A Revision of the North American Ants of the Genus Myrmica latreille with a Synopsis of the Palearctic Species. III.

By

NEAL A. WEBER

A REVISION OF THE NORTH AMERICAN ANTS OF THE GENUS MYRMICA LATREILLE WITH A SYNOPSIS OF THE PALEARCTIC SPECIES. III.

By

NEAL A. WEBER

Reprinted from
ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA
Vol. 43, No. 2, June, 1950

A REVISION OF THE NORTH AMERICAN ANTS OF THE GENUS MYRMICA LATREILLE WITH A SYNOPSIS OF THE PALEARCTIC SPECIES. III.

NEAL A. WEBER
Swarthmore College,
Swarthmore, Pennsylvania

The preceding parts with this title were published in the Annals of the Entomological Society of America, September, 1947 (40:437-474, 3 text figs.) and June, 1948 (41:267-308, 7 pl.). They treated the genus as a whole (keys, distribution, affinities, etc.) and 20 species comprising 104 described forms. The present part deals with the North American *brevinodis* and its subspecies, which are among the commonest ants of this area, and 12 additional species of the Holarctic Region comprising 42 forms. A projected fourth part will summarize the data and contain addenda and an index.

THE HOLARCTIC SPECIES OF MYRMICA LATREILLE
(Continued)

Myrmica brevinodis Emery

M. rubra brevinodis Emery, 1894, Zool. Jahrb. Abth. f. Syst., 8: 312–313, ☿.
M. rubra brevinodis Wheeler, 1907, Bull. Wisconsin Nat. Hist. Soc., 5: 73–74; ☿ ♀ ♂; Mann, 1911, Psyche, 18: 102.
M. brevinodis Wheeler, 1917, Proc. Amer. Acad. Arts Sc., 52: 502.
M. rubra brevinodis var. *canadensis* Wheeler, 1907, Bull. Wisconsin Nat. Hist. Soc., 5: 76–77; Wheeler, 1910, "Ants," p. 566.
M. rubra brevinodis var. *subalpina* Wheeler, 1907, Bull. Wisconsin Nat. Hist. Soc., 5: 77–78; Wheeler, 1910, "Ants," p. 566.
M. brevinodis var. *subalpina* Wheeler, 1917, Proc. Amer. Acad. Arts Sc., 52: 503.
M. brevinodis var. *alaskensis* Wheeler, 1917, Proc. Amer. Acad. Arts Sc., 52: 503; Wheeler, 1917, Bull. Mus. Comp. Zool., 61: 16.

The following descriptions have been drawn from a worker cotype from Salt Lake, Utah and from all castes of a single colony, taken by Dr. W. M. Wheeler, from Cheyenne Springs, south of Colorado Springs, Colorado.

Worker (cotype):—Length 5.0 mm.

Antennal scape extending to the occipital margin; basal fourth inwardly and evenly bent at an obtuse angle, gradually enlarging distally to about half the basal diameter. Mesoepinotal notch of thorax, when viewed in profile, shallow and broadly obtuse. Epinotal spines, seen from the side, shorter than the epinotal declivity, backwardly and only a trifle upwardly directed, somewhat curved downward at the tips; seen from above as long as the distance between them, subparallel. Petiole short, nearly as high as long, the mid-ventral tooth projecting anteriorly as far as the epinotal laminae; anterior face slightly concave, meeting the gently rounded dorsal surface at nearly a right angle, posterior declivity slightly concave. Postpetiole,

in profile, higher than long, from above transversely elliptical, being slightly broader than long. Gaster ovate. Legs of moderate length, first tarsal joint of mesothoracic leg slightly shorter than the four following joints.

Surface of body moderately but extensively sculptured. Median dorsal surface of head longitudinally and shallowly rugose; sides of head longitudinally but more vermiculate-reticulate rugose; back of head longitudinally rugose, medially and laterally reticulate; frontal area clearly delimited, shining, minutely punctate, scarcely striate; clypeus with seven ridges of moderate height between the frontal carinae. Dorsal surface of thorax coarsely vermiculate on the pronotum, becoming more finely and longitudinally rugose posteriorly; sides moderately and longitudinally rugose. Pedicel coarsely vermiculate except on the sides of the petiole where only feebly sculptured. Gaster smooth, but for slight scattered punctures, and shining. Body, except on the gaster, moderately punctate on the petiole. Antennae and legs comparatively smooth and shining.

Hairs of body moderately long and abundant, slender, pointed except on the thorax where truncate; subappressed on the antennae and legs.

Color pale brownish-red; a brownish median blotch on the head, gaster with a broad, transverse, median, brown band, legs and antennal scapes the color of the body, funiculi infuscated.

Worker (Colorado specimens):—Length 4.5-5.3 mm.

Closely resembling the cotype. The epinotal spines in some specimens are longer and not directed downwards at the tips; the spines may also be more divergent. In some specimens the clypeus has eight to ten ridges between the frontal carinae; the frontal area may also be distinctly, though finely, striate. The hairs of the thorax in many specimens are distinctly pointed. The general color of the majority of specimens is distinctly darker, the head dark red-brown, the thorax paler, and the gaster dark brown; the antennal scapes are characteristically a yellow brown and frequently contrast with a darker head.

Female:—Length 6.2-6.7 mm.

Similar to the worker with the usual sexual differences and the following:

Antennal scapes at the base slightly compressed and a little spatulate; epinotal spines somewhat shorter and distinctly blunt.

Sculpture coarser, the frontal area clear only at the base, the dorsal surface of the head medially vermiculate, laterally and posteriorly reticulate; pronotum reticulate-vermiculate, mesonotum variously sculptured, having a small, clear, triangular antero-median area, posteriorly about three median rugae, and laterally vermiculate; remainder of thorax irregularly rugose, finely punctate between; pedicel coarsely reticulate, densely punctate between. Hairs of body somewhat shorter. Color dark brown, almost black on the mesonotum with a darker median and two parapsidal blotches dimly showing, gaster shining black.

Wings hyaline, tinged with pale brown on the anterior margins, veins brown.

Male:—Length 5–6 mm.

Antennal scapes cylindrical, slightly bent medially, as long as the two following joints together; antennal club four to five jointed; petiole, from the side, rounded trapezoidal, as high as long, with a distinct

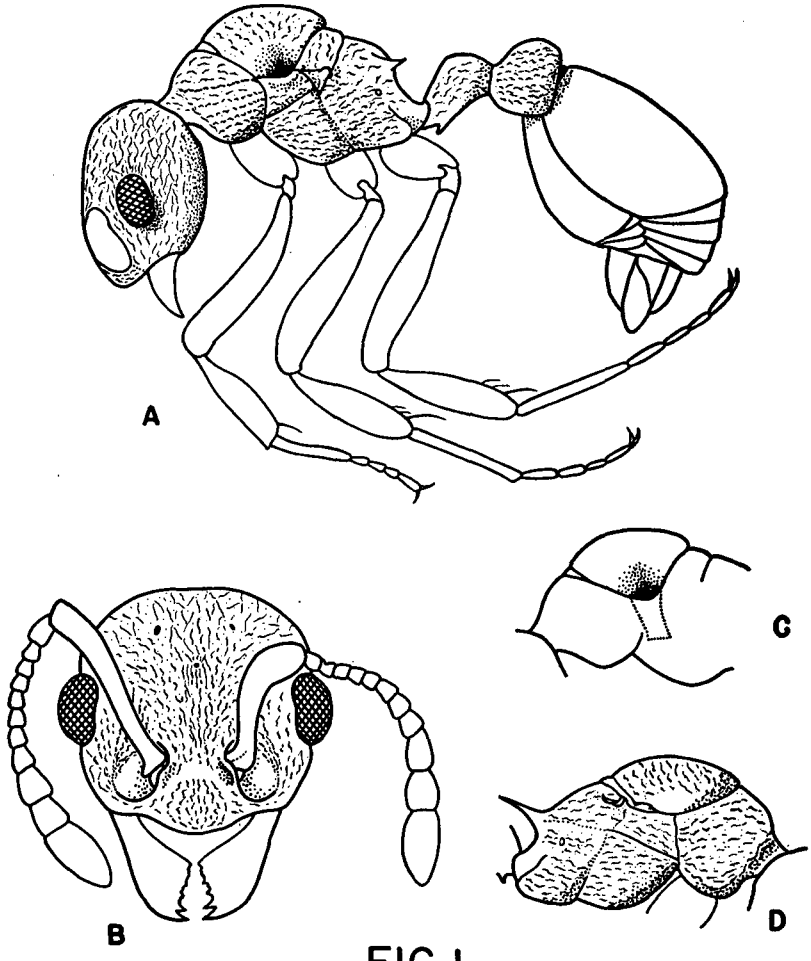

FIG. 1

FIG. 1. Anomalous apterous *Myrmica schencki emeryana* individual whose asymmetry suggested to Professor P. W. Whiting gynandromorphism with mixed tissue. A. Lateral view from the left showing general external features of the female with male external genitalia. B. Frontal view of head. The antennae are twelve-segmented as in female and worker castes. The left antenna, however, has the scape short and elbowed, suggesting the male; ocelli, not present in the worker caste, are asymmetrical. C. Left side of thorax showing extent of deep hole by dotted lines. D. Right side of thorax showing worker-length epinotal spine and possible vestige of a wing.

ventral tooth which points as much downward as forward; sagittae of the genitalia with 28 to 33 serrations, volsellae as illustrated.

Surface of head finely striate, becoming reticulate laterally; thorax striate or rugose, with punctations between, and shining; pedicel densely punctate, lightly rugose dorsally; gaster shining, microscopically reticulate-punctate.

Hairs sparse except on head, short, fine and pale yellow.

Wings hyaline, faintly brownish along margins of veins, which are light brown.

Type Locality. UTAH: Salt Lake.

Other Localities. LABRADOR: Chateau Bay (no collector); Assizes Is. (H. H. Vogel). NEWFOUNDLAND: Bay of Islands, Spruce Brook (no collectors). NOVA SCOTIA: Cape Breton Island (G. B. Fairchild); Portaupinque, Penobsquis, Westchester Lake (C. A. Frost); Digby (J. Russell); Pleasantfield (W. H. Prest); Boisdale (no collector); Port Hawkesbury (W. H. Vogel). NEW BRUNSWICK: Grand Manan (no collector). QUEBEC: Hull, Chelsea (W. M. Wheeler); Magdalene Is. (H. H. Vogel). MAINE: S. Harpswell, Riverton (W. M. Wheeler); Kittery Point (U. S. N. M.); Ogunquit (H. S. Pratt); "Maine" (Pergande Coll.); Enfield, Presque Isle (M. W. Wing). NEW HAMPSHIRE: Mt. Washington summit (A. T. Slosson). MASSACHUSETTS: Boston region (N. A. Weber; W. M. Wheeler); Lawrence (S. Henshaw); New Boston, Berkshire County, 1,400 ft. (W. M. Wheeler). CONNECTICUT: Colebrook (H. L. Viereck, W. M. Wheeler). NEW YORK: Carmel, Richf. Springs (U. S. N. M.); Ashokan Survey, Bronxville (W. M. Wheeler); "New York" (Emery). PENNSYLVANIA: Bucks Co. (Bowman's Hill Dark), Centre Co. (The Rock), State Coll., Philadelphia, Ringtown, Bushkill Falls (W. L. Brown); Lehigh Gap (no collector); Towanda (N. A. Weber); Cameron Co. (Sinnemanhoning) (L. Stannard). NEW JERSEY: Ramsey (no collector). NORTH CAROLINA: Half-way Place, Summit of Black Mountain, North Fork, Swannanoa R. (W. Beutenmuller). TENNESSEE: Montvale Springs (C. H. Kennedy). ONTARIO: Lake Nipigon (L. Logier); Guelph (W. M. Wheeler); Lake Couchiching, Algon Park., Toronto, Macdiarmid, Sunbury (R. O. M. Z.); Moose Factory (A. Skinner); Manitoulin I. (C. H. Kennedy). OHIO: Adams Co. (C. H. Kennedy). ILLINOIS: "Illinois" (M. C. Tanquary); Champaign (T. H. Frison); Volo (R. E. Gregg). INDIANA: Lafayette (H. O. Deay). MICHIGAN: Marquette (M. Downing); Isle Royale (O. Gleason). WISCONSIN: Milwaukee (C. E. Brown); Superior (R. E. Gregg). IOWA: Ames (Pergande coll.). MINNESOTA: Duluth, Knife R., Saganaga L. (R. E. Gregg). MANITOBA: Pierson (N. A. Weber). SASKATCHEWAN: Gainsborough, Elmore (N. A. Weber). NORTH DAKOTA: Kelly, Grand Forks (N. A. Weber, E. & G. Wheeler); Bottineau, Drake, Towner, Minot, Rugby, Rock Lake, Belcourt, Turtle Mts., Butte, Bantry (N. A. Weber); Cass Co. (C. Schonberger); Niangara, Northwood (C. V. Johnson); Garrison (R. P. Uhlmann). SOUTH DAKOTA: "South Dakota" (Emery); Brownsville (W. S. Creighton); Hill City (W. S. Creighton, Pergande Coll.). ALBERTA: Banff (F. Silvestri, W. M. Wheeler); Edmonton, Bilby (G. Salt); Red Deer, Sylvan Lake ("J. D. T."); Jasper (C. Hewitt). WYOMING: Yellowstone Park (F. Silvestri, U. S. N. M.; A. C. Cole, Jr.). COLORADO: "Colorado"

(C. F. Baker, U. S. N. M., Pergande); Rocky Mts. National Park, Endovalley Camp, 8650 ft. (N. A. Weber); Winfield, Montrose (W. S. Creighton); Pingree Park (G. F. Knowlton); Florissant, Boulder, Meeker (T. D. A. Cockerell, W. M. Wheeler); Eldora, West Cliff, Salina (T. D. A. Cockerell); Steamboat Springs (Cockerell, Creighton); Colorado Springs (W. M. Wheeler); Ouray, Pueblo, Breckenridge (U. S. N. M.). IDAHO: Twin Falls, Stanley, Muldoon (A. C. Cole, Jr.); North Fork (W. S. Creighton). MONTANA: Helena (W. M. Mann). UTAH: Logan (G. E. Knowlton); Salt Lake Co., Heber, 5800 ft., Vernal, Ashley Co., 6000 and 7000 ft., So. Fork, Big Cottonwood, 7000 and 7400 ft., Deer Creek Res., 5700 ft., Soapstone Canyon, Vinta Mts., 9000 ft. (A. W. Grundmann); Utah Lake, Park City (U. S. N. M.); Bryce Canyon, La Sal Mts., (W. S. Creighton). ALASKA: Seward (F. H. Whitney, Frost); Fort Yukon, Pynaw Mts., Rampart, White Pass (J. A. Kusche); Fairbanks (N. A. Weber). BRITISH COLUMBIA: Emerald Lake, Carbonate, Lake Louise (W. M. Wheeler); Hector, Fields (J. C. Bradley); Golden (W. Wenman). WASHINGTON: Orcas Island (W. M. Mann.).

