THE ANTS OF THE CHICAGO REGION[1]

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The area at the southern end of Lake Michigan is interesting ecologically for the transition between the deciduous forests and the "prairie wedge;" the latter reaches its most eastern extension in Indiana. There is also a well-marked transition between the boreal and the austral portions of the forested land, and semi-arid conditions prevail in the dune localities.

Numerous papers on the geological and ecological features of the region have been published (Salisbury and Alden, 1899; Fryxell, 1927; Cowles, 1899, 1901; Shelford, 1907, 1908, 1911, 1912, 1913; Fuller, 1914, 1925, 1934, 1935; Pepoon, 1927; Peattie, 1930; O. Park, 1930, 1931 a, b, 1935, 1937; Park, Lockett and Myers, 1931; Park and Keller, 1932, Park and Sejba, 1935; Park and Strohecker, 1936; Pearson, 1933; Talbot, 1934; Strohecker, 1937 a, b, 1938; Lowrie, 1942). In addition, studies on the biology of a local aggregation of *Formica ulkei* nests have been contributed (Holmquist, 1928; O. Park, 1929; T. Park, 1929; Dreyer and Park, 1932).

The materials for this report were accumulated while the author was engaged on another program, and are largely qualitative as no exact sampling methods were employed. Yet, to one collecting a specific group in a limited area the degrees of abundance soon become evident, and from such experience an indication of the relative numbers of each species is included in the table of habitat comparisons (Table I; see also Table III). The number of places actually visited is not large, but selected localities representing sixteen major habitats have been investigated repeatedly.[2]

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[1]The excellent study by Dr. Mary Talbot on adaptive differences among certain *Formicae* and the ecological distribution of ant species in the vicinity of Chicago, Illinois, has led the author to undertake similar field studies and to record the results with the view of adding new data for the region. It is hoped this report will be of aid to those wishing identification of the local ants.

[2]I wish to acknowledge indebtedness to the following persons whose help has been greatly appreciated. Dr. Talbot afforded much early assistance with the taxonomy of ants and the checking of determinations. Dr. Neal A. Weber has graciously supplied the names for certain species of *Myrmica*. Dr. Donald C. Lowrie, and others whose names appear in connection with the localities collected, have added many specimens. My sincere thanks are extended to the Department of Zoology for providing various facilities, and to my wife, Ella Virginia Gregg, I am especially grateful for aid in numerous instances and for many specimens. To Mr. R. W. Miller belongs the credit for preparation of the photographs.

THE CHICAGO REGION

Prairies lie west and southwest of Chicago, and ant mounds are everywhere visible although the number of species is low. Eight species are listed but only *Formica cinerea neocinerea* is abundant, and probably ninety-five per cent of the nests are constructed by this form. *Polygerus rufescens breviceps*, one of the rarest of ants, is present locally as a parasitic (dulotic) species on this vast assemblage of *cinerea* nests.

At the junction of prairie and forest a rich parkland and savanna is found, and this is shown by the interdigitation of grasslands on the upland with trees along the watercourses. Forest margin and meadow are important habitats and such ants as the yellow *Lasii*, *Formica ulkei* and *Formica sanguinea* can be expected to occur. It may be surmised that the total amount of forest-prairie ecotone is larger than formerly, and correlated with this may be an increase in the number of ant species. Certain inhabitants of the deep woods may be rarer than when climax forests were continuous. The ant, *Proceratium silaceum*, is probably an illustration of this tendency (Kennedy and Talbot, 1939).

On the terminal and ground moraines and outwash deposits to be seen at Palos Park, Orland Park, New Lenox, Volo, Aurora, Illinois, and Lake Geneva, Wisconsin, there are stands of oak forest. Black, red and white oaks are mixed in varying proportions, and the ants *Prenolepis imparis*, *Formica fusca subaenescens*, *F. f. subsericea* and *Lasius niger alienus americanus* are common members of the community. Along streams and ravines elm and hickory are added indicating more mesic conditions (e.g., at New Lenox, Mount Forest Island at Palos and at Hadley, Illinois), and the ant *Camponotus herculeanus pennsylvanicus ferrugineus* often makes its appearance in these situations.

The oak-hickory forest is perhaps the physiographic climax for some localities, but beech seems to be restricted to the more humid stations in northern Indiana and southern Michigan. This lake-border region marks a portion of the western boundary of the beech-maple-hemlock cover type, and stands of this climax were studied at Warren Woods (Lakeside), Michigan, and at Smith, Indiana, both on mixtures of silt and clay. The ants most strikingly associated with the beech-maple forest are the several species of the *Aphaenogaster fulva* complex, *Myrmecina graminicola americana* and *Leptothorax longispinosus*.

Floodplain forests on argillaceous substrata flank the numerous rivers, and collections were made in the Salt Creek Forest Preserve of Chicago (elm and oaks), and beside Coffee Creek near Chesterton, Indiana (elm-oak-maple-basswood). The ants of this community do not differ radically from those of the oak and oak-hickory types, but the single nest of *Strumigenys pergandei* was collected from a log in the Coffee Creek woods.

The area about the head of Lake Michigan originally was one of extensive marshes, but unfortunately, much of this land has been drained. In the marshes of the Palos hills, the temporary marshes of the low prairie southwest of Chicago and in the Lake Calumet district, the prairie ant, *Formica c. neocinerea*, is the most obvious resident.

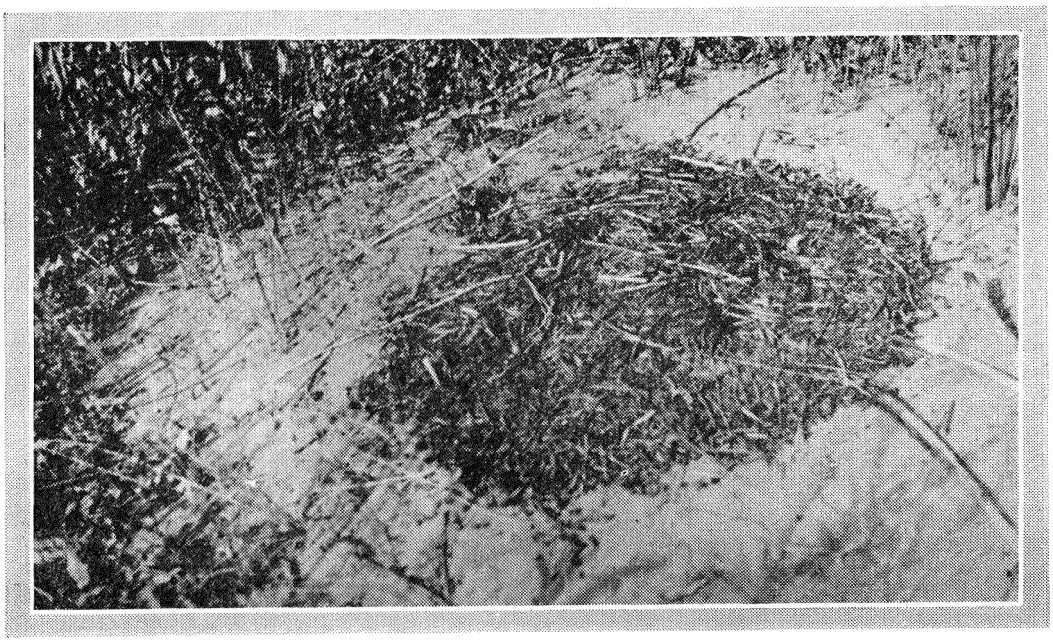

FIG. 1. Low, thatch covered mound of *Formica rufa aggerans* Wheeler in the dunes at Waukegan, Illinois. Photo by Zora Ivaska.

FIG. 2. Masonry dome of *Formica ulkei* Emery from the local aggregation of these ants at Palos Park, Illinois. Shows differential angles of slope oriented with reference to the sun; longest slope faces south. Photo by A. S. Windsor.

This may be due to its capacity for building high conical domes which could stand above the water during periodic inundation, but the author did not succeed in proving this supposition. In drier prairies, however, the mounds were much lower. In the senescent marshes of the Gary Pond Series at Hammond, Indiana, were found several nests of *Formica ulkei*, and even more astonishing were a number of large formicaries of *Lasius umbratus mixtus aphidicola* (see discussion of this species below).

Bogs are infrequent but one mid-stage tamarack bog in the lake region near Volo, Illinois, was visited several times and a senescent bog at Dune Acres, Indiana, on at least one occasion. The ant fauna of bogs is, as far as observed, rather meager, although from these the majority of *Dolichoderus* were taken. These ants nested between the leaves of dead *Typha* plants, and other species were in rotting wood. Two *Myrmicae* (*brevinodis* and *brevispinosa*) actually nested in the bog mat and could be located usually by standing at one place until the sphagnum sank causing the ants to retreat to the surface ahead of the rising water.

Three sandy areas in the Chicago Region, each with certain distinctive features, have been described at some length (Lowrie, 1942). The classical strip of dunes along the southern and eastern shore of Lake Michigan is the most diversified, and was examined at Pine, Miller, Ogden Dunes, Dune Acres (Mineral Springs), and Tremont, Indiana, and at Lakeside, Michigan. It includes substantial plant and animal successions which correlate with changing physiographic conditions progressing inland from the lake (Cowles, Shelford, O. Park, Strohecker). The typical sequence at Ogden presents three levels of beach (lower, middle and storm beach), foredunes (formed by sand-binding grasses, *Ammophila* and *Calamovilfa*), cottonwood dunes (height correlated with this species of tree), Jack and white pine pioneer woodlands or meadows of *Andropogon*, black oak woodlands and in sheltered pockets behind the high sand, mesophytic forests of red-white oak, maple, basswood, et cetera, which approach closely the beech-maple climax. Outstanding examples of ants which parallel this series are (1) *Monomorium minimum*, *Lasius niger neoniger* and *Pheidole bicarinata* on the upper beach and the two subsequent pioneer stages, (2) *Iridomyrmex pruinosus analis*, *Paratrechina parvula* and *Crematogaster lineolata* in the evergreen zone, (3) a long list of species of which the *Formica pallidefulva* group is almost diagnostic for the black oak woodland, and (4) a group of ants similar to those in the beech-maple forest with the conspicuous addition of *Lasius flavus nearcticus* and *Formica truncicola obscuriventris* in the mesophytic ravine subclimax. Some species range over two or more of the plant associes, but we can recognize the following trends. Representatives of the tropical and somewhat xerophilous genera *Monomorium* and *Pheidole* are the predominant species in the hot, semi-arid conditions of the open sand whether on the usual dune sequence or in stations where the plant cover has been removed and the dunes rejuvenated. Typical deciduous forest members increase directly with the increase of mesophytism, and an abrupt change of this sort is noted in passing from the pines into the oaks. The occasional presence of *pallidefulva* species in the pine

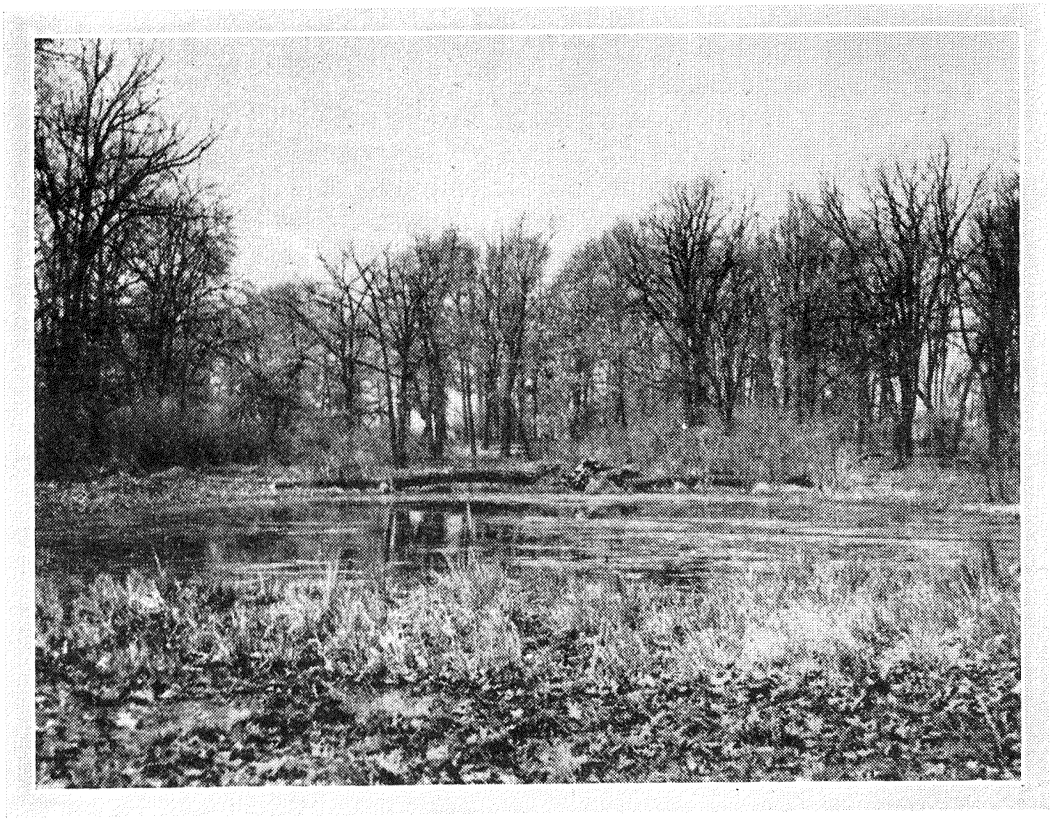

FIG. 3. Mixed oak forest and vernal pond at Palos Park, Illinois. Photo by Ecology Class, 1933.

