Specimens were found under stones and among the fallen maple leaves in the deciduous forest, III; in the humus of the cedar swamp, IV; in the fallen spruce logs in the coniferous forest, VI, and in the moss of the tamarack swamp, V. A few specimens were also found in the moss among the bearberry bushes on the Minong Trap promontory, IX.

8. *Zonitoides exigua* (Stimp.). II. Found among the fallen leaves of an alder thicket on a very wet mud flat, and in the moss covering the ground in the coniferous forest bordering the river. Collected among the fallen leaves in the deciduous forest, III; in the moss of the arbor vitae swamp, IV, and in the moss of the tamarack swamp, V. Also found in the moss among the bearberry bushes on the Minong Trap promontory, IX.

9. *Pyramidula alternata* (Say). III. Among the damp fallen leaves, beneath the bark of fallen birch logs, and under stones in the deciduous forest.

10. *Pyramidula striatella* (Anth.). This species was collected on Washington river, II, among the fallen leaves of alders on a mud flat, and in the moss in the coniferous forest, bordering the river. It was also collected in

the deciduous forest, III, among the damp fallen leaves and under rocks; in the humus of the cedar swamp, IV; in the moss in the tamarack swamp, V, and in the moss among the heath plants on the Minong Trap promontory, IX.

11. *Pyramidula striatella alba* (Walker). II. In the moss forming the ground cover of the coniferous forest. III. Several specimens were also collected among the damp fallen leaves in the deciduous forest.

12. *Pyramidula asteriscus* (Mse.). III. Taken among the fallen leaves in a moist ravine in the deciduous forest.

13. *Acanthinula harpa* (Say). II. This species was found to occur in the moss ground cover of the coniferous forest bordering Washington river; in the humus of the arbor vitae swamp, IV, and in the moss about the roots of the heath plants on the Minong Trap promontory, IX.

14. *Punctum pygmaeum* (Drap.). III. Several specimens of this form were collected among the damp fallen leaves in the deciduous forest.

15. *Sphyradium edentulum* (Drap.). II. Beneath the bark of a fallen log in the coniferous forest along Washington river, and among the fallen leaves in the deciduous forest, III.

16. *Euconulus fulvus* (Drap.). This shell was found beneath the bark of a fallen birch tree in the coniferous forest, II; among the fallen leaves in the deciduous forest, III, and in the moss of the tamarack swamp, V. A few dead shells were also found in the sediment in the bottom of Grace creek.

17. *Euconulus chersinus polygyratus* (Pils.). Collected in the moss and decaying logs in the coniferous forest on the flood-plain of Washington river, II; among the fallen leaves in the deciduous forest, III, and beneath the bark of a decaying tamarack stump, V.

18. *Vertigo ovata?* Say. A defective specimen was found in the humus of the arbor vitae swamp, IV.

19. *Vertigo gouldii* Binn. Among the fallen leaves in the deciduous forest, III, and in the moss of the tamarack swamp, V.

20. *Vertigo* sp. In the moss about the foot of a tamarack, V.

21. *Carychium exile* H. C. Lea. This species was found among the fallen alder leaves on a very wet flat along Washington river, II, and among the fallen maple leaves in the deciduous forest, III.

22. *Limnaea stagnalis* L. var. This snail is very abundant about the shores of Washington Harbor, X. The specimens collected were attached to the larger rocks that are not readily moved by the action of the surf.

23. *Limnaea* n. sp.? (related to *L. sumassi* Bd., but probably undescribed). X. This form is also abundant in Washington Harbor, and with *Limnaea stagnalis* constitutes the characteristic molluscan life of this station. The specimens collected were found clinging to the rocks under the same conditions as *L. stagnalis*. It was also found to occur commonly in the rock pools on the Minong Trap promontory, IX.

24. *Physa sayii* Tapp. var. X. This form was found only in Washington Harbor, where it occurs on the rocks near shore.

25. *Physa* sp. (probably *sayii* Tapp.). VIII. A few specimens were found at Siskowit Bay, attached to stones in the back water pools on the beach.

26. *Physa* sp. Under this head are grouped a number of immature shells collected in Lake Desor, VII, in the fine silt near shore and attached to large rocks about the islands; among the leaves of submerged aquatic

plants in Washington river, II, and attached to the rocks about the shore of Washington Harbor, X.

27. *Aplexa hypnorum* (L.). II. Found only among the fallen alder leaves on a wet flat on Washington river.

28. *Planorbis bicarinatus striatus* Baker. VII. This species was found in the silt near shore and on the rocks off the islands of Lake Desor.

29. *Planorbis exacuus* Say. II. A number of specimens were taken among the leaves of submerged aquatic plants in Washington river. It was also found on the rocks in shallow water about the islands of Lake Desor, VII, and in Washington Harbor, X.

30. *Planorbis parvus* Say. III. Collected among the leaves in the bed of a dry creek in the deciduous forest. Also found in the rock pools on the Minong Trap promontory, IX, and clinging to the rocks in shallow water about the islands of Lake Desor, VII.

31. *Planorbis hirsutus* Gld. This species was only found in Lake Desor, VII, where it occurs on the rocks in shallow water about the islands.

32. *Valvata sincera lewisii* Curr. VIII. A few specimens of this species were found on the rocks in a back water pool at Siskowit Bay.

33. *Anodonta marginata* Say. VII. Several specimens were collected in shallow water at the west end of Lake Desor, among a scattered vegetation of equisetum and water lilies. This is the only place where mussels were found on the south end of the island, with the exception of a broken shell in Washington Harbor, X, although a careful search was made for them about the shore of the harbor and in Washington river.

34. *Pisidium abditum* Hald. var. II. Several specimens were collected among the wet fallen leaves in the alder thicket, on the bank of Washington river.

35. *Pisidium variabile* Pme. II. Among the leaves of a submerged aquatic plant in Washington river.

36. *Pisidium* sp. *Pisidia* which could not be identified were collected on water plants in Washington river, II; in the silt in the bottom of Washington creek running through the arbor vitae swamp, IV, and in the debris in the bottom of Grace creek, near its mouth.

The following general observations on the collection will call attention to the specimens of special interest and to their faunal affinities. So far as Isle Royale is concerned, the fauna is purely boreal; the land species, as far as they go, are the same (with one exception) as those of the Porcupine Mountains, Ontonagon County. The only species not found in Ontonagon County is *Pyramidula striatella* Anth. The occurrence of the typical form of *striatella* on Isle Royale while the Ontonagon County form is uniformly var. *catskillensis* Pils., is very curious. *Catskillensis* is the characteristic form of Northern Michigan. It has been traced from Beulah, Benzie County, Mich. north through the Grand Traverse region, Mackinac Island and the St. Mary's river, to Marquette, Baraga and Ontonagon Counties. At Charlevoix both forms occur, while specimens from Crooked Lake, Emmet County, are rather intermediate. On the main land of the Upper Peninsula thus far only the variety has been found.

Among the aquatic species, however, Isle Royale furnishes some interesting forms. The form of *Limnaea stagnalis* is a peculiar and well marked

one, quite different from any of the described forms. The occurrence of the *Limnaea* related to *L. sumassi* Bd. on Isle Royale is a very interesting discovery, and, whether distinct or merely a variety of that form, is new to the Michigan fauna. Originally described from British Columbia *L. sumassi* is peculiarly a western species, and its occurrence so far east, if these shells are referred to it, is quite unexpected. *Planorbis bicarinatus striatus* Baker has not before been listed in the Michigan fauna, as it was described since the last (1894) general catalogue of the Mollusca of the State was published. It is, however, a form of general distribution through the northern part of the state and occurs occasionally in the southern counties. (Raisin river, Monroe Co. and Orchard Lake, Oakland Co.). The *Pisidia* are represented by several interesting forms, some of which are probably undescribed species, but the amount of material is at present too meager to justify a decisive opinion. It is a matter of regret that this interesting group was not more largely represented in the collection. The collection from the Porcupine Mountains is necessarily largely the same as that made in 1903, and affords no occasion to vary the opinion as to the general character of the fauna already expressed in the report on these collections.*

The specimens of *Cochlicopa lubrica* from the hardwood forest, II. 2, are the elongated slender form described by Doherty as *morseana*. It has not been listed before from this State. *Acanthinula harpa* and *Zonitoides asteriscus* are boreal species, the former hitherto found only at Beulah, Benzie Co., Charlevoix and Petoskey, and the latter at Charlevoix. Their occurrence on Isle Royale and in Ontonagon County are the first records for the Upper Peninsula. *Pallifera hemphilli* W. G. Binn. is a new species for Michigan and a very interesting one. It was originally described from Mount Mitchell, N. C. and Lulu, Hall Co., Ga. Dr. Pilsbry says, "It looks as though *hemphilli* might be a Canadian form which extends down the mountains. I have seen it also from the mountains in Pennsylvania."

*Sixth Report Mich. Acad. Science, 1904, p. 192.

SPIDERS AND INSECTS FROM THE PORCUPINE MOUNTAINS
AND ISLE ROYALE, MICHIGAN.

A. G. RUTHVEN.

With the exception of the Odonata and Orthoptera, no attempt was made to make extensive collections of the different groups of invertebrates, and the lists comprise only the more characteristic forms in the different habitats studied. The collections were, for the most part, made by the author with the assistance of the other members of the party, except in the case of the ants which were collected largely by Mr. Otto McCreary. We are indebted to the following persons for the determination of the collections:

Spiders.—Mr. Nathan Banks, U. S. Department of Agriculture.

Dragonflies.—Mr. E. B. Williamson, Bluffton, Ind.

Butterflies and Moths.—Prof. Arthur J. Snyder, Springfield, Idaho.

Ants.—Dr. W. M. Wheeler, American Museum of Natural History.

1. SPIDERS FROM THE PORCUPINE MOUNTAINS.

1. *Gnaphosa conspersa* Thor. III. 1. Taken under a pine log among the dwarf huckle-and blueberry bushes in the aspen zone, August 6.

2. *Linyphia phrygiana* Koch. I. Taken on the leeward side of projecting outcrops of rock on the beach of Lake Superior, July 21. Also occurs in Europe (Banks).

3. *Epeira trifolium* Hentz. I. This spider occurs numerously along the beach of Lake Superior. It weaves its web behind projecting outcrops of rock, and when surprised runs swiftly into the rock crevices. The webs are often filled with small white moths, July 30.

4. *Epeira patagiata* Clerck. I. This species was found under the same conditions as *Epeira trifolium*. Also occurs in Europe (Banks).

5. *Lycosa gracilis* Bks. III. 1. In a shallow hole in dead grass under a fallen pine log in the aspen zone, August 6.

6. *Pardosa lapidicina* Th. I. This species was taken on the beach of Lake Superior, July 30. It was observed quite frequently running about over the rocks, and dodging into the crevices when pursued.

7. *Pardosa* sp. (probably *lapidicina*). I. Several immature specimens were taken on the rocks of the Lake Superior beach, July 21.

8. *Dolomedes tenebrosus* Hentz. II. 1. A specimen of this spider with its egg mass was taken on a cedar stump in the arbor vitae swamp, August 25.

2. SPIDERS FROM ISLE ROYALE.

1. *Amaurobius* sp. V. One specimen was found in the Sphagnum moss in a tamarack swamp, August 22.

2. *Amaurobius bennetti* Blackw. II. One specimen was taken in the moss ground cover of the balsam and spruce forest on the flood-plain of Washington river, August 26.

3. *Lycosa pratensis* Em. IX. Several specimens were found in the moss about the roots of the dwarf blueberry bushes on the Minong Trap promontory, September 2.

4. *Xysticus* sp. IX. One specimen was taken in the same habitat as the last, September 2.

Mr. Banks remarks in a letter, concerning the collection, that these species are all fairly common throughout the northeastern United States.

3. DRAGONFLIES FROM THE PORCUPINE MOUNTAINS.

1. *Calopteryx aquabilis* Say. IV. 2. A male was taken among the alder bushes along Carp river, August 5, and a female flying up the river, IV. 1, on August 12.

2. *Lestes unguiculatus* Hagen. II. 3. A male was taken in the clearing on August 12. III. 2. Two females were taken on the "bald" crest of the first range, resting on goldenrods, July 18. IV. 2. One male was taken on a cassandra bush in the valley of Carp river, August 5.

3. *Nehalennia irene* Hagen. V. 2. A female was collected on a grass stem on the delta of Carp river, August 12.

4. *Enallagma hageni* Walsh. V. 2. Twenty-one males and one female were taken on the delta of Carp river, on August 12, and four males on July 21. This is the only station at which this form was observed. It occurs here, however, abundantly, and is the characteristic species of this marsh.

5. *Enallagma carunculatum* Morse. V. 2. A single specimen of this form, a male, was taken on the delta of Carp river, August 12.

6. *Enallagma* sp. V. 2. A male was taken on the delta of Carp river on August 12.

7. *Ischnura verticalis* Say. V. 2. A female was taken on the delta of Carp river, July 21, resting on a grass stem, and a male and female in the same locality on August 12.