Males and females appear from about July 15 to September 19 (July 15, Connecticut; July 23-Aug. 9, Ontario; July 31, South Dakota; Sept. 5, North Dakota; Aug. 31-Sept. 1, Quebec; Aug. 28, Nova Scotia; Aug. 11-12, Sept. 19, Colorado; July 15, Saskatchewan; Aug. 10, 20, Alberta; Aug. 15, 16, British Columbia; Sept. 7, Alaska).

The variety *canadensis* has been synonymized with the typical *brevinodis* only after considerable search for characters which would consistently separate the two forms. One such character, which was believed to be consistent, was color. Specimens referred to the typical form by Dr. Wheeler (1907) from Colorado were pale red with the gaster a bright red-brown and agreed well with Emery's cotype from Utah. The variety *canadensis* was erected for the dark brown representatives from Canada and the Eastern United States. Among the thousands of myrmicas brought together in the collection since 1907, however, are pale red workers with the gaster bright red-brown from Maine, dark brown workers from Colorado and series from many regions with completely intermediate conditions. It was also found that epinotal spine length and depth of sculpture could not be relied upon, for the range within the same colony may be considerable.

Additional evidence for synonymizing the variety *canadensis* is presented by the males of the two forms. The male which Emery placed tentatively with the typical *brevinodis* cannot, as Dr. Wheeler (1907) stated, belong here because of the great length of the antennal scape and must belong to another form. The males, however, which were described as typical *brevinodis* by Dr. Wheeler have been examined and I find them to be *lobicornis fracticornis*, with the long antennal scapes equal to the five following segments; more conclusively, the genitalia, particularly the volsellae, prove it to be this *lobicornis* subspecies. These males were probably taken with the females which were typical *brevinodis*. Another instance of the mingling of sexes of different forms is listed under the subspecies *brevispinosa* where I took a *brevispinosa* female from a swarm containing *sabuleti* subsp. *americana* females as well as *Lasius niger* males and females. Similar cases are recorded by Donisthorpe and others from Europe.

The variety *alaskensis* has been synonymized after an examination of the types and specimens from Alaska later referred to it. I can not distinguish them consistently from many of the widespread typical *brevinodis* workers; a number of *brevinodis* workers have been examined with as few as eight rugae on the clypeus, though this is not the general condition. The discovery of the sexual forms may reinstate *alaskensis* as a distinct form.

The variety *subalpina* has also been synonymized after an examination of the types. The hairs on the bodies of most of the types have been found to be acute; some of the types have obtuse hairs in variable abundance intermixed with acute hairs, as if they had been broken off. While the wings of the type winged forms are hyaline throughout, there are transitions to this condition in typical *brevinodis* specimens and specimens from Ontario are before me with almost completely hyaline wings. The male gentalia are indistinguishable from the typical *brevinodis*.

Biology

This *Myrmica*, on the whole, prefers moist nesting sites and is one of the commonest bog-inhabiting ants. It is also found under bark or in rotted wood on the ground and under stones, but usually in moister situations than the other North American *Myrmica* forms are found. The brood occurs in a series of cavities in the top few inches of soil, among grass roots or in rotted wood.

A colony was taken from a slight depression in the dry, short grass prairie of northwestern North Dakota and taken to Cuba during the height of summer. Not only did the workers survive the change to a much moister and hotter climate but they reared other workers and several males before the colony was ended over a month later. The males emerged on July 18, several weeks earlier than they have been taken in North Dakota.

While the colonies of this form, as of *Myrmica* species in general, contain only a few hundred workers at the most, several colonies were discovered July 15, 1934 which far exceed any of which I have records. These colonies were found on either side of the Manitoba-Saskatchewan line just north of the United States-Canada boundary (Weber, 1941).

This region, having badly suffered from drouth for several consecutive years, was nearly denuded of vegetation and myrmicas could hardly thrive except in small areas. Such an area was the Canadian Pacific Railway right-of-way where, between the railway embankment and the surrounding prairie, a shallow ditch held a little moisture and supported more vegetation than the desert-like prairie.

On the north side, under scattered stones from the embankment, were found the polydomous colonies of *brevinodis*. In one case the nests extended along the ditch for fully 46 meters and laterally from one to three meters so that the area covered by the single colony was fully 100 square meters; there were probably over 100,000 adult ants. The nests were under scores of stones of variable size which were lying on the surface or embedded to a variable extent. Upon the roots of grasses which extended under the stones, or elsewhere where the ants had excavated chambers, were pastured both aphids and coccids. The

myrmicas carried these away when the roots were exposed and their excretions probably were the chief source of food of the ants.

Dr. Wheeler, in a series of papers (1901, 1903, 1907) has described the habits of an interesting inquiline ant, *Leptothorax emersoni* and its subspecies *glacialis*, which has established trophallactic relations with this ant.

Anomaly

An abnormal ant taken by myself in North Dakota August 26, 1934 belongs to this subspecies (Part II, 1948, p. 277, fig. 8). Head, thorax, appendages and petiole are those of a normal winged female. Seen from above, the postpetiole is fused asymmetrically to the gaster, whose long axis is directed at a distinct angle from the long axis of the body. Since the gaster is a dark brown and the pedicel red, the fused postpetiole may be readily traced. The dorsum of the postpetiole may also be traced by its rugosity to the left anterior region of the first gastric segment. The right side of the segment bears a red streak corresponding probably to the right side and ventrum of the postpetiole. From the suture between the first and second gastric segments, at the end of the red streak, exudes an amorphous mass. In side view the petiole seems directly attached to the gaster.

The insect was taken in the then nearly completely dried up bed of the Souris or Mouse River about 14 miles north of Towner, N. D. As I approached a small pool a cicindellid beetle flew away from the margin where it was attacking the ant. The myrmica was unharmed except for slightly torn metathoracic wings, which probably prevented it from attempting flight, and crawled with difficulty because of its abnormal abdomen.

A second anomaly is described under the subspecies *brevispinosa*.

Myrmica brevinodis subsp. **sulcinodoides** Emery

M. rubra brevinodis var. *sulcinodoides* Emery, 1894, Zool. Jahrb. Abth. f. Syst., 8: 313, ☿; Wheeler, 1907, Bull. Wisconsin Nat. Hist. Soc., 5: 75–76, ♀; Wheeler, 1910, "Ants," p. 566.

M. brevinodis var. *sulcinodoides* Wheeler, 1917, Proc. Amer. Acad. Arts Sc., 52: 502; Wheeler, 1917, Bull. Mus. Comp. Zool. Harvard, 61: pp. 16.

M. rubra brevinodis var. *frigida* Forel, 1902, Trans. Ent. Soc. London, part 4: 699, ☿; Wheeler, 1907, Bull. Wisconsin Nat. Hist. Soc., 5: 78; Wheeler, 1910, "Ants," p. 566; Santschi, 1909, Bull. Soc. Ent. Ital., 41: 5.

M. rubra brevinodis var. *whymperi* Forel, 1904, Ann. Soc. Ent. Belg., 48: 154, ☿; Wheeler, 1910, "Ants," p. 566.

M. brevinodis var. *whymperi* Forel, 1913, Bull. Soc. Vaud. Sc. Nat., 49: 215; Wheeler, 1917, Bull. Amer. Acad. Art. Sc., 52: 502.

This subspecies may be considered merely a darker, and more deeply sculptured form. Between this subspecies and the typical form exist specimens which may be with equal propriety referred to either. The male genitalia are practically indistinguishable.

The following descriptions are drawn from specimens of a single colony from Cheyenne Canyon, Colorado.

Worker:—Length 4.8–5.4 mm.

Antennal scapes smoothly but sharply bent at about 45° at the base, the base being dorso-ventrally distinctly compressed and somewhat spatulate, frontal lamina large, bent parallel to the head; epinotal

spines long, slender, and pointed, seen from above, divergent, longer than the distance between their bases.

Median dorsal surface of head, including clypeus and most of frontal area, strongly and longitudinally rugose, sides of head variably reticulate or longitudinally reticulate-rugose; back of head medially rugose, laterally reticulate-rugose; dorsal surface of thorax anteriorly strongly vermiculate, posteriorly becoming more rugose; sides of thorax longitudinally rugose, somewhat vermiculate on pronotum; pedicel strongly vermiculate, densely punctate between the vermiculations; gaster smooth and shining.

Hairs short, subappressed on head, erect on thorax, inclined and scanty on gaster.

Color of head and gaster dark brown, appendages and thorax brownish red.

Female (dealate):—Length 6.5–7.1 mm.

Resembling the worker with the usual sexual differences and the following:

Epinotal spines about as long as the distance between their bases, stout, blunt and widely diverging. Surface of the sides of the head strongly reticulate; surface of pronotum vermiculate anteriorly, rugose posteriorly; surface of mesonotum with a small, smooth and shining antero-median area from which radiate rugosities becoming regular and parallel immediately behind it (these are more numerous and regular than in the typical *brevinodis*); remainder of thorax chiefly rugose; pedicel vermiculate; gaster smooth and shining. Hairs short and scanty as in the worker. Color somewhat darker than in the worker, thorax in some too dark to show the antero-median and two parapsidal blackish blotches on the mesonotum.

Male:—Length 6.3–7.2 mm.

Antennal scape subcylindrical, slightly enlarged distally, a trifle bent, equal in length to the two following joints together; epinotal declivity dorsally with two low, obtuse gibbosities; antennal club four-jointed; petiole about as high as long, with a distinct subconic ventral tooth. Surface of head irregularly and shallowly reticulate, densely punctate between. Hairs yellowish, rather long and subappressed on the head, finer and scantier on the body. Color dark brown to black. Sagittae of genitalia with 32 to 36 serrations; volsellae as illustrated.

Type Localities. SOUTH DAKOTA, UTAH, MAINE.

Other Localities. ALASKA: Homer (A. Menner); Sitka (T. Kincaid).[1] NEWFOUNDLAND: Bay of Islands (L. P. Gratacap). MASSACHUSETTS: Essex County (King); Naushon Island (W. M. Wheeler). MAINE: "Maine" (Emery); Ogunquit (Pratt). INDIANA: Valparaiso (M. Talbot). MICHIGAN: Warrens Dunes (M. Talbot). WISCONSIN: Lake Geneva, Williams Bay (Ill. Nat. Hist. Surv). NORTH DAKOTA: Towner, Bantry (N. A. Weber). SOUTH DAKOTA: "South Dakota" (Emery); Hill City (Pergande Coll., N. A. Weber). WYOMING: Big Horn National

[1]Also Kodiak, all castes, Aug. 5 (N. A. Weber); the ants were markedly larger and much less concolorous than those of *brevinodis* taken 400 miles north at Fairbanks.

Forest (W. S. Creighton). MONTANA: Bear Paw Mt. (Pergande Coll.); Helena (W. M. Mann). IDAHO: Galena (A. C. Cole, Jr.). COLORADO: Boulder, 5,347 feet, Ward (W. W. Robbins); Cheyenne Canyon, 5,990 feet, Ute Pass, Florissant 8,000–9,000 feet, Colorado Springs (W. M. Wheeler); Westcliffe 7,849 feet (P. J. Schmitt); Winfield, Steamboat Springs (W. S. Creighton); Rico, 10,000 feet and Hayden Peak 10,000 feet (E. J. Osler); Lost Lake, Eldora, 9,500 feet (D. M. Andrews); Gregory Canyon, Boulder (L. F. Byars); Breckenridge, Ouray, Denver (U. S. N. M.); Nederland, 9,600 feet (F. H. Carpenter). NEW MEXICO: Beulah, 8,000 feet, Rociada, Upper Pecos Valley, Top of Las Vegas Range, 11,000 feet (T. D. A. Cockerell); N. E. Truchas Peak, 12,-13,000 feet (A. Springer). UTAH: "Utah" (Emery); Park City, Salt Lake (U. S. N. M.); Logan, Woodland (Knowlton); Cache Co. (Smith); Mirror L., Uinta Mts., 10,000 feet (W. S. Creighton). ARIZONA: Kaibab National Forest (W. S. Creighton). ALBERTA: Lake Louise (W. M. Wheeler); Soda Lake (G. Salt); Jasper (C. G. Hewitt); Vermillon Pass (E. Whymper). BRITISH COLUMBIA: Ice River Valley (E. Whymper); Hector, Carbonate and Spillimachen R., Selkirk Mts., (J. C. Bradley); Field, Emerald Lake, Yoho Pass (W. M. Wheeler); Victoria (P. J. Darlington). WASHINGTON: Orcas Island (W. M. Mann). CALIFORNIA: Tallac, Lake Tahoe, 5,200 feet (W. M. Wheeler); Sisson (F. Silvestri).

The winged forms appear Aug. 1 (Wyoming), Aug. 2 (New Mexico).

The varieties ***whymperi*** and ***frigida*** have been synonymized with ***sulcinodoides*** after an examination of the original descriptions and of many specimens from British Columbia, including two cotypes of ***whymperi***. The descriptions fit Emery's previously described subspecies very well and the ants belong to the same ***brevinodis-sulcinodoides*** complex. The ***whymperi*** cotypes have slender, acute, and strongly diverging epinotal spines which are about 1½ times as long as the distance between their bases. The dorsal surface of the pedicel is strongly vermiculate.

Myrmica brevinodis subsp. **kuschei** Wheeler

Myrmica brevinodis var. *kuschei* Wheeler, 1917, Bull. Mus. Comp. Zool., 61: 17, ♂ ♀.

Worker:—Length 3.7–4.5 mm.

Antennal scape evenly bent at the base and slightly compressed; epinotal spines as short or shorter than the distance between their bases, divergent, straight, directed backwards and only slightly upward.