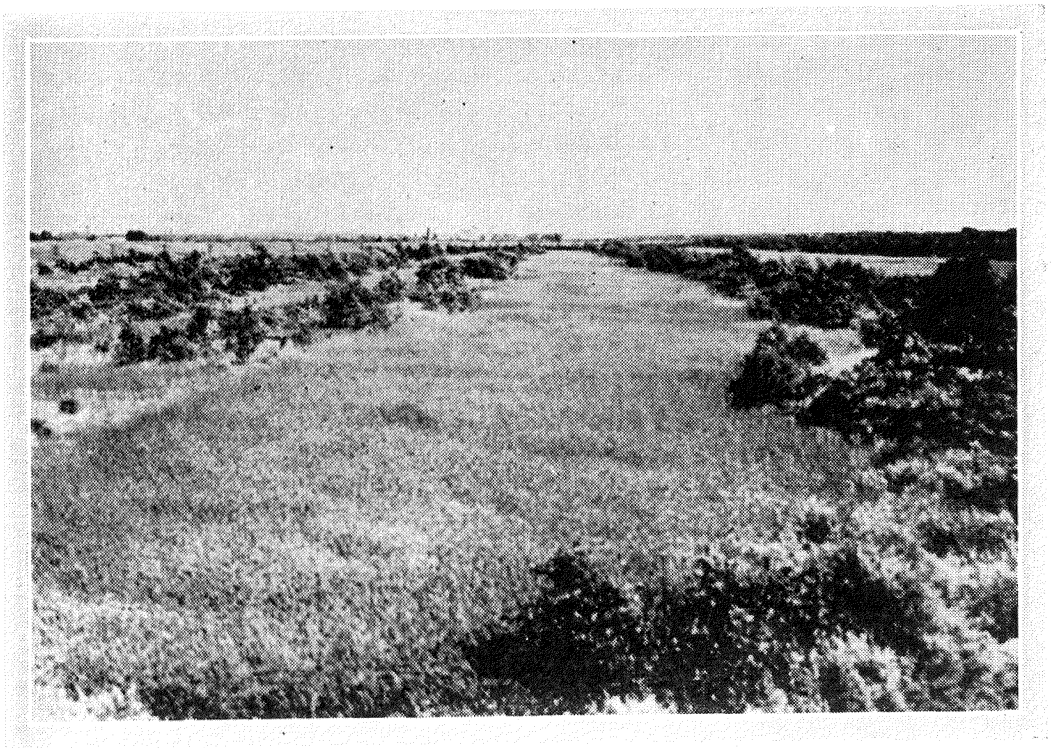

FIG. 4. The Gary Ponds. View eastward from the embankment of the Elgin, Joliet and Eastern Railroad where it crosses Highway Twelve, showing the successional series of parallel ridges and depressions formed in Lake Chicago as sand bars and land-locked pools. Photo by Ecology Class, 1938.

woods may be an indication of environmental changes among the pines which culminate in their replacement by black oaks. Many of these tendencies are observable in Table I.

At Tremont the subclimax is well developed over much of the State Park, but the succession seems to be partially destroyed by an eroding shore which has reached far enough to expose some of the mesophytic forests on old established dunes. The lush growth ends sharply above steep, lakeward slopes with foredunes at the base. At Lakeside undercutting and slumping from wave action have produced high cliffs of sand which stand sixty to eighty feet above the water. The pattern in the Indiana dunes is further complicated by blowouts in which the terrestrial succession may start anew, and if the surface has been lowered beyond the water-table, pannes of open water and marshes develop.

Near Pine, Indiana, the ant species are identical with those in the pioneer stages of the other dune localities. The series of linear ponds alternating with former sand bars of Lake Chicago is still intact, but it is lamentable the first three or four of these have been filled by steel mill wastes. As previously noted, some of the oldest ponds which are now drying cattail swamps were visited at Hammond.

In the dunes of the Kankakee River basin ten miles south of Momence, Illinois, the ants are very similar to those of the other black oak forests on sand, but *Pheidole morrisi*, *Formica pallidefulva schaufussi* and *Formica sanguinea subintegra* are unusually abundant. The dunes are low and the vegetation consists of oak woods and meadows of mixed grasses.

Along the shore north of Waukegan, Illinois, the ants are again similar to those of the Indiana and Kankakee dunes except that *Formica neogagates* is considerably more abundant and the rare *Lasius latipes* was secured there. Almost all records of *Pheidole pilifera* were obtained from this station also. The vegetation is characterized by sand-binding grass, black oak ridges, Scotch pine and spreading marshes.

Within the various forest habitats are several strata, but only the subterranean and ground strata are important as places of abode for ants. They search in the trees for aphid honey-dew and capture much insect prey, but unlike tropical and subtropical species, seldom seem to build nests above the ground. Colonies either have galleries in the soil with craters or masonry domes at the surface, or are log inhabiting. Frequently, underground nests open beneath the protection of bark fragments, sticks or boards. Hypogaeic species are to be expected under stones or boulders. One colony of *Leptothorax* was found in the bark of a live tree, and this genus occasionally uses the fallen acorns of black oaks. The subterranean yellow *Lasii* forage actively above ground at Smith during the nocturnal period, and species of *Camponotus* are also abroad in great numbers at night.

The log niche is well occupied in forest and woodland, and runways may be excavated partly in soil and log. A number of stages in the process of wood decay can be recognized. Shelford designated four (1913, pp. 238, 246), while Talbot lists six and for the most part these may be adhered to. Stage 1 (dead tree still intact), Stage 2 (bark loosened), Stage 3 (sapwood soft), Stage 4 (heartwood soft), Stage 5

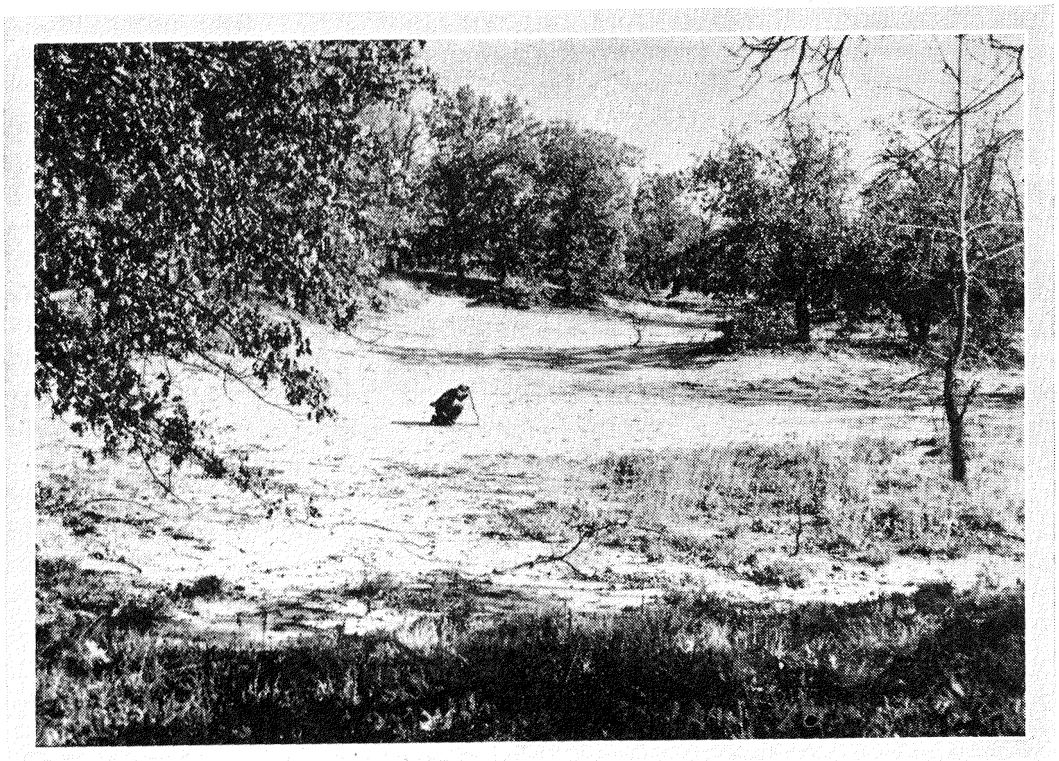

FIG. 5. Black oak dunes in Kankakee County near Momence, Illinois. Photo by R. W. Miller.

FIG. 6. Beech-maple forest at Warren Woods near Lakeside, Michigan. Photo by Ecology Class, 1940.

(log crumbling), Stage 6 (merging with soil). Though a single ant species may be present in more than one stage, the following list serves to show that in logs the optimum conditions for different forms vary directly as the wood disintegrates, and indeed, this process is often hastened by the ants themselves. *Crematogaster lineolata* and *C. l. cerasi* are common types in the early phases. *Camponotus herculeanus* spp. alone seem able to tunnel in live trees or fresh wood, and in logs all *Camponotus* remain until the wood is honeycombed but not collapsed. *Aphenogaster fulva* spp. and *A. tennesseensis* with *Formica fusca subaenescens* also are most frequent in the middle stages of the succession. There is a tendency for hypogaeic species (which regularly require a moist environment) to be present in the middle and late stages when the wood is wet and spongy. Examples of these are the *Lasius umbratus* group and *Ponera coarctata pennsylvanica* (Table II).

These stages in log decay are convenient categories, but instances are encountered where it is arbitrary to assign a stage as the process is a continuous one. Phases three, four and five are the most confusing, and different sections of a large log show varying degrees of decomposition. Savely (1939) describes a fairly close connection between the stage of decay and the number of years duration of the process, but one difficulty lies in the fact that the rate of disintegration varies decidedly with different woods.

The delineation of ant-plant communities can be ascertained from the accompanying tabular data. Since ants are closely associated with soil and are somewhat fixed in position by rather permanent nest locations, it follows that modification of the ground stratum by the plant cover automatically affects the tolerances of ant species. In the list presented below the communities are labeled by the ant names most characteristic of them. Common and widely distributed species are not considered good indices.

ANT-PLANT COMMUNITIES

Prairie-meadow-pasture: *Formica cinerea neocinerea* and *Myrmica lobicornis fracticornis* community.
Foredune-cottonwood: *Monomorium minimum* and *Pheidole bicarinata* community.
Coniferous dune: *Iridomyrmex pruinosus analis* and *Paratrechina parvula* community.
Black oak dune: *Formica pallidefulva* spp., *Aphaenogaster treatae* and *Leptothorax texanus* community.
Mesophytic dune ravine forest: *Formica truncicola obscuriventris* and *Lasius flavus nearcticus* community.
Mixed oak forest: *Prenolepis imparis* and *Stenamma brevicorne* community.
Oak-hickory forest: *Camponotus herculeanus pennsylvanicus ferrugineus* community.
Beech-maple forest: *Aphaenogaster fulva* spp., *Myrmecina graminicola americana* and *Leptothorax longispinosus* community.
Bog forest: *Myrmica brevinodis* spp. and *Dolichoderus* spp. community.
Floodplain forest: *Strumigenys pergandei* community.
Forest margin: This community appears to be too variable to have any ant species restricted to it. (See discussion of *F. ulkei*.)
Marsh: Has only sporadic colonies of ants and none characteristic.
Railway and roadside: These habitats may be considered special extensions of the prairie and forest margin communities.

The importance of sand versus clay in the Chicago Region is not neglected but the differences among vegetation types are emphasized.