8. *Hagenius brevistylus* Selys. V. 1. Only one specimen of this form was collected, a female taken on Carp Lake, on an alder branch overhanging the water, August 10.

9. *Gomphus spicatus* Hagen. A male was taken in the clearing, II. 3, on July 16, a female, flying about among the cassandra bushes on the flood-plain of Carp river, IV. 2, August 5, and five males on the delta of Carp river, V. 2, July 21. The habitat of this form seems to be the marsh and river. The specimen taken in the clearing was the only specimen observed away from water.

10. *Aeschna clepsydra* Say. I. Several individuals resembling this form were observed, flying back and forth along the beach of Lake Superior on July 30. II. 3, 4. Two males and two females were taken about dusk on July 16, flying about the clearing and in and out among the surrounding aspens. V. 2. A male and female were captured in coitu among the grasses and sedges on the delta of Carp river, on August 8. IV. 1. Individuals resembling this form were often seen in the evening, flying up and down Carp river, and along Little Carp river, VII. 3, and over the lake, VII. 1, on August 3. This species seemed to occur generally along the streams, except in the evening, when it was also observed flying back and forth in the woodland clearings. The individuals seen flying over Little Carp Lake often made sudden swerves close to the surface, and nearly every time, as they flew upward again, they were followed by the snout of a hungry dace, but in no instance observed was the fish successful.

11. *Sympetrum obtusum* Hagen. II. 3. One female was taken on July 16; many others were seen in the clearing at various times. II. 4. Five males and one female were taken in the aspen zone that surrounds the clearing, July 15 and 16. II. 5. Two males and two females were taken on the heath undergrowth in the aspen zone bordering the north side of the bald crest of the ridge, July 15. III. 1, 2. Several individuals of the genus, thought to belong to this species, were seen at different times, flying about over the heath plants, and in the aspen zone on the mountain top. III. 3. One specimen was taken among the pines on July 19. III. 4. Two males and one female were taken on July 15 in the aspen zone that borders, on the east, the bald crest of the first range. IV. 2. Three males were taken among the cassandra bushes along Carp river on July 5. VII. 2. One taken and several seen on the beaver meadow on Little Carp river, August 3. This form seemed to occur most numerous in the cassandra zones and beaver meadows along the streams, although it was also observed to occur quite commonly in hardwood clearings and on the bald crests. It is not strictly confined to the clearings, however, but seems to occur in equal abundance in the aspen zones.

12. *Sympetrum costiferum* Hagen. I. One male was taken on July 30, flying about over the beach of Lake Superior. This was the only specimen taken. Three others which resembled this form were seen resting on the beach, but they eluded capture. None were observed at any other station.

13. *Plathemis iydia* Drury. IV. 1, V. 2, VII. 2. No specimens of this form were taken, but a dragonfly was observed several times on the mudflats of Carp river, on the marsh at the east end of Carp Lake, and on the beaver meadow, that can be referred to this species with little doubt.

4. BUTTERFLIES AND MOTHS FROM THE PORCUPINE MOUNTAINS AND ISLE ROYALE.

a. Porcupine Mountains.

1. *Argynnis cybele* Fab. II. 3. One specimen of this form was taken on the flower of a cow parsnip in the clearing, July 20, and one on a goldenrod on the mountain top, III. 2, on August 10. Argynnid forms resembling this species were often seen about the clearing, "balds" and river valley, but how many of these were to be referred to the species, and to the following variety, was not determined.

The observations and collections indicate that both the variety and typical forms prefer an open sunny habitat.

2. *Argynnis cybele* Fab. var. (near *leto*). For a discussion of this variety see Prof. Snyder's comments on the collection at the close of the Isle Royale list. II. 3. One specimen was taken, flying about the clearing, July 21, and one on Carp river, IV. 2, flying about among the cassandra bushes on August 12.

3. *Argynnis atlantis* Edwards. Specimens of this species were collected on the beach of Lake Superior, I, August 11, in the clearing, II. 3, July 16, and in the valley of Carp river, IV. 2, August 12.

4. *Phyciodes tharos* Drury. I. Two were taken, flying over the beach of Lake Superior, July 30 and August 11, and two on a harebell on July 17. II. 3. Two specimens were also found on a cow parsnip flower in the clearing, July 16. This species like the Argynnids, seems to prefer open sunny habitats.

5. *Grapta gracilis* Grote and Robinson. I. Five specimens were taken on the rocks and flying about over the beach of Lake Superior on August 11. II. 3. One was collected in the clearing, August 7, and one on the face of the cliff, III. 6, August 11. This form is the characteristic butterfly of

the beach. The one captured in the clearing was the only one observed there. They were numerous on the face of the cliff, but, owing to the difficulty in scaling the precipice, only one could be secured. Both on the cliff face and beach, they made but short flights when disturbed, and if not pursued soon settled on the rocks again. After alighting they settled close to the rocks with their wings outspread, now and then raising them above their back, but quickly lowering them again.

6. *Grapta progne* Cramer. I. One specimen of this butterfly was taken, flying over the beach of Lake Superior, August 11.

7. *Vanessa j-album* Boisduval and Leconte. This form was taken on the beach of Lake Superior, I, on August 11. Two individuals were collected in the clearing, II. 3, on August 5, and August 7. III. 2. One specimen was also found on the talus slope, July 21.

8. *Vanessa antiopa* Linn. I. One taken on the beach of Lake Superior, August 11. This butterfly was not often seen. It was twice recognized in the clearing, II. 3, once on the shore of Carp Lake, V. 1, and once in the beaver meadow on Little Carp river, VII. 2.

9. *Basilarchia arthemis* Drury. This form was found to occur on the beach of Lake Superior, I, in the clearing and surrounding aspen zone, II. 3, 4, in the cassandra zone on Carp river, IV. 2, and in the beaver meadow. It is a very common form in this region, being apparently of general distribution in clearings.

10. *Thecla edwardsii* Saunders. III. 2. One specimen was collected on a goldenrod on the mountain top, August 10.

11. *Colias philodice* Godart. I. Two specimens were taken on harebells on the beach of Lake Superior, August 30, and three flying about, August 11. II. 3. One was found on a cow parsnip in the clearing, August 7. "Yellow" butterflies were not often observed.

12. *Catocala uniŷuga* Walker. II. 3. One specimen was found in a crevice between the logs of the camp shack in the clearing, August 5.

13. *Hypoprepia miniata* Kirby. III. 6. On a huckleberry bush on the "bald" mountain top, August 11.

14. *Actias luna* Linn. II. 2. A single specimen was taken on a hemlock, July 15.

b. Isle Royale.

Basilarchia arthemis and *Colias philodice* were both common in the clearings. One specimen of *Vanessa antiopa* was seen in a clearing, September 3.

c. Notes on the Collection of Butterflies, by Prof. A. J. Snyder.

Of all the lot the most interesting are the two varieties of the female of *Argynnis cybele*, which so closely resemble the female of *Argynnis leto* as to startle one. The same form was found in the Lake Superior region by Mr. Bates of Chicago. I believe two specimens of this form are now in the collection of Mr. John Healey of Chicago. The two specimens listed above well illustrate geographic variation.

Dr. Holland speaks of *Carpenterii*, the variety of *cybele* found in New Mexico and Colorado, and claims a similar form is found in Labrador and Canada; also on the mountains of Carolina. The largest forms of *cybele* I have seen are from Tennessee. *Argynnis leto* is a western species common in Utah and some parts of Colorado. The dark female, at its best, is a handsome specimen, and that a female of *cybele* should be found in the Superior country is enough to make one question the ancestry of *leto*. Of one thing we are

certain, altitude and latitude both tend to make smaller and darker colored specimens of a species.

5. ANTS FROM THE PORCUPINE MOUNTAINS.

1. *Formica impeza* Wheeler.* III. 6. A colony of this form was found beneath a loose stone among the huckleberry bushes on the mountain top, August 12, 1904 (not 1902 as given by Wheeler).

"Worker. Length 3.3—6 mm.

"With the habitus of *Formica rufa*. Mandibles 8 toothed. Clypeus broadly rounded in front, not produced in the middle, carinate its entire length. Head excluding the mandibles, distinctly longer than broad even in the largest workers. Cheeks rather long, straight, subparallel. Posterior border of head straight, posterior corners rounded. Joints 1-4 of antennal funiculus decidedly longer and more slender than the remaining joints. Thorax of the *rufa* type, but with the epinotum very low and rounded. Petiole rather thick anteroposteriorly, its anterior surface convex in profile, its posterior flattened, its edge, especially in smaller workers, very blunt. Seen from behind the node is produced upwards in the middle and is of rather variable outline, being notched in the middle in some specimens, but oftener more or less rounded.

"Mandibles lustrous, finely and sharply striated. Surface of clypeus uneven. Frontal area shining. Remainder of body opaque, distinctly but finely shagreened.

"Whole body and appendages covered with very minute white pubescence, which is rather sparse on the head and thorax, but dense and concealing the ground surface on the gaster. Body, antennal scapes, and legs covered with robust, obtuse, erect or suberect, whitish or yellowish hairs. On the gaster they are uniformly distributed and very conspicuous in certain lights. They are also very numerous and prominent on the upper surface of the thorax, clypeus, front, vertex, posterior corners and lower surface of the head. They are absent or very sparse on the cheeks, pleurae and coxae. On the legs they are prominent both on the flexor and extensor surfaces.

"Head and thorax red. Gaster black. All specimens, even the largest are more or less infuscated as follows: Mandibles, anterior border of clypeus and apical half of funiculi dark reddish brown. Ocellar triangle, upper surface of pro- and mesonotum, much of the upper portion of the petiole, legs and coxae, except their articulations, more or less blackened. In the largest workers the fore coxae are largely red. Anal region and articulations of legs yellowish. In the smallest workers the infuscation is more extensive, involving the whole of the posterior portion of the head and the epinotum.

"Described from twelve workers taken August 12, 1904 by Mr. O. McCreary from a colony nesting under a stone in the Porcupine Mountains, Ontonagon county, Michigan. Types in the American Museum of Natural History, cotypes No. 32,925 in the University Museum, University of Michigan, Ann Arbor, Mich.

"*F. impeza* is allied to *F. oreas* Wheeler and *F. microgyna* Wheeler, with which it agrees in having erect hairs on the antennal scapes. It differs from *F. oreas* in the much stiffer and less abundant erect and obtuse hairs on the head and thorax, the prominent hairs on the gaster, the longer head, more opaque surface of the head and thorax, etc. In most of these characters

it also differs from the typical *microgyna*. The erect hairs on the gaster of *impeza* are much more robust and obtuse than in the latter species. The new species also resembles *F. difficilis* Emery and notably its var. *consocians* Wheeler, except in pilosity and the absence of any yellow color on the basal gastric segment.

"It is very probable that the female of *F. impeza* is aberrant, either in being very diminutive like the females of *F. difficilis* and *F. microgyna* or in having an unusual color like the female of *F. oreas*. Until this sex of *impeza* is discovered there may be some doubt as to whether the form should be regarded as a species distinct from *rufa*. That it differs very markedly in pilosity from all the hitherto described subspecies and varieties of *rufa*, there can be no doubt." W. M. Wheeler.

2. *Formica fusca* L. var. *subsericea* Say. III. 6. On the rocks at the foot of the talus slope and at the foot of the cliff, August 12. Also found in an ant hill in the clearing, II. 3, and under the loose stones on the mountain top, III, August 6.

3. *Formica fusca* L. var. *argentata* Wheeler. III. 1, 2. A number of colonies were found under the loose rocks on the mountain top, especially among the heath plants.

4. *Formica fusca* L. var. *neorufibarbis* Emery. II. 4. A colony of this species was found in a decaying aspen log, August 8.

5. *Formica lasioides* Emery. var. *picea* Emery. III. 2. Collected under the loose stones on the mountain top, August 11.

6. *Brachymyrmex heerii* Mayr. subsp. *depilis* Emery. III. 6. Under stones on the mountain top, August 12. III. 2. Taken among the heath plants on the mountain top, July 18.

7. *Tapinoma sessile* Say. (small var.). III. 1. Under the stones in the aspen zone near the top of the first range, August 11, and on III. 6, under the loose stones on the side of the mountain near the top on August 12.

8. *Camponotus herculeanus* L. var. *whymperi* Forel. III. 2. A colony was found in a dry decaying pine log on the bare mountain top, August 6. and in a decaying pine log on the mountain top, III. 6, August 12.

9. *Lasius brevicornis* Emery. III. 2. Beneath the loose rocks on the mountain top, August 11.

10. *Spenamma (Aphaenogaster) fulvum* Roger. var. *rude* Emery. III. 6. Collected beneath the stones near the top of the mountain, August 12, and under stones and fallen pine logs in the aspen zone near the top of the ridge, August 6.

6. ANTS FROM ISLE ROYALE.

1. *Formica sanguinea* Latr. subsp. *aserva* Forel. I. One colony found in the clearing, August 18.

2. *Formica fusca* L. var. *subsericea* Say. I. Several colonies were found in the clearing, August 18.