Median dorsal surface of head rather finely rugose, about 8 more coarse and more widely separated rugae on the clypeus, frontal area shining, slightly punctate, sides of the head elongate-reticulate, in front of the eyes longitudinally rugose. Dorsal surface of thorax vermiculate-reticulate; lateral surfaces longitudinally rugose, somewhat vermiculate on the prothorax. Pedicel vermiculate, mid-dorsal surface of the postpetiole smooth and shining. Surface of head, thorax and pedicel densely punctate at the base of the sculpturing. Thorax smooth and shining.

Hairs of the body moderately short and obtuse or truncate, possibly from having been broken off; hairs of the gaster sparse, except on the sutures.

Color of head and gaster reddish brown, rest of body and appendages pale brownish red.

Female (dealate):—Length 5.8 mm.

Resembling the worker, with the usual sexual differences and the following:

Epinotal spines moderately diverging, straight and bluntly tipped, distinctly shorter than the distance between their bases. Pronotum coarsely reticulate, becoming finely rugose posteriorly; antero-median area of the mesonotum clear, posteriorly the median surface has several longitudinal rugae which are bordered on the side by irregular vermiculations; between the vermiculations are large and distinct pits or coarse punctures; remainder of thorax longitudinally rugose; dorsal surface of the petiole transversely rugose; surface of the postpetiole concentrically rugose, the rugae becoming transverse posteriorly; ventral surface of the pedicel densely, dorsal surface lightly, punctate; gaster smooth and shining.

Hairs as in the worker, short, sparse and truncate.

Color of body dark brown, the gaster distinctly paler than the head or thorax; appendages pale brownish red.

Described from the type female, a series of worker cotypes and a worker from the Pergande collection. As Dr. Wheeler (1917b, p. 21) pointed out, this specimen was included by Pergande in his *Myrmica scabrinodis* subsp. *lobicornis* var. *lobifrons*.

The sculpturing of the female is distinct from that of any of the other *brevinodis* forms although the workers closely resemble those of the typical *brevinodis*. Males have not yet been taken.

Type Locality. ALASKA: Ketchikan (J. A. Kusche).

Other Locality. ALASKA: Metlakahtla (T. Kincaid).

Myrmica brevinodis subsp. **brevispinosa** Wheeler

M. rubra brevinodis var. *brevispinosa* Wheeler, 1907, Bull. Wisconsin Nat. Hist. Soc., 5: 74, ♀ ♂; Wheeler, 1910, "Ants," p. 566.

M. brevinodis var. *brevispinosa* Wheeler, 1917, Proc. Amer. Acad. Arts and Sc., 52: 502.

M. rubra brevinodis var. *decedens* Wheeler, 1907, Bull. Wisconsin Nat. Hist. Soc., 5: 75; Wheeler, 1910, "Ants," p. 566.

M. brevinodis var. *decedens* Wheeler, 1917, Proc. Amer. Acad. Arts and Sc., 52: 502.

The following descriptions are drawn from cotypes.

Worker:—Length 3.8–5 mm.

Antennal scapes in the form of a long drawn out sigmoid curve; slightly compressed dorso-ventrally at the base and with a distinct though shallow sulcus; the posterior margin of the base is furthermore drawn out as a slight keel. Mesoepinotal suture of thorax, in profile, averaging somewhat deeper than in the typical *brevinodis*. Epinotal spines extending backwards and, at a very slight angle, upward; short stout, about as long as the excision of the lamellae directly under them, or as the distance between their bases. Petiole, in profile, three-fourths as high as long; the anterior face flat or slightly concave, the dorsal faces gently convex, the two enclosing a rounded right angle; median ventral tooth small, rounded, and extending backwards as a slight rounded keel. Postpetiole, in profile, three-fourths as long as high, with evenly rounded dorsal, and irregularly convex ventral, surface.

Surface of dorsal area of head shallowly and longitudinally rugulose, becoming reticulate laterally and on the posterior margin, thickly punctate between; frontal area punctate, shining; clypeus rugose; antennal scapes punctate. Dorsal surface of thorax coarsely reticulate or vermiculate-rugose, becoming somewhat more regularly and longitudinally rugose, densely punctate between. Surface of pedicel comparatively smooth and with only faint reticulations, densely punctate between. Gaster smooth and shining.

Hairs moderately abundant, generally obtuse on the head and thorax, finer, shorter and more abundant on the gaster.

Color brownish red, gaster dark brown apically.

Female:—Length 5.3–6.3 mm.

General form of the worker with the usual differences and the following:

Surface of the pronotum reticulate, more coarsely on the dorsal surface, less on the sides, densely punctate between the reticulations; remainder of the thorax rugose.

Color of body and appendages brownish red; dorsal surface of mesonotum with two parapsidal dark brown blotches; gaster shining dark brown, light brown apically. Wings hyaline with the base clear; veins light brown.

Male:—Length 5.2–5.4 mm.

Antennal scape slightly bent medially, a little larger in diameter at the distal than at the proximal half, equal in length to three to four of the following segments together. Epinotum dorsally with a gibbosity on each side. Each sagitta of the genitalia with 24 to 27 serrations; volsellae as illustrated.

Head shallowly rugose-punctate; thorax anteriorly smooth or finely punctate anteriorly, somewhat shallowly rugose posteriorly; pedicel smooth or finely punctate; gaster smooth.

Color of head black, rest of body and appendages dark brown. Wings hyaline, faintly tinged with yellowish bassally; veins light brown.

Type Localities. COLORADO: Cheyenne Canyon, 8,500 feet and Colorado City, 6,064 feet (W. M. Wheeler); Canon City, 5,329 feet (P. J. Schmitt). NEW MEXICO: Las Vegas, 6,398 feet, Pecos, 6,366 feet (T. D. A. Cockerell).

Other Localities. COLORADO: Buena Vista, 7,900 feet, Colorado Springs, Denver, Cheyenne Canyon, Manitou, (W. M. Wheeler); Florissant, 8,500–9,000 feet (T. D. A. Cockerell, W. M. Wheeler); Wolf Creek (W. S. Creighton); Longmont, Fort Collins (E. S. G. Titus); Mountain House Lake, Fort Garland, 8,300 feet (no collector); 10 mi. N., Denver (N. A. Weber). UTAH: Price, Carbon Co. (P. Koller); Johnson Creek, Abajo Mts., 7,000 ft., San Juan Co. (A. W. Grundmann). NEW MEXICO: Taos (A. C. Cole, Jr.); Little Tesuque Canon, 9,200 feet, Santa Fe, (W. M. Wheeler); Pecos Mts., San Mejuel County (Mitchell). CALIFORNIA: Lake Tahoe (W. M. Wheeler). ILLINOIS: Volo (R. E. Gregg). MICHIGAN: Crystal Falls (A. C. Cole, Jr.). MINNESOTA: Oslo, Marshall Co. (N. A. Weber); Duluth, Holyoke (R. E. Gregg). NORTH DAKOTA: Mikkelson (J. E. Goldsberry); Amidon (E. & G. Wheeler); Stark Co. (R. P. Uhlmann); Hebron (E. Krauth); Devils Lake, N. Roosevelt State Pk., Towner, Bismark, Arvilla, Grafton,

Wing (N. A. Weber); University (L. Monda); Cass Co. (C. Schonberger). SOUTH DAKOTA: Rapid City (N. A. Weber). MONTANA: Belt (W. S. Creighton). WYOMING: Cheyenne, Evanston (N. A. Weber). IDAHO: North Fork (W. S. Creighton). ONTARIO: Nipigon, Ft. William (N. A. Weber); Manitoulin I. (C. H. Kennedy).

The winged forms appear July 19–Aug. 18 (Colorado); July 27–Aug. 10 (New Mexico); Aug. 21 (Idaho); Aug. 28 (Montana); Sept. 5 (Utah); and Sept. 10–28 (North Dakota).

The combination of the compressed and grooved basal portion of the antennal scape with the short epinotal spines easily distinguish the worker of this subspecies from the other *brevinodis* forms; the males are easily distinguished by the length of their scape.

The variety *decedens* Wheeler has been synonomized with *brevispinosa* after the examination of the type specimens of the two and the finding of a considerable number of completely intermediate forms. The epinotal spines of the two from actual measurement average practically the same, there being an appreciable deviation on both sides of the average in both series. The size of the *decedens* workers averages a trifle smaller but well within the normal range, even within a single colony, of a *Myrmica* form. The surface of the thorax is similar.

As is to be expected, the structure of this subspecies shows considerable variation. The dorsal surface of the thorax of the worker is generally vermiculate-rugose but specimens from the same colony may be, on the one hand, distinctly reticulate, or, on the other hand, longitudinally rugose. Within the same colony may be considerable range in size of the epinotal spines. Indeed, in a single Florissant, Colorado, specimen the spine on one side of the epinotum was typically short as in *brevispinosa*, on the other side, however, it was equally typical *brevinodis*! The spines were entirely normal in appearance.

The color of *brevispinosa*, on the whole, is lighter than that of the other forms. The color of the females varies little; the darkest female seen was one with the gaster entirely dark brown and the general tone darker, which I took at Fort William, Ontario. The darkest workers examined were taken at Nipigon, Ontario, in the midst of the "bush" or extensive spruce woods.

Biology

Dr. Wheeler notes that in Colorado the colonies are "rather small, nesting under stones in grassy places on the banks of streams." In North Dakota I have found the small colonies in similar situations and also nesting in sand on the prairie. Other ants occupying the same ecological formation in the sandhills south of Towner, North Dakota, include *Solenopsis molesta* Say, *Lasius niger* var. *americana* Em., and *Formica* (*F.*) *bradleyi* Wheeler. Near the shore of Round Lake, McHenry County, North Dakota, the workers of this variety were observed tending the aphids, *Anuraphis* sp. (det. P. W. Mason) on the taproots of the dandelion (*Taraxacum officinale*). On nearby willow trees workers of *Formica rufa obscuripes* Forel were tending the aphids, *Chaitophorus populifoliae* (Oest.) (det. P. W. Mason) and it is probable that the myrmicas would visit these aphids also when the more aggressive

formicas would be absent. At Towner upon a September 10th, I captured a female of this variety in a swarm with *M. sabuleti* ssp. *americana* females and *Lasius niger* males and females. The ants were part of a steady stream flying just above the level of the tree tops in the shallow Mouse River Valley. The day was calm so winds could not account for this mixed swarm.

Anomaly

A curious anomaly from Belt, Montana, taken by Dr. W. S. Creighton belongs to this subspecies (Part II, 1948, p. 277, fig. 7). It was taken in company with entirely normal workers. In this specimen the postpetiole is absent and the petiole is fused to the epinotum. In a dorsal view the line of fusion is transverse and clearly indicated; the epinotum is without trace of spines; the fused petiole is slightly broader than the adjacent part of the thorax and has evenly convex sides; the gaster is joined to the petiole by its normal slight peduncle; the sculpturing of the petiole is very irregularly reticulate-rugose, smoother and not longitudinal as on the epinotum; the pilosity is that of the normal petiole. In lateral view about one-half of the epinotum is seen to be missing, all of the petiolar peduncle and the entire postpetiole; the lateral line of fusion is not so distinct but it appears that the fusion is not entirely vertical, the petiole having been carried into the thorax a little; oddly enough the ventral margin is much like that of the postpetiole although the remainder is clearly that of the petiole; as on the dorsal surface, the sides are more feebly and indistinctly sculptured than on the thorax. Even allowing for the fusion of parts of the worker, it is a little undersized.

At least five abnormalities of the same nature are recorded in the ant literature. As mentioned in Part II, 1948, p. 292, the *Myrmica* female lacking the entire pedicel described and figured by Creighton (1920), belongs to *M. sabuleti* subspecies *americana*.

Donisthorpe, in 1922, records a similar female of *Leptothorax acervorum* F. and Forel a worker of the same species with the pedicel firmly fused to the metathorax. Karawajew (1927) described a worker of *Megaponera foetens* F. without a petiole. In 1946 I figured and described a worker of *Oecophylla longinoda* (Latr.) with the petiole telescoped into the epinotum (Weber, 1946). This *brevispinosa* worker and the *brevinodis* female above described add two records to the five listed which would seem to indicate that this type of monstrosity, in which there is a telescoping of the pedicel with the thorax or gaster, is commoner than any other abnormality in ants, aside from intersexes or gynandromorphs.

Myrmica brevinodis Emery subsp. **discontinua** Weber

M. brevinodis Emery ssp. *discontinua* Weber, 1939, Lloydia, 2: 150, ♀.

Worker:—Length 3.3–4.2 mm.

General habitus as in *brevispinosa*, with the following differences: Antennal scape at the base more compressed, with a distinct keel on the proximal part at medial angle of the bend, (when the scape is extended posteriorly towards the mid-occiput), which may be prolonged distally and bifurcated, following the lateral and medial margins for

a slight distance; similar in this to *fracticornis* but the keel is not transverse, but V-shaped. Thorax, in profile, with feebly impressed meso-epinotal suture; epinotal spines slender, acute; in profile, produced backwards and upwards at a 40° to 50° angle, distinctly longer than the excision of the lamina beneath them; from above, distinctly longer than the distance between their bases, diverging. Postpetiole, in profile, less than three-fourths as long as high.

Sculpturing of the head comparatively fine, most of the median dorsal surface closely and regularly rugulose, more open and reticulate on the sides. Dorsal surface of thorax moderately reticulate-vermiculate, becoming finer posteriorly; sides finely rugulose. Petiole feebly reticulate on dorsal surface; sides of pedicel thinly rugulose; dorsal surface of postpetiole smooth, except for punctations. Whole surface of body, except gaster, densely and conspicuously punctate.

Color dark brown; head and gaster nearly black.

Cotypes. A series of workers taken by Dr. W. M. Wheeler at Topaz Butte, Florissant, COLORADO, July 15, 1906. *Syntypes* are from the following localities: Bay of Islands, NEWFOUNDLAND (no collector); Pleasantfield, NOVA SCOTIA (W. H. Prest). Mikkelson, NORTH DAKOTA (J. E. Goldsberry): Yellowstone Park. WYOMING (A. C. Cole).

Other locality: UTAH. Ashley Creek, Vernal, 6000 ft. (A. V. Grundmann).

This subspecies can be readily distinguished from *brevispinosa* by the greater development of a keel on the scape, longer epinotal spines, smaller size and darker color. It appears closer to *fracticornis* but for the strikingly smooth and punctate surface. A male on the same pin with the North Dakota specimens is very much like a *fracticornis* male and with the antennal scape equal in length to from five to six of the following joints together. The Wyoming specimens have the thorax unusually smooth. The exact status of this variety must await the certain correlation of the males.