In the later stages of plant succession the nature of the soil (so modified by the plant types) probably has a minor effect upon the distribution of ants. Many species are log or humus dwellers and are thus removed

FIG. 7. The Region of Chicago. Permission has been granted to use this modification of "Plate I" from F. M. Fryxell's, "The Physiography of the Region of Chicago," published by the University of Chicago Press. (Three Rivers, Michigan, is too far east to be conveniently included on this map, and La Salle, Illinois, and Madison, Wisconsin, are too far west, but all are legitimately cited as localities for the region.)

from direct contact with the mineral substratum. Of the sixty-one ants present in black oak dunes and mixed oaks on clay, twenty-three species (37.7%) are common to both forests despite wide differences in soil. In comparing the sixty ants present in black oak dunes and

TABLE I

DISTRIBUTION OF ANTS

SPECIES	Prairie	Meadow	Pasture, Field	Forest margin	Foredune	Cottonwood dune	Jack pine dune	Black Oak dune	Mesophytic ravine	Oak Forest	Oak-hickory Forest	Beech-maple Forest	Floodplain Forest	Marsh	Bog Forest	Railway and Roadside	House	Log Stages	Under Stones, Logs, Wood, etc.	Abundance
1. *Ponera coarctata pennsylvanica*			x	x				x		x	x	x	x					2, 3, 4, 5, 6	s	C
2. *Ponera inexorata*																				R
3. *Proceratium croceum*																			dung	R
4. *Stigmatomma pallipes*									x	x	x							2, 3	l, dung	R
5. *Aphaenogaster fulva*				x				x		x		x			x			2, 3, 4, 5		U
6. *Aphaenogaster fulva aquia*			x						x	x	x	x	x		x			3, 4, 5	s, l, w	C
7. *Aphaenogaster fulva aquia picea*									x			x						3, 4, 5	w	U
8. *Aphaenogaster tennesseensis*				x				x		x	x	x						1, 2, 3, 4		C
9. *Aphaenogaster texana carolinensis*												x						5		R
10. *Aphaenogaster treatae*								x										3	w	U
11. *Crematogaster lineolata*							x	x				x						3, 4	l	C
12. *Crematogaster lineolata cerasi*			x	x			x	x		x	x	x	x					2, 3, 4, 5	s, l, w	A
13. *Leptothorax curvispinosus*		x						x		x	x	x	x					2, 3, 4, 5	acorn	C
14. *Leptothorax curvispinosus ambiguus*	x									x										R
15. *Leptothorax fortinodis*												x	x					1, 3 (?)		U
16. *Leptothorax longispinosus*												x						1, 2, 3, 4, 5		U
17. *Leptothorax texanus*								x												U
18. *Monomorium minimum*					x	x	x	x												C
19. *Monomorium pharaonis*																	x			R
20. *Myrmecina graminicola americana*									x			x	x					4, 5	w	R
21. *Myrmica brevinodis brevinodis*			x												x				s	U
22. *Myrmica brevinodis brevispinosa*															x					U
23. *Myrmica lobicornis fracticornis*			x					x		x									s	A
24. *Myrmica punctiventris*									x			x						5		U
25. *Myrmica sabuleti americana*							x	x					x							A
26. *Myrmica schenki emeryana*								x		x			x						w	U
27. *Pheidole bicarinata*		x		x	x	x	x	x										2, 4, 5	w	C
28. *Pheidole morrisi*								x												U
29. *Pheidole pilifera*					x		x	x												U
30. *Solenopsis molesta*		x	x	x				x		x	x	x	x					2, 3, 5	s	C
31. *Stenamma brevicorne*		x								x								3 (?)		U
32. *Stenamma brevicorne schmitti*								x	x										w	R
33. *Strumigenys pergandei*													x					4		R
34. *Tetramorium caespitum*																	x			R
35. *Dolichoderus mariae*															x					R
36. *Dolichoderus plagiatus*															x					R
37. *Dolichoderus plagiatus inornatus*										x					x				Typha	U
38. *Dolichoderus plagiatus pustulatus*															x				Typha	R
39. *Dorymyrmex pyramicus flavus*					x															R
40. *Iridomyrmex pruinosus analis*							x	x												C
41. *Tapinoma sessile*			x	x						x	x	x	x		x			1, 2, 3, 4, 5	s	A
42. *Brachymyrmex heeri depilis*				x				x		x									s	U
43. *Camponotus caryae caryae nearcticus*								x				x	x					2, 3, 4		U
44. *Camponotus caryae caryae tanquaryi*										x		x								R
45. *Camponotus caryae discolor clarithorax*					x	x														U

TABLE I—(*Continued*)

SPECIES	Prairie	Meadow	Pasture, Field	Forest margin	Foredune	Cottonwood dune	Jack pine dune	Black Oak dune	Mesophytic ravine	Oak Forest	Oak-hickory Forest	Beech-maple Forest	Floodplain Forest	Marsh	Bog Forest	Railway and Roadside	House	Log Stages	Under Stones, Logs, Wood, etc.	Abundance
46. *Camponotus caryae subbarbatus*	....	....	....	....	....	....	....	....	....	....	....	x	....	....	....	....	....	3, 4	.....	R
47. *Camponotus castaneus*	....	....	....	....	....	....	....	x	....	....	....	....	....	....	....	....	....	3	1	U
48. *Camponotus castaneus americanus*	....	....	....	....	....	....	....	....	....	x	x	....	....	....	....	....	....	.....	.....	U
49. *Camponotus herculeanus ligniperda noveboracensis*	....	....	x	x	....	....	....	x	....	x	....	x	....	....	x	....	....	2, 3, 4	.....	C
50. *Camponotus herculeanus pennsylvanicus*	....	....	....	....	....	....	x	x	x	x	x	x	x	....	....	....	....	2, 3, 4, 5	1	U
51. *Camponotus herculeanus pennsylvanicus ferrugineus*	....	....	....	....	....	....	....	....	....	x	x	x	....	....	....	....	....	3, 4, 5	.....	A
52. *Formica cinerea cinerea neocinerea*	x	x	x	x	....	....	....	x	....	....	....	....	....	x	....	x	....	.....	w	U
53. *Formica exsectoides exsectoides*	....	x	....	x	....	....	....	....	....	x	....	....	....	....	....	x	....	.....	.....	A
54. *Formica fusca fusca subaenescens*	....	....	....	....	....	....	....	....	x	x	....	....	....	....	x	....	....	2, 3, 4, 6	.....	U
55. *Formica fusca fusca subsericea*	x	....	x	....	....	x	....	x	x	x	x	....	x	x	x	x	....	5	.....	A
56. *Formica neogagates neogagates*	....	....	....	....	....	....	....	x	x	....	....	....	....	....	....	....	....	.....	.....	U
57. *Formica neogagates lasioides vetula*	....	....	x	....	....	....	....	x	....	....	....	....	....	....	....	....	....	.....	.....	U
58. *Formica nepticula*	x	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	R
59. *Formica pallidefulva nitidiventris*	x	x	x	....	....	....	....	x	....	x	....	....	....	....	....	....	....	.....	1, w	C
60. *Formica pallidefulva nitidiventris fuscata*	....	x	....	....	....	....	....	x	....	x	x	....	....	....	....	....	....	3	s	U
61. *Formica pallidefulva schaufussi*	....	....	....	x	....	....	x	x	....	....	....	....	....	....	....	....	....	5	w	U
62. *Formica pallidefulva schaufussi incerta*	....	....	....	....	....	....	x	x	....	x	....	....	....	....	....	....	....	3, 4	1	U
63. *Formica rufa aggerans*	....	....	....	....	....	....	....	x	....	x	....	....	....	....	....	....	....	.....	.....	C
64. *Formica rufa aggerans melanotica*	....	....	....	....	....	....	....	x	....	....	....	....	....	....	....	....	....	.....	.....	C
65. *Formica sanguinea aserva*	....	....	....	....	....	....	....	....	....	x	....	....	....	....	....	....	....	.....	.....	U
66. *Formica sanguinea rubicunda*	....	....	....	....	....	....	....	x	x	x	....	....	....	....	....	....	....	5	1	C
67. *Formica sanguinea subintegra*	x	....	....	....	....	....	....	x	....	....	....	....	....	....	....	....	....	4	.....	C
68. *Formica sanguinea subnuda*	....	....	....	....	....	....	....	....	....	....	x	....	x	....	....	....	....	.....	.....	R
69. *Formica truncicola integra*	x	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	R
70. *Formica truncicola obscuriventris*	....	....	....	....	....	....	....	x	x	x	....	....	....	x	....	....	....	.....	.....	R
71. *Formica truncicola obscuriventris gymnomma*	....	....	....	....	x	....	....	x	....	....	....	....	....	....	....	....	....	.....	1	R
72. *Formica ulkei*	....	....	x	x	....	....	....	x	....	x	....	....	....	x	x	....	....	.....	.....	R
73. *Lasius brevicornis*	....	x	....	....	....	....	....	x	....	....	....	....	....	....	....	....	....	.....	1	A
74. *Lasius claviger*	....	....	x	....	....	....	....	x	....	....	x	....	....	....	....	....	....	2	s	C
75. *Lasius flavus nearcticus*	....	....	....	....	....	....	....	x	x	....	....	x	....	....	....	....	....	2, 3	s, 1	R
76. *Lasius interjectus*	....	....	....	x	....	....	....	....	....	x	....	....	....	....	....	....	....	.....	s	R
77. *Lasius latipes*	....	....	....	....	....	....	....	x	....	....	....	....	....	....	....	....	....	.....	.....	R
78. *Lasius niger alienus americanus*	....	....	x	x	....	....	....	x	x	x	x	x	x	....	x	....	....	2, 3, 4, 5	s, 1	C
79. *Lasius niger neoniger*	....	....	x	x	x	x	x	x	....	x	....	....	x	....	x	x	....	4, 6	s, 1, w	A
80. *Lasius umbratus mixtus aphidicola*	....	....	....	x	....	....	....	....	x	x	x	x	x	x	....	....	....	3, 4, 5	1, w	C
81. *Lasius umbratus mixtus speculiventris*	....	....	x	....	....	....	....	....	....	....	....	x	....	....	....	....	....	3	s	C
82. *Paratrechina parvula*	....	....	....	....	....	....	x	x	....	....	....	....	....	....	....	....	....	3	1, w	C
83. *Prenolepis imparis*	....	....	x	....	....	....	....	x	....	x	x	....	....	....	....	....	....	.....	.....	C
84. *Prenolepis imparis testacea*	....	....	....	....	....	....	....	x	....	x	....	....	....	....	....	....	....	.....	.....	R
85. *Polyergus rufescens breviceps*	x	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	R
Total	8	9	18	17	7	5	12	47	15	37	18	25	18	5	15	4	2			
Percentage	9.4	10.6	21.2	20.0	8.2	6.0	14.1	55.3	17.6	43.5	21.2	30.0	21.2	6.0	17.6	4.7	2.4			

beech-maple forest on silt and clay, twelve (or 20%) are common to both despite wide differences in soil. The reduction in the percentage of common forms between these two habitats seems to parallel important differences in vegetational type. *Prenolepis imparis*, though noticeably dependent on the clay of morainic oak woodland for the construction of domed galleries, has been found also in the oak dunes. Oak forests, regardless of type, have the richest assemblage of species, and this might be traced to the variety of niches. Much humus is present, trees and shrubs add important strata, logs are numerous, yet openings appear where meadow conditions develop and there are even patches of bare earth.

TABLE II

	USE OF LOGS BY ANT SPECIES					
Stage of decomposition	1	2	3	4	5	6
Number of ant species	4	17	29	24	20	3
Perecntage	10.0	42.5	72.5	60.0	50.0	7.5

TABLE III

	ABUNDANCE OF ANT SPECIES			
Density of ant species	A Abundant	C Common	U Uncommon	R Rare
Number of ant species	9	19	31	26
Percentage	10.6	22.3	36.5	30.6

GEOGRAPHIC ORIGINS

The upper Mississippi Valley is similar in species composition to the St. Lawrence Drainage and the North Atlantic States. Most of the ant species in Connecticut, for instance, are found at least as far west as Illinois, Indiana and Wisconsin, and others cross the continent. *Formica, Lasius, Myrmica, Stenamma* and *Polyergus* which are Holarctic, and *Camponotus* which is cosmopolitan, contain over half (48) of the species known for the area. Nevertheless, the vegetational transitions in the Chicago Region are matched by ant species or genera with overlapping ranges. Some western members of the above genera have spread into Illinois, and several species have migrated southward from the Canadian Zone. A noteworthy southern invasion is represented by thirteen genera (of the twenty-five listed for Chicago) which are tropical in distribution. Since some of these are large groups with many tropical forms described, the one or few species in each characterizing our fauna indicates that these genera are near the limit of their northern penetration. Illustrations of the zoögeographic trends are briefly outlined below. Consult Wheeler's works (1917b, etc.) for the distribution of North American Formicidae.

From the East:

Several eastern species seem to be rarer in the middle west.
Ex. *Formica exsectoides* and *Lasius (A.) claviger.*
Tetramorium caespitum (introduced from Europe).

From the West:

Formica cinerea neocinerea.
Polyergus rufescens breviceps.
Myrmica brevinodis brevispinosa.

From the North:

Formica ulkei.
Camponotus herculeanus ligniperda noveboracensis.

From the South:

Pheidole (t)	*Leptothorax*	*Stigmatomma*
Solenopsis (t)	*Iridomyrmex*	
Crematogaster (t)	*Dorymyrmex*	
Monomorium (t)	*Dolichoderus*	
Strumigenys (t)	*Ponera*	
Aphaenogaster	*Proceratium*	

(All these genera are tropical; "t"—tropicopolitan.)