3. *Formica fusca* L. var. *neorufibarbis* Emery. I. In the humus beneath a decayed stump in the clearing, August 18. III. In a decayed log on the top of the ridge, August 20.

4. *Camponotus herculeanus* L. var. *whymperi* Forel. I. Found on sides of a log shack, August 18, and feeding on a fish head in the clearing, September 1.

5. *Leptothorax canadensis* Prov. var. I. One colony found in the clearing, August 18.

Dr. Wheeler makes the following comments on the collection: "The

*Wheeler, W. M. New Species of Formica. Bull. Amer. Mus. Nat. His., XXI, p. 273, 1905.

collection is a very interesting one. All the forms are subboreal and characteristic of the hills or mountains of the northern states or British Columbia. The new *Formica [impexa]* is especially interesting. Unfortunately only workers are represented. The female is probably an aberrant form like the female of *F. oreas* or *F. ciliata*. All the other species are well known, with the exception of *F. aserva* and *Camponotus whymperi*. The latter occurs in the mountains of Colorado and British Columbia."

THE COLD-BLOODED VERTEBRATES OF THE PORCUPINE MOUNTAINS AND ISLE ROYALE, MICHIGAN.

A. G. RUTHVEN.

The list of fish in the following report is entirely the result of the work of this expedition, and we are indebted to Dr. S. E. Meek of the Field Columbian Museum, Chicago, for the identification of the specimens.

The list of amphibians and reptiles is intended to include the data at present available to the author on the occurrence of these animals in the Northern Peninsula. It is of necessity far from complete, as very little collecting has been done in this region, and the records that have been made are scattered. For the latter reason it was thought best to bring together all available information. The sources of the records are the collections made for Mr. Bryant Walker about Limestone Mountain, Baraga County, and in the Porcupine Mountains, Ontonagon County, in the summer of 1903*; the collections and field notes of the Museum Expedition in the Porcupine Mountains and on Isle Royale, during the summer of 1904; records and collections made about Marquette by Dr. E. R. Downing of the Northern State Normal School, and specimens in the University Museum collected by Dr. A. E. Foote on Isle Royale. A few notes have also been added from specimens collected during the summer of 1905, by Dr. C. A. Davis of the Michigan Geological Survey.

The amphibians, with the exception of the Marquette specimens, have been identified by Dr. Stejneger of the United States National Museum; the Marquette specimens, and the reptiles were identified by the writer, unless otherwise stated.

1. FISH FROM THE PORCUPINE MOUNTAINS.

1. *Catostomus commersonii* (Lacépede). Fine Scaled or Common Sucker. IV. 1. Ten specimens were taken in the deeper holes in Carp river near Carp Lake, July 16, on a bottom of fine mud. V. 3. Twelve specimens were collected near the center of Carp Lake on July 16. VII. 1. One was taken and several others seen off the edge of the delta of Little Carp river, August 3. VII. 3. Two specimens were collected in a pool about five feet deep behind a beaver dam on Little Carp river, August 3. This is the characteristic and common fish in the deeper waters of this region.

2. *Semotilus atromaculatus* (Mitchell). Horned Dace. IV. 1. Thirteen specimens were taken in Carp river on July 16 and 18. This fish seemed to occur only in small numbers in the deeper water near the lake, but farther up stream, where the current is more rapid, it was very abundant, although the bottom was still composed of mud and debris. No specimens were taken in Carp Lake, but it is abundant in Little Carp Lake, VII. 1, where

*Ruthven, A. G.—Notes on the Molluscs, Reptiles and Amphibians of Ontonagon County, Michigan. Sixth Annual Report Michigan Academy of Science, pp. 188-192.

thirty-four specimens were taken, August 3. In the latter, locality they were observed repeatedly about dusk to jump partly out of the water in pursuit of dragonflies.

3. *Nototropis cayuga* Meek. IV. 1. Four specimens were taken off a mud flat in Carp river on July 16, among a vegetation of water lilies.

4. *Nototropis hudsonius* (DeWitt Clinton). Spawn Eater or Shiner. IV. 1. Four specimens were taken off a mud flat in Carp river, and many others in Carp Lake, V. 3, in about six feet of water, off a gravelly shore, July 16.

5. *Nototropis cornutus* (Mitchell). Shiner; Red Fin. VII. 3. One specimen of this form was taken in Little Carp river. This fish was observed to occur much more numerous up stream, where the current was swift and the bottom composed of gravel, than in the deeper water near the lake.

6. *Couesius plumbeus* (Agassiz). VII. 3. Six specimens of this fish were collected in Little Carp river at about the middle of the beaver meadow, where the stream is shallow, current quite rapid, and the bottom composed of small stones.

7. *Salvelinus fontinalis* (Mitchell). Brook Trout. Owing to the preference of this species for clear cold streams with a swift current and gravel bottom, it is not surprising that it does not occur in Carp Lake or Carp river within the mountains. It is reported by Mr. Allie, of the Carp Lake Mine, to be abundant in Little Carp Lake during the spring and early summer, but we were unable to obtain any in August.

8. *Thymallus ontariensis* (Cuvier and Valenciennes). Grayling. This fish was not taken, but specimens were seen by the writer in the summer of 1903, which had been taken in Little Carp river, near Lake Superior.

9. *Eucalia inconstans pygmaea* (Agassiz). VII. 3. One specimen was taken in Little Carp river on August 3, where the current was quite rapid and the bottom composed of fine silt. Several others were seen in a small creek cut in the loam of the beaver meadow.

10. *Percopsis guttatus* Agassiz. Trout Perch. IV. 1. Three specimens were collected in shallow water off a mud flat in Carp river, and in the deeper waters of Carp Lake, V. 3. This genus and species were originally described by Agassiz¹ from specimens taken in the Lake Superior region. Its habitat is given by Forbes², as apparently deeper waters, not often found in streams, and by Jordan and Evermann,³ as "cold or clear lakes and rivers." It, however, occurs in the Porcupine Mountains, in quite shallow water. This may be due to the fact that it is a northern form, and that in this region the conditions to which it is adapted are more widespread than toward the south.

11. *Perca flavescens* (Mitchell). Yellow Perch. IV. 1. Four specimens were collected in the deeper parts of the river near Carp Lake, and twenty-five in the lake, V. 3. These specimens were all obtained in the deeper parts of the lake and river, where there was considerable vegetation and muddy bottom.

2. FISH FROM ISLE ROYALE.

1. *Catostomus commersonii* (Lacepede). Common Sucker. X. Often seen in large schools near the shore of Washington Harbor. The conditions were: bottom rocky, and little or no vegetation.

¹Agassiz, Louis. Fishes of Lake Superior compared with those of the other Great Canadian Lakes. p. 284. Lake Superior its Physical Character, Vegetation, and Animals. Boston, 1850.

²Forbes, S. A. A Catalogue of the Native Fishes of Illinois. Rep. Ill. State Fish Com., 1886, p. 96.

³Jordan and Evermann. The Fishes of North and Middle America. Bull. U. S. Nat. Mus., No. 47, Pt. 1, p. 784.

2. *Couesius plumbeus* (Agassiz). The type of this species was from Lake Superior.* It occurs abundantly in Washington Harbor, X, where eight specimens were taken, August 31, just off shore, on hooks baited with worms.

3. *Argyrosomus artedi* (LeSueur). Lake Herring. X. The Herring was observed in large schools in Washington Harbor at different times; one was taken in a gill net out in the harbor, and one near shore in about fifteen feet of water, August 31.

4. *Cristivomer namaycush* (Walbaum). Lake Trout. X. This fish was taken at various times by trolling off rocky reefs in Washington Harbor and along the north shore of the island. The weight of those taken varied from 5 to 12 pounds.

5. *Salvelinus fontinalis* (Mitchell). Brook Trout. This trout occurs abundantly in Washington river, II, and individuals were often observed in the Herring schools in Washington Harbor, just off shore, X.

6. *Lucius masquinongy* (Mitchell). Muskallunge. X. But one specimen of this fish was observed, which was speared with a cant hook near the shore of Washington Harbor on August 2. Weight 13 pounds.

7. *Perca flavescens* (Mitchell). Yellow Perch. X. Occasionally taken in Washington Harbor on hooks baited with worms.

8. *Cottus icталops* (Rafinesque). Millers Thumb. X. Occurs among the large rocks along the shore of Washington Harbor.

3. THE AMPHIBIANS OF THE NORTHERN PENINSULA.

1. *Plethodon glutinosus* Green. Slimy Salamander. I have examined a specimen of this salamander collected by Dr. E. R. Downing at Marquette. He reports it as occurring commonly in that locality.

2. *Plethodon cinereus erythronotus* Green. Red-backed Salamander. Specimens of this form were taken in decayed logs, especially in damp places, at Limestone Mountain, Baraga County, in August, 1903, and in the Porcupine Mountains in August and September, 1903. It is also reported by Dr. Downing from Marquette.

3. *Diemyctylus viridescens* Raf. Green Triton or Newt. I have examined a specimen of this form taken by Dr. Downing from a small tributary to Dead river, near Marquette.

4. *Bufo americanus* (Lec.). Common Toad. Found commonly in the woods both at Limestone Mountain and in the Porcupine Mountains in the summer of 1903, and in the Porcupine Mountains and on Isle Royale, in the same habitat, in the summer of 1904. It is reported by Dr. Downing as common at Marquette. There are also four specimens in the University Museum collected by Dr. A. E. Foote on Isle Royale, where the notes of the Museum Expedition indicate that it is very common.

5. *Hyla pickeringii* Storer. Pickering's Tree Frog. A specimen of this little frog was taken on a fern in a damp ravine at Limestone Mountain in the summer of 1903, and another on a rush in the beaver meadow on Little Carp river, VII. 2, in the Porcupine Mountains on August 3, 1904. A specimen was also taken by Dr. C. A. Davis near Winona, Houghton County, on September 1, 1905.

6. *Hyla versicolor* Lec. Chameleon Tree Frog. Dr. Downing writes me that he has taken this species at Marquette. There is also a record in the University Museum (Museum Catalogue, Vol. 2, p. 196) of a specimen

*Agassiz, loc. cit., p. 366.

(No. 7457) taken on Isle Royale by Dr. Foote, which I have been unable to verify.

7. *Rana pipiens brachycephala* Cope. Leopard Frog. The distinction between the typical form of this species and the so-called variety *brachycephala* does not seem to be a good one. If it is, the specimens recorded from the Northern Peninsula, according to Dr. Stejneger, probably belong to the variety. The specimens collected on the shores of Carp Lake in the summer of 1903, and recorded as *R. pipiens*,* belong to this form. Specimens were also taken here, V. 1, 2, during the summer of 1904, and Dr. C. A. Davis captured four specimens near Winona, Houghton County, September 1, 1905. The "Leopard Frog" is abundant about Marquette, according to Dr. Downing. Owing to the resemblance between this species and *R. palustris* Lec. several specimens from the Porcupine Mountains were listed provisionally as *palustris* in the 1903 list. These have all been identified by Dr. Stejneger as *R. pipiens brachycephala*.

8. *Rana septentrionalis* Baird. Mink Frog. This species is more aquatic than the other members of the genus found in this region, and specimens are thus more difficult to capture. A number of specimens were taken along the shores of Carp Lake, V. 1, and river, IV. 1, in the summer of 1904. It is also reported by Dr. Downing at Marquette, and there is in the University Museum a specimen taken by Dr. A. E. Foote on Isle Royale, that is labeled *R. clamitans*, but, owing to its condition, it is impossible to tell whether it is to be referred to this species or *clamitans*. As it is labeled *clamitans*, however, it should probably be listed with that species.

9. *Rana clamitans* Daud. Green Frog. This is probably the most common frog in the Northern Peninsula, at least in the western part. Several specimens were taken in Otter river near Limestone Mountain in August, 1903, and it was found to be abundant in Carp, IV. 1, and Little Carp river, VII. 3, and Lakes, V. 1, and VII. 1, in 1903 and 1904. At least one of the two specimens listed as *catesbiana* in the 1903 list belongs to this species, and perhaps also the other. They are both characterized by an obscurity of the dorso-lateral folds. In the former specimen this obscurity is more pronounced than in the latter, but Dr. Stejneger states that the slight webbing of the toes in the latter indicates that it, also, belongs to this species.

10. *Rana catesbiana* Shaw. Bull Frog. See *R. clamitans*. Dr. Downing reports this species from Marquette, but it is doubtful whether his specimens are to be referred to this species or, as the Porcupine Mountain specimens, to *clamitans*.

11. *Rana sylvatica cantabrigensis* Baird. Cambridge Frog. This variety of the Wood Frog is one of the most common amphibians in the localities where collecting has been done in the Upper Peninsula. It was found to be abundant in damp woods, especially about springs, both at Limestone Mountain and in the Porcupines, during the summers of 1903 and 1904. A single specimen was also taken on the shore of Lake Desor, Isle Royale; this was, however, the only one seen on the island. To this variety are to be referred the specimens that were listed in 1903 as *R. sylvatica*.