The Nova Scotia workers were taken from their "nests in moss of meadow, a few inches above water (with aphids)."

Myrmica scabrinodis Nylander

M. scabrinodis Nylander, 1846, Act. Soc. Sc. Fennicae, 2: 931–932, ♀ ♂; Karawajew, 1926, Mem. Acad. Sc. Ukraine, 4: 65–66, fig. 2; Karawajew, 1929, Ibid., 13: 206–207; Finzi, 1926, Boll. Soc. Adr. Sc. Nat. Trieste, 29: 98–99; Stärcke, 1926, Ent. Bericht. Nederlandsche Ent. Ver., 7: 90; Stärcke, 1927, De Levende Natuur, 1927: 13; Karawajew, 1929, Zool. Anz., 83: 45; Santschi, 1931, Rev. Suisse Zool., 38: 341–342.

Worker (after Nylander):—Length 1¾–2 lin.

Similar to the preceding (*M. ruginodis*), sculpturing rougher, frontal area indistinct and antennal scape formed as described below. Strong striae on the head, thorax and pedicel, deeper than in the predecing, pilosity of the body more dense; frontal lamina differently formed, dilated auriculate on the margins of both sides, the processes lamelliform and nearly semicircular, a little elevated, so formed as to conceal the base of the antennae. Frontal triangular area small, almost concealed. Antennal scape bent at the base, dorsally with a small, obliquely transverse lobe, nearly semicircular, concave, apically compressed; viewed

anteriorly, appearing as a small very acute extension of the bend. Epinotal spines long. Otherwise nearly as in the preceding.

Female (after Nylander):—Length 2½ lin.

Similar to the worker, but much darker. Head fuscous, ferrugineo-testaceous between the genae, on the mandibles and antennae, frontal area scarcely apparent. Scapes bent at the base, dorsally with a suberect angle, arcuate beneath, no distinct lobe. Epinotal spines as in the preceding species, but nodes of the pedicel roughly sulcate-rugose. Wings whitish hyaline, about 2½ lin. long; between the stigma and the base faintly pallid-cinereous.

Male (after Nylander):—Length 2½ lin.

Similar to the male of *M. laevinodis*, antennae, in truth, as long as the funiculus in the same species, scape one-fifth as long as the rest of the antennae, legs with long yellow pilosity. Mandibles apically pale and sordid. Antennae obscurely rufous, with longer and more slender pilosity than in the female and worker; scape subcylindrical, as long as the three following segments, of the thickness of the last segment, moreover; first funicular segment suborbiculate, broader than any of the seven following joints, which have long vertical pilosity; ninth, tenth and eleventh suborbiculate, broader; last segment subconic, nearly as long as the tenth and eleventh taken together, but in the same way broad at the base. Wings less whitish than in the female. Legs with long pilosity on all sides, cinereous hairs on the tarsi almost longer. Anus sordid.

For recent discussions of this species see the bibliography given above and also Emery (1908, pp. 174–177). It remains for European myrmecologists to find Nylander's types or to agree upon a typical form.

This species is widely distributed over Europe and North and Central Asia.

Myrmica scabrinodis var. **ahngeri** Karawajew

M. scabrinodis var. *ahngeri* Karawajew, 1926, Mem. Acad. Sc. Ukraine, 4: 66, 67, fig. 3; 2 ♀.

Worker (after Karawajew):—Length 4.5 mm.

Head hardly longer than wide, hardly broader posteriorly than anteriorly and the anterior margin of the clypeus more projecting than in the typical form. The frons broad, occupying about one-third of the width of the head, with strongly S-shaped frontal carinae and broad, diverging lobes, which are rounded anteriorly (larger than in the typical form). Frontal area short and broad. Lobe of the scape nearly right-angled, at the apex with a small projection. Epinotal spines moderately long, somewhat horizontal and diverging. Pedicel similar to that of var. *sancta*.

Head coarsely, but not very deeply, somewhat irregularly, rugose and reticulate on the sides; between the coarse rugosities are finer and more abundant, almost contiguous, punctations. Thorax coarsely rugose longitudinally; declivous surface of epinotum smooth and shining. Pedicel somewhat less coarsely rugose and finely punctate.

Color dark red-brown; antennae, legs, apex of the gaster and a few blotches on the thorax somewhat lighter, ferruginous.

Type Locality. Taganrog, 8.VI.1926 (K. Ahnger).

Myrmica scabrinodis var. **aloba** Forel

M. scabrinodis var. *aloba* Forel, 1909, Ann. Soc. Ent. Belg., 53: 103, ☿.
M. rugulosoides var. *aloba* Finzi, 1926, Boll. Soc. Adr. Sc. Nat., Trieste, 29: 95, ☿ ♂.
M. aloba Santschi, 1931, Rev. Suisse Zool., 38: 340–341.
M. albuferensis Lomnicki, 1925, Bull. Ent. Pologne, 4: 15, ☿.

Spain, Portugal, Eastern Pyrenees, Mts. of Tunis (Santschi).
For descriptions of this disputed form see the references above.

Myrmica scabrinodis subsp. **angulinodis** Ruzsky

M. scabrinodis subsp. *angulinodis* Ruzsky, 1905, Formic. Imp. Rossici, pp. 654, 689–690, ☿ ♀.

Worker (after Ruzsky):—Length 4–4.5 mm.

Antennal scape extending to the occipital margin, at the base bent as in the typical *scabrinodis* and equipped with a small sharp lobe but the basal part of the bend, however, is very short. Third to sixth joints of the antennal funiculus likewise as long as broad (the condition in *scabrinodis*); club almost four-jointed. Clypeus weakly shining, rough, fine granulations. Mesoepinotal impression less sharp than in *scabrinodis*. Epinotal spines shorter, straight or almost straight, more produced upwards than backwards. Petiole especially distinctive; it is very short and forms dorsally a sharp wrinkle, the anterior face, seen in profile, steep and somewhat concave, the posterior surface less steep and hardly convex. The petiolar peduncle is not well developed. Postpetiole as in *scabrinodis*. Sides of the head with well developed reticulations which are thin and dull; the space between shining, very finely, although not clearly punctate. Thorax coarsely wrinkled, petiolar node likewise strongly wrinkled, dorsal surface of the postpetiole with thin longitudinal rugulosities and finer punctations. Sides of the petiole finely and thickly punctate. Infraspinal surface of the epinotum smooth, shining. Reddish or yellowish brown, more or less dark, with blackish brown head and first gastric segment; appendages and apex of gaster yellowish brown.

Female (after Ruzsky):—Length 5 mm.

Similar to the worker. Strongly sculptured, the dorsal surface of the postpetiole with broad, longitudinal incisures and more punctations. Dorsal body hairs thick and short. Black brown with lighter (brownish) appendages.

Type Locality. IRKUTSK GOUV.

Myrmica scabrinodis subsp. **eidmanni** Menozzi

M. eidmanni Menozzi, 1929, Verh. Zool. Bot. Gesellsch. Wien, 1929, 79: 331–332, fig. 3, ☿.

Worker (after Menozzi):—Length 5.3 mm.

Black, thorax and pedicel piceous, appendages a little lighter. Sculpturing very strong, above all on the head, consisting of high rugosities more or less anastomosing except on the sides of the thorax; gaster smooth. Numerous erect hairs, of a yellow color and longer on the body than on the appendages; that of the joints of the funicle as long as the joints themselves, except, naturally, that of the joints of the club.

Head oval, slightly more narrowed posteriorly than anteriorly, at the sides moderately convex. Mandibles opaque and striate. Cylpeus slightly rounded anteriorly to the middle; on the postero-median convex portion with five to six equidistant rugae, not connected to one another. Frontal area smooth, or, posteriorly, with a few rudimentary striae. Scape striate-punctate and opaque; exceeding the posterior margin of the head a little, at the base strongly curved and with a rounded lobe on the outside margin. Third joint of the funiculus much shorter than the second; remainder of the antennae much as in those forms of the *scabrinodis* group. Front relatively narrow; the more narrowed at about the middle where it is nearly equal to four-fifths of the length of the frontal lamina. This is distinctly arcuate. Thorax rather elongate, with well marked mesoepinotal impression. Epinotum equipped with somewhat slender spines, as long as, or a little less, twice the distance between their bases, almost horizontal and little diverging, extending to about the middle of the petiole. Petiole with a short peduncle and a node visibly angulate in profile. Postpetiole narrowed anteriorly, longer than broad and moderately rounded at the sides; seen from the side the maximum convexity is posterior.

Type Locality. SIBERIA: Verkneudynsk (H. Eidmann).

"This *Myrmica* belongs to the *scabrinodis* group but differs from the subspecies *angulinodis* and *kasczenhoi* described by Ruzsky from Siberia and Transbaikal; rather are points of resemblance found with *saposhnikovi*, described from the Altai Mts. by the same author, but differs in slightly larger size, by the more conspicuous lobe of the scape and in consequence the more narrow front, and by the more abundant fine pilosity."

Myrmica scabrinodis subsp. **granulinodis** Nylander

M. granulinodis Nylander, 1846, Act. Soc. Sc. Fennicae, 1846: 1060, ♀.

Female (after Nylander):—Quite similar to the female of *M. scabrinodis* but the antennal scape is entirely geniculate at the base, not (anteriorly?) excavated, frontal laminae a little less dilated on both sides, nodes of the pedicel somewhat reddish, densely granulose-rugose; legs pubescent (to sparsely decumbent pilose) as in the *scabrinodis* female. Male similar to the male of the same, scape at the base a little curved, one-third the length of whole antenna, a little exceeding, to as long as, the seven following joints, funicular joints moderately pilose, the ultimate ones a little more coarsely, all the antennal joints somewhat longer than in *M. ruginodis*, legs almost bare, thinly pubescent; pleura and metanotum somewhat longitudinally striate; wings as in the female, more dilute than in *scabrinodis*, nerves and stigma pale cinereous.

Type Locality. "Siberia."

Myrmica scabrinodis subsp. **kaszenkoi** Ruzsky

M. scabrinodis subsp. *kaszenkoi* Ruzsky, 1905, Formic. Imp. Rossici, pp. 7 02–703 ♀ ♂.

Worker (after Ruzsky):—Length 4–5 mm.

Antennal scape cylindrical, abruptly bent at the base in the form of an even angle (as in *rugulosa* or *sulcinodis*); at the bend a small

extension. Sculpturing of the head about as in *scabrinodis*. Frontal surface of head striate. Mesoepinotal impression not large. Epinotal spines short, pointed, somewhat broad at the base, almost straight, not diverging, as long as the width of the space between them; infraspinal surface finely striate on the upper part. Petiole short, thick (about as in *scabrinodis*), the node, from above, somewhat tapering, with rounded corners; anterior declivity somewhat concave, posterior declivity somewhat convex. Pedicel dull, finely wrinkled, thickly and finely punctate, on the sides weak longitudinal furrows. Pilosity somewhat dense, on the legs and antennae short, inclined on the thorax and petiole, somewhat lighter (yellowish-brown red); sometimes darker on the dorsal surfaces of the thorax, except posteriorly.

Male (after Ruzsky):—Very close to *rugulosa*. Antennal scape very weakly bowed, short, not longer than the three following joints together. The 1st funicular segment almost equal to the third, the second less than 1½ times longer than the first. Club five-jointed. Head and frontal surface finely punctate; on the frons and clypeus fine, thin striae. Pilosity of the tarsi, color and body length as in *rugulosa*.

"This *Myrmica* stands, on the one hand, near *M. scabrinodis* and *rugulosa*, and, on the other hand, it is referable in the form of the antennal scape and the short petiole to *M. brevinodis* Em."

Type Localities. Transbaikal, Yenisesk.

Myrmica scabrinodis var. **lacustris** Ruzsky

M. scabrinodis var. *lacustris* Ruzsky, 1905, Formic. Imp. Rossici, p. 686, ♀.

Worker (after Ruzsky):—Anterior medial margin of the clypeus with a small incision. Frontal area striate posteriorly. Antennal scape at the bend with a small sharp tooth. Mesoepinotal impression weak, the thorax, in profile, flatter than in the typical *scabrinodis*. Sculpturing of the body weaker. Epinotal spines one-half to two-thirds as long as the basal surface. Color as in the type but the gaster is quite dark brown, except at the apex.

Type Locality. Tobolsk.

"This *Myrmica* nests in small sized colonies in earth mounds, similar to those of *Lasius flavus* and *niger*. The mounds were stripped of leaves. In one *Myrmica* mound *Lasius flavus* inhabited the other end. Very possibly the *Myrmica* in most cases does not build such a mound but moves into one being deserted by the *Lasius*."

Myrmica scabrinodis subsp. **mexicana** Wheeler

M. mexicana Wheeler, 1914, Jour. New York Ent. Soc., 22: 52–53, ♀ ♀ ♂; Wheeler, 1917, Proc. Amer. Acad. Arts Sc., 52: 503.

Original Descriptions.

"*Worker:*—Length 3.5–5 mm.

"Closely allied to the European *M. sulcinodis* Nyl. Head distinctly longer than broad. Antennal scapes shaped like those of *sulcinodis* or rather of the var. *sulcinodis-scabrinodis* Forel, being a little more sharply bent at the base and in some specimens with a small tooth or ridge at the angle as in some forms of *scabrinodis*. The joint is of nearly uniform thickness throughout. Funiculi with a 3-jointed club,

which in some specimens, seems to be indistinctly 4-jointed. Spines of the epinotum straight or very slightly bent downward, somewhat shorter than those of *sulcinodis* and not recurved at their tips. Petiole in profile a little longer than high, shaped as in *sulcinodis*, not pedunculate, its node with subequal declivities, the anterior feebly concave, the posterior feebly convex, both meeting at a rather sharp angle. Postpetiole also as in *sulcinodis*, distinctly higher than long.

"Sculpture very coarse and much as in *sulcinodis*, with shining interrugal spaces, but the longitudinal trend of the rugae is not so distinct on the thorax and pedicel, often vermiculate on the thoracic dorsum and the nodes. Frontal area rugose, opaque.

"Hairs like those of *sulcinodis*, but of a gray instead of a yellow tint.

"Deep cherry red, legs a little darker; gaster, clypeus and anterior half of head, black. In many specimens the whole head and thorax are dark brown or blackish.

"*Female* (dealated):—Length 5.5 mm.