Myrmica brevinodis sulcinodoides Emery and *Formica perpilosa* Wheeler have been listed for the area by Talbot but I have not relocated them. *Camponotus caryae caryae minutus* Emery is difficult to distinguish from *nearcticus* and may not deserve formal recognition. *Iridomyrmex humilis* Mayr was present at the University Laboratory in 1934 but it has not been seen in recent years.

In addition to the seventy ants recorded by Dr. Talbot, twenty-two others have been collected, and doubtless more remain undiscovered. The following keys modified from various papers by Wheeler (1903a, b, 1905, 1910a, b, c, 1913, 1916, 1922), Smith (1931, 1936) and Cole (1940), trace the species represented in the author's collection.

Formicidae

KEY TO THE SUBFAMILIES[3]

1. Anal opening circular and terminal, usually bounded by a fringe of curved hairs (p. 469) ..... **FORMICINAE**
   Anal opening a narrow slit, ventral in position 2
2. Pedicel composed of two segments; sting usually well developed (p. 460), **MYRMICINAE**
   Pedicel of only one segment 3
3. A marked constriction between the first and second gastric segments (p. 459) ..... **PONERINAE**
   No constriction between the gastric segments; anal slit transverse (p. 467), **DOLICHODERINAE**

Ponerinae

KEY TO THE GENERA

1. Abdomen strongly decurved and pointing somewhat forward (p. 460), **Proceratium**
   Abdomen of the usual shape (not decurved) 2
2. Mandibles triangular, teeth minute (p. 460) ..... **Ponera**
   Mandibles linear, teeth conspicuous and bidenticulate (p. 460) .. **Stigmatomma**

[3]Key to the workers. The subfamilies Cerapachyinae, Dorylinae and Pseudomyrminae are not represented in the Lake Region.

Proceratium Roger

Proceratium croceum (Roger).—The single record of this species was obtained by Mr. Henry Dybas near the periphery of the area. Its presence beneath dung appears unusual as it is expected to occur in old logs.

Localities: Hamlet, Ind. (Dybas).

Stigmatomma Roger

Stigmatomma pallipes (Haldeman).—In the few places where I have collected this ant it seems always to be restricted to woodland areas and to be either in logs or under them. Two records of its occurrence are with other ants or at least in their immediate vicinity, namely: *Lasius* (*A.*) *claviger* and *Formica ulkei*. One specimen was found in cow dung. None but isolated individuals have been secured in each case despite efforts to locate the nests.

Localities: Palos Park, Ill. (R. Wheeler, Gregg); Ogden Dunes, Ind. (Lowrie, Gregg); Hamlet, Ind. (Dybas); Three Rivers, Mich.

Ponera Latreille

KEY TO THE SPECIES

Color brownish black; external borders of mandibles straight (p. 460), **coarctata pennsylvanica** Buckley

Color ferruginous yellow; external borders of mandibles sinuate (p. 460), **inexorata** Wheeler

Ponera coarctata pennsylvanica Buckley.[4]—In contrast to *Stigmatomma*, this ant is very common in certain habitats. The greatest number of nests was found in deep woods where the galleries ramified under bark or beneath the moss covering old logs. In one instance, many colonies were taken from under flat stones in a pasture. Winged males and females can be obtained in the latter part of August and early September.

Localities: New Lenox, Ill.; Hadley, Ill.; Palos Park, Ill.; Orland Park, Ill.; Momence, Ill.; Waukegan, Ill.; Volo, Ill.; Carlé Woods, Ill. (O. Park); Hodgkins, Ill. (Miller); Chicago, Ill. (Miller); Chesterton, Ind.; Smith, Ind.; Starke Co., Ind. (Dybas); Lakeside, Mich.

Ponera inexorata Wheeler.—According to Smith, this ant ranges from "Costa Rica through Mexico into the southern section of the United States." Its presence so far north seems difficult to explain, but its distribution is as yet uncertain owing to the meagre records of its occurrence. Its yellowish color serves easily to distinguish it.

Localities: Lake Geneva, Wis. (Lowrie).

Myrmicinae

KEY TO THE GENERA

1. Antennae 6-jointed; head cordiform (p. 461) ..... **Strumigenys**
   Antennae with more than six joints 2
2. Antennae 10-jointed, with a club composed of two joints (p. 461) .. **Solenopsis**
   Antennae 11- or 12-jointed 3
3. Postpetiole articulated to the dorsal surface of the gaster which is dorsally flattened and pointed at the tip (p. 461) ..... **Crematogaster**
   Postpetiole articulated in the usual place at the anterior end of the gaster .. 4

[4]Unless otherwise stated, the third name in trinomials is subspecific.

4. Posterior margin of clypeus elevated into a ridge bordering the antennal fossa 5
   Posterior margin of clypeus not thus elevated 6
5. Portion of clypeus in front of antennal fossa very narrow and reduced to a mere ridge (p. 462) ..... **Myrmecina**
   Portion of clypeus in front of antennal fossa narrow but not reduced to a mere ridge (p. 462) ..... **Tetramorium**
6. Workers strongly dimorphic (worker and soldier castes); antennae with a 3-jointed club (p. 462) ..... **Pheidole**
   Workers monomorphic; antennal club indistinct or not longer than the remainder of the funiculus 7
7. Last three antennal joints shorter than the remainder of the funiculus, and not forming a distinct club 8
   Last three antennal joints about equal to the remainder of the funiculus, and forming a distinct club 10
8. Posterior tibial spurs pectinated; body coarsely sculptured (p. 463) .. **Myrmica**
   Posterior tibial spurs not pectinated; body smooth or finely sculptured 9
9. Small, hypogaeic species with vestigeal eyes and two keels on the clypeus, (p. 464) ..... **Stenamma**
   Medium sized epigaeic species with well developed eyes and no clypeal keels (p. 465) ..... **Aphaenogaster**
10. Clypeus armed with a pair of ridges which project forward in the form of teeth; epinotum without spines or teeth (p. 466) ..... **Monomorium**
    Clypeus unarmed; epinotum armed with spines or teeth (p. 466) .. **Leptothorax**

Strumigenys F. Smith

Strumigenys (*Cephaloxys*) *pergandei* Emery.—Eleven specimens form a single record of this minute ant taken from the same rotting log as a large colony of *Lasius umbratus mixtus aphidicola*. The galleries of the two species were in very close proximity but it could not be ascertained whether they intercommunicated. The habitat is a flood-plain forest with a rather wet floor, and the nests were located in the upper side of the log.

Localities: Chesterton, Ind. (Talbot, Gregg).

Solenopsis Westwood

Solenopsis (*Diplorhoptrum*) *molesta* (Say).—This species is discovered frequently in the mound nests of *Formica ulkei* and *Formica exsectoides* where it occupies minute galleries tunneled in the walls separating the runways of the larger species. Of special interest is the disparity in size of the castes; the female is many times larger than her worker progeny. This condition has been traced to the lestobiotic tendencies of the insect. It is by no means dependent upon the thieving habit for sustenance, however, as flourishing nests with numerous alate females have been observed far from any large host species.

Localities: Waukegan, Ill.; Palos Park, Ill.; Chicago, Ill.; New Lenox, Ill.; Momence, Ill.; Dune Acres, Ind.; Three Rivers, Mich.; Lakeside, Mich.; Ogden Dunes, Ind.

Crematogaster Lund

KEY TO THE SPECIES

Dark brown to piceous black in color; hairs on thoracic dorsum numerous (p. 462) ..... **lineolata** Say
Paler in color, thorax reddish; hairs on thoracic dorsum restricted to the humeral angles (p. 462) ..... **lineolata cerasi** Fitch

Crematogaster lineolata Say.—With one exception this ant was found in dry, open woodland of the pine or black oak types, and it is a common inhabitant of the middle stages of log decay. Judging from the specimens in the collection, it is not as frequently encountered nor does it occur in as many seral units as the next species. Winged males have been captured in October.

Localities: Momence, Ill.; Waukegan, Ill.; Miller, Ind.; Dune Acres, Ind.; Ogden Dunes, Ind.; Lakeside, Mich.

Crematogaster lineolata var. *cerasi* Fitch.—Present in most environments from pasture to climax forest and all but the earliest and latest periods in the disintegration of logs or stumps. Laboratory populations of these *Crematogasters* have built small quantities of carton from pieces of moist sponge placed in the nests, but in the field no indications of aerial construction have been detected. A closely related species in Florida (*Crematogaster atkinsoni* Wheeler) makes a nest of paper, and one of these, sent through the courtesy of Dr. E. Morton Miller, when examined measured approximately six inches in diameter.

Winged males and females are present in the nests of *cerasi* during July, August, September and October.

Localities: New Lenox, Ill.; Volo, Ill.; Palos Park, Ill.; Chicago, Ill.; Waukegan, Ill.; Momence, Ill.; Orland Park, Ill.; Dune Acres, Ind.; Smith, Ind.; Valparaiso, Ind. (Lowrie, Gregg); Ogden Dunes, Ind.; Chesterton, Ind.; Starke Co., Ind. (Dybas); Three Rivers, Mich.; Lakeside, Mich.

Myrmecina Curtis

Myrmecina graminicola americana Emery.—This small and sluggish ant seems to be restricted to sheltered spots, particularly climax and subclimax forests where much shade exists. The colonies are small, and a few workers were gathered from such moist places as the underside of wood and the late stages of log decay. The species is rare for the Chicago Area, but Cole found that it is rather common in the buckeye-basswood forests of the Smoky Mountains.

Localities: Ogden Dunes, Ind. (Lowrie, Gregg); Chesterton, Ind.; Lakeside, Mich.; Smith. Ind. (Miller).

Tetramorium Mayr

Tetramorium caespitum Linnaeus.—It is an introduced European form and though common in some parts of the East, my collections indicate that it is still rare in the region about the head of Lake Michigan.

Localities: Chicago, Ill.

Pheidole Westwood[5]

KEY TO THE SPECIES

1. Epinotal spines reduced to low tubercles; color yellowish red (p. 463)..**morrisi**
   Epinotal spines well developed; brownish red to black..... 2
2. Head of soldier very large, coarsely sculptured throughout (p. 463)....**pilifera**
   Head of soldier smaller, posterior portion smooth and shining..... 3

[5]Soldiers are necessary for the adequate determination of *Pheidole* species, and the key is based on this caste.

3. Epinotal declivity with transverse striae; antennal scape long (p. 463), **bicarinata**
   Epinotal declivity smooth; antennal scapes shorter than in *bicarinata* (p. 463), **vinelandica**

Pheidole morrisi Forel.—Nests of this species are present in the various dunelands but they are abundant only in the black oak woods south of Momence. The formicaries are very populous, and upon being disturbed the ants swarm out in large numbers to defend themselves. An excellent aggregation of colonies was found in a blowout of one of the dunes, and each nest was placed among the roots of a grass hummock. Winged males were collected in August and females were present as early as June.

Localities: Momence, Ill.; Miller, Ind.; Dune Acres, Ind.

Pheidole pilifera (Roger).—The huge heads of the soldier make this ant especially striking in the field. Its powerful jaws supposedly serve to crush the seeds that are gathered and stored by the workers in the galleries of the nest. Except for one doubtful instance, all collections of the species have been in dune areas. The nest entrances were surrounded by craters as a rule larger than those of *Lasius*, and this usually helps to distinguish them from the latter.

Localities: Waukegan, Ill.; Momence, Ill.

Pheidole bicarinata Mayr.—It appears in a greater variety of habitats than either of the other *Pheidole* although it is restricted to sand or sand humus substrata. Several log stages and the underside of rotting wood are also included in its places of abode. Minute nest entrances marked by little or no crater deposits were located on the foredunes among shoots of marram grass. Their occurrence is fairly frequent.

Localities: Waukegan, Ill.; Momence, Ill.; Pine, Ind.; Miller, Ind.; Ogden Dunes, Ind.; Dune Acres, Ind.; Tremont, Ind.; Lakeside, Mich.

Pheidole vinelandica Forel.—This form is very close to *bicarinata* but can be distinguished from it by the characters mentioned in the key. It is recorded for the area by Dr. Talbot but is much rarer than the former species and does not occupy as many of the dune associes. At present I have obtained no specimens within the confines of the Chicago Region.

Myrmica Latreille

KEY TO THE SPECIES

1. Antennal scapes evenly bent at the base 2
   Antennal scapes sharply angled at the base 4
2. Gaster with hairs set in distinct punctures (p. 464) . . . . . **punctiventris**
   Gaster not punctate 3
3. Epinotal spines short, not longer than their distance apart at the base (p. 464) . . . . . **brevinodis brevispinosa**
   Epinotal spines longer than their distance apart at the base (p. 464), **brevinodis brevinodis**
4. Angle of antennal scape with a lateral, tooth-like projection (p. 464), **lobicornis fracticornis**
   Angle of scape possessing a transverse ridge or lamina across the bend (p. 464) . . . . . **sabuleti americana**
   Angle of scape expanded into a broad, spatulate flange (p. 464), **schencki emeryana**

Myrmica lobicornis fracticornis Emery.—One of the commonest myrmicines in the area, and it is apparently well adapted to either sand or clay substratum. The nest entrances are obscure although small craters are at times constructed, and colonies of considerable size are frequently unearthed. Under stones and beneath decaying wood are suitable nest sites; one colony was collected from the interior of an *ulkei* formicary. Their slow and deliberate movements and dark, earthy coloration make these ants inconspicuous against most soil backgrounds.