4. THE REPTILES OF NORTHERN MICHIGAN.

1. *Storeria occipitomaculata* (Storer). Storer's Snake. A single specimen of this snake was taken in the Porcupine Mountains in 1903, and a number of specimens collected about Marquette by Dr. Downing have been examined.

*Ruthven, loc. cit., p. 191.

During the summer of 1904, eight specimens were taken on Isle Royale. These snakes, as has been stated by Smith,* appear to be somewhat nocturnal although not strictly so, and the specimens found on Isle Royale were taken, for the most part, under stones in the coniferous, VI, and deciduous forest, III. On September 3, after a heavy frost, four adult specimens, very sluggish on account of the cold, were found under a stone in the woods. These were brought to Ann Arbor alive. One of these snakes, University Museum Catalogue No. 33408, during the night of September 7 gave birth to a single young, and the next morning was found dead; the young one died the following night. The mother was examined at once, and six entire and two mutilated embryos were removed. As the mutilated specimens were nearest the opening of the oviduct, it is possible that they may have been killed by an injury to the mother in rolling over the stone under which she was found, and prevented the birth of those that lay behind them. The young snake was 45 mm. long, of a rich dark brown above, and pink below. As in the adult specimens, the pink was confined to the center of the gastrosteges, not extending to the edges. The upper occipital spot was bright yellow and well defined; the laterals smaller and less distinct, although plainly present.

Another adult, University Museum Catalogue No. 33409, died on September 10. This is also a female and possesses four nearly mature embryos in the right oviduct. The left oviduct is flattened out against the dorsal body wall and contains but one very small embryo which lies in the lower part of the oviduct; notwithstanding its small size, however, it is evidently nearly mature, as the yolk has entirely disappeared.

During the night of September 19, a third specimen, University Museum Catalogue No. 33410, gave birth to nine young, one of which was dead. The fourth specimen, University Museum Catalogue No. 33411, during the night of September 26 gave birth to seven young, one of which was dead. These records are interesting on account of the questions which they raise, as to the size of the young at the time of hibernation. On the Isle, during the first part of September, the nights were cold, and heavy frosts occurred frequently, so that the specimens found in the morning were very sluggish, and the time of hibernation was probably near at hand.

Since the above was written, the University Museum has received two specimens from Dr. C. A. Davis, which were taken on Paint River, near Crystal Falls, Iron County, on August 22, 1905.

2. *Diadophis punctatus* (L.). Ring-necked Snake. Specimens of this snake have been taken by Dr. Downing at Marquette.

3. *Thamnophis sirtalis sirtalis* (L.). Common Garter Snake. Specimens of the Common Garter Snake have been taken at Marquette by Dr. Downing, and near Limestone Mountain (1903), in the Porcupines (1903 and 1904), and on Isle Royale (1904). They are more commonly found along the streams, although they are also often found in forest clearings. The University Museum has recently received a specimen from Dr. C. A. Davis, which was taken in the woods near Bessemer, Gogebic county, August 28, 1905. There are four specimens (No. 7454) listed in the University Museum Catalogue, Vol. 2, p. 196, as taken on Isle Royale by Dr. Foote. These specimens are probably the basis for Smith's Isle Royale locality.†

4. *Thamnophis sirtalis parietalis* (Say). Pacific Garter Snake. This

*Smith, W. H. Report on the Reptiles and Amphibians of Ohio, p. 698. Geological Survey of Ohio, Vol. IV., 1882.

†Smith, loc. cit., p. 680.

snake has been listed from the Lower Peninsula,* but I have never seen a specimen from southern Michigan that could be definitely referred to this variety. *Sirtalis* forms with a varying amount of red on the skin between the lateral spots are often found about Ann Arbor, but the amount of red is so small that it is generally more satisfactory to classify the specimens with the typical form. During the past summer, however, three specimens were taken on Isle Royale, II, III, that strikingly resemble specimens from Colorado and Washington and can only be referred to the variety. The dorsal row of spots, as in typical specimens of the variety, are fused into a band along either side of the dorsal stripe, which is united below with the row of spots above the lateral stripes. Between the scales the skin is Orange Red Tint No. 1 (using Milton Bradley colors). One of these is a female containing 28 embryos not yet mature, as a large yolk body is present.

5. *Thamnophis saurita* (L.). Riband Snake. There is a record in the University Museum Catalogue, Vol. 2, p. 196, of a specimen (No. 7452) of this snake taken on Isle Royale by Dr. Foote, which I have been unable to verify.

6. *Chrysemys marginata* Agassiz. Painted Tortoise. A number of specimens were taken on Carp river, IV. 1, in the Porcupine Mountains in 1904. It is also reported from Marquette by Dr. Downing.

*Clark, H. L. Notes on the Reptiles and Batrachians of Eaton County. Fourth Annual Report Michigan Academy of Science, pp. 192-194.

ANNOTATED LIST OF THE BIRDS OF THE PORCUPINE MOUNTAINS AND ISLE ROYALE, MICHIGAN.*

N. A. WOOD, MAX M. PEET, AND O. MCCREARY.

1. PORCUPINE MOUNTAINS.

The following observations upon the birds cover a period from July 13 to August 13, 1904. For the determination of certain specimens from both the Porcupine Mountains and Isle Royale, we are indebted to Mr. Robert Ridgway and Mr. H. C. Oberholser of the Smithsonian Institution, and to Dr. C. Hart Merriam, Chief of the Biological Survey of the U. S. Department of Agriculture.

1. *Podilymbus podiceps*. Pied-billed Grebe. Station VII. Sub. 1. One seen on Little Carp Lake, August 3. VII. 3. One was seen August 7, on Little Carp river.

2. *Gavia imber*. Loon. I. One seen on Lake Superior August 5, and two July 21. V. 3. One seen on Carp Lake August 10.

3. *Larus argentatus*. Herring Gull. I. Several adults, observed at various times along the lake. Common at Ontonagon, Mich., July 12, 13, and August 13 and 14.

4. *Merganser americanus*. American Merganser. I. An adult female and nine or ten young were seen July 21 on Lake Superior.

5. *Lophodytes cucullatus*. Hooded Merganser. IV. 1. Adult female and young found on Carp river, July 19 and 20; also observed July 18.

6. *Botaurus lentiginosus*. American Bittern. I. One seen in the bushes along the lake shore, August 12. IV. 1. One seen along Carp river July 18, and one shot July 19.

7. *Ardea herodias*. Great Blue Heron. IV. 1. One seen July 16. V. 2. One adult male in breeding plumage seen at Carp lake, August 6. One was seen flying across Carp Lake, July 30.

8. *Porzana carolina*. Sora. V. 2. An adult male taken on the delta at the eastern end of Carp Lake, August 5.

9. *Gallinago delicata*. Wilson Snipe. IV. 1. An adult male taken along Carp river, July 19. One observed feeding July 17. IV. 2. One seen in a grassy marsh along Carp river, July 18.

10. *Actodromas minutilla*. Least Sandpiper. I. One seen along the Lake Superior shore, July 21. VII. 2. Adult male taken and several specimens seen at the beaver meadow on August 3.

11. *Totanus flavipes*. Yellow-legs. VII. 2. Immature and adult males taken at the beaver meadow August 3.

12. *Helodromas solitarius*. Solitary Sandpiper. I. One seen on the Lake Superior beach, July 27. IV. 1. Immature males, adult male and females, taken along Carp river, July 27 and 28. Common along Carp river, July

*A preliminary note was published by N. A. Wood, Auk, XXII, pp. 175-178, 1905.

18 and August 10. VII. 2. Several were seen along Little Carp river in the beaver meadow.

13. *Actitis macularia*. Spotted Sandpiper. I. One male taken on the Lake Superior beach August 13. IV. 1. Two seen along Carp river, August 3.

14. *Bonasa umbellus togata*. Canadian Ruffed Grouse. II. 2. Several beavies of quite small young were seen July 17. Both old and young were seen several times. II. 3. Large beavies of young were seen in a clearing near camp. An adult bird was killed in the camp clearing by a Sharp-shinned Hawk. II. 5. A female with a large bevy of young was seen July 18. A large flock of young, unable to fly, and several nearly full grown were seen August 1. III. 2. Several flocks of both young and adults were seen on the mountain top during July. IV. 3. Both young and old were seen several times in the forest.

15. *Circus hudsonius*. Marsh Hawk. II. 3. An adult female was seen fighting with a Sparrow Hawk, August 8. IV. 2. A male was observed hunting, August 3. V. I. One was seen along the shore of Carp Lake August 3. VII. 2. One was seen near the beaver meadows, August 3.

16. *Accipiter velox*. Sharp-shinned Hawk. II. 1. An adult male taken July 27 and a female July 26. II. 3. One seen July 13 in the camp clearing. Several were seen below camp toward the Carp river. III. 5. They were frequently seen circling over the cliff in the morning. IV. 2. An adult female taken, August 7, near Carp river.

17. *Buteo borealis*. Red-tailed Hawk. II. 2. Two were seen flying overhead July 20. II. 3. One seen circling over the clearing August 8. III. Seen flying overhead on July 20, and at other times.

18. *Buteo lineatus*. Red-shouldered Hawk. One seen July 13 in the hemlock forest near Union Bay. The bird was on a tall dead tree, which afforded a good view of it (Wood).

19. *Buteo platypterus*. Broad-winged Hawk. II. 2. Young male, female and adult female taken August 12. The only ones seen.

20. *Haliaeetus leucocephalus*. Bald Eagle. III. 5. One seen circling over the cliff, July 31, and two were observed on wing July 29. V. One was seen circling over Carp Lake July 29. Two were observed at Union Bay on July 23.

21. *Falco columbarius*. Pigeon Hawk. Several were seen at Union Bay and two were taken July 23.

22. *Falco sparverius*. American Sparrow Hawk. II. 1. Female taken in cedar swamp July 23. II. 3. One young female was taken August 4. Several were seen August 8, both young and adults. An immature male was taken July 28. These Hawks came into the camp clearing searching for grasshoppers. III. 5. Frequently observed sitting on dead stubs near the edge of the cliff in the early morning. IV. 3. A nest with young was found in an old pine stub in the hardwoods, July 16. Observed several times flying along the river. VII. 1. Seen at Little Carp Lake, August 3 and 7.

23. *Pandion haliaetus carolinensis*. Osprey. V. 3. One seen over Carp Lake July 23, and on August 10. One was also observed at Iron river, northeast of the Porcupines, July 13.

24. *Asio magellanicus occidentalis*. Great Horned Owl. II. 1. Young of the year taken and two others seen July 26. One seen among the hemlocks and maples, July 30.

25. *Coccyzus erythrophthalmus*. Black-billed Cuckoo. II. 2. Was heard many times in the hardwood forest. II. 3. One was seen July 17 near the

camp. Late in the evening, about 9 p. m. of July 20, one was heard. One was seen July 15 in the aspens. An adult female was taken July 21. IV. 2. The call was heard many times in the alders. IV. 3. One was seen in the woods at the foot of the talus.

26. *Ceryle alcyon*. Belted Kingfisher. II. 3. One alighted upon the house top. IV. 2. Two birds were seen many times along Carp river. V. 3. One seen near Carp Lake July 16 and an adult female was taken July 28. VII. 1 and 2. Several were observed at Little Carp Lake and at the beaver meadows, August 2 and 3.

27. *Dryobates villosus*. Hairy Woodpecker. II. 1. One adult male was taken July 21 in the cedar swamp. II. 2. A young male was taken July 22, and adult females July 24 and 29. II. 3. An adult female was taken August 10 in the clearing. III. A male and female were seen August 10 on a dead Norway pine. III. 5. Often found on the dead stubs on top of, or overhanging the cliff. VII. 1. One seen at Little Carp Lake, August 7. VII. 2. One seen at the beaver meadow, August 3.

28. *Dryobates pubescens medianus*. Downy Woodpecker. II. 3. Young males were taken near camp August 2 and August 7, and an adult male was taken July 28. III. 3. Male and female seen near camp, August 10 on Norway pines. III. 5. Only seen once, August 12, upon a decayed pine stump. IV. 2. One seen in the tag alders, July 27. IV. 3. One was seen in the maples at the foot of the cliff, July 28. VII. One was seen August 6, at Little Carp Lake.

29. *Picoides arcticus*. Arctic Three-toed Woodpecker. II. 1. One was seen on the road to camp, July 13, and an adult male was taken July 21.

30. *Sphyrapicus varius*. Yellow-bellied Sapsucker. II. 3. A young female was taken near camp July 28. VI. One seen near Little Carp Lake, August 3, and again on August 9. One was seen at Little Iron river, east of the Porcupines, July 13.