"Closely resembling the worker and differing greatly from the female *sulcinodis* in color, being like the darkest workers, with the upper surface of the thorax and the whole head blackish.

"*Male:*—Length 5–5.5 mm.

"Differing from the male of *sulcinodis* in its larger size and in color, the body being deep black, with only the legs and genitalia piceous, and the 4–5-jointed clubs of the antennae and tips of the mandibles clear yellow. The wings are more grayish and longer (6 mm.), whereas those of *sulcinodis* measure less than 5 mm., and the veins and stigma are of a deeper brown tint. The antennal scapes resemble those of *sulcinodis*, being fully half as long as the funiculi, and equal to the 6–7 following joints together, but are somewhat stouter, especially at the base. There are no appreciable differences in pilosity between the two forms. In sculpture the following differences may be noted: the petiolar node is irregularly rugulose-punctate, not longitudinally rugose as in *sulcinodis* and the postpetiole is also smoother and more shining; the fine rugae on the head are more irregular and not longitudinal.

"Described from many workers and males and three females taken from several colonies at Guerrero Mill. These colonies were found under stones, both in the pine woods and on the open hillsides."

This *Myrmica*, taken by Dr. W. M. Mann at an altitude of 8,500–9,000 feet on the eastern slope of the mountain range east of Pachuca, the capital of the State of Hidalgo, Mexico, is of unusual interest. Coming as it does from 20° North Latitude, well within the Tropic of Cancer, it is by far the most southern *Myrmica* recorded in the Western Hemisphere.

It also combines characters of *M. sulcinodis* and *M. scabrinodis*, as Dr. Wheeler has pointed out. The study of the male genitalia proves it closer to *scabrinodis* than to *sulcinodis* and the long scape of the male (equal in length to from six to seven of the following segments together) links it to *scabrinodis lobicornis*, as does the occasional transverse ridge at the base of the worker scape.

Other Localities. ARIZONA: Ramsay Canyon, Huachuca Mts. (W. S. Creighton); Santa Rita Mts., 7500 ft., Santa Catalina Mts., 7700 ft. (L. F. Byars).

Myrmica scabrinodis subsp. **rolandi** Bondroit

M. rolandi Bondroit, 1918, Ann. Soc. Ent. France, 87: 101, ☿ ♀ ♂; Finzi, 1926, Boll. Soc. Adr. Sc. Nat., Trieste, 29: 89–90.
M. scabrinodis st. *rolandi* Santschi, 1931, Rev. Suisse Zool., 38, p. 344.

Southern France, Iberian Peninsula, Morocco.

For descriptions and discussions of this form see the references above. This is one of the three recorded forms from North Africa.

Myrmica scabrinodis rolandi var. **reticulata** Santschi

Myrmica scabrinodis st. *rolandi* v. *reticulata* Santschi, 1931, Rev. Suisse Zool., 38: 344, ☿.

Central Pyrenees.

For a description of this form see the above reference. Apparently differs only in having the appendages more dull colored.

Myrmica scabrinodis subsp. **rugulosoides** Forel

M. scabrinodis var. *rugulosoides* Forel, 1915, Fauna Insect. Helvet. Hym. Form., p. 29, ☿; Santschi, 1931, Rev. Suisse Zool., 38: 342–343.
M. rugulosoides Finzi, 1926, Boll. Soc. Adr. Sc. Nat., Trieste, 1926: 94–95, fig. 6, ☿ ♀ ♂.
M. specioides Bondroit, 1918, Ann. Soc. Ent. France, 87: 102.

Central Europe.

For descriptions and discussions of this form see the references above.

Myrmica scabrinodis rugulosoides var. **striata** Finzi

M. rugulosoides var. *striata* Finzi, 1926, Boll. Soc. Adr. Sc. Nat., Trieste, 29: 96, fig. 7, ☿ ♀ ♂.
M. scabrinodis st. *striata* Santschi, 1931, Rev. Suisse Zool., 38: 344–345.

For descriptions and discussions of this form see the references above.

Myrmica scabrinodis var. **sancta** Karawajew

M. scabrinodis var. *sancta* Karawajew, 1926, Mem. Acad. Sc. Ukraine, 4: 67, 68, fig. 4, ☿; Karawajew, 1926, Konowia, 5: 285.

Worker (after Karawajew):—Length 4–4.5 mm.

Occipital margin scarcely concave in the middle. Frons broader than in the typical form, in the middle broader than one-third of the breadth of the head, the frontal carinae more strongly S-shaped, the lobes clearly broader and much more rounded anteriorly. Scape bent under 45° at the base, forming a blunt angle. On the thoracic profile the metanotum shows clearly. Epinotal spines somewhat shorter than in the typical form. Petiole, in profile, with curved upper and lower margins. Postpetiole convexly produced above and below.

Strongly wrinkled, the wrinkles, especially on the head, dark colored. Infraspinal declivity of the epinotum somewhat smooth and shining, barely striate. Pedicel clearly rugose longitudinally.

Moderately darkly colored.

Type Locality. KRIM: Neighborhood of Karadagh, not far from Theodosia, 10.V.1920 (Karawajew).

The colony was under a large flat rock on the peak of a "Holy Mountain."

Myrmica scabrinodis subsp. **saposhnikovi** Ruzsky

M. scabrinodis saposhnikovi Ruzsky, 1905, Formic. Imp. Rossici, pp. 701–702, fig. 171, ♀.

Worker (after Ruzsky):—Length 3.6–4.5 mm.

Antennal scape bent as in *lobicornis*, at the bend with a moderately sized blunt tooth (much as in *fracticornis* Emery), clearly surpassing the occipital margin. Third funicular joint the smallest, about as long as broad, club four-jointed. Head a long oval with strongly curved occipital corners. Thorax, in profile, moderately convex, mesoepinotal impression weak. Petiole very short, almost lacking a cylindrical peduncle, node with sharply rounded corner, anterior declivity somewhat depressed in the middle. Head, thorax and pedicel dull. Petiole coarsely and irregularly wrinkled, postpetiole broadly sulcate with slight wrinkles between (in the var. *fracticornis* the petiole is less wrinkled and the form quite different). Epinotal spines thin, strong, shorter than the basal surface, as long as the distance between their bases, somewhat curved, weakly diverging. Infraspinal surface almost smooth, shining. Frontal area smooth, somewhat shining. Thorax coarsely wrinkled.

Color blackish brown, appendages and apex of gaster lighter, scape dark, petiole sometimes with a reddish cast.

Type Locality. MIDDLE ASIA: Semiridje in the Altai Mts., 1,000 m.; in a dense fir forest.

"Distinct in the length and narrowness of the antennal scape; similar in that to *fracticornis* and *stangeana*; in epinotal spines and sculpture near to *lobicornis*."

Myrmica scabrinodis saposhnikovi var. **baikalensis** Karawajew

M. scabrinodis saposhnikovi var. *baikalensis* Karawajew, 1931, Zool. Anz., 93: 28, 29, ♀ ♀.

Worker (after Karawajew): Length 3.5–4 mm.

The little tooth on the corner of the bend of the scape can hardly be perceived, in the smallest specimens (somewhat dimorphic) even quite absent. The mesoepinotal impression is very clear (in the type weakly indicated), the promesonotum, in profile, somewhat convex. The epinotal spines are somewhat more erect, hardly bent inwardly.

Female (after Karawajew): Length about 5 mm.

Head as in the worker, somewhat longer than broad, with even occipital margin in the middle. Frons even broader than in the worker, with less curved frontal carinae. Frontal area not quite smooth. The antennal scape hardly exceeds the occipital margin, without a tooth at the angle of the bend.

Thorax comparatively shorter and thicker than in the worker. In profile the posterior half of the mesonotal scutum and the anterior half of the scutellum form an even line. Epinotal spines as in the worker; frontal area likewise. The wings are lacking in my single example. Otherwise similar to the worker.

Type Localities. Shore of Lake Baikal: Listwenitschnoje, 15.VII. 1930, Tanchoj-Mischicha (eastern shore, southern part), 1–6.VIII.1930, (W. Karawajew).

Myrmica scabrinodis subsp. **stangeana** Ruzsky

M. bergi stangeana Ruzsky, 1902, Zool. Jahrb. Syst., **17**: 474, ♀; Ruzsky, 1905, Formic. Imp. Rossici, p. 678, ♀.

Worker (cotype):—Length 4.9 mm. (3.5–5 mm. after Ruzsky).

Head 0.67 as broad between the eyes as long (with mandibles), occipital margins almost imperceptibly concave in the middle (in strictly dorsal view) occipital corners evenly rounded, eyes slightly closer to the anterior clypeal than to the occipital margin; anterior clypeal margin very slightly convex; antennal scapes exceeding the occipital margin a little; in a posterior view bent almost at right angles near the base and distinctly compressed obliquely to its long axis, no clear dorsal carina but a slight indication of a keel at the bend; joints 1 and 2 of the funiculus together about equal to joints 3 to 5 together, club indistinctly four-jointed. Thorax, in profile, evenly convex to the moderately impressed mesoepinotal suture; epinotal spines straight, slender and acute, projected backwards and upwards at about 45°, about as long as the declivity ventral to them, seen from above, indistinctly longer than the distance between their bases (one spine being clearly shorter than its mate). Petiole, in profile, short, anterior face almost imperceptibly concave, slightly higher than the distance between the apex of the ventral tooth and the postpetiole. Postpetiole, in profile, distinctly higher than the petiole or than it is long, highly convex dorsally, slightly convex ventrally. Gaster subelliptical. Legs moderately long, somewhat robust.

Dorsal medial surface of head, including the cylpeus, regularly rugulose, sides reticulate-rugulose, frontal area smooth and shining but for several striae entering the posterior angle; densely and conspicuously punctate at the base of the sculpturing. Dorsal surface of thorax coarsely and longitudinally vermiculate, sides rugose, infraspinal surface of epinotum clearly and transversely striate. Dorsal surface of petiole coarsely and irregularly reticulate-vermiculate, sides rugose-punctate. Dorsal median area on postpetiole striate-punctate, surface otherwise rugose-punctate. Gaster, at the base, joined to a peduncle by very short ridges, otherwise microscopically reticulate and shining. Antennal scapes finely but completely, legs sparsely, striate-punctate.

Pilosity of body short, sparse, rather coarse, mostly truncate dorsally except on the head; on appendages short, reclining, rather coarse. Short appressed pubescence on the antennal club, almost absent from the two basal joints.

Color reddish brown, dorsal surface of head a little darker, gaster dark brown.

Type Localty. Kirgisen Steppes of Turgai: Lehmboden (G. Stange).

The ants were "wandering amongst *Artemesia* and live in groups in the ground."

Myrmica scabrinodis variety **turcica** Santschi

M. scabrinodis var. *turcica* Santscyi, 1931, Rev. Suisse Zool., 38: 343, ♂ ♀.

Worker (after Santschi):—Length 4.2–4.6 mm.

Antennal scape with an acute lobe as in *sabuleti*, epinotal spines as long as in typical *scabrinodis*.

Female (after Santschi):—Length 5.5 mm.
Type Locality. Ankora
Other Locality. MOLDAVIA: Val du Berlad.

Myrmica scabrinodis subsp. **ussuriensis** Kuznetzov-Ugamskij

M. scabrinodis subsp. *ussuriensis* Kuznetzov-Ugamskij, 1928, "The Ants of the South Ussuri Region (In Russian)," pp. 36, 37, figs. 20, 21; Kuznetzov-Ugam, skij, 1929, Zool. Anz., 83: p. 33, ♀.

Worker (after Kuznetzov-Ugamskij):—Length 4.8–5 mm.

Antennal scape as in *M. scabrinodis lobicornis* from Transbaikal (see Ruzsky, Formic. Imp. Rossici, 1905, p. 694), clearly compressed at the side, on the margin of the bend sharply toothed. Frontal area quite smooth and shining. Clypeus a little produced from the middle of the anterior margin. Pedicel coarsely wrinkled and dull, the petiole, in profile, angular. Epinotal spines broad at the base, then abruptly tapering and pointed apically; shorter than the horizontal surface of the epinotum; infraspinal surface smooth and strongly shining. Metasternal lobes blunt. Mesoepinotal suture only weakly indicated. Reddish brown, head and gaster blackish brown.

Type Locality. Nikolsk-Ussurijsk.

Myrmica scabrinodis var. **vandeli** Bondroit

M. vandeli Bondroit, 1919, Ann. Soc. Ent. France, 85: 301, ♀ ♂; Finzi, 1926, Boll. Soc. Adr. Sc. Nat., Trieste, 29: 115; Santschi, 1931, Rev. Suisse Zool., 38: 347.

For descriptions and discussions of this uncertain form see the references above.

Myrmica scabrinodis subsp. **wesmaeli** Bondroit

M. wesmaeli Bondroit, 1918, Ann. Soc. Ent. France, 87: 106, fig. 54, ♀; Finzi, 1926, Boll. Soc. Adr. Sc. Nat., 29: 97–98, fig. 8, ♀ ♀ ♂.
M. sulcinodis var. *wesmaeli* Emery, 1922, Genera Insectorum, fasc. 174c, p. 42; Santschi, 1931, Suisse Zool., 1931, 38: 340.

Southern Europe.

For descriptions of this form see the references above. I have placed it under *scabrinodis* after examining a male sent me by Mr. B. Finzi and which was labelled this form. The genitalia show it to be a true *scabrinodis* and definitely not a *sulcinodis*. The antennal scapes, furthermore, which are about as long as the four following joints together, are too short for *sulcinodis*.

Myrmica forcipata Karawajew

M. forcipata Karawajew, 1931, Zool. Anz., 94: 104–106, ♀.

Worker (after Karawajew):—Length 3.5–4 mm.

Antennal scape with a lobe somewhat as in *lobicornis*. Epinotal spines long, straight, acute; viewed from above they converge apically and enclose a rounded area. Petiole short, anterior and posterior faces of node form a pointed right angle.

Type Locality. U. S. S. R.: Jakutien, R. Tshona, Distr. Viljujsk; Tyilyminskij Nasleg.

Myrmica ravasinii Finzi

M. ravasinii Finzi, 1923, Boll. Soc. Ent. Ital., 55: 2, ☿; Finzi, 1926, Boll. Soc. Adr. Sc. Nat., Trieste, 29: 112–113, fig. 15.

For a description and discussion of this species see the references above.