Localities: Palos Park, Ill.; New Lenox, Ill.; Waukegan, Ill.; Volo, Ill. (Miller); Momence, Ill. (Lowrie); Dune Acres, Ind. (Lowrie).

Myrmica sabuleti americana Weber.—At all but one station this species was found living on dune sand. The Chesterton specimens were obtained in a lush pawpaw thicket growing on alluvial deposits. The coloration of this ant is somewhat lighter and more reddish brown than the preceding species, and its epinotal spines are distinctly longer.

Localities: Waukegan, Ill. (Lowrie, Gregg); Momence, Ill. (Lowrie, Gregg); Miller, Ind.; Tremont, Ind.; Chesterton, Ind.

Myrmica schencki emeryana Forel.—As indicated in the key, this ant is distinguished by the pronounced enlargement of the antennal angle, but the color and sculpture are very similar to *lobicornis*. The species seems to show no decided preference for either sand or clay soil although it is found usually in moist woodland and nests under stones or wood.

Localities: Dune Acres, Ind. (Lowrie, Gregg); Ogden Dunes, Ind. (Lowrie); Chesterton, Ind.; Volo, Ill.; Lake Geneva, Wis. (Lowrie).

Myrmica brevinodis brevinodis Emery.—According to my collections, this ant and the following species have a circumscribed distribution in the area. They are common only in a bog of the lake district where they inhabit the sphagnum mat, and the subspecies *brevinodis* was also secured from the fields adjacent to the bog. No nests were constructed in the swamp as the ants merely occupied the interstices of the mat.

Localities: Volo, Ill.; Miller, Ind.; Tremont, Ind.; Lakeside, Mich.

Myrmica brevinodis brevispinosa Wheeler.—All specimens were taken in the bog, and certain of them had been trapped in a pitcher plant.

Localities: Volo, Ill. (Miller, Gregg).

Myrmica punctiventris Roger.—Easily distinguished by the coarse punctures on the base of the gaster. The color is dark brown, the sculpture heavy and the epinotal spines long and sharp. It lives in climax and subclimax forests but does not seem to be abundant in them. Late stages of log decay are included as suitable nesting sites.

Localities: Carlé Woods, Ill. (O. Park); Smith, Ind.; Lakeside, Mich.

Stenamma Westwood

KEY TO THE SPECIES

Larger forms (2.5–4 mm.); body dark brown, base and tip of gaster yellowish; eye with more than four ommatidia in its greatest diameter (p. 465). . **brevicorne**

Smaller forms (2.4–3 mm.); body reddish brown; eye very small, with not more than three or four ommatidia in its greatest diameter (p. 465). . **brevicorne schmittii**

Stenamma brevicorne Mayr.—This is a small, hypogaeic ant living in logs or under the surface of leaf mold on the forest floor. Its colonies are small and quite uncommon. Winged males and females were taken from one nest in September.

Localities: Waukegan, Ill.; Palos Park, Ill.; Carlé Woods, Ill. (Park).

Stenamma brevicorne schmittii Wheeler.—The small size of the eye is the best means to separate this subspecies from the typical *brevicorne.* It exhibits the same preference for mesic conditions as the latter, and according to the local records it occurs only in wooded dunes. Winged females were captured in October.

Localities: Miller, Ind.; Ogden Dunes, Ind. (Lowrie, Gregg).

Aphaenogaster Mayr

KEY TO THE SPECIES

1. Antennal scape with long, flat lobe at the base; postpetiole markedly swollen (p. 465) ..... **treatae**
   Antennal scape without such a lobe; postpetiole not swollen 2
2. Head with posterior angles distinctly rounded (p. 465) ..... **texana carolinensis**
   Head with posterior corners obtusely angled 3
3. Epinotal spines at least as long as the base of the epinotum; color red (p. 465), **tennesseensis**
   Epinotal spines shorter than the base of the epinotum; color reddish brown to black 4
4. Epinotal spines somewhat longer than half the base of the epinotum; length 4.5–5 mm. (p. 466) ..... (typical) **fulva**
   Epinotal spines shorter than half the base of the epinotum; length 4–4.5 mm. . 5
5. Color reddish brown (p. 466) ..... **fulva aquia**
   Color pitchy black ..... **fulva aquia picea**

Aphaenogaster treatae Forel.—Black oak woodland of the several dunes seemed to be the only stations inhabited by this species. It tunnels in logs or the soil directly beneath them.

Localities: Dune Acres, Ind.; Miller, Ind.; Momence, Ill. (Lowrie, Gregg); Waukegan, Ill.

Aphaenogaster texana var. *carolinensis* Wheeler.—This ant belongs to a group with more southern distribution, and its occurrence in the Lake Region would seem unusual A single colony has been discovered in a crumbling log of the climax forest, the habitat most common for other *Aphaenogasters.* Structurally, it might be confused with *fulva aquia* or its variation *picea,* but the rounded condition of the posterior part of the head is a dependable diagnostic character.

Localities: Lakeside, Mich.

Aphaenogaster tennesseensis Mayr.—A beautiful red species of large size. The formicaries are very populous and may be found in the early and middle stages of log disintegration. At least none have been located in soil devoid of decaying wood. These ants are thought to be temporary parasites on species of *Aphaenogaster fulva.* The diminutive queen of *tennesseensis* invades the host colony to become established, after which the host individuals gradually disappear and leave a thriving nest of her progeny. One deälated female (probably a young queen) was collected on November sixth, and two alate females were found with their colony in July.

Localities: New Lenox, Ill.; Palos Park, Ill.; Orland Park, Ill.; Hadley, Ill.; Hodgkins, Ill.; Miller, Ind. (Lamar); Smith, Ind. (Lowrie, Gregg); Lakeside, Mich.; Three Rivers, Mich.; Coloma, Mich. (Ivaska).

Aphaenogaster fulva Roger.—All members of the *fulva* group are insects of moist, shady situations, particularly climax and subclimax forests. They are almost invariably associated with wood, being either in the late stages of log succession or in the leaf litter and soil under the log. Occasional colonies nest beneath stones. *A. fulva* is the rarest.

Localities: Palos Park, Ill.; Momence, Ill.; Dune Acres, Ind.; Tremont, Ind.; Smith, Ind.

Aphaenogaster fulva aquia (Buckley).—Localities: New Lenox, Ill.; Palos Park, Ill.; Volo, Ill.; Dune Acres, Ind.; Chesterton, Ind.; Smith, Ind.; Lakeside, Mich.

Aphaenogaster fulva aquia picea Emery.—Localities: Ogden Dunes, Ind.; Smith, Ind.; Lakeside, Mich.; Coloma, Mich. (Ivaska).

Monomorium Mayr

KEY TO THE SPECIES

Clypeal teeth prominent; length 1.5–2 mm.; color black (p. 466)..... **minimum**
Clypeal teeth indistinct; length 2–2.3 mm.; color yellow (p. 466)..... **pharaonis**

Monomorium minimum (Buckley).—In certain areas of the sand dunes this species is common, but, like *Solenopsis molesta*, it is so small and its colonies obscure that it is easily overlooked. A tiny crater may betray the nest opening although this is not a constant feature. Multiple queens are frequently observed in one colony, and up to twelve and fourteen have been recovered after excavation of complete nests. The species is especially adaptable to laboratory conditions. It will flourish in small plaster nests, and two to three thousand individuals may be reared if an abundance of insect meat is furnished.

Localities: Waukegan, Ill.; Momence, Ill. (Lowrie, Gregg); Ogden Dunes, Ind.

Monomorium pharaonis Linnaeus.—The ant is a house-infesting form in northern regions but originally came from "warmer regions of the Old World." Its distribution has become global. One record of this species (with the queen) was secured from a house in the city.

Localities: Chicago, Ill. (Sturtevant).

Leptothorax Mayr

KEY TO THE SPECIES

1. Antennae 11-jointed..... 2
   Antennae 12-jointed (p. 467)..... **texanus**
2. Epinotal spines very short, dentiform; color deep brown to black (p. 467), **fortinodis**
   Epinotal spines long..... 3
3. Color black; epinotal spines very long (p. 467)..... **longispinosus**
   Color yellow; epinotal spines shorter..... 4
4. Epinotal spines long, thin and curved; first gastric segment with two black or brown spots (p. 467)..... **curvispinosus**
   Epinotal spines short and straight (p. 467)..... **curvispinosus ambiguus**

Leptothorax texanus Wheeler.—Nowhere outside of black oak dunes was this ant found, and it appeared always to nest in the soil. Its presence in this habitat is probably correlated with its southern distribution.

Localities: Waukegan, Ill. (Lowrie, Gregg); Momence, Ill. (Lowrie, Gregg); Dune Acres, Ind. (Lowrie, Gregg).

Leptothorax fortinodis Mayr.—This species, like the following one, was observed in moist forested stations, and is an inhabitant of logs. One colony was discovered nesting in the bark of a live tree (Stage 1).

Localities: Chesterton, Ind.; Tremont, Ind.; Smith, Ind. (Kurtz, Gregg); New Lenox, Ill.

Leptothorax longispinosus Roger.—Beech-maple forest is the sole habitat for the species, according to the records, but I suspect that it may occur in other situations which approach the mesophytic environment of the forest. It is to be seen in most log stages.

Localities: Smith, Ind., Lakeside, Mich., Coloma, Mich. (Ivaska).

Leptothorax curvispinosus Mayr.—Of the several species in the area, this one is the most tolerant of conditions. It is distributed in a variety of communities, and occasionally occupies such special niches as fallen acorns and goldenrod galls. Rotting logs are also places of abode as would be expected. The small size of *Leptothorax* colonies and the individuals which compose them render their location difficult. Often, foraging workers can be gathered but the position of the nest is not revealed.

Localities: Palos Park, Ill.; Orland Park, Ill.; Hadley, Ill.; Momence, Ill. (Lowrie, Gregg); Dune Acres, Ind. (Lowrie); Chesterton, Ind. (Lowrie); Smith, Ind.; Lakeside, Mich.

Leptothorax curvispinosus ambiguus Emery.—Occurs in both woodland and prairie, but no instances of log dwelling were evident.

Localities: Palos Park, Ill.; Chicago, Ill.; Harvey, Ill.

Dolichoderinae

KEY TO THE GENERA

1. Integument hard and brittle; declivity of the epinotum strongly concave (p. 467) ..... **Dolichoderus**
   Integument thin and flexible; epinotal declivity not strongly concave 2
2. Petiolar scale vestigial or absent (p. 468) ..... **Tapinoma**
   Petiolar scale well developed 3
3. Epinotum with a conical elevation (p. 468) ..... **Dorymyrmex**
   Epinotum rounded, without a conical elevation (p. 468) ..... **Iridomyrmex**

Dolichoderus Lund

KEY TO THE SPECIES

1. Head and thorax with shallow foveolae, shining 2
   Head and thorax coarsely and deeply foveolate, subopaque 3
2. Epinotal concavity with a strong, median longitudinal ridge; head, thorax and petiole yellowish red (p. 468) ..... **mariae**
   Epinotal concavity without ridge; color brownish to black, base of gaster with reddish yellow spots (p. 468) ..... **plagiatus pustulatus**
3. Base of gaster with reddish yellow spots (p. 468) ..... **plagiatus**
   Gaster entirely black (p. 468) ..... **plagiatus inornatus**

Dolichoderus (*Hypoclinea*) *mariae* Forel.—A tamarack bog with open water in its center was practically the only place where species of this genus were obtained. To find members of a group with tropical distribution in a bog of this area (the organisms of which are relicts of a more northern fauna and flora) seems incongruous, but I am unable at present to offer an explanation. The colonies collected personally were in each case located in the stalk and between the leaves of dried *Typha*.

The rather striking species, *D. mariae*, is represented only by one specimen.

Localities: Volo, Ill.

Dolichoderus (*Hypoclinea*) *plagiatus* Mayr.—This ant appeared to be far less abundant than its variety which follows.

Localities: Volo, Ill. (Lowrie).

Dolichoderus (*Hypoclinea*) *plagiatus* var. *inornatus* Wheeler.—In addition to the tamarack bog, one collection of the species was made in a white oak woodland. This ant was present in noticeably greater numbers than any of the others in the genus.

Localities: Volo. Ill. (Lowrie, Schweitzer, Gregg); Ogden Dunes, Ind.; Dune Acres, Ind. (Lowrie).

Dolichoderus (*Hypoclinea*) *plagiatus pustulatus* Mayr.—Localities: Volo, Ill.