31. *Coephalocephalus pileatus abieticola*. Northern Pileated Woodpecker. II. 1. A young female was taken July 27. II. 2. An adult female was taken August 1 in the hardwoods. "A young male was taken July 28. This I called to the tree nearest to me by clapping my hands, the method suggested in Chapman's Handbook. Two were called on this occasion and came within easy gun shot. After being called, they alighted and kept up a calling and drumming noise." (Peet). "In the hardwood forest I saw a dead hard maple which showed to good advantage the work of this bird. The tree contained many holes, some from 10 to 20 inches long; others 6 to 8 inches wide and deep. These birds seem to have the habit of working a tree very thoroughly." (Wood). VI. Several were seen and heard August 7 and 8, in the vicinity of Little Carp Lake. One was seen about a mile south of Carp Lake, on a hemlock. One was seen near Union Bay, east of the Porcupines, in a forest of large hemlocks with scattered white pine and a few maples, July 13.

32. *Colaptes auratus luteus*. Northern Flicker. II. 1. Several were seen in a clearing near the Lake Superior shore, August 4. II. 2. A young male was taken July 19. II. 3. One was seen July 17 flying over camp. III. 2. Several were seen and a young male was taken July 26, on the mountain top. Common, especially the young. III. 1. Several seen at different times on the stumps on the face of the cliff. IV. 3. One seen July 15, in the hardwoods near camp.

33. *Chaetura pelagica*. Chimney Swift. I. Several seen, flying overhead, along the Lake Superior shore, July 27. II. 3. Several were seen

in the evening of August 9 about camp, and an adult female was taken. IV. From the mountain top these birds were seen many times on wing over the valley of Carp river, July 19 and 20. V. Observed flying over Carp Lake on several occasions. Seen at the mouth of Carp river, July 31.

34. *Trochilus colubris*. Ruby-throated Hummingbird. VII. A female came many times to feed from flowers within about 20 feet of our breakfast camp fire, at Little Carp Lake, August 7. Another was seen at Little Carp Lake, August 9.

35. *Tyrannus tyrannus*. Kingbird. II. 1. Seen near the Lake Superior shore August 13. VI. One was seen near Little Carp Lake, August 7. On August 8 four birds, two young and two adults, were seen at a small lake two miles southwest of Little Carp Lake.

36. *Sayornis phoebe*. Phoebe. III. 5. Was seen on the south side of the cliff north of Carp Lake, July 29.

37. *Nuttallornis borealis*. Olive-sided Flycatcher. II. 1. Adult male and female were taken July 27, and an adult male was seen, and a female taken August 4, in an arbor vitae clearing near the Lake shore. IV. 4. Two birds were seen in a tamarack swamp, July 28.

38. *Contopus virens*. Wood Pewee. II. 1. An adult female was taken July 30. II. 2. Several were seen in open woodland. One nest was found July 23 in a tree, about 60 feet from the ground. VI. One was heard on the trail to Government Peak, July 26.

39. *Empidonax traillii alnorum*. Alder Flycatcher. IV. 2. Observed catching insects along the bank of Carp river. Several were seen in the alders along the river July 18. An adult male and female were taken July 22; these were among the willows when shot.

40. *Empidonax minimus*. Least Flycatcher. II. 1. Two were seen in a clearing in the arbor vitae swamp near the lake shore, and an adult male and female were taken July 27. IV. 2. Several were seen along Carp river, August 6, and two were seen in the alders along Carp river, July 18.

41. *Cyanocitta cristata*. Blue Jay. III. 5. Several seen at top of bluff July 23, and a female was taken July 17. IV. 3. Often seen along the river bank; an adult male shot July 18. VII. Several were seen at Little Carp Lake August 3, and one was seen August 7.

42. *Perisoreus canadensis*. Canada Jay. VI. One was seen near Little Carp Lake, August 7.

43. *Corvus corax principalis*. Northern Raven. I. Observed several times near Lake Superior. II. 3. One was seen flying over camp July 15, and one was heard August 12. One alighted upon the roof of the barn and was seen in the vicinity of the camp several times. III. Seen flying over the mountain top. III. 5. Often seen flying over the cliff, between July 5 and July 26. Adult males were taken, August 5 and July 30, on the cliff. Usually seen flying toward this cliff toward evening, about a dozen in a flock. IV. Was seen flying over the valley many times. V. Nine were counted flying over Carp Lake July 29. VII. One was seen at Little Carp Lake, August 2.

44. *Corvus brachyrhynchos*. American Crow. I. Common on the shore of Lake Superior. II. 3. One seen upon a dead tree near camp. III. 2. Observed flying overhead. III. 5. Common on the bluff July 15, and on July 18 several were seen on a dead pine. IV. 2 and 3. Often seen at the foot of the cliff, near the river, resting on tall tamaracks.

45. *Agelaius phoeniceus*. Red-winged Blackbird. IV. 2. Several were seen August 6, and on August 8 a young male was taken.

46. *Carpodacus purpureus*. Purple Finch. II. 1. Was often seen in the coniferous trees. An adult female was taken July 27. II. 3. "I found these very plentiful, and they did not appear to be paired. The males and females usually coming in separate flocks." (Peet). An adult male was taken July 14, and both sexes again July 15. These birds visited the camp for table refuse. IV. 2. Was seen feeding in the tamaracks August 3 and 4. VII. Observed at Little Carp Lake, August 2.

47. *Loxia curvirostra minor*. American Crossbill. II. 3. Adult male and female were taken at camp, August 5. These birds often came to camp to pick up crumbs. IV. 4. An adult male was taken August 4. A small flock was seen near the upper part of the river, August 5. Observed feeding among tamaracks, August 3 and 4.

48. *Loxia leucoptera*. White-winged Crossbill. IV. 4. Adult male and three females were taken August 5. The crops of these birds were full of tamarack seeds. VII. 2. A flock was seen at the beaver meadow, August 3.

49. *Spinus pinus*. Pine Siskin. II. 2. Common among coniferous trees July 13 and August 12. II. 3. A female came to camp and was seen to pick up some hair and fly away. Adult males were taken at camp, July 15 and 25, and August 9. The birds about camp showed little fear, and would fly within about three feet of one, to pick up crumbs. The males secured had very large testes. IV. 4. They were observed many times in the tamarack swamp August 3 and 4. VII. 2. Were seen near the beaver meadow, August 3.

50. *Poocetes gramineus*. Vesper Sparrow. III. 2. Several were seen on the top of the mountain, August 10. III. 5. Several were seen on the top of the cliff on July 26; a large flock was also seen here August 3. They appeared to be migrating.

51. *Zonotrichia albicollis*. White-throated Sparrow. II. 2. An adult female was taken July 22 and an adult male August 5, in the hardwoods. II. 3. One was heard singing at dusk, July 18, in the clearing. IV. 2. One adult male was taken July 21 near Carp river, and an adult female was taken August 5. Often seen and heard singing towards evening along the river. IV. 4. Several were seen in a tamarack swamp July 28. VII. Several were seen at Little Carp Lake August 7. VII. 2. A number were seen at the beaver meadow, August 3. One was seen on the road from the Porcupines to Ontonagon August 14.

52. *Spizella socialis*. Chipping Sparrow. III. 2. An adult male was taken July 20. III. 5. Several were seen on the top of the cliff July 26, and a small flock on August 3. VII. Seen at Little Carp Lake August 2.

53. *Junco hyemalis*. Slate-colored Junco. III. 2. Abundant at all times on top of the cliff. Many were seen with insects, as if caring for young; they were always in the open or near the edge of a clearing (Peet). III. 5. On the top of the mountain a female was seen feeding young on July 27, and an adult female was taken July 17. VII. Observed at Little Carp Lake, August 2.

54. *Melospiza cinerea melodia*. Song Sparrow. II. 1. One was seen in a clearing near Lake Superior, July 25. II. 3. An adult female was taken, July 21, near camp. IV. 2. A young female was taken near Carp river. Adults were observed feeding fully fledged young, July 22.

55. *Melospiza georgiana*. Swamp Sparrow. IV. 2. Very common in the valley. Adult males were taken July 21 and 22, and young females July 28 and 31. The adults were observed feeding fully fledged young July 22. VII. 2. Observed at the beaver meadow, August 3.

56. *Zamelodia ludoviciana*. Rose-breasted Grosbeak. III. 5. One seen at the edge of the cliff July 23. IV. 2. One was seen in the alders July 23. A young male and female were taken in the tamaracks, August 5.
57. *Cyanospiza cyanea*. Indigo Bunting. II. 3. An adult female was taken while eating weed seeds in the clearing near camp, July 21. This was the only one seen.
58. *Piranga erythromelas*. Scarlet Tanager. III. 5. Adult male and female were seen July 15, and an adult male was seen July 26. VI. One was heard along the trail to Government Peak, July 26.
59. *Tachycineta bicolor*. Tree Swallow. VII. 2. One was seen at the beaver meadow, August 3.
60. *Ampelis cedrorum*. Cedar Waxwing. II. 1. One adult female was taken August 13; was frequently observed along the lake shore. II. 2. Seen flying overhead. II. 3. An adult male was taken July 19. These birds came repeatedly to the camp to pick up crumbs, etc. near the door of the shack. III. 2. Frequently seen on the top of the cliff and observed feeding on berries. III. 5. Several were seen July 26, along the edge of the cliff. Frequently observed at this locality, always in flocks. IV. 2. Very common along Carp river. An adult female was seen August 2 building a nest in the alders overhanging Carp river. VI. Several were seen at a small lake below Little Carp Lake on August 7.
61. *Vireo olivaceus*. Red-eyed Vireo. II. 1. Abundant at this station. II. 2. One was heard in the hardwoods July 14. An adult male was taken July 20. Several were seen with young just able to fly. II. 3. At camp an adult male was taken July 19, and young were taken July 15 and 20. These birds were common about camp, in the aspens. IV. 2. On July 22 one was seen singing in the alders. Abundant along the river. VII. 2. Seen near the beaver meadow, August 3.
62. *Vireo solitarius*. Blue-headed Vireo. II. 1. An adult male and female were taken July 27. IV. 4. Were seen in a tamarack swamp, and an adult male and female were taken August 5.
63. *Mniotilta varia*. Black and White Warbler. VI. The only one seen was on a small maple tree south of Carp river, August 5.
64. *Dendroica caerulescens*. Black-throated Blue Warbler. II. 2. A pair was found July 17, whose actions indicated a nest was near. A young bird in the down and an adult male were taken July 20. Several were seen on August 1. An abundant bird at this station, the young and adults were common in the hardwoods and usually in low brush. An adult female was taken July 16. II. 3. A female seen feeding young near the edge of a clearing July 20. II. 5. Many seen whose restless manner indicated a nest. Usually seen in young maples about four feet high. II. 2. Frequently in the low growth along the path in the hardwoods. IV. 2. Often seen in the bushes bordering Carp river. VI. Several males and females were seen in the vicinity of Little Carp Lake, August 7.
65. *Dendroica coronata*. Myrtle Warbler. I. Adults and young birds were seen in the brush near the shore of Lake Superior, July 16. III. 3. A young male was taken August 10. Several birds were seen in a flock among the tops of the Norway pines.
66. *Dendroica maculosa*. Magnolia Warbler. II. 1. A male was seen and a female taken July 21. Was always to be found among cedars near Lake Superior. Two were seen, August 1, on damp land quite thickly overgrown with bushes and tall grass. IV. 4. An adult male was taken July 21. Several were seen feeding in the tops of tamarack trees, and heard

- singing July 28. On July 18 they were also observed in the tamaracks. VI. Seen near a stream on the trail to Government Peak July 26.
67. *Dendroica pensylvanica*. Chestnut-sided Warbler. IV. 2. An adult female was taken July 28, and several were seen near Carp river.
68. *Dendroica blackburniae*. Blackburnian Warbler. II. 1. A pair with two young were seen in the tops of birches, July 14. On August 1 several adults and young were seen in birches on marshy land. II. 2. Observed several times between July 13 and 30. II. 3. A female, with young in the down, were taken July 14. A young male was taken July 19. Several were seen near camp with young. II. 5. Small flocks of adults and young were seen several times feeding in the tops of young maples. IV. 3. Seen at the foot of the talus slope among the maple trees July 15.
69. *Dendroica virens*. Black-throated Green Warbler. II. 1. An adult male taken July 30, along the lake shore. II. 2. Common in the hardwoods; an immature male was taken July 20, and an adult July 18. III. 2. Several were seen feeding in the tops of Norway pines on the mountain top August 10. III. 5. Seldom seen at this station. A young male was seen here July 20. IV. 2. An immature male was taken August 5. Common among the alders along Carp river.
70. *Dendroica vigorsii*. Pine Warbler. III. 2. Seen carrying food to young in top of a Norway pine, at the edge of the cliff.
71. *Seiurus aurocapillus*. Oven-bird. II. 2. A nest containing two eggs and one young bird was found in the leaves near the path through the hardwoods, July 15. Young in nearly all stages of plumage were seen. Two were seen in the maple undergrowth, August 11, and a young male was taken July 21. II. 5. An adult male was taken in a trap set for mammals near the top of the bluff, July 15. Many young birds were seen, usually on the ground among the bushes, but sometimes running ahead in the path like quail (Peet). III. 2. Several were seen singly in the aspens bordering the bare mountain top. IV. 2. Seen several times among the alders along Carp river.
72. *Seiurus noveboracensis*. Water Thrush. IV. 2. Seen several times in the alders along Carp river, one was seen July 22. A bird was seen July 13 east of the Porcupines, on the road to Ontonagon.
73. *Geothlypis agilis*. Connecticut Warbler. II. 1. Adult females were taken July 27 and August 4. On July 27, four of these birds were seen in a marshy strip of land thickly overgrown with birch and long grass, but shaded with large hemlocks.
74. *Geothlypis philadelphia*. Mourning Warbler. II. Seen among the brush of open woodland, August 4. II. 3. A female and her young were taken July 15. An adult male was taken at the camp, July 14. Two females were seen, each with one young bird just able to flutter along in the low weeds. When the young were shot the females remained near by and kept up a sharp chirping and jerking movement of the body. Two males were taken, one of these appeared greatly excited when approached and flew from tree to tree among the young aspens, grasping the trunk of the trees so that its body was at right angle to the tree. They remained within about five feet of the ground (Peet). IV. 2. Was seen several times among the alders along Carp river and last seen August 5. VII. An adult and one young bird were seen among the brush on a bluff at Little Carp Lake, August 7.
75. *Geothlypis trichas brachidactyla*. Northern Yellow-throat. IV. 2. One was seen, scolding vigorously, in the brush near the boat landing, July

22, on Carp river. VII. 1. One was seen at Little Carp Lake, August 7 among the low brush growing on a rocky bluff over the lake.