The gaster of a single worker sent me by Mr. Finzi is distinctly, though finely, reticulate and somewhat striate-reticulate at the base. This character is not mentioned by Mr. Finzi and, if it is common to the other type specimens, marks the ants as very distinct. The frontal carinae in the specimen are relatively close-set and the antennal scape, from above, is broadly spatulate at the bend.

Myrmica wheeleri Weber

M. wheeleri Weber, 1939, Lloydia, 2: 150–152, ☿ ♀ ♂.

Worker:—Length 3.3–4.2 mm.

Head, between eyes, 0.67 as wide as long (with mandibles); occipital margin straight; anterior clypeal border produced over base of mandibles in about a 130° lobe. Antennal scape exceeding the posterior margin of the head by a distance equal to its distal diameter; from above, in the form of a long drawn-out sigmoid curve, from a posterior view, evenly bent at its basal fourth about 0.6 as wide proximally as distally; joints 1 and 2 of the funiculus together equal in length to joints 3 to 5 together; club three-jointed, terminal joint equal in length to the preceding two joints together. Thorax, in profile, convex, with a slight but distinct mesoepinotal suture; epinotal spines, in profile, triangular with deflected apex, projected backwards and upwards at about a 45° angle, appreciably shorter than the declivity ventral to them, from above, about as wide as the distance between their bases, widely diverging. Petiole, in profile, with distinctly concave anterior face forming a sharp 90° angle with the convex dorsal surface; ventral surface concave, shorter from apex of ventral tooth to postpetiole than it is high; postpetiole, in profile, slightly higher than the petiole and higher than long, dorsal and ventral surfaces convex, the ventral convexity produced anteriorly as a lobe. Gaster ovate. Legs moderately long and slender.

Surface of head finely sculptured and shining, clypeus very sparsely and irregularly rugose, shining, frontal area triangular, smooth and shining, mid-dorsal surface longitudinally rugulose, becoming reticulate laterally and posteriorly. Thorax feebly sculptured, shining, with large, irregular vermiculations dorsally, feeble and sparse vermiculations on the sides. Petiole feebly vermiculate-reticulate on the node; postpetiole dorsally smooth and shining, laterally with a few irregular vermiculations. Base of the sculpturing of body, except gaster, densely, though shallowly punctate. Gaster, antennae and legs smooth and shining.

Pilosity comparatively abundant and fine, mostly truncate dorsally, subappressed on the legs; pubescence only on the antennal funiculi.

Color varying from light to dark ferruginous, head brown to dark brown, gaster with a broad, dark, transverse band across the middle.

Female:—Length 4.5–5.2 mm.

Closely resembling the worker. The epinotal spines vary in length from worker size and shape to shorter, blunt teeth. The petiole is higher and more distinctly separated into node and peduncle.

The sculpturing is appreciably coarser, the pronotum, on the sides, reticulate, rugose only at the posterior margin, thoracic sides otherwise rugose, scutum of mesonotum shining, with anteromedial triangular area punctate, otherwise feebly vermiculate, becoming more rugose posteriorly.

Color darker; head, thorac and transverse band across gaster dark brown; pedicel and appendages ferruginous. The thorax in several is ferruginous with brown blotches. Wings hyaline; veins pale brown, stigma large and pale brown in color.

Male:—Length 3.6–4.3 mm.

Antennal scape equal in length to the following three segments together, subcylindrical, about one-fourth as wide as long, bent slightly at the base; funicular club four-jointed. Epinotal declivity dorsally with two slight, rounded gibbosities. Petiole, in profile, distinctly arched, anterior and ventral surfaces slightly concave, dorsal surface convex, slightly longer from apex of ventral tooth, or gibbosity, to postpetiole than it is high; postpetiole about one-third higher than petiole and distinctly higher than long. Sagittae of the genitalia with about 17 serrations; volsellae as illustrated, unique in the absence of a medial tooth inside the hook.

Surface of the head finely and evenly punctate, nearly devoid of rugosities. Thorax largely punctate, smooth and shining mid-dorsally, a few scattered rugae on the sides; petiole punctate, with sparse, feeble rugae. Postpetiole and gaster smooth and shining.

Pilosity sparse, fine, acute.

Color brown, dark brown on the dorsal surfaces of the head and thorax. Wings hyaline with a purplish sheen; veins pale gray, stigma large and gray in color.

Described from two colonies collected by Dr. W. M. Wheeler, July 26 and 27, 1917, on Mt. Lemmon, 8–9,150 feet and at Stratton, 6–7,000 feet, in the Santa Catalina Mts., ARIZONA.

This species could easily have been taken for a small form near *M. brevinodis* subsp. *brevispinosa* were it not for the utterly different volsellae of the male genitalia. The sculpturing of the worker and male is finer than in any other North American *Myrmica;* the short epinotal spines of the worker differ from those of *brevispinosa* in being stouter and deflected, resembling, in profile, the horns of *Bison bison*, the American buffalo.

The examination of hundreds of male genitalia and the uniformity in general habitus and size within a species convinces me that this ant can only be regarded as a distinct North American species. The volsellae of the genitalia are distinct from those in any other *Myrmica* and closest to those of *M. moravica* Soudek from Southern Europe.

Myrmica moravica Soudek

M. moravica Soudek, 1922–23, Act. Mus. Moraviensis, Brno, 20–21: 106, 6. fig. ☿ ♀; Soudek, 1925, Ent. Rec., 37: 34–35, Pl. 4, figs. 1–3, ☿ ♀ ♂; Finzi, 1926, Boll. Soc. Adr. Sc. Nat., 29: 104–105.

Worker (cotypes):—Length 5–6.5 mm.

Head about 0.6 as broad between the eyes as long (with mandibles), occipital margin, in strictly dorsal view, very slightly impressed medially, occipital corners evenly rounded; frontal laminae raised, auriculate; antennal scapes extending to the occipital margin or slightly exceeding it; seen from a posterior view, with outer margin bent nearly at right angles at the base, the medial side being flat and produced posteriorly as a carina, the carina being produced dorsally and appearing in this view as an acute tooth, from above appearing as a transverse keel; joints 1 and 2 of the funiculus together a trifle shorter than joints 3 to 5 together, third joint about as broad as long, club indistinctly four-jointed. Thorax, in profile, convex, almost imperceptibly impressed at the mesoepinotal suture; epinotal spines projected backwards and upwards at about 55°, longer than the distance to the episternal spines but much shorter than the whole declivity. Petiole, in profile, with slightly concave anterior face, a little longer from apex of ventral tooth to postpetiole than it is high; petiolar-postpetiolar junction much constricted. Postpetiole, in profile, slightly higher than the petiole, ventral margin slightly, dorsal margin highly, convex. Gaster ovate. Legs of moderate proportions.

Surface of head coarsely and sharply reticulate-rugose, clypeus irregularly rugose, frontal area punctate with a few striae, base of sculpturing shining irregularly and shallowly punctate. Thorax deeply rugose, somewhat vermiculately anteriorly; infraspinal surface of metanotum shallowly and transversely striate. Dorsal surface of petiole deeply and irregularly vermiculate-punctate, sides rugose. Postpetiole rugose-punctate but for a finely reticulate mid-dorsal area. Gaster smooth and shining, at the junction with a short peduncle are a few inconspicuous short ridges. Antennal scapes striate, legs microscopically reticulate.

Body with comparatively abundant pilosity, appendages with abundant subappressed hairs; antennal club sparsely pubescent, almost lacking on the basal (fourth) joint.

Color dark reddish brown, darker on the dorsal surface of the head and gaster.

Female (cotype):—Length 7 mm.

Similar to the worker. The epinotal spines are of comparable length and are stout and blunted. From a narrow antero-median, largely smooth, area on the scutum of the mesonotum several rounded rugae extend, these are bordered laterally by rounded vremiculations, sides of thorax deeply rugose, infraspinal surface of epinotum smooth; pedicel as in the worker, except the mid-dorsal smoother area on the postpetiole is much reduced. Color as in the worker, the thorax with several darker brown blotches; including a parapsidal pair on the scutum of the mesonotum but no antero-median blotch.

Male (cotype):—Length 6 mm.

Antennal scapes subcylindrical, slightly smaller and bent gently at the basal third, as long as the two following joints of the funiculus together; antennal club four- to five-jointed. Epinotal declivity with two rounded dorsal gibbosities. Petiole with evenly convex dorsal margin and nearly straight ventral margin, without a tooth. Postpetiole, in profile, distinctly higher than the petiole, as long as high,

with nearly straight ventral and convex dorsal margin. Sagittae of the genitalia with greatly reduced medial tooth.

Surface of head dully shining, very finely punctate striate. Dorsal surface of thorax shining, sparsely rugulose on the margins, sides mostly rugulose-punctate. Petiole shining, microscopically striate-punctate. Postpetiole and gaster smooth and shining.

Pilosity sparse, more abundant and finer on the appendages.

Color dark brown, nearly black on the head.

Type Locality. CZECHOSLOVAKIA (South Moravia); Pavlovske Kopce (S. Soudek).

The male genitalia of this ant show that it must be considered a distinct species. In the great reduction of the median tooth on the volsella it approaches the condition in the American *Myrmica wheeleri* and is distinct from any *M. scabrinodis* form examined; the reversed serrations on the sagittae of my cotype are unique and might be an individual anomaly, for in Soudek's figure they are shown normally. The worker, in the coarseness of sculpturing, is similar to another American *Myrmica, M. punctiventris* Roger.

Myrmica punctiventris Roger

M. punctiventris Roger, 1863, Berlin Ent. Zeitschr., 7: 190, ☿; Mayr, 1886, Verh. Zool. bot. Ges. Wien, 36: 450; Emery, 1895, Zool. Jahrb. Syst., 8: 312, ♂; Wheeler, 1905, Bull. Amer. Mus. Nat. Hist., 21: 383; Wheeler, 1910, "Ants," p. 566.

M. punctiventris var. *isfahani* Forel, 1922, Rev. Suisse Zool., 30, p. 92, ☿ ♀.

Worker:—Length 4–4.7 mm.

Antennal scape bent inwards at about a 45° angle at the basal fourth, basal diameter over half the distal diameter, scapes extending a little beyond the occipital margin; thorax in profile with a deep mesoepinotal notch, that part of the thorax anterior to the notch appreciably higher than that part posterior; epinotal spines directed at about a 45° angle backward and upward from the epinotum, about 1½ times in length the distance between their bases, divergent, acutely pointed, and deflected at the tips; petiole in profile 1½ times as long as high, anterior face concave, dorsal and posterior surfaces convex, median ventral tooth short, extending to under the epinotal lamina. Postpetiole in profile nearly twice as high as long, dorsal surface eccentrically convex, seen from above transversely elliptical but only slightly broader than long. Gaster long-ovate. Legs long, femur and tibiae incrassate, 1st tarsal joint of mesothoracic leg longer than the four following joints.

Surface of the head very coarsely sculptured, medial dorsal surface, including the clypeus and sides of the frontal area, the sides anterior to the eyes, and the back longitudinally rugose, sides posterior to the eyes irregularly reticulate; surface of the thorax coarsely and somewhat irregularly rugose; pedicel coarsely vermiculate, somewhat smoother on the median dorsal surface of the postpetiole; interrugal surfaces finely punctate; gaster smooth and shining but for conspicuous, large, deep punctures which are more numerous basally.

Hairs of head and thorax of moderate length, scanty, those of gaster more numerous; hairs of appendages more numerous and subappressed.

Color of body red-brown, darker on the head and gaster, lighter on the appendages; head and gaster in some specimens approaching black in color.

Female (undescribed):—Length 5.0–5.7 mm.

Very similar to the worker, with fully as long epinotal spines and as coarse sculpturing. The pronotum and the anterior part of the mesonotum are vermiculate, the remainder of the thorax more regularly rugose; the gastric punctures are coarse and conspicuous; the body is dark brown with lighter red-brown appendages.

Male:—Length 3.8–4.8 mm.

Antennal club five-jointed; antennal scape long, slender, subcylindrical, bent at the basal fifth in about a 30° angle, equal in length to the six following joints together; petiole from the side pyriform, with smoothly rounded dorsal surface; postpetiole from the side perpendicularly elliptical, from above subcircular and nearly twice as broad as the petiole. Sagittae of the genitalia with about 24 serrations; volsellae as illustrated. Surface of the head with sparse, shallow and irregular vermiculations, densely punctate between the vermiculations; surface of the thorax and petiole feebly and irregularly rugose with dense punctations interrugally; postpetiole mostly smooth and shining or finely striate-punctate; gaster smooth and shining but for large, shallow and inconspicuous punctations. Hairs fine, pale yellow and scanty, even on the head. Wings hyaline with a faint brownish tinge; veins pale brown. Color dark brown to black.

Type Locality. "North America" (Roger).

Other Localities. MASSACHUSETTS: Naushon Island (W. S. Creighton, W. M. Wheeler); Woods Hole (A. H. Sturtevant, W. M. Wheeler); Forest Hills, Boston and Blue Hills (N. A. Weber, W. M. Wheeler); S. Wellfleet (N. A. Weber). NEW YORK: Cold Spring Harbor, Long Island (W. M. Wheeler); Flatbush, L. I. (T. Pergande). NEW JERSEY: Alpine, Newfoundland, Fort Lee (W. M. Wheeler); Riverton (U. S. N. M); Watchung Mts. near Westfield (C. R. Mekeel, N. A. Weber). PENNSYLVANIA: Beatty (P. J. Schmidt); St. Vincent (U. S. N. M.). DISTRICT OF COLUMBIA: Washington (Pergande Coll., W. M. Mann, N. A. Weber), Tacoma (Pergande Coll., W. M. Mann). MARYLAND: Plummers Island (W. M. Mann, U. S. N. M.); Beltsville, (W. L. McAtee). VIRGINIA: Loft Mt., 2452 ft., Shenandoah Nat. Park (N. A. Weber). NORTH CAROLINA: Black Mountains, (no collector); Durham (N. A. Weber). GEORGIA: Tray Mountain, White County (M. R. Smith). OHIO: Willard (M. Talbot); Southcent. Region (L. G. and R. G. Wesson); Ashtabula Co. (A. E. Headley). ILLINOIS: Champaign (A. O. Weese, T. H. Frison); Hickory Creek (M. Talbot). IOWA: Belle Plaine (W. F. Buren). MICHIGAN: Charity Island (Gaige). TENNESSEE: Gt. Smoky Mts. (A. C. Cole, M. Talbot).