Tapinoma Förster

Tapinoma sessile (Say).—This insect can be confused with the varities of *Lasius niger*, but the slit-like anal opening and the low petiolar scale will always distinguish *Tapinoma*. Further, when handled *Tapinoma* raises the gaster and emits a whitish fluid that has the odor of cocoa butter, and this is the best field mark. The ants nest in a variety of natural communities, and are to be found in different log stages and under stones or debris.

Localities: Palos Park, Ill.; New Lenox, Ill.; Volo, Ill., Dune Acres, Ind.; Chesterton, Ind.; Smith, Ind.; Three Rivers, Mich.; Lake Como, Wis. (Lowrie).

Dorymyrmex Mayr

Dorymyrmex pyramicus var. *flavus* McCook.—A single record of this ant is from dry duneland, and the specimens were living with or near a colony of *Pheidole pilifera*. The species *pyramicus* is known to associate itself with colonies of *Pogonomyrmex* in the western states, and it is said to appropriate some of the food of the latter form to its own use. The occurrence of *flavus* in the Great Lakes Region probably represents a portion of the northern limit of the range of the species.

Localities: Waukegan, Ill.

Iridomyrmex Mayr

KEY TO THE SPECIES

Head and thorax brownish, gaster light yellow (p. 468).....**pruinosus analis**
Head, thorax and gaster reddish brown (p. 469).....**humilis**

Iridomyrmex pruinosus var. *analis* (André).—It seems to be confined to black oak and Jack pine dunes, and is very active over the arid sand

of these areas. Craters are constructed which are almost identical with those of *Lasius*.

Localities: Momence, Ill.; Ogden Dunes, Ind.

Iridomyrmex humilis Mayr.—The Argentine ant. It is now cosmopolitan, having spread from its home in South America, and infests houses especially in the cooler parts of its range. It has not been taken from the natural environments about Chicago, but Dr. Talbot collected it from the zoological laboratory at the University. It has since disappeared, and the author was unable to get samples. The head of *humilis* has a peculiar, subtriangular shape, and this serves further to separate it from *pruinosus* in which the head is subrectangular.

Formicinae

KEY TO THE GENERA

1. Antennae 9-jointed (p. 469) ..... **Brachymyrmex**
   Antennae with more than nine joints 2
2. Workers strongly polymorphic; anterior portion of thorax flattened dorsally, and triangular in outline when viewed from above (p. 477) ..... **Camponotus**
   Workers monomorphic or sometimes variable in size; thorax constituted differently 3
3. Clypeal fossa distinctly separate from antennal fossa 4
   Clypeal fossa confluent with antennal fossa 5
4. Body covered with long, stiff hairs; mesonotum constricted but not subcylindrical (p. 469) ..... **Paratrechina**
   Body with only delicate, flexible hairs; mesonotum constricted and subcylindrical in shape (p. 469) ..... **Prenolepis**
5. Joints 2–5 of funiculus shorter or not longer than the succeeding joints; ocelli usually absent (p. 470) ..... **Lasius**
   Joints 2–5 of funiculus longer than the remaining joints; ocelli present 6
6. Mandibles with broad, dentate apical border (p. 472) ..... **Formica**
   Mandibles narrow, falcate and pointed (p. 476) ..... **Polyergus**

Brachymyrmex Mayr

Brachymyrmex heeri depilis Emery.—It is distributed in woodland and forest margin, nesting in the soil directly or under stones. In size it ranks among the smallest, and the shortness of the antennae easily sets it apart from other ants in the region.

Localities: Palos Park, Ill.; Chicago, Ill. (Windsor); Dune Acres, Ind.

Paratrechina Motschoulsky

Paratrechina (*Nylanderia*) *parvula* (Mayr).—In logs and under debris in sandy habitats. Its long setae readily isolate it from any other ant in the area. *Lasius niger* is the main species with which it might be confounded.

Localities: Waukegan, Ill.; Momence, Ill.; Ogden Dunes, Ind.; Dune Acres, Ind.

Prenolepis Forel

KEY TO THE SPECIES

Body piceous black, mandibles, antennae, tibiae and tarsi lighter (p. 470) ..... **imparis**
Body brownish or reddish yellow, gaster and occipital region darker (p. 470), **imparis testacea**

Prenolepis imparis (Say).—This species appears predominantly in woodlands built upon a substratum of clay. Small craters mark the entrance to the nests, and a short distance below the surface are domed chambers where the brood and repletes may be found. The gorged condition of the latter individuals results from imbibing the secretions of aphids, and recalls the honey ants of the Southwestern United States in which the replete has evolved further.

Localities: Palos Park, Ill.; Orland Park, Ill.; Volo, Ill.; Cary, Ill. (Schweitzer); Chesterton, Ind.; Ogden Dunes, Ind.; Dune Acres, Ind.; Three Rivers, Mich.; Lake Geneva, Wis. (Lowrie); Miller, Ind. (Miller).

Prenolepis imparis var. *testacea* Emery.—The habitat requirements are the same as for the typical *imparis*, but this variety has been encountered less frequently.

Localities: Palos Park, Ill.; Miller, Ind.

Lasius Fabricius

KEY TO THE SPECIES

1. Maxillary palpi 6-jointed 2
   Maxillary palpi 3-jointed ..... (subgenus *Acanthomyops*) 7
2. Terminal joints of maxillary palpi long, subequal; eyes medium-sized; epigaeic ..... (subgenus *Lasius*) 3
   Terminal joints of maxillary palpi successively diminishing toward the apex; eyes minute; hypogaeic ..... (subgenus *Chthonolasius*) 4
3. Scapes and legs without erect hairs (p. 470) ..... **niger alienus americanus**
   Scapes and legs beset with erect hairs (p. 471) ..... **niger neoniger**
4. Tips of scapes not quite reaching to posterior corners of the head (p. 471), **brevicornis**
   Tips of scapes surpassing posterior corners of head 5
5. Tips of antennal scapes but slightly surpassing posterior corners of head; color pale yellow (p. 471) ..... **flavus nearcticus**
   Tips of antennal scapes extending some distance beyond posterior corners of head; color brownish yellow 6
6. Gaster subopaque; with appressed hairs (p. 471) ... **umbratus mixtus aphidicola**
   Gaster smooth and shining; without appressed hairs (p. 471), **umbratus mixtus speculiventris**
7. Petiole low and blunt above in profile (p. 471) ..... **latipes**
   Petiole higher, thin, and acute above in profile 8
8. Penultimate joints of distally incrassated antennal funiculus somewhat broader than long; gaster with abundant long hairs (p. 472) ..... **claviger**
   Penultimate joints of but slightly incrassated funiculus not broader than long; gaster with sparse long hairs (p. 472) ..... **interjectus**

Lasius niger alienus americanus Emery.—This is an exceedingly common ant and is found from dry, open pastures to the interior of climax forests. It will nest in most stages of logs and under sticks or stones or other suitable cover. The colonies are large, hence they are able to produce numerous winged males and females which appear in late summer. The workers have often been observed tending aphids for their secretions, and the species also cultivates the corn root aphid in its subterranean passages. As a result of this habit it is of considerable importance as an agricultural pest.

Localities: New Lenox, Ill.; Palos Park, Ill.; Hadley, Ill.; Volo, Ill.; Ogden Dunes, Ind.; Dune Acres, Ind.; Chesterton, Ind.; Hammond, Ind.; Smith, Ind.; Lakeside, Mich.; Coloma, Mich. (Ivaska); Three Rivers, Mich.; Lake Como, Wis. (Lowrie).

Lasius niger var. *neoniger* Emery.—This variety, though very abundant and widespread, I have not collected from the beech-maple forests or subclimax. *Neoniger* overlaps with *americanus* in many habitats but replaces the latter in pioneer dunes, and is the commonest ant in the lawns and gardens of urban dwellings. Nests have been located under stones and in some decaying logs.

Localities: Chicago, Ill.; Volo, Ill.; New Lenox, Ill.; Waukegan, Ill.; Momence, Ill.; Pine, Ind.; Ogden Dunes, Ind.; Dune Acres, Ind.; Chesterton, Ind.; Lakeside, Mich.; Coloma, Mich. (Ivaska).

Lasius (*Chthonolasius*) *brevicornis* Emery.—It is most often found under logs or stones in well drained situations. The indications from my records are that it is a rare to uncommon species.

Localities: Willow Springs, Ill. (Windsor); Dune Acres, Ind.

Lasius (*Chthonolasius*) *flavus nearcticus* Wheeler.—In the majority of cases this ant occurred in moist, shady woods and under logs and stones. Its extremely pale yellow color correlated with its subterranean habits make the species easy to distinguish.

Localities: Ogden Dunes, Ind. (Lowrie, Gregg); Smith, Ind.; Lakeside, Mich.

Lasius (*Chthonolasius*) *umbratus mixtus aphidicola* Walsh.—This is the most abundant of the hypogaeic species of *Lasius*. Its colonies are usually large and are placed in and under logs or rotting stumps.[6] As indicated by the varietal name, they have a propensity for cultivating aphids and coccids which are sometimes present in large numbers. Winged males and females of *aphidicola* were taken from nests in April, August, September and October.[7]

Localities: Palos Park, Ill.; New Lenox, Ill.; Aurora, Ill. (Dybas); Chicago, Ill.; Miller, Ind.; Hammond, Ind.; Chesterton, Ind.; Smith, Ind. (Kurtz, Gregg); Lakeside, Mich.; Lake Geneva, Wis. (Lowrie); Madison, Wis. (Collector ?).

Lasius (*Chthonolasius*) *umbratus mixtus speculiventris* Emery.[8]—Much rarer than the preceding variety.

Localities: New Lenox, Ill.; Volo, Ill.; Smith, Ind.

Lasius (*Acanthomyops*) *latipes* Walsh.—Members of the subgenus *Acanthomyops* are rare in the Chicago Region although they seem to be more common in the Eastern States. A colony of *latipes* in dune sand was preparing to swarm in the late afternoon, and a number of the Beta females were captured as well as males and workers (August).

Localities: Waukegan, Ill.; Hessville, Ind. (Wenzel).

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[6]A group of nests in one of the filled ponds of the Gary Pond Series at Hammond was constructed of rich muck and stood two to three feet high with diameters of somewhat smaller dimension. The ground about them was doubtless subject to flooding at certain periods. (Located by Mr. S. A. Windsor.)

[7]In my possession are two cases of the temporary parasitism of *Lasius umbratus mixtus aphidicola* on *Lasius niger alienus americanus*, and one case on *Lasius niger neoniger*. In each instance, however, only the invading queens of the parasite were obtained and none of their progeny had apparently developed.

[8]A single doubtful specimen of *Lasius umbratus minutus* Emery from Chicago, Illinois, was identified too late to be fitted into the key. This subspecies may be distinguished from the others by its small size (average less than 4 mm.) and the dense pubescence with erect hairs on the gaster. The gaster is subopaque.

Lasius (*Acanthomyops*) *claviger* Roger.—Localities: Momence, Ill.; Lake Geneva, Wis. (Lowrie); Three Rivers, Mich.

Lasius (*Acanthomyops*) *interjectus* Mayr.—Under stones in open woodlands or forest margin. Two colonies only were discovered.

Localities: Palos Park, Ill.; New Lenox, Ill.