76. *Wilsonia canadensis*. Canadian Warbler. II. 1. Seen several times among cedars along the Lake Superior shore, July 13-August 2. An adult female was taken August 2. IV. 2. An adult female was taken July 31 and again on August 2. One was seen July 15 with an insect in its bill and acted as if young were near.

77. *Setophaga ruticilla*. American Redstart. II. 1. An adult male was seen July 16, and several were observed in tall birches on July 17, near the Lake Superior shore. An adult male was taken July 17. IV. 2. An adult female was seen near Carp Lake, August 6. Many were seen in the brush along the river at various times. One was seen on the road to Ontonagon, July 14.

78. *Troglodytes aedon*. House Wren. II. 1. A young female was taken in a clearing July 25. There were several observed at this place in a dense brush pile. II. 2. A young male was taken July 24, in the hardwoods.

79. *Olbiorchilus hiemalis*. Winter Wren. II. 1. A small family was seen July 21, and a young male was taken July 23. Abundant at this station. IV. 2. An adult female and two young were taken August 10. Often seen among the alders along Carp river. VI. Several were seen near streams on the trail to Government Peak, July 26.

80. *Telmatodytes palustris*. Long-billed Marsh Wren. IV. 2. One male was taken near Carp river, July 22.

81. *Certhia familiaris americana*. Brown Creeper. II. 1. The first ones were seen July 13, but were frequently observed after that date. II. 2. A large flock of adults and young were seen among the hemlocks, July 15. An adult female and young were taken July 19.

82. *Sitta carolinensis*. White-breasted Nuthatch. III. 3. One was heard in the pines, July 20.

83. *Sitta canadensis*. Red-breasted Nuthatch. II. 1. This species was seen twice in the cedar swamps near Lake Superior, July 21 and 27. III. 3. One was seen, July 20, in the pines on the mountain top. IV. 4. An adult male and female, and two young males were taken July 27 in a tamarack swamp. Several were seen here again August 4. VI. One was seen near the beaver meadow August 3.

84. *Parus atricapillus*. Chickadee. II. 2. Adults were seen feeding fully fledged young in the aspens, along the path through the hardwoods, on July 15. Young were taken July 21. II. 3. A young bird was taken July 15, and an adult male and a young female were taken July 21. Often seen in the aspens about camp, usually with young which they were feeding. III. 5. Several were seen feeding in the Norway pines on top of the cliff, July 23. IV. 4. Several observed in a flock of Golden-crowned Kinglets in a tamarack swamp, August 11. VI. Quite common near Little Carp Lake on August 7.

85. *Regulus satrapa*. Golden-crowned Kinglet. II. 2. Young in the down taken July 2. Several seen in the hemlocks July 17. Abundant among the hemlocks, July 13 to August 12. Large flocks of young and adults seen in the tops of the tallest hemlocks on July 14. II. 3. Young birds were taken July 14 in the clearing. IV. 2. A young female was taken July 27. Several were seen with Chickadees August 11. Many were seen along the Carp river at various times. IV. 4. They were abundant in the tamarack swamps, August 4 and 5.

86. *Hylocichla ustulatus swainsonii*. Olive-backed Thrush. II. 1. An

adult female was taken July 22, with the tough thickened skin on the abdomen characteristic of a breeding bird. II. 2. Often seen in an open woodland, July 13 to August 12. III. 2. One specimen seen August 1. IV. 2. A young male taken July 29. The song was heard in the evening and morning in the woods at the foot of the cliff, but during the day the bird retired to the alders along the river valley. It stopped singing the last week in July. VI. A nest containing two eggs was found on the trail to Government Peak July 26.

87. *Hylocichla fuscescens*. Wilson Thrush. II. 3. Heard singing near camp during the evening of July 18. IV. 2. Young taken July 22 along Carp river.

88. *Merula migratoria*. American Robin. II. 3. An adult male was taken July 30, and another was seen near camp on August 10. III. 2. One was seen July 20. III. 5. An adult male was seen on the top of the bluff July 23. This is apparently a rare bird in the Porcupines.

89. *Sialia sialis*. Blue Bird. III. 2. Several seen near the edge of the cliff on August 10. III. 5. An adult female was taken July 19. "A nest was found in a Norway pine stub on the top of the cliff July 23. The old birds fed the young every 5 to 8 minutes during the half hour they were observed. The parents were quite tame as they fed the young while I stood within 15 feet" (Wood).

2. ISLE ROYALE.

The observations and records incorporated in the following notes were made at the southwestern or lower end of the Isle, in the vicinity of Washington Harbor. A few observations were also made in the vicinity of Siskowit Bay on the south coast. The time spent on the island covered the period from August 16 to September 5, 1904.

On account of the lateness of the season, but little could be determined concerning the breeding birds. The migrants were already abundant. This was evident on account of the abundance of the Chipping Sparrow, Sharp-shinned and Sparrow Hawks. Many of these migrating birds were so abundant and of such general occurrence that little could be learned of their habitat relations. Perhaps the limited extent of the island, as a feeding ground, emphasized the apparent abundance.

1. *Podilymbus podiceps*. Pied-billed Grebe. II. Two were seen on Washington river, August 17, and several more August 30. A young bird, in the first plumage, was taken August 18, and young birds were again taken August 24 and 25.

2. *Gavia imber*. Loon. VII. Two were seen on Lake Desor, August 24, and again August 30.

3. *Larus argentatus*. Herring Gull. VII. One adult was seen at Lake Desor on August 24. IX. The rocky promontories were often white with these gulls. They would swim about in the lake and then fly back to the rock. X. These birds were very abundant in the harbor, where they were seen every day. On August 19, a small island north of the mouth of Washington Harbor was almost completely covered with them. On August 31, flocks were observed feeding in the harbor.

4. *Merganser americanus*. American Merganser. II. A young female, in the down, and an adult, were taken August 31. An adult and five young were observed on Washington river, August 31. VII. A young bird, in the down, was taken August 21. X. An adult bird and several young were observed August 19.

5. *Querquedula discors*. Blue-winged Teal. II. Three were seen on Washington river August 30. X. A flock of 25 or 30 were seen in the harbor August 30.

6. *Botaurus lentiginosus*. American Bittern. II. One was seen flying along the river on August 24 and again on August 30.

7. *Ardea herodias*. Great Blue Heron. I. One was seen flying over camp, August 21. X. One was seen flying over the harbor on August 30.

8. *Porzana carolina*. Sora. II. One was seen near the margin of the river August 22. Adult males were taken on both August 24 and 25. One was again observed at the edge of the river in tall grass, August 28; also observed on August 30, near the river.

9. *Fulica americana*. American Coot. II. One was seen August 22 on the river, and an adult female was taken August 24.

10. *Gallinago delicata*. Wilson's Snipe. I. One seen August 17 and 25 near the harbor.

11. *Actodromas minutilla*. Least Sandpiper. X. One seen August 28 and September 4, along the shore of Washington Harbor.

12. *Totanus flavipes*. Yellow-legs. I. An adult female was taken August 26 from a small flock which came into the clearing at the house. X. One was seen on the dock in the harbor, August 25.

13. *Helodromas solitarius*. Solitary Sandpiper. II. An adult male was taken August 17, a female August 18, and a young bird September 3. It was common along Washington river August 17 to September 3. X. Several were seen at the edge of the harbor September 4.

14. *Actitis macularia*. Spotted Sandpiper. X. One was seen on the shore at Washington Harbor, August 28.

15. *Pediocetes phasianellus*. Sharp-tailed Grouse. I. A resident reports that "prairie chickens" come to the clearing in the fall. VIII. Several were seen in a clearing at Siskowit Bay, August 29. This was the only species of grouse seen on the island by the party.

16. *Accipiter velox*. Sharp-shinned Hawk. I. Very abundant. Young males were taken between August 16 and 31, and young females August 21, 23 and 31. One adult female was taken August 27. Several were seen every day about the camp and in the clearings along the river. "Very abundant in clearings, showing little fear until fired upon repeatedly. They were very ferocious; one caught a Sora Rail while on the wing, and tore it to pieces within 15 feet of me. It grasped its prey from beneath by darting under it, turning over, and thrusting its claws into its victim's breast" (Peet). VII. One was seen at Lake Desor, August 24.

This was an abundant bird from August 17 until September 3, and showed a decided preference for clearings and open woodland, where it found several kinds of sparrows and warblers, in whose company it seemed to migrate.

17. *Accipiter cooperii*. Cooper's Hawk. X. One seen over the harbor. "This bird flew over the boat as I was fishing on August 19" (Wood).

18. *Buteo borealis*. Red-tailed Hawk. I. One was seen flying over camp, August 28.

19. *Buteo lineatus*. Red-shouldered Hawk. II. One was seen September 4.

20. *Haliaeetus leucocephalus*. Bald Eagle. X. A fine adult was seen at Washington Harbor, August 16. An adult bird was perched upon a stump near the water's edge, at the mouth of Washington river, on August 27. On August 31, this eagle was again seen. A resident reports

that its mate was killed last year, and that the pair had lived here for many years (Wood).

21. *Falco columbarius*. Pigeon Hawk. I. An adult female was taken August 30. One was seen near the camp on August 31 and September 1. II. An adult male was taken August 23, and two were seen September 1.

22. *Falco sparverius*. American Sparrow Hawk. I and II. Adult males were taken August 16 and 23, adult females August 23 and 27. This was the most common hawk frequenting the clearing about the harbor. Observed catching grasshoppers in the clearings. Several were caught in steel traps baited with meat. Observed in abundance from August 16 to September 5.

23. *Pandion haliaetus carolinensis*. Osprey. II. An adult female was taken August 26, and one was seen August 25. X. One was seen over the harbor on August 20.

24. *Asio accipitrinus*. Short-eared Owl. I. One was seen at the edge of the clearing August 17, and one was found dead near the camp on August 16. This species was not seen after August 17. It probably migrated (Wood).

25. *Asio magellanicus occidentalis*. Great Horned Owl. II. Three were seen August 22 near the river. Near by, in a clearing, four were found about dark August 26, and three were taken.

26. *Ceryle alcyon*. Belted Kingfisher. II. One or two were seen nearly every day from August 16 to September 1, along Washington river. An adult female was taken August 26. They were occasionally seen pursued by Sharp-shinned Hawks. When the hawk was nearly upon it, the Kingfisher would throw up its bill and ward it off, in a manner similar to that stated for herons when pursued by hawks (Peet). VII. One was seen at Lake Desor on August 24. X. Occasionally seen along the harbor.

27. *Dryobates villosus leucomelas*. Northern Hairy Woodpecker. I. One was seen September 1. II. One was seen August 16 and again on 19. III. Adult females were taken August 20 and on September 1. IV. Two were heard along the creek in the cedar swamp, August 4.

28. *Dryobates pubescens medianus*. Downy Woodpecker. I. A young male was taken August 29. •IV. An adult male was taken August 18. VII. Seen at Lake Desor, August 24. A common bird of general distribution.

29. *Picoides arcticus*. Arctic Three-toed Woodpecker. II. An adult female was taken, August 31. One was seen each day August 28, 29 and 30. This was a rare bird in the vicinity of Washington Harbor.

30. *Sphyrapicus varius*. Yellow-bellied Sapsucker. II. A young female was taken August 22, along Washington river, in the coniferous forest. Apparently a rare bird in this vicinity.

31. *Coephalocephalus pileatus abieticola*. Northern Pileated Woodpecker. II. and III. An adult male and a young female were taken August 19. An adult male was taken August 30, and five other birds were seen. Quite common in the forest and were heard or seen almost every day. "One specimen, after being shot at, was called back by continued clapping of the hands, although under other circumstances, they are very shy and difficult to approach. On rainy mornings they were very noisy" (Peet). "They were very noisy in the morning about sunrise, but on cloudy days they continued their pounding and calling for several hours" (McCreary).