The sexual forms appear in Massachusetts Aug. 30 to Sept. 8; in Georgia Sept. 11; in Washington, D. C., Oct. 3.

The coarse sculpturing and the gastric punctations easily distinguish the workers of this species from all other known forms. The genitalia of the male are unique in the possession of a series of pointed tubercles on the outer margin of the base of the volsellae; these appear in side view as serrations. Other species may possess a few small and inconspicuous

tubercles at this place but in no other species examined is there such a development.

The colonies are small and are generally found under stones in wooded areas. The workers sometimes become temporarily immobile when handled or disturbed. Wesson and Wesson report them nesting only in soil in Ohio and often surmounting the entrance with a turret of crude carton.

The variety *isfahani* Forel has been synonymized because of the inadequacy of the original description. Several of the characters given are those of the typical form; the others agree well with slight variants present in the collection from different localities. To follow the practice of naming these slight variants would necessitate the erection of innumerable varieties in the North American members of the genus alone. The minimum size given for the female is smaller than that of any females I have seen and smaller than that of other females from the same region.

Myrmica punctiventris subsp. **pinetorum** Wheeler

Myrmica punctiventris subsp. *pinetorum* Wheeler, 1905, Bull. Amer. Mus. Nat. Hist., 21: 384, ♀; Wheeler, 1910, "Ants," p. 566.

Worker:—Length 3.5–3.9 mm.

Similar to the typical form but differing in the following characteristics: Smaller size; epinotal spines, from above, acute and diverging, slightly longer than the distance between their bases, averaging one-fourth shorter than those of the typical form; seen from the side, directed upward and backward at a 45° angle, not deflected apically; sculpturing finer, especially on the head; color paler, averaging medium brownish red on the head and middle part of the gaster and a light brownish red on the remainder of the body and on the appendages.

Female (undescribed):—Length 4.7–5.1 mm.

Similar to the female of the typical form. The sculpturing of the head, however, is less regularly longitudinal; the epinotal spines are of nearly the same length but are not deflected downward; the color is paler, parts of the thorax, the pedicel and the appendages being a pale brownish red, the remainder of the body being dark brown. Wings hyaline with a brownish cast; veins pale brown.

Male (undescribed):—Length 3.9–4.3 mm.

Easily separated from the male of the typical form by the short antennal scape which is equal to only the first two of the following joints together, is subcylindrical, and is almost imperceptibly bent medially; the antennal club is four-jointed. The petiole is also not pyriform but with an irregularly convex dorsal and a distinctly concave ventral surface; the postpetiole is highest at the posterior half; the sagittae with 20 to 21 serrations, the volsellae as illustrated. Gaster finely punctate with coarser setigerous punctations. The color is a deep brown, not black.

Type Locality. NEW JERSEY: Lakehurst (W. M. Wheeler).

Other Localities. CONNECTICUT: Colebrook (W. M. Wheeler). OHIO: Southcent Region (L. G. and R. G. Wesson). TENNESSEE: Tusculum, Greenville (C. A. Dennis). SOUTH CAROLINA: Clemson College (M. R. Smith). MISSISSIPPI: Starkville (M. R. Smith).

The winged forms appeared August 19 in Connecticut; no other records seen.

Dr. Wheeler found this colony nesting in pure sand in the pine barrens. Wesson and Wesson report the ants building carton turrets as nest entrances. A nest reported by Dennis was in a small log, the brood being in a cavity in the wood.

The South Carolina record is from two workers, sent me by Dr. Smith, which are a little larger and darker than the average form and with slightly different thoracic rugae. More workers and the males are necessary to determine whether they represent a distinct form.

Myrmica myrmecoxena Forel

M. myrmecoxena Forel, 1894, Verh. 66 Versamml. D. Naturf. Aerzte, Wien, p. 143; Finzi, 1926, Boll. Soc. Adr. Sc. Nat., Trieste, 29: 114, ♀.

Female (after Emery):—Length 4.3 mm. (almost 5 mm., after Forel).

Distinctive by the short, compact form and the weak sculpture. Head especially short, shorter than in *scabrinodis* or its forms. Antennae short and thick; scape at the basal fourth obtusely geniculate, without a trace of thickening or of a tooth, hardly reaching to the occipital margin; club three-jointed. Mandibles broad, with 10 to 12 teeth, which, except for the two apical teeth, are very small. Epinotal spines short and robust. Petiole strikingly short and high. Postpetiole from below with a strong forwardly directed lobe.

Surface of the head somewhat smooth, dorsal surface longitudinally rugose, lateral surfaces rugose-reticulate, with conspicuous basal punctations; frontal area small, shining; frontal lamina as in *lobicornis*. Mesonotum smooth in the middle, without rugosities; the thorax otherwise dull and densely rugose; face of the epinotal declivity transversely striate. Petiole rugose. Upper part of postpetiole smooth and strongly shining.

Color ferruginous, posteriorly lighter; mandibles, antennal scapes, and legs dirty yellow; wings hyaline, with pale venation.

Male (after Forel):—Length 4.8 mm.

Antennal scape hardly as long as the first four segments of the funiculus; antennae and legs short. Epinotum with short teeth. Hairs on the tibiae long and almost upright. Color blackish-brown, shining; frontal area smooth and shining. Mesonotum from above smooth.

Nuptial flight in August (Finzi).

This peculiar form was collected by Professor Bugnion in the Swiss Alps with a colony of *Myrimca lobicornis* at an altitude of 2,000 meters. As Forel states, he was at first inclined to consider it an abnormal type of *lobicornis* but he later believed it to be a possible parasite. Genitalic slides of the males would quickly determine its position. The absence of workers and the small size, of course, suggest its parasitic nature. Neither Forel nor Emery mention a marriage flight of this form and the source of Finzi's information is unknown to me. It apparently has been taken only the original time.

Myrmica margaritae Emery

M. margaritae Emery, 1889, Ann. Mus. Stor. Nat. Genova, 27: 502, ♀.

Worker (after Emery):—Length 5–5¼ mm.

Piceous, antennae and epinotal spines rufotestaceous, legs and gaster testaceous, with very short and sparse pilosity. Head and thorax coarsely, irregularly, while longitudinally, rugose, occipital margin with a confused reticulate sculpturing, clypeus longitudinally rugose, mandibles striate; antennal scapes finely striate, at the base curved, antennal club four-jointed, mesoepinotal suture lightly impressed, epinotal spines still much longer and much more graceful than in the preceding (*M. ritae*) and similarly curved, likewise with minute spines on either side of the petiolar articulation, upper declivity of this segment concave, shining. Petiole feebly elongate, finely reticulate-rugose, almost shining; postpetiole finely and longitudinally striate-rugose, rather opaque; gaster shining, with sparse, minute piligerous punctations. Legs with short, oblique hairs.

Type Locality. MALAY PENINSULA: Tenasserim: Mt. Mooleyit, 1–1,900 m. (L. Fea).

Emery believed that the nearest form to this species and *M. ritae* was *M. rugosa* Mayr, which, however, is quite different in general habitus.

Myrmica margaritae subsp. **inornata** Menozzi

M. margaritae subsp. *inornata* Eidmann, 1942, Zeitschr. f. Morph. u. Ökol. Tiere, 38: 15.

Type Locality. WEST CHINA: Wasukou, 1600 m.

The original description of Menozzi has not been seen. Eidmann gives ecological information only. It is an Indomalayan form found near 30° North Latitude in an arid, subtropical district and workers were taken under a stone.

Myrmica margaritae var. **pulchella** Santschi

M. margaritae var. *pulchella* Santschi, 1937, Bull. Ann. Soc. Ent. Belg., 77: 368, ♀.

Worker (after Santschi):—Color as in *margaritae* but gaster with a large transverse band across the middle; black, with mandibles, legs, epinotal spines, base and apex of the gaster yellow; anterior border of head russet, antennae bright red.

Type Locality. FORMOSA: Musha.

Myrmica ritae Emery

M. ritae Emery, 1889, Ann. Mus. Stor. Nat. Genova, 27: 501–502, Pl. XI, fig. 27, ♀.

Head, between the eyes, about 0.6 as broad as long (with mandibles), eyes, in breadth, twice the diameter of the distal end of the antennal scape; anterior margin of clypeus slightly concave; antennal scapes exceeding the posterior margin of the head by one-fourth its length, slightly bent at its basal sixth, distal diameter 1½ times the basal diameter; antennal club four-jointed, joints 1 to 2 of the funiculus together distinctly shorter than joints 3 to 5 together. Thorax, in profile, feebly convex to the distinct and broad mesoepinotal impression;

epinotal spines, in profile, slender, acute, straight, projected backwards and upwards at about a 25° angle, about one-third longer than the declivity ventral to them; from above, fully three times as long as the distance between their bases, slightly diverging. Petiole, in profile, clavate, anterior face plane, dorsal surface convex, distinctly longer from apex of ventral tooth to postpetiole than it is high. Postpetiole, in profile, subconic, the posterior dorsal angle being convex, anterior face sloping to a slight peduncle, ventral surface slightly convex. Gaster ovate. Legs long and slender; first joint of mesothoracic leg about one-sixth longer than the following four joints together.

Surface of head shining, clypeus with six rugae between the frontal carinae, frontal area smooth and shining, remainder of head sharply and longitudinally rugose; interrugal surface smooth or with shallow punctations; mandibles rugose. Dorsal surface of thorax coarsely vermiculate, sides rugose, whole surface shining. Pedicel rugose, dorsal surfaces more irregularly and shallowly vermiculate-punctate. Gaster smooth and shining. Antennal scapes and legs finely striate-punctate.

Pilosity very sparse, a few long, truncate or acute hairs; appendages, except on the femora, with moderately abundant, subappressed hairs; antennal clubs pubescent.

Color of head rufous, antennae lighter, thorax and pedicel dark brown, gaster brown, legs yellowish brown.

Type Locality. MALAY PENINSULA: Tenasserim, Mt. Mooleyit, 1–1,900 m. (L. Fea).

The unusually long first tarsal joint of the mesothoracic leg separates this species from all others of the genus which I have been able to examine. This character is correlated with unusually long legs. Nothing seems to be known of its habits.

Myrmica ritae subsp. **formosae** Wheeler

M. margaritae var. *formosae* Wheeler, 1929, Boll. Lab. Zool. R. Ist. Portici, 24: 37, ♀.

Worker (cotypes):—Length 4.5–6.4 mm.

Head about 0.62 as broad between the eyes as long (with mandibles), occipital corners evenly rounded to a transverse margin posteriorly, eyes distinctly closer to the anterior clypeal than to the occipital margin, anterior clypeal border with a broad rounded medial notch, frontal carinae low, arcuate, sub-vertical; antennal scape slender, evenly bent at the basal seventh, exceeding the posterior margin by about four times its distal diameter; joints 1 and 2 of the funiculus together a trifle longer than joints 3 and 4 together, much shorter than 3 to 5 together; club four-jointed. Thorax in profile, feebly convex, deeply notched at the mesoepinotal suture; epinotal spines, in profile, acutely attenuate and upwards at about 25°, over 1½ times as long as the declivity ventral to them, from above, over three times as long as the distance between their bases, moderately diverging; metasternal lobes directed upwards and acute. Petiole, in profile, with a distinct peduncle which is convex dorsally, concave ventrally, nearly one-half longer, from apex of ventral tooth to postpetiole, than it is high, node feebly

and irregularly convex dorsally. Postpetiole distinctly higher than the petiole, a little longer than high, dorsal margin produced in a convex lobe at the posterior margin, ventral margin nearly flat. Gaster short ovate. Legs long and slender; first tarsus of mesothoracic leg nearly one-third longer than the second to fifth together.

Surface of head deeply, sharply and coarsely sculptured, clypeus rugose, the posterior margin smooth and confluent with the frontal area which is shining, microscopically punctulate and posteriorly margined by vertical walls; frontal carinae produced posteriorly as one of the rugosities, between them about four similar rugosities, sides of head more reticulate-rugose. Dorsal surface of thorax deeply vermiculate in a general longitudinal trend, sides more rugose, base of spines finely striate. Pedicel coarsely rugose-reticulate, including the dorsal surface which also may bear punctations and the ridges may be more or less fused, especially on the petiole. Gaster smooth and shining. Antennal scapes densely striate, legs microscopically reticulate.

Pilosity moderately abundant, hairs of the body long and acute, shorter on the gaster, appendages with more numerous, fine and oblique to subappressed acute hairs. Antennal club and tarsi pubescent.

Dorsal surface of head, "thorax, pedicel and posterior ⅔ of the first gastric segment reddish piceous, pedicel somewhat darker; mandibles and antennae pale brown; cheeks, anterior portion of gula, legs and anterior ⅔ of gaster ivory yellow."

Type Locality. FORMOSA: Funkiko (F. Silvestri).

Other Localities. FORMOSA: Riyohen, Karenko (R. Takahashi); Taiheizan (L. Gressit).

This subspecies differs from the typical *M. ritae* Emery chiefly in more irregular sculpturing, in paler coloration of the legs and in longer first tarsal joint compared to the following joints. It differs from the subsp. *serica* in sculpturing and in much paler coloration.

Both the subspecies *formosae* and *serica*, which were described as varieties of *M. margaritae* Emery, have been placed under *M. ritae* Emery after the comparison of them with a cotype of *ritae* and with the original figure of this species. The general habitus is the same. Judging from the original descriptions, *ritae* and *margaritae* must be much alike, but *margaritae* is described with minute metasternal spines and finely sculptured pedicel, certainly not characters of *formosae*, *serica* or *ritae*.

Myrmica ritae subsp. **indica** n. subsp.

Worker:—Length 5.3–5.6 mm.

Head about 0.66 as wide between the eyes as long (with mandibles), posterior margin feebly convex, occipital corners somewhat angular, eyes somewhat closer to the anterior clypeal than to the occipital margin, anterior clypeal margin evenly and broadly notched medially; antennal scapes slender, exceeding the posterior margin by fully twice their distal diameter, joints 1 and 2 of the funiculus together shorter than joints 3 to 5 together, club indistinctly four-jointed. Thorax with a distinct mesoepinotal impression; epinotal spines acutely attenuate, straight, projected backwards and upwards at about 15°, slightly longer than the declivity ventral to them; from above, nearly three

times as long as the distance between their bases, moderately diverging. Petiole, in profile, with a distinct peduncle, anterior declivity feebly concave dorsally, slightly convex ventrally, dorsal surface of node feebly convex, about one-fourth longer from apex of ventral tooth to postpetiole than high. Postpetiole higher than petiole, about as long as high, ventral surface nearly flat, dorsal surface produced posteriorly in a convex lobe. Gaster elliptical, legs long and slender.