Formica Linnaeus

KEY TO THE SPECIES

1. First funicular joint of worker and female about as long as the second and third joints taken together.....(subgenus **Proformica**) 2
   First funicular joint of worker and female distinctly shorter than the second and third taken together...(subgenus **Formica** and subgenus **Neoformica**) 3
2. Antennal scapes with erect hairs (p. 473).....**neogagates lasioides vetula**
   Antennal scapes without erect hairs (p. 473).....**neogagates neogagates**
3. Clypeus emarginate or notched in the middle of the anterior border..... 4
   Clypeus not emarginate..... 7
4. Gaster black, head and thorax deep red..... 5
   Gaster brown, head and thorax light red..... 6
5. Front and vertex more or less infuscated (p. 473).....**sanguinea aserva**
   Front and vertex not infuscated (p. 473).....**sanguinea rubicunda**
6. Hairs almost always absent from the thoracic dorsum and petiolar border, short and few on the head and gaster (p. 473).....**sanguinea subnuda**
   Hairs present on the thoracic dorsum, longer and more numerous on the head and gaster (p. 473).....**sanguinea subintegra**
7. Posterior border of head broadly excised; sides of head subparallel..... 8
   Posterior border of head straight or convex, or at most very feebly excised; sides of head converging anteriorly..... 9
8. Pronotum and mesonotum with coarse yellow hairs; posterior half of head black (p. 474).....**ulkei**
   Pronotum and mesonotum without hairs; head completely red (p. 474), **exsectoides exsectoides**
9. Body of worker stout; head of largest individuals not longer than broad. Funicular joints 2–3 longer and more slender than joints 6–8. Superior border of petiole usually sharp. Color light or dark red with brown or black gaster.....10
   Body of worker slender; head of largest individuals distinctly longer than broad. Funicular joints 2–3 at most slightly more slender than joints 6–8. Petiole narrow with superior border blunt. Color black, brown or yellowish brown.....15
10. Female smaller or not larger than the largest workers (p. 474).....**nepticula**
    Female larger than the largest workers.....11
11. Erect hairs absent on the gula and upper surface of head and thorax (p. 474).....**truncicola integra**
    Erect hairs present on the gula and upper surface of head and thorax.....12
12. Eyes hairless (p. 474).....**truncicola obscuriventris gymnomma**
    Eyes hairy.....13
13. Head and thorax of small workers scarcely or not at all darker than in the largest workers (p. 474).....**truncicola obscuriventris**
    Head and thorax of small workers decidedly darker than in the largest workers.....14
14. Thorax of large workers bright red like the head or at most very feebly infuscated; pubescence on gaster dense (p. 474).....**rufa aggerans**
    Thorax of large workers deeply infuscated; pubescence on gaster more dilute (p. 475).....**rufa aggerans melanotica**
15. Median joints of funiculus less than 1½ times as long as broad; scapes distinctly curved at the base. Thorax of worker rather short; petiolar scale flattened posteriorly.....16
    Median joints of funiculus more than 1½ times as long as broad; scapes scarcely curved at the base. Thorax of worker longer; petiole convex posteriorly.....(subgenus **Neoformica**) 18

16. Gula with erect hairs; body dark brown (p. 475)..**cinerea cinerea neocinerea**
    Gula without erect hairs; body black.....17
17. Gaster opaque (silky lustre), pubescence dense (p. 475),
    fusca fusca subsericea
    Gaster shining (metallic lustre), very sparsely pubescent (p. 475),
    fusca fusca subaenescens
18. Erect hairs present on the gula and petiolar border.....19
    Erect hairs absent on the gula and petiolar border.....20
19. Hairs on gula and petiole numerous and conspicuous; color light (p. 475),
    pallidefulva schaufussi
    Hairs on gula and petiole few, often lacking on one or the other; color darker (p. 476).....**pallidefulva schaufussi incerta**
20. Head and thorax brown or reddish, gaster very dark (p. 476),
    pallidefulva nitidiventris
    Head and thorax as well as gaster very dark brown to piceous black (p. 476),
    pallidefulva nitidiventris fuscata

Formica (*Proformica*) *neogagates neogagates* Emery.—Ants of the subgenus *Proformica* are structurally intermediate between *Lasius* and the subgenus *Formica* (s. str.). Their colonies are located in the soil and, in fact, the craters surrounding the nest entrances resemble oversized craters of *Lasius*. The two species in the area were fairly abundant in sandy soil; one record of the variation *vetula* was obtained from clay soil.

Localities: Momence, Ill.; Waukegan, Ill.; Chicago, Ill.; Ogden Dunes, Ind.; Tremont, Ind.

Formica (*Proformica*) *neogagates lasioides vetula* Wheeler.—Localities: Waukegan, Ill. (Lowrie, Gregg); Orland Park, Ill.; Dune Acres, Ind.; Lake Como, Wis. (Lowrie).

Formica sanguinea aserva Forel.—Species of the *sanguinea* group are represented in a fair variety of communities but seemed to prefer areas with stands of trees. The subspecies *aserva* is the rarest of the four known from the region, and it was taken on but one occasion.

Localities: Palos Park, Ill.

Formica sanguinea rubicunda Emery.—This is easily the most common member of the group. It will nest in late stages of log decomposition and under stumps, and is found from the seral habitats of the dunes to the open woodlands on clay. An especially fine group of nests was discovered by Mr. Windsor on the hilltops overlooking the Sag Channel at Palos Park. The species are noted for their dulotic or slave-making habits and most frequently use the workers of *subsericea* as hosts. The finish of a raid by *sanguinea* was seen as the captured pupae were being carried from the nest of the slave species, but I was not present when the process began.

Localities: Palos Park, Ill.; Harvey, Ill.; Momence, Ill. (Lowrie, Gregg); Ogden Dunes, Ind.; Dune Acres, Ind.; Delavan Lake, Wis. (Dybas).

Formica sanguinea subnuda Emery.—Observed at two widely separated stations, but probably more common than the records indicate.

Localities: Chicago, Ill.; Three Rivers, Mich.

Formica sanguinea subintegra Emery.—Like the preceding species, it is fairly common.

Localities: Chicago, Ill.; Momence, Ill.

Formica ulkei Emery.—This ant is characteristic of the boreal fauna, and according to Wheeler is peculiar to the Canadian Zone. It is present in the vicinity of Chicago in very local spots, and it is probable that our collections represent the southern edge of its range. A striking aggregation of nests at Palos Park was visited many times, and it has furnished much material for other investigators. Several stations have yielded specimens of *ulkei*, as indicated, but a group of nests reported from Palatine, Illinois, was not my privilege to observe. Where a large number of colonies occupy a circumscribed area, the correlation of their distribution with the forest margin habitat is almost diagramatic.

Localities: Palos Park, Ill.; Waukegan, Ill. (Lowrie, Gregg); Volo, Ill.; Dune Acres, Ind.; Smith, Ind. (Maina); Lakeside, Mich.

Formica exsectoides exsectoides Forel.[9]—This species is closely allied to *ulkei* and is the only other example of the *exsecta* group known to me in the area. It is apparently much commoner in the Eastern States, and efforts to locate nests at the head of the lake have been rewarded with meager returns.

Localities: New Lenox, Ill.; Palos Park, Ill.; Tremont, Ind. (Wiersinski); Lakeside, Mich.; Chicago Heights, Ill.

Formica nepticula Wheeler.—The *microgyna* group, to which this species belongs, is practically impossible to determine without the queens as it is the disparity in stature of the female caste that differentiates these ants from species of the *rufa* group. An adequate series of individuals came from a single colony in the prairies southwest of the city.

Localities: Chicago, Ill.

Formica truncicola obscuriventris Mayr.—Ants of the *rufa* group are usually exemplified by this form, but the others appear in varying degrees of abundance. *Obscuriventris* is commonest in the wooded parts of the dunes and especially in the more mesophytic portions. Its nests ramify through the leaf-litter, and the exact entrance leading to the main galleries is not easy to discern. They have been recovered from the soil beneath badly decayed stumps.

Localities: Waukegan, Ill.; Ogden Dunes, Ind.; Dune Acres, Ind.; Tremont, Ind.; "Indiana Sand Dunes" (Dropkin).

Formica truncicola obscuriventris gymnomma Wheeler.—Localities: Waukegan, Ill.; Momence, Ill. (Lowrie).

Formica truncicola integra Nylander.—Found alone in the prairies southwest of the city.

Localities: Chicago, Ill.; Harvey, Ill.

Formica rufa aggerans Wheeler.—This species and the following variety were first noticed in the dry, black oak woodland of the Waukegan Dunes. The mounds are scarcely raised above the surrounding ground level, and a peculiar feature of the nest is its almost

[9] *Formica exsectoides exsectoides davisi* Wheeler has been found in the collection since composition of this paper, and was obtained from forest margin at New Lenox, Illinois. It may be separated from *exsectoides* by the infuscation of the vertex, occiput and pro- and mesonotum.

entire construction of thatch or small twigs heaped into the center and extending some distance into the interior of the colony.

Localities: Waukegan, Ill.; Palos Park, Ill.

Formica rufa aggerans melanotica Emery.—As indicated in the key, this is a very dark variety of *aggerans*. It occurs in essentially the same situations as the latter, but was not seen on clay.

Localities: Waukegan, Ill.

Formica cinerea cinerea neocinerea Wheeler.—The predominate formicid of the prairies and meadows is this member of the *fusca* group. Its mounds are low and usually a foot or two in diameter, and in some spots they are but a few paces apart. One astonishing nest measured approximately six feet across. Occasionally, a high dome may be built in low lying grasslands, but a correlation of this style of nest with inundation of the habitat was not verified. The species serves as host for some of the slave-making ants.

Localities: Chicago, Ill.; Palos Park, Ill.; Orland Park, Ill.; Waukegan, Ill.; Volo, Ill.; Smith, Ind.

Formica fusca fusca subsericea Say.—Aside from the varieties of *Lasius niger*, this is our commonest ant, and as would be expected, it tolerates a wide range of environmental fluctuations. It has been observed to forage over hot sand in the pioneer stages of dune succession, and is equally adjusted to the shade of ravine forests. Many workers have been seen on the branches and foliage of trees or upon the understory where they actively search the secretions of aphids. As with *neocinerea*, this ant is frequently parasitized by species of slave-makers.

Localities: Palos Park, Ill.; Chicago, Ill.; New Lenox, Ill.; Waukegan, Ill.; Volo, Ill.; Momence, Ill.; Ogden Dunes, Ind.; Dune Acres, Ind.; Lakeside, Mich.; Three Rivers, Mich.; Lake Como., Wis. (Lowrie).

Formica fusca fusca subaenescens Emery.—This variety of *fusca* is much rarer than the preceding one, and in addition is relatively stenokous. Moist woodlands and especially the advanced stages of logs are its places of abode. The shiny gaster distinguishes it from *subsericea*.

Localities: Palos Park, Ill.; Chicago, Ill.; Volo, Ill. (Lowrie, Gregg); Ogden Dunes, Ind.

Formica (*Neoformica*) *pallidefulva schaufussi* Mayr.—The four ants of this group in our fauna are excellent indicators of the black oak associes in dune succession, for under a high percentage of the sticks and logs in these woods one may find the openings to their inconspicuous nests. The prickly pear cactus (*Opuntia*) often conceals a formicary under its orbicular stems. A few colonies were noticed in pastures and grasslands. The workers seem to be very timid, and they are used extensively as slaves by the different species of *sanguinea*. The subspecies *schaufussi* is less common than others of the group, but it is the largest. The characters given in the key, while somewhat variable, are nevertheless the most satisfactory. A series of specimens is indispensable for taxonomic determination as there is considerable overlap among individuals of one colony.

Localities: Palos Park, Ill.; Momence, Ill. (Lowrie, Gregg); Miller, Ind.; Ogden Dunes, Ind.; Dune Acres, Ind.

Formica (*Neoformica*) *pallidefulva schaufussi incerta* Emery.—Localities: Palos Park, Ill.; Momence, Ill.; Miller, Ind.; Ogden Dunes, Ind.; Dune Acres, Ind.

Formica (*Neoformica*) *pallidefulva nitidiventris* Emery.—Localities: Palos Park, Ill.; New Lenox, Ill.; Momence, Ill. (Lowrie, Gregg); Waukegan, Ill.; Volo, Ill.; Dune Acres, Ind. (Lowrie, Gregg); Miller, Ind.; Lakeside, Mich.

Formica (*Neoformica*) *pallidefulva nitidiventris fuscata* Emery.—Localities: Palos Park, Ill.; Momence, Ill. (Lowrie, Gregg); Ogden Dunes, Ind.; Dune Acres, Ind.

Polyergus Latreille

KEY TO THE SPECIES

Antennal scapes distinctly short, not reaching to posterior corners of head; long, stiff hairs on both dorsum and ventrum of gaster; color light red (p. 476), **rufescens breviceps**

Antennal scapes reaching to posterior corners of head; long, stiff hairs on the gaster almost confined to the ventrum; color dark red (p. 476)..... **lucidus**

Polyergus rufescens breviceps Emery.—This handsome ant is unquestionably the most interesting species in the region. It is very rare, and as yet only four nests have been seen. These are located at two well separated stations which were made known to me through the generosity of Mr. A. S. Windsor. The genus *Polyergus* is a group of obligatory slave-makers, and unlike *sanguinea* is dependent upon its host, apparently, for the performance of such essential activities as feeding, brood care and construction of nests. The specialized falcate mandibles are employed for both offense and defense in raids on colonies of the *fusca* and *Neoformica* species, during which pupae of these ants are carried off to be hatched in the *Polyergus* nest. All the colonies observed were in the prairies, and correspondingly the auxiliaries used were derived from the numerous nests of *neocinerea* in the same community. Though one of the localities has been visited often, the ants have provided no military display. On July 13, 1939, males and winged females were captured as they swarmed from the nest, and on August 10, 1940, the phenomenon was repeated. *Rufescens* and its subdivisions range widely through the western part of the United States with the subspecies *breviceps* extending its occurrence to Illinois which is probably the boundary of its territory.

Localities: Harvey, Ill. (Windsor, Gregg); Mokena, Ill. (Windsor, Gregg).

Polygerus lucidus Mayr.—This is the typical species of the Eastern States, but it is found as far west as the Great Plains and therefore overlaps with *breviceps*. I have not yet obtained individuals from the Chicago Area, but *lucidus* has been reported from Pine, Indiana, by Dr. Wheeler and its presence will doubtless be confirmed with further search.