32. *Colaptes auratus luteus*. Northern Flicker. II. Very abundant in the clearings along Washington river. One was shot August 16. VII. One was seen September 3 at Lake Desor.

33. *Chordeiles virginianus*. Night Hawk. I. Young females were taken August 16, and an adult male was taken August 23. A very common bird, frequently seen in the evening catching insects over the grass and water. Found roosting on the ground in clearings. None were observed after August 29.

34. *Chaetura pelagica*. Chimney Swift. I. Several were seen flying overhead on August 16, 17, 19 and 23, at the camp clearing.

35. *Trochilus colubris*. Ruby-throated Hummingbird. I. It was reported, as have been seen hovering about flower beds at the camp clearing. II. One was seen August 30 along the road through the coniferous forest.

36. *Sayornis phoebe*. Phoebe. I. An adult male was taken August 26 near camp. II. An adult female was taken August 18 and others were seen, at various times, between August 17 and 28, along the road in or near clearings.

37. *Nuttallornis borealis*. Olive-sided Flycatcher. I. Occasionally seen on dead trees in the clearings. II. An adult male was taken August 18, and was common from August 17 to August 28. IV. Seen on August 18 in a cedar swamp.

38. *Empidonax minimus*. Least Flycatcher. II. Often seen between August 19 and September 3. III. An adult male was taken August 31. Common.

39. *Cyanocitta cristata*. Blue Jay. II. An adult male was taken August 19, and a young female August 18. Very common about the deserted mining camps. Seen August 22 and 28, along the road. Adults moulting.

40. *Perisoreus canadensis*. Canada Jay. II. An adult male and female were taken August 25. Found about the deserted mining camps. Adult males were seen August 18, 22, and September 1, and females August 19 and 23. A common bird. VII. A number were seen at Lake Desor, August 24. They were very quiet and were not seen until we started to fry our bacon in front of the tent. Several then came flying from different directions and perched on the spruce boughs just above us, hopping about until we left camp, when they flew down about the ashes in search of scraps. (Ruthven).

41. *Corvus corax principalis*. Northern Raven. I. An adult female was taken August 23. II. On several mornings a flock of six was seen in a clearing. One was shot August 17. X. Eight were seen August 19, near the entrance to Washington Harbor; on August 30, three were seen flying over the Harbor. Reported to be a resident bird. The adult specimens taken were moulting.

42. *Corvus brachyrhynchos*. American Crow. I. This species was not as common about the clearing as were the Ravens, and was much more shy. Early in the morning of September 4, one came to the clearing and perched on the roof of an old log house, a few rods from camp. II. Two were seen nearly every day along the river.

43. *Agelaius phoeniceus*. Red-winged Blackbird. I. An immature female was taken August 26.

44. *Agelaius phoeniceus fortis*. Northern Red-winged Blackbird. I. Young males were taken August 18 and 26, and an adult female was taken on August 29. II. Several flocks (species uncertain) numbering about 15 or 20 specimens, were seen in the clearing. Only one male in black plumage was seen. Common. VII. An adult female was taken on August 24.

45. *Quiscalus quiscula aeneus*. Bronzed Grackle. II. An adult female

was taken August 19 in the clearing along the river. This was the only specimen seen and was found feeding in front of a deserted cabin.

46. *Loxia leucoptera*. White-winged Crossbill. II. Only small flocks were seen August 18, 26 and 30. IV. A small flock was seen on August 18.

47. *Astragalinus tristis*. American Goldfinch. II. A flock was seen August 19, and several were seen on August 17.

48. *Spinus pinus*. Pine Siskin. II. Frequently seen in flocks between August 18 and September 5.

49. *Passerculus sandwichensis savanna*. Savanna Sparrow. I. Young males were taken August 17 and 26, and adult females were taken August 30, and 31. This species was seen in flocks all over the clearing about camp, and was very tame, even coming into the houses. Very common after August 26 along roads and in the clearings. During the last week in August this species became abundant and was very tame. After September 1 it began to leave and nearly all were gone by September 5.

50. *Zonotrichia leucophrys*. White-crowned Sparrow. II. Two specimens were seen near the deserted mining camps September 1. On August 29 two were seen along Washington river. One was taken August 28.

51. *Zonotrichia albicollis*. White-throated Sparrow. I. One was seen at the edge of the clearing on August 24, and on September 1 and 4. II. An adult female and a young male were taken August 19. Young and the adults were seen almost every day along the river. VII. One was heard at Lake Desor on August 24.

52. *Spizella socialis*. Chipping Sparrow. I. Young males were taken August 17 and 27, and young females August 24 and 27. Very common in the camp clearing. II. Abundant in the clearing.

53. *Spizella pallida*. Clay-colored Sparrow. I. An adult male was taken August 25, and one was seen August 26. II. One was seen each day on August 28 and 31, in the clearing.

54. *Junco hyemalis*. Slate-colored Junco. I. An adult male was taken August 29. II. It was very common in the clearings between August 28 and September 5.

55. *Melospiza cinerea melodia*. Song Sparrow. I. One was seen August 24. II. Common from August 17 to 28, among brush in the clearings.

56. *Melospiza lincolni*. Lincoln's Sparrow. II. An adult male was taken September 1, in the undergrowth of a white cedar swamp.

57. *Ampelis cedrorum*. Cedar Waxwing. I. A young male was taken and a flock was seen August 18. II. Several were frequently seen along Washington river. Several nests were found August 28 in alders about six to ten feet from the ground. These nests had recently been used (Wood). An old bird was seen feeding four young that had just left the nest, September 1. An abundant species.

58. *Vireo olivaceus*. Red-eyed Vireo. II. Adult males were taken August 23 and September 5.

59. *Vireo philadelphia*. Philadelphia Vireo. II. One was seen September 1, along the road through the coniferous forest.

60. *Mniotilta varia*. Black and White Warbler. II. One was seen August 24 (Wood).

61. *Helminthophila rubricapilla*. Nashville Warbler. II. One was seen August 28. IV. A young male was taken August 18.

62. *Helminthophila peregrina*. Tennessee Warbler. I. An adult male was taken August 22 and a young male September 4. II and III. Three birds were seen August 24. Very common in woodland. Not seen before

August 22, after that date they were quite common until September 4. Evidently a migrant.

63. *Dendroica caerulescens*. Black-throated Blue Warbler. II and III. An adult male was taken August 17. A male and female were seen August 25 and one was seen August 24. Common, a few seen nearly every day from August 17 to September 4.

64. *Dendroica coronata*. Myrtle Warbler. I. A young male was taken August 29. II and III. An adult female was taken September 3. A few seen nearly every day from August 20 to September 3. Apparently migrating. Common.

65. *Dendroica maculosa*. Magnolia Warbler. II. An adult male was taken August 30, and an adult female September 3.

66. *Dendroica striata*. Black-poll Warbler. I. A young male was taken August 26, and two were seen September 4, near the camp. II. Young males were taken August 26 and 30.

67. *Dendroica virens*. Black-throated Green Warbler. II and III. One seen on August 24, and three on August 25. Seen every few days between August 18 and September 3. An adult male was taken September 1. Of general occurrence. Common.

68. *Dendroica palmarum*. Palm Warbler. I. An adult male was taken August 26 and September 4, and a young male was taken August 29. Many were seen at camp September 4, and were quite tame. These birds were abundant in the clearing about camp and even came close to the house, September 1. Generally found in bushes along clearings. During the night of September 3, a wave of this species occurred, and in the morning of September 4, large numbers of these birds were observed in the brush in the clearing, some specimens even coming about the camp.

69. *Seiurus aurocapillus*. Oven Bird. II. One was seen August 24. VII. An adult female was taken August 24.

70. *Seiurus noveboracensis notabilis*. Grinnell's Water Thrush. I. An adult male was taken August 26. II and III. One was seen on each of the following dates, August 18, 22, 24, 28 and 31. An adult female was taken August 24. IV. On September 1, one was heard singing a low sweet song in a cedar swamp. (Wood).

71. *Wilsonia pusilla*. Wilson's Warbler. II. An adult male was taken August 30, in alder bushes near a small stream. Evidently a migrant.

72. *Setophaga ruticilla*. American Redstart. I. Several were seen August 24, 27 and September 4. II. A young male was taken August 17. A few were seen every few days from August 17 to September 4.

73. *Olbiorchilus hiemalis*. Winter Wren. II and III. Individuals were seen August 20, 25, 30 and September 1, 3, and 4. A young male was taken August 31. IV. "An adult female was taken September 1 in a dense cedar swamp. I awakened her curiosity so much by making a chirping sound that she hopped upon a bush in full view thus allowing a chance to secure her." (Wood).

74. *Certhia familiaris americana*. Brown Creeper. II. One was killed August 19 and one seen August 20, and 22.

75. *Sitta carolinensis*. White-breasted Nuthatch. VII. An adult male taken August 24 among birch trees on the hillside.

76. *Sitta canadensis*. Red-breasted Nuthatch. II, III and IV. Adult females were taken August 17, 18 and 25. Many were seen almost every day between August 16 and September 5. VII. Abundant August 24. A very abundant bird of general distribution in the forest.

77. *Parus atricapillus*. Chickadee. II, III and IV. An adult male was taken August 17. Many were seen almost every day between August 16 and September 5. VII. Abundant August 24. Very abundant, of general distribution in forests.

78. *Regulus satrapa*. Golden-crowned Kinglet. II, III and VI. It was often seen feeding in spruce and balsam trees in company with the Chickadee and Red-breasted Nuthatch. Many were seen almost every day between August 16 and September 5. VII. Abundant at Lake Desor, August 24. Abundant and of general distribution in the forest.

79. *Regulus calendula*. Ruby-crowned Kinglet. II. An adult female was taken August 28, and one or two were seen on each of the following days, August 29, 30, and September 3 and 5.

80. *Hylocichla ustulatus swainsonii*. Olive-backed Thrush. II and III. An adult male was taken September 1, and a young male on August 24. Some were seen every few days in underbrush, they were very shy.

81. *Merula migratoria*. Robin. I. One was seen on August 16. II. One was also seen along the river on August 23.

NOTES ON THE MAMMALS OF THE PORCUPINE MOUNTAINS
AND ISLE ROYALE, MICHIGAN.

CHAS. C. ADAMS.

The specimens obtained by the expedition were largely collected and prepared by Max Minor Peet assisted by N. A. Wood. Mr. Wood secured the series of notes from Mr. Haring, a former fur dealer, concerning early mammal records. Other members of the party, A. G. Ruthven, O. McCreary and W. A. Maclean, also contributed notes, specimens or both.

I take pleasure in expressing our obligations to Dr. C. Hart Merriam, Chief of the Biological Survey of the U. S. Department of Agriculture, for kindly determining a representative series of specimens, and for the determinations made by Mr. W. H. Osgood of the same Survey; also to Dr. Glover M. Allen of the Boston Society of Natural History, for valuable suggestions and for the determination of the deer and bats. The other specimens collected have been named by a careful comparison with the determined series.

1. PORCUPINE MOUNTAINS.

1. *Odocoileus virginianus borealis* (Miller). Northern Virginia Deer. Near Station II. 2, but on Section 15, an adult male was taken in the hardwood forest, August 1, and a fawn, August 14, on Section 18. V. 2. "After sundown a deer came down into the marsh at the east end of Carp Lake, also a young buck about a year old, and later on a doe with a small fawn" (Maclean). VII. 1. "After sundown, August 3, nine deer were seen about the margins of Little Carp Lake, where they were feeding on the grasses and sedges. During September, 1903, deer were often surprised during the night, standing in the water at the margin of Carp Lake. Trappers reported that the flies were especially abundant this year" (Ruthven). During the past season this habit was not observed. Trappers reported that flies were not abundant owing to late spring frosts, and attributed the absence of the deer from the lake, during the night, to this cause.

2. *Sciurus hudsonicus loquax* Bangs. Southeastern Red Squirrel. II. 1. Two adult females were taken, August 21 and 28, in the cedar swamp. IV. An adult male was taken July 29.

3. *Tamias striatus lysteri* (Rich.). Northeastern Chipmunk. II. 2. An adult female was taken August 10. III. 4. A male was taken July 20. II. 3. On July 20, an adult male was taken at the camp clearing. IV. 3. August 2, an immature male was taken in the hardwood forest of the river valley.

4. *Eutamias quadrivittatus neglectus* (Allen). Lake Superior Chipmunk. II. 1. Seven specimens, young and adults of both sexes, were taken between July 21 and August 12, at the edge of a cedar swamp and along the Lake Superior shore. VII. 1. An adult female was taken, August 11, on a rocky bluff on Little Carp Lake.

5. *Marmota monax* (Linn.). Woodchuck. II. 2. An adult female

was taken July 28 (No. 32139). This is a very dark specimen when compared with the normal form found at Ann Arbor, Mich. The long over hair, especially on the top of the head, the rear of the back and the tail, is very dark brown or black. The pale under fur is also darker than in normal specimens. The hair on the lower parts of the body is much more rufous and darker than in the normal form. II. 3. In the camp clearing, an adult and one young of the normal color were seen.