Surface of head coarsely reticulate-vermiculate, longitudinally rugose only for a short distance posterior to the frontal area, clypeus shallowly rugulose except on the posterior margin, frontal area shining, finely punctulate; base of sculpturing densely punctate. Dorsal surface of thorax coarsely reticulate, without a longitudinal trend; sides rugose. Dorsal surface of petiole irregularly vermiculate-reticulate, sides sparsely vermiculate, base of sculpturing punctate. Dorsal surface of postpetiole finely and densely rugose-punctate, sides more sparsely rugose, densely punctate. Gaster shining, ridged at the peduncle, finely reticulate. Antennal scapes finely and densely striate-punctate; legs finely and densely reticulate-punctate.

Pilosity rather sparse and fine, more numerous and oblique on appendages. Antennal club pubescent.

Color dark reddish brown, appendages somewhat lighter.

Described from two workers from Tonglu, Darjiling dist., E. Himalayas, 10,000 feet, 22.IV.10 (C. W. Beebe) in Dr. W. M. Wheeler's collection, with the Indian Museum labels and numbers 8612–19 and 8614–19.

This subspecies differs from the typical *ritae* chiefly in sculpture and color. The head is not sculptured in even ridges, the dorsal surface of the thorax not longitudinally vermiculate and the gaster is finely reticulate instead of smooth. The color is much darker and the cheeks and legs do not contrast conspicuously with the adjacent surfaces. From *r. serica* it differs chiefly in more reticulate sculpturing on the head and thorax, gaster distinctly reticulate, epinotal spines nearer the horizontal and darker coloration of the appendages. It is distinct from *r. formosae* in shorter epinotal spines, in sculpturing and in much darker coloration of the appendages.

Myrmica ritae subsp. **serica** Wheeler

M. margaritae var. *serica* Wheeler, 1928, Boll. Lab. Zool. R. Ist., Portici, 22: 8–9, ♀.

Worker (type):—Length 5.9 mm.

Head about 0.68 as broad between the eyes as long (with mandibles), occipital margin straight, the angles evenly rounded, eyes a trifle closer to the anterior clypeal than to the occipital margin, clypeal margin with a median rounded notch; frontal carinae low, horizontal, shaped in a subhorizontal ridge; antennal scape very slender, bent evenly at the basal seventh, exceeding the occipital border by about three times its distal diameter, joints 1 and 2 of the funiculus together distinctly shorter than joints 3 to 5 together, club four-jointed. Thorax, in profile, shallowly convex to the distinct and moderately deep mesoepinotal impression; epinotal spines bent near the base, slender, attenuated, projected

backwards and upwards at about 30°, over one-fourth longer than the declivity ventral to them, from above, over three times as long as the distance between their bases, slightly diverging; metasternal spines produced in an acute tooth pointing upwards. Petiole, in profile, with a distinct subcylindrical peduncle, slightly convex dorsally, and a node with feebly convex dorsal surface, anterior declivity evenly concave to the peduncular convexity, about one-half longer from apex of ventral tooth to postpetiole than high. Postpetiole slightly longer than high, ventral surface nearly flat, dorsal surface convex. Gaster ovate. Legs long and slender.

Surface of head sharply and deeply sculptured; of clypeus sharply and irregularly rugose, frontal area sharply triangular, microscopically striate-punctate; between the frontal carinae six more or less continuous rugae, sides reticulate-rugose; base of sculpturing shining, shallowly punctate. Dorsal surface of thorax sharply and deeply vermiculate irregularly, sides deeply rugose. Sides of pedicel irregularly rugose; dorsal surface of petiole interruptedly rugose, of post-petiole rugose, somewhat fused on the posterior margin. Gaster smooth and shining. Antennal scapes densely striate, legs shallowly punctate.

Pilosity moderately abundant, hairs of the body long and acute, shorter on the gaster; appendages with fine, oblique to subappressed hairs. Antennal club and tarsi pubescent.

Color of body dark reddish brown, epinotal spines, apex of gaster and appendages dark yellowish brown.

Female, dealated (undescribed):—Length 6.9 mm.

Similar to the worker. The epinotal spines are fully as long and somewhat curved downwards. The sculpturing is similarly coarse; the median rugosity on the clypeus higher than the others, anterior border of the frontal area confluent with the clypeus and smooth and shining; antero-median triangular area on the scutum of the mesonotum finely striate-punctate, coarse, deep vermiculate rugosities extending posteriorly.

Color as in the type worker, lighter than the workers taken with it.

Type Locality. CHINA: Yunnanfu (F. Silvestri) 1 ☿.

Other Locality. FORMOSA: Arisan (L. Gressitt) 4 ☿, 1 ♀.

The Formosan workers are somewhat darker than the type specimen and a little more shining; the antennal scapes are slightly shorter.

This subspecies differs from the typical *M. ritae* chiefly in more irregular sculpturing and in darker coloration; from the subsp. *formosae* it varies chiefly also in sculpturing and darker coloration, especially on the legs.

For the shifting of this ant from a variety of *M. margaritae* to a subspecies of *M. ritae*, see above under *formosae*.

Myrmica everesti Donisthorpe

M. everesti Donisthorpe, 1929, Ann. Mag. Nat. Hist. (10) 4: 445-446, ☿.

Worker (after Donisthorpe:—"Dark brown, head and gaster except apex almost black, coxae, mandibles, articulations of the legs and antennae, and apex of gaster reddish. Body furnished with sparse, scattered, yellow hairs.

"Head strongly longitudinally striate, temples and occiput reticulated; mandibles longitudinally striate, masticatory margin with terminal tooth long and curved, second tooth shorter but distinct, the rest indistinct; clypeus with anterior border produced and pointed, entirely longitudinally striate; frontal area smooth and shining; scape of antennae reaching beyond posterior margin of head, funiculus with a distinctly 4-jointed club. Thorax strongly reticulate, longitudinally striate at sides; epinotal spines very short, sharply pointed, very slightly curved inwards, very shining between the spines, but distinctly though finely transversely striate. First node of pedicel rugosely punctured above, longitudinally striate at sides, with a distinct tooth or spine projecting forward at its base beneath; second node rugosely longitudinally striate, broader but shorter than first node, rounded at sides, with a very blunt projection at its base beneath. Gaster oval, very shining; sting strong. Long. 4.5–5 mm.

"This species comes near to *M. smythiesi*, Forel, but is darker and slightly more robust; the antennae are shorter and stouter, the spines shorter and more curved. The spines are about the same length as those of *M. tibetana*, Mayr, but are broader at the base and more curved. The whole of the insect is much more rugose than *tibetana*, the space between the spines being smooth in the latter.

"Described from five ♀ ♀ taken by Major R. W. G. Hingston at Jelap La (Tibetan side), at a height of 12,000 ft., on April 1st, 1924 (Everest Expedition). Type and paratypes in the British Museum Collection."

Myrmica specularis Donisthorpe

M. specularis Donisthorpe, 1929, Ann. Mag. Nat. Hist. (10) 4: 446, ♀.

Worker (after Donisthorpe):—"Red-brown, head and gaster black, apices of mandibles, articulations of legs and antennae, base of thorax including the epinotal spines and the space between, the nodes anteriorly and posteriorly reddish; covered with stiff scattered white bristles.

"Head somewhat square, rounded behind, front longitudinally striate with a few cross-striae, temples, cheeks, and occiput rather strongly reticulate; mandibles longitudinally striate, with several transverse striae towards the apex; clypeus convex, rounded in front, both longitudinally and transversely striate; frontal area smooth and shining; scape of antennae evenly curved at base, funiculus with 4-jointed club.

"Thorax strongly reticulate, longitudinally striate at sides; spines long, strong, and sharply pointed, pointing backwards, but slightly curved downwards, space between smooth and shining. First node of pedicel high, with a strong tooth beneath pointing forwards, punctured and somewhat reticulate above; second node shorter and in profile not so high as first node, slightly less punctured, with somewhat deep longitudinal pits. Gaster smooth and very shining. Long. 6–6.5 mm.

"The spines are more divergent than in *M. rugosa*, Mayr, the apex of the clypeus is not pointed, the nodes of the pedicel are broader and not so closely sculptured, and the insect is not so dark in color.

"From *M. ruginodis*, Nyl., the present species differs in its much darker color and more robust form, and in the space between the spines

being smooth. The head is much more strongly reticulated, the body generally is more coarsely sculptured, and the bristles are stronger, longer, and more numerous. Described from eight ♀ ♀ taken by Major R. W. G. Hingston in Tibet, Gautsa, at a height of 13,000 ft., on April 5, 1924 (Everest Expedition). There are also ten specimens in the British Museum Collection taken at Khamba Jong, Sikhim, 15–30. vii. 03, at a height of 15,000–16,000 ft. (Tibet Expedition, 1903), which agree quite well with the above species with the exception of not being quite so dark.

"Type and paratypes in the British Museum Collection."

No species of *Myrmica* appears to have been taken at an elevation higher than the above 15,000–16,000 feet. *M. ruba khamensis* Ruzsky was taken at 11,400 feet, *M. tibetana furva* Ruzsky at 12,500 feet and *M. kozlovi* Ruzsky at 13,000 feet in Tibet. In North America *M. brevinodis sulcinodoides* Emery was taken at 13,000 feet in New Mexico and *M. lobicornis fracticornis* Emery at the same elevation in Arizona.

BIBLIOGRAPHY

For additional bibliography and synonymy prior to 1893, see the Catalogus Hymenoptorum (Dalla Torre, 1893) and, prior to 1922, the Genera Insectorum (Emery, 1922).

Bernard, F. 1944. Répartition des fourmis en Afrique du Nord. Bull. Soc. Hist. Nat. Afr. Nord, 35: 117–124.

Buren, W. F. 1944. A list of Iowa ants. Iowa State Coll. Jour. Sci., 18: 277–312.

Carpenter, F. H. 1930. The fossil ants of North America. Bull. Mus. Comp. Zool., 70: 1–66, 11 pl.

Creighton, W. S. 1928. Notes on three abnormal ants. Psyche, 35: 51–56, Plate I.

Dalla Torre, C. G. 1893. Catalogus Hymenoptorum. Formicidae, 7.

Donisthorpe, H. St. J. K. 1913. Some notes on the genus *Myrmica*, Latr. Ent. Rec., 25: 1–51.

Donisthorpe, H. St. J. K. 1915. British ants. pp. xv *X*379, 92 figs., 18 pl.

Dennis, C. A. 1938. The distribution of ant species in Tennessee, with reference to ecological factors. Ann. Ent. Soc. Amer., 31: 288.

Eidmann, H. 1942. Zur Kenntnis der Ameisenfauna des Nanga Parbat. Zool. Jahrb., 75: 239–266.

Eidmann, H. 1943. Die Uberwintering der Ameisen. Zeitschraf. Morph. u. Okol. Tiere, 39: 217–275.

Emery, C. 1908. Palaearctic Formicidae. Deutsches Ent. Zeitschr.

Emery, C. 1922. Myrmicinae, in Genera Insectorum. Fasc. 174C. P. Wytsman.

Finzi, B. 1926. Le forme europee del genere Myrmica Latr. Boll. Soc. Adr. Sc. Nat. Trieste, 29: 71–119, 16 figs.

Kuznetzov-Ugamskij, N. N. 1929. Die Ameisenfauna Daghestans. Zool. Anz., 83: 31–46, 4 figs.

Menozzi, C. 1926. Zur Kenntnis der Ameisenfauna der Balearen. Zool. Anz., 66: 180–182.

Santschi, F. 1931. Notes sur le genre Myrmica (Latreille). Rev. Suisse Zool., 38: 335–355.

Santschi, F. 1941. Quelques fourmis japonaises inédites. Mitt. Schweiz. Ent. Ges., 18: 273–279.

Skwarra, E. 1929. Die Ameisenfauna des Zehlaubruches. Schr. Phys. ökon. Ges. Königsberg, 66: 3–174, 12 figs., 2 pl.

Stärcke, A. 1942a. Ants, collected by Dr. C. F. Engelhardt at Stockmarknes, (etc.). Ent. Berichten, 21: 21–23.

Stärcke, A. 1942b. Drie nog onbeschreven Europeesche Miervormen. Nederl. Ent. Ver., XXIV-XXIX, Oct. 12.

Talbot, M. 1946. Daily fluctuations in aboveground activity of three species of Ants. Ecol., 27: 65–70.

Talbot, M. 1945. Population studies of the ant *Myrmica schencki* ssp. *emeryana* Forel. Ann. Ent. Soc. Amer., 38: 365–372.

Weber, N. A. 1934. A new American myrmosid (Hymenoptera:Myrmosidae), Psyche, 41: 57–59.

1935. The Biology of the thatching ant, *Formica rufa obscuripes* Forel, in North Dakota. Ecol. Mon., 5: 165–206, 6 figs.

1939. Descriptions of new North American species and subspecies of Myrmica Latreille (Hym. :Formicidae). Lloydia, 2: 144–152.

1946. Dimorphism in the African Oecophylla worker and an anomaly (Hym. :Formicidae). Ann. Ent. Soc. Amer., 39: 7–10, 1 pl.

Wesson, L. G. and Wesson, R. G. 1940. A collection of ants from Southcentral Ohio, Amer. Midl. Nat., 24: 94.

Wheeler, W. M. 1901. The compound and mixed nests of American ants, Part I. Amer. Nat., 35: 431–448, 9 figs.

1903. Ethological observations on an American ant (*Leptothorax emersoni Wheeler*). Arch. Psych. Neurol., 2: 1–31, 1 fig.

1907. Notes on a new guest-ant, *Leptothorax glacialis*, and the varieties of *Myrmica brevinodis* Emery. Bull. Wisconsin Nat. Hist. Soc., 5: 70–83.

1914. The ants of the Baltic amber. Schrift. Physik-ōken. Ges. Konigsberg, 55: 1–142, 66 figs.

1917a. The mountain ants of Western North America. Proc. Amer. Acad. Arts Sci., 52: 455–569.

1917b. The ants of Alaska. Bull. Mus. Comp. Zool., 61: 13–23.

1928. Ants collected by Professor F. Silvestri in Japan and Korea. Boll. Lab. Zool. R. Ist. Portici, 21: 96–125.