Camponotus Mayr

KEY TO THE SPECIES

1. Anterior clypeal border with a distinct, median emargination, (subgenus **Myrmentoma**) 2
   Anterior clypeal border without such an emargination, (subgenus **Camponotus**) 5
2. Cheeks and clypeus with elongate, piligerous foveolae 4
   Cheeks and clypeus without such foveolae 3
3. Body black, except prothorax which is dark red (sometimes infuscated), (p. 477) . . . . . **caryae caryae nearcticus**
   Body dark, but thorax and at least basal half of first gastric segment yellowish red (sometimes mottled), (p. 477) . . . . . **caryae caryae tanquaryi**
4. Brownish yellow, gaster paler with brown bands (p. 477) . . . **caryae subbarbatus**
   Head blackish brown, thorax red (p. 477) . . . . . **caryae discolor clarithorax**
5. Head of worker major smooth and shining behind; color at least in part light red or yellow 6
   Head of worker major opaque or feebly shining behind; color black or black and darker red 7
6. Body yellow or light red throughout (p. 477) . . . . . **castaneus**
   Head at least dark brown or black (p. 477) . . . . . **castaneus americanus**
7. Gaster opaque or subopaque; pubescence on gaster long 8
   Gaster shining, with short sparse pubescence; thorax deep red (p. 478), **herculeanus ligniperda noveboracensis**
8. Color black throughout; pubescence white (p. 478) . . **herculeanus pennsylvanicus**
   Posterior portion of thorax, petiole, legs and base of gaster reddish yellow; pubescence and pilosity yellow (p. 478), **herculeanus pennsylvanicus ferrugineus**

Camponotus (*Myrmentoma*) *caryae caryae nearcticus* Emery.—The ants of the *caryae* group are not as abundant as other *Camponoti*, but can be found if one is careful to examine dead twigs and early stages of logs. They seem to exhibit some preference for rather dry wood. The variety *nearcticus* is the commonest form and is present in black oak dunes and climax forest chiefly.

Localities: Waukegan, Ill.; Momence, Ill.; Aurora, Ill. (Dybas); Chesterton, Ind.; Dune Acres, Ind.; Tremont, Ind.; Beverly Shores, Ind.(Dybas); Smith, Ind.

Camponotus (*Myrmentoma*) *caryae caryae tanquaryi* Wheeler.—Localities: Palos Park, Ill.; Smith, Ind.

Camponotus (*Myrmentoma*) *caryae subbarbatus* Emery.—Localities: Smith, Ind.; Lakeside, Mich. (Miller).

Camponotus (*Myrmentoma*) *caryae discolor clarithorax* Emery.[10]—Localities: Waukegan, Ill.; Lakeside, Mich.; Ogden Dunes, Ind.

Camponotus castaneus Latreille.—This attractive species nests in logs and the soil under them in the black oak woods of the dunes. The colonies are of moderate size.

Localities: Momence, Ill. (Lowrie, Gregg); Dune Acres, Ind.; Beverly Shores, Ind. (Dybas).

Camponotus castaneus americanus Mayr.—According to the few data obtained, this ant inhabits moist oak forests on clay.

Localities: Palos Park, Ill.; Hadley, Ill.

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[10] *Camponotus* (*M.*) *caryae discolor* Buckley, another addition for the region, was collected in a dune heath at Waukegan, Illinois. Differs from *clarithorax* in having the head and thorax both bright red.

Camponotus herculeanus pennsylvanicus De Geer.—This is the ubiquitous "carpenter ant" that attacks live trees as well as all but the final stages of log decay. The wood is chewed and excavated probably by the worker majors or soldiers, and is deposited outside the nest as sawdust. Their food consists in large measure of the excretions of aphids, and is sought by the medium and small sized workers foraging over the leaves and twigs of trees. Incipient colonies containing a deälated female and her brood or first workers (very small) are frequently revealed when the loose bark of a fallen tree is removed. All forested zones about Chicago yielded specimens, and occasionally the ant may invade houses.

Localities: Palos Park, Ill.; New Lenox, Ill.; Momence, Ill.; La Salle, Ill. (Miller); Tonica, Ill. (Lowrie); Miller, Ind.; Ogden Dunes, Ind.; Dune Acres, Ind.; Chesterton, Ind.; Smith, Ind.; Lakeside, Mich.; Three Rivers, Mich.

Camponotus herculeanus pennsylvanicus ferrugineus Fabricius.—The red of this variety contrasts strikingly with the deep black of the typical *pennsylvanicus*. It is a much less common ant and is found primarily in rich, shady woods. Its preference seems to be for middle and late periods in rotting logs and stumps.

Localities: Orland Park, Ill.; Hadley, Ill.; Smith, Ind.; Lakeside, Mich.

Camponotus herculeanus ligniperda noveboracensis Fitch.—The species surpassed *pennsylvanicus* in the variety of niches occupied, yet was not as frequently encountered. While *pennsylvanicus* reaches into the Gulf States, *noveboracensis* overlaps its distribution only in the Northern States, and is said to live at somewhat higher elevations than the former. This may account in part for our records of the ant from tamarack bogs, which are boreal in character.

Localities: New Lenox, Ill.; Volo, Ill.; Miller, Ind.; Dune Acres, Ind.; "Indiana Dunes," Morocco, Ind. (Seevers); Smith, Ind.

POSTSCRIPT

Since this paper went to press, two more species have been found, namely: *Formica (Proformica) neogagates neogagates morbida* Wheeler and *F. (P.) neogagates neogagates vinculans* Wheeler. With the eighty-five species listed in Table I, plus the five additional accounted for here and in the footnotes, there are ninety forms which have been examined. Added to this, the five ants recorded by Talbot, but not represented in my collection, bring a total of ninety-five species (including subspecies and varieties) which are known to occur in the Chicago Region.

Dr. Creighton has recently revised the forms of *Formica rufa* in which varieties are eliminated and four new subspecies are described, et cetera.[11] Unfortunately, it is impractical to incorporate such changes into the present report, but the writer is in agreement with them, and no doubt similar revisions in other groups of *Formica* would be a distinct advance.

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[11]Creighton, W. S. 1940. A revision of the North American variants of the ant *Formica rufa*. Amer. Mus. Nov. No. 1055, pp. 10.

LITERATURE CITED

Burrill, A. C., and **M. R. Smith.** 1919. A key to the species of Wisconsin ants, with notes on their habits. Ohio Jour. Sci. 19: 279–292.

Cole, A. C. 1940. A guide to the ants of the Great Smoky Mountains National Park, Tennessee. Amer. Midl. Nat. 24: 1–88.

Cowles, H. C. 1899. The ecological relations of the vegetation on the sand dunes of Lake Michigan. Bot. Gaz. 25: 95–117; 167–202; 281–308; 361–391.

1901. The plant societies of Chicago and vicinity. Bull. Geog. Soc. Chicago, No. 2, pp. 1–76.

Dreyer, W. A., and **Thomas Park.** 1932. Local distribution of *Formica ulkei* mound-nests with reference to ecological factors. Psyche 39: 127–133.

Fryxell, F. M. 1927. The physiography of the region of Chicago. Univ. Chicago Press, pp. viii, 1–55.

Fuller, G. D. 1914. Evaporation and soil moisture in relation to the succession of plant associations. Bot. Gaz. 58: 193–234.

1925. The vegetation of the Chicago Region. Univ. Chicago Press, pp. 1–27.

1934. The plant communities of the dunes. Scientific Monthly 38: 444–451.

1935. Postglacial vegetation of the Lake Michigan Region. Ecology 16: 473–487.

Holmquist, A. M. 1928. Notes on the life-history and habits of the mound-building ant, *Formica ulkei* Emery. Ecology, 9: 70–87.

Kennedy, C. H., and **Mary Talbot.** 1939. Notes on the hypogaeic ant, *Proceratium silaceum* Roger. Proc. Ind. Acad. Sci. 48: 202–210.

Lowrie, D. C. 1942. The ecology of the spiders of the xeric dunelands in the Chicago Area. Bull. Chicago Acad. Sci. 6: 161–189.

Park, O. 1929. Ecological observations upon the myrmecocoles of *Formica ulkei* Emery, especially *Leptinus testaceus* Mueller. Psyche 36: 195–215.

1930. Studies in the ecology of forest Coleoptera. I. Ann. Ent. Soc. Amer. 23: 57–80.

1931a. Studies in the ecology of forest Coleoptera. II. Ecology 12: 188–207.

1931b. The measurement of daylight in the Chicago Area and its ecological significance. Ecol. Mono. 1: 189–230.

1935. Studies in nocturnal ecology. III. Recording apparatus and further analysis of activity rhythm. Ecology 16: 152–163.

1937. Studies in nocturnal ecology. VI. Further analysis of activity in the beetle, *Passalus cornutus*, and description of audio-frequency recording apparatus. Jour. Anim. Ecol. 6:239–253.

Park, O., J. A. Lockett and **D. J. Myers.** 1931. Studies in nocturnal ecology. I. The climax forest. Ecology 12: 709–727.

Park, O., and **J. G. Keller.** 1932. Studies in nocturnal ecology. II. Preliminary analysis of activity in nocturnal forest insects. Ecology 13: 335–346.

Park, O., and **O. Sejba.** 1935. Studies in nocturnal ecology. IV. *Megalodacne heros.* Ecology 16: 164–172.

Park, O., and **H. F. Strohecker.** 1936. Studies in nocturnal ecology. V. An experiment in conducting field classes at night. Ohio Jour. Sci. 36: 46–54.

Park, T. 1929. Notes on the relationship between *Formica ulkei* Emery and *Solenopsis molesta* Say. Ent. News 40: 325–326.

Pearson, J. F. W. 1933. Studies on the ecological relations of bees in the Chicago Region. Ecol. Mono. 3: 374–441.

Peattie, D. C. 1930. Flora of the Indiana Dunes. Field Mus. Nat. Hist. Pub., Chicago, pp. 432.

Pepoon, H. S. 1927. An annotated flora of the Chicago Area. Chicago Acad. Sci. Pub., pp. 554.

Salisbury, R. D., and **W. C. Alden.** 1899. The geography of Chicago and its environs. Bull. Geog. Soc. Chicago No. 1, pp. 1–63. 2nd Ed. 1920.

Savely, H. E. 1939. Ecological relations of certain animals in dead pine and oak logs. Ecol. Mono. 9: 321–385.

Shelford, V. E. 1907. Preliminary note on the distribution of tiger beetles and its relation to plant succession. Biol. Bull. 14: 9–14.

1908. Life-histories and larval habits of tiger beetles. Jour. Linn. Soc. London 30: 157–184.

1911. Physiological animal geography. Jour. Morph. 22: 551–618.

Shelford, V. E. 1912. Ecological succession IV. Vegetation and control of land animal communities. Biol. Bull. 23: 59–99.
1913. Animal communities in temperate America. Bull. Geog. Soc. Chicago No. 5, pp. xiii, 1–368.
Smith, M. R. 1931. A revision of the genus *Strumigenys* of America, north of Mexico, based on a study of the workers. Ann. Ent. Soc. Amer., 24: 686–710.
1936. Ants of the genus *Ponera* in America, north of Mexico. Ann. Ent. Soc. Amer. 29: 420–430.
Strohecker, H. F. 1937a. A survey of soil temperatures in the Chicago Area. Ecology 18: 162–168.
1937b. An ecological study of some Orthoptera of the Chicago Area. Ecology 18: 231–250.
1938. Measurement of solar ultraviolet in the Chicago Area. Ecology 19: 57–80.
Talbot, M. 1934. Distribution of ant species in the Chicago Region with reference to ecological factors and physiological toleration. Ecology 15: 416–439.
Wheeler, W. M. 1903a. A revision of the North American ants of the genus *Leptothorax* Mayr. Proc. Acad. Nat. Sci. Philadelphia, pp. 215–260.
1903b. The North American ants of the genus *Stenamma sensu stricto*. Psyche 10: 164–168.
1905. The North American ants of the genus *Dolichoderus*. Bull. Amer. Mus. Nat. Hist. 21: 305–319.
1907. Notes on a new guest-ant, *Leptothorax glacialis*, and the varieties of *Myrmica brevinodis* Emery. Bull. Wis. Nat. Hist. Soc. 5: 70–83.
1910a. The North American Forms of *Lasius umbratus* Nylander. Psyche 17: 235–243.
1910b. The North American ants of the genus *Camponotus* Mayr. Ann. New York Acad. Sci. 20: 295–354.
1910c. The North American forms of *Camponotus fallax* Nylander. Jour. New York Ent. Soc. 18: 216–232.
1913. A revision of the ants of the genus *Formica* (Linné) Mayr. Bull. Mus. Comp. Zool., Harvard, 53: 379–565.
1916. Guide to the insects of Connecticut. Part III. The Hymenoptera, or wasp-like insects, of Connecticut. Formicoidea. Bull. State Geol. and Nat. Hist. Surv. Connecticut, No. 22, pp. 577–601.
1917a. A list of Indiana ants. Proc. Indiana Acad. Sci., pp. 460–466.
1917b. The mountain ants of western North America. Proc. Amer. Acad. Arts and Sci., 52: 457–569.
1922. Ants of the American Congo Expedition. A contribution to the myrmecology of Africa. Part VII. Keys to the genera and subgenera of ants. Bull. Amer. Mus. Nat. Hist. 45: 631–710.