6. *Sciuropterus sabrinus* (Shaw). Northern Flying Squirrel. II. 2. Two adult females were taken in the hardwood forest, August 3 and 4. III. 5. In the aspen zone near the mountain top, an adult female was taken July 29.

7. *Castor canadensis* Kuhl. American Beaver. IV. 1. Old beaver dams were observed on Carp river, and relatively fresh ones on Little Carp river, VII. 3, by Ruthven. Mr. David Allie, of the Carp Lake Mine, reported that the last beaver taken on Carp river was about 1898. VII. 3. No fresh signs of beaver were observed on Little Carp river. Allie reported them to occur on the river below Little Carp Lake. Beaver cuttings were secured from the dams on Carp and Little Carp rivers.

8. *Peromyscus canadensis* (Miller). Canadian White-footed Mouse. II. 2. Four males taken August 3, 11, and 13, were referred to *canadensis* by the U. S. Biological Survey. Two males taken August 8 (No. 32193) and August 6 (No. 32197), and an immature male taken July 24 (No. 32198), apparently belong here. This was one of the most common mammals in the mountains.

9. *Eutamias gapperi* (Vigors). Common Red-backed Mouse. II. 2. Two males were taken in the hardwood forest, August 3 and 13. III. 5. Two pair of adults were taken in the aspen zone bordering the mountain top between July 22 and 30. IV. 4. Two adult females were taken August 6 and 7, in the tamarack swamp.

In the Porcupines this mouse is thus seen to frequent a variety of habitats, the hardwood forest, the aspen zone, and the tamarack swamp. Farther south it is more closely restricted to cool swamps.

10. *Fiber zibethicus* (Linn.). Muskrat. IV. A few specimens were seen along Carp river, July 16, by Maclean and McCreary. VII. 1. One specimen was shot at Little Carp Lake, August 7, by Peet.

11. *Zapus hudsonius* (Zimm.). Northern Jumping Mouse. II. 2. An immature male was taken, July 30, in the hardwood forest. VII. 1. An immature male was taken on a rocky bluff along Little Carp river, August 11.

12. *Napaeozapus insignis* (Miller). Woodland Jumping Mouse. II. 2. Three adult males were taken in the hardwoods, between August 4 and 13.

13. *Erethizon dorsatum* (Linn.). Canadian Porcupine. II. 2. An adult female and a pair of young were taken in the hardwood forest between July 23 and August 8. An adult male was shot, July 13, in the hardwood forest near the base of the mountain slope. II. 3. Three females were taken, during July, in the camp clearing. IV. 1, and V. 1. Porcupines were frequently seen, by Ruthven, in the river and lake both during the day and night, eating leaves of the yellow water lily. (This habit is shown in Fig. 19).

This interesting animal was very abundant and of general distribution in the forest.

14. *Lepus americanus virginianus* (Harlan). Southern Varying Hare. II. 3. An adult female was taken, August 9, in the camp clearing. It had evidently been suckling young and was in full summer pelage. The yellowish rufous pelage is much more marked than in the Hares from Isle Royale

(var. *americanus*). The white outer ear margin is only feebly developed. IV. 2. A young female was taken, Aug. 21, in the alders along Carp river. In this specimen the rufous tints are very pronounced on the upper side of the legs and on the pectoral region. The outer margin of the ear is of a distinctly yellowish white color.

15. *Lynx ruffus* (Gueld.). Bay Lynx; Wild Cat. IV. 2. A weathered skull was found in the alder bushes along Carp river, by Ruthven. Trappers reported this species common.

16. *Canis occidentalis* Richardson. Gray Wolf. The trappers reported them common. Near the Porcupines, during the winter of 1902-'03, a trapper was reported to have been treed by a pack. Wolves are reported to have killed many deer near the Porcupines, during the past winter of 1904-'05.

17. *Taxidea taxus* (Schreber). Badger. Trappers reported that occasionally specimens were found.

18. *Mephitis hudsonica* (Rich.). Northern Plains Skunk. II. 3. Young and three adults of both sexes were secured between July 15 and July 30, in the clearing about camp. They were very abundant. A large adult male was taken, July 30, which weighed eight pounds. II. 2. Two specimens were seen by Ruthven along the road through the hardwood forest in September, 1903. On the morning of July 15, Wood found a young skunk in a trap, held fast by the foot. Another of about the same size was observed running about the captive, making frequent attempts to liberate it by biting the trap and pulling with its fore feet.

The skunks found in the traps were not at all violent in their attempts to escape and could easily be approached and killed with a noose.

This is a northern plains and Rocky Mountain species. These northwestern affinities suggest an origin from that direction, by way of Minnesota.

19. *Putorius cicognani* (Bonap.). Small Brown Weasel. Near II. 2. An adult female was taken along a corduroy road through the hardwoods on Section 17. Dr. Merriam wrote in 1896, "It probably also occurs in Northern Michigan and Wisconsin." (N. A. Fauna No. 11, p. 11).

20. *Ursus americanus* Pallas. Black Bear. III. Fresh signs were observed several times on the mountain top, where Allie reports that they often came to feed upon the dwarf and low black blueberries. A cub was observed here, August 5, by Allie.

Trappers reported them quite common in the mountains. An adult bear was killed, July 11, 1904, at Iron river, near the Porcupine Mountains.

21. *Sorex hoyi* Baird. Hoy's Shrew. III. 5. A pair of adult specimens were found in the aspen zone on the mountain on July 29, and August 2. IV. 4. One specimen was taken, August 12, in the tamarack swamp.

This is said to be the smallest North American mammal, and is without doubt the smallest one in Michigan.

22. *Blarina brevicauda* (Say). Large Bob-tailed Shrew. II. 2. Adult shrews of both sexes were taken in the hardwoods during August. II. 3. Three adult females were taken in the clearing. III. 5. Adults of both sexes were taken in the aspen zone surrounding the mountain top.

This shrew and the White-footed Mouse were the most common small mammals in the mountains.

23. *Condylura cristata* (Linn.). Star-nosed Mole. II. 2. A pair of moles was taken, September 2, 1903, by Ruthven, in the hardwood forest, on the mountain slope above the camp. This was about 800 feet above lake level. The line of their tunnel was intersected by a cutting, at the base

of which was an old ore bucket into which they had apparently fallen and drowned. Farther south these animals are closely confined to swamp land.

24. *Myotis subulatus* (Say). Say's Bat. II. 3. Three adult males were taken in camp, August 13, by Peet.

Supplementary Notes.

The following notes were secured by Mr. Wood from Mr. C. E. Haring of Ontonagon, Michigan. Mr. Haring and his brother bought furs from the Indians and trappers between 1860 and 1875. Unless otherwise specified these records refer to Ontonagon County.

Caribou. He had no authentic record of this species.

Moose (Alce). A moose was taken at Union Bay in 1864, and one at Gogebic Lake, Gogebic County in 1863.

Deer. Are more abundant now than formerly.

Beaver. Was yet common in 1860.

Canada Lynx. Was twice as abundant as the Wild Cat. At the present time this species is rare.

Wild Cat. Common.

Panther. Had no experience with them but had heard authentic reports of their occurrence before 1860.

Wolf. Was very common and killed many deer.

Red Fox. Was common; cross fox rare, and silver gray fox very rare.

Otter. Several skins were secured each year about 1860.

Wolverine. At Rockland, five were bought by his brother, J. M. Haring, between 1865 and 1875. This is the only Michigan (?) locality known to the writer. Of course the animals may not have been killed near Rockland, but may have come from a distance. Hon. Peter White, of Marquette, informs me, that, although he has made inquiry for many years, he has been unable to obtain authentic records of the Wolverine in Michigan.

Fisher. Common in 1860; a few skins secured each year.

Martin. Very common in 1860. A few have been taken in recent years.

Mink. Common.

Raccoon. A very few have been taken.

2. ISLE ROYALE.

1. *Rangifer caribou* (Gmelin). Woodland Caribou. An Indian trapper reported that fresh tracks were seen during July, 1904, in a clearing near Siskowit Bay.

2. *Sciurus hudsonicus* Erx. Hudson Bay Red Squirrel. II. Nine specimens were taken in the coniferous forests, both young and adults. The resin on the hair about the mouth shows that both young and adults feed upon the coniferous seeds. Two of the specimens are old females which have reared young, as shown by the scanty hair on the belly; in both, four nipples had been functional. III. A young and adult male were taken in the deciduous forest along the Lake Desor trail.

There is considerable variation in the color of the upper side of the tail in the Isle Royale specimens. The median rufous band is quite pronounced in two specimens.

A winter skin, taken by a trapper, lacks the distinct lateral black line, found in the summer specimens and has a faint rufous stripe extending from the ears to the subterminal black bar on the tail. The shorter tails, with

much less rufous, and the gray color contrast these squirrels with those from the Porcupine Mountains (var. *loquax*).

Mr. Wood frequently saw squirrels feeding upon seeds taken from the cones by first cutting away the lower scales.

3. *Peromyscus canadensis* (Miller). Canadian White-footed Mouse. I and III. Two specimens, both adult females, one from the camp clearing and the other from the Lake Desor trail were determined by the U. S. Biological Survey as of this species. Two immature males, from II, were doubtfully referred to this species, also a male from III. Four specimens, of both sexes, taken at II, are provisionally referred to this species.

4. *Fiber zibethicus* (Linn.). Muskrat. II. A pair of muskrats were taken along the creek through a cedar swamp, other specimens were seen but not taken.

No. 32117. August 29. l. 465., t. 216., h. f. 66. M. M. Peet,

No. 32118. August 24. l. 436., t. 250., h. f. 64. collector.

5. *Lepus americanus* Erx. Hudson Bay Varying Hare. II. Six specimens were taken among the conifers between August 18 and 22. The pelage of three of the specimens is long and loose, the tips of the long hairs on the back are white or very pale yellow; the white hairs give the head a frosted appearance. These are young specimens. The pelage of the other three is more compact, and black hairs are more conspicuous, the upper part of the head is a pale yellowish brown. An adult female, No. 32131, is the largest specimen, and also the darkest; a black mid-dorsal band is fairly distinct. The white outer margin of the ears is very wide and distinct. The upper part of the hind legs is mottled with white and yellow hairs; long, scattered white tipped hairs occur on the end of the body above the tail.

The distinctness of the outer white ear margin varies in this series. The large female, mentioned above, has very long white hair; the three specimens first mentioned, have quite white hair, while in two others the hair is yellowish white.

It is interesting to note that these are a different variety from that found in the Porcupine Mountains, on the south shore (var. *virginianus*). This, like several other members of the biota, shows the close affinities of the Isle Royale types to the adjacent mainland rather than to the remainder of Michigan.

6. *Lynx canadensis* (Kerr). Canada Lynx. Mr. Wood made the following note on lynx skins which he saw at the Washington Club House, at Washington Harbor. "I saw two Lynx skins taken by Chas. Preulx during the winter of 1903 and 1904. Preulx says that this is the only species he has seen on the Island."

7. *Mustela americana* Turton. Eastern Martin. "Mr. Preulx had several martin skins which were taken during the winter of 1903-'04, on the maple ridge, not far from Washington Harbor. These skins were very dark brown with a few scattered white hairs, especially on the under side." (Wood).

8. *Putorius vison* (Schreber). Mink. II. Mr. Wood found a dead specimen in a barrel sunk at a spring. Preulx reported it quite common about the Harbor and along the streams.

9. *Putorius cicognani* (Bonap.). Small Brown Weasel. Mr. Wood reports that Preulx had about 10 skins, and said they were quite common.

10. *Putorius noveboracensis* Emmons. New York Weasel. Preulx had a number of large weasel skins which probably belonged to this species.

11. *Myotis lucifugus* (LeConte). Little Brown Bat. I. One specimen was taken, September 1, by Peet. Wood reports seeing a bat on wing August 22. These were the only bats seen on the island.

No specimens of the Red-backed Mouse, (*Evotomys gapperi*), were taken although they have been reported from Isle Royale by Coues (Mong. N. American Rodentia, p. 145). Of special interest to the student of the Isle Royale fauna is Miller's "Notes on the Mammals of Ontario," (Pro. Bost. Soc. Nat. His., 1897, Vol. 28, pp. 1-44).

This collection from Isle Royale, although a small one, is of interest in several respects. The Isle, it should be remembered, is 45 miles long with a maximum width of 8½ miles, and is about 15 miles from the Canadian shore. As might be anticipated, the affinities of the mammal fauna are with those of the north shore of Lake Superior rather than with those of the south shore. This is shown by the occurrence of the Caribou, Red Squirrel, Varying Hare and, perhaps, the White-footed Mouse.

It should also be borne in mind the relatively recent or postglacial origin of this island fauna. Since the advent of the present fauna we have no reason to believe that this island has ever been connected with the mainland. In other words, the fauna and flora must have reached their present location through the agency of winds, waves, lake currents, over the ice, and, possibly, in the case of some forms, through the influence of man.