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SECOND SUPPLEMENT

Prepared by the staff and collaborators of the Hymenoptera Unit,
Insect Identification and Parasite Introduction Research Branch,
Entomology Research Division, Agricultural Research Service,
under the direction of

KARL V. KROMBEIN and B. D. BURKS



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Family SAPYGIDAE

Genus SAPYGA Latreille, pp. 777-778

aculeata Cresson. Minn.*louiis* Krombein. N. J. (Princeton), Fla. (Orlando).*pumila* Cresson. Hosts: *Ashmeadiella* (A.) *aridula* Ckll., *Megachile* (*Eutricharaea*) *rotundata* (F.).

Family FORMICIDAE

Morphology: Wilson, 1954. *Insectes Sociaux* 1: 75-80, figs. 1-2 (polymorphism).—Eisner and Brown, 1958 (1956). 10th. Int. Cong. Ent. Proc. 2: 503-508, figs. 1-9 (evolution and social significance of proventriculus).—Eisner, 1957. Harvard Univ., Mus. Compar. Zool. Bul. 116: 439-490, pls. 1-25 (studies of the proventriculus).—G. C. and J. Wheeler, 1960. *Psyche* 67: 87-94 (techniques for study of ant larvae).—Nachtweg, 1961. *Insectes Sociaux* 8: 369-381.—Nachtweg, 1963. *Insectes Sociaux* 10: 43-57 (sound organs).—Nachtweg, 1964 (1963). *Insectes Sociaux* 10: 359-378 (acoustics).

Taxonomy: Van Pelt, 1948. *Fla. Ent.* 30: 57-67, figs. 1-24 (key to species of Alachua County, Florida).—G. C. and J. Wheeler, 1963. *The Ants of North Dakota*. Univ. N. Dakota Press, Grand Forks, 326 pp., 56 figs., 20 illus., 81 maps.—Gregg, 1963. *The Ants of Colorado: Their Taxonomy, Ecology and Geographic Distribution*. Univ. of Colorado Press, Boulder. 792 pp., 26 tables, 24 pls., 16 distribution maps, 163 altitudinal charts, 1 colored vegetation map.

Economics: Smith and Weiss, 1942. U. S. Dept. Agr., Tech. Bul. 798: 1-44 (relation of insects to spread azalea flower spot).—Smith, 1950. *In Pest Control Technology*. Natl. Pest Control Assoc. Inc., Garrard Press, Champaign, Ill., pp. 261-300, figs. 104-119 (house-infesting ants).—Simeone, 1954. State Univ. N. Y., College of Forestry, Syracuse, Bul. 34: 1-19 (carpenter ants and their control).—Pimentel, 1955. *Jour. Econ. Ent.* 48: 28-30.—Reid, 1962. Ga. Agr. Expt. Sta. and Univ. Ga. Handbook, 71 pp., 17 pls., 154 figs. (ants as intermediate hosts of chicken and turkey tapeworms).—Orlob, 1964 (1963). *Ent. Expt. and Appl.* 6: 95-106 (plant virus trans.).

Embryology: Ledoux, 1954. *Ins. Sociaux* 1: 149-175, figs. 1-55, pl. 1 (*Oecophylla longinoda* Latreille).

Evolution: Brown and Wilson, 1960 (1959). *Quart. Rev. Biol.* 34: 278-294, figs. 1-33 (dacetinae ants).

Ecology: Van Pelt, 1956. *Amer. Midland Nat.* 56: 358-387, figs. 1-8, tables 1-3 (ants of Welaka Reserve, Fla.).—Kannowski, 1956. *Amer. Midland Nat.* 56: 168-185, table 1 (ants of Ramsey County, N. Dak.).—Van Pelt, 1958. *Amer. Midland Nat.* 59: 1-57 (annotated list of ants of Welaka Reserve, Fla.).—Carter, 1962. *Elisha Mitchell Sci. Soc. Jour.* 78: 150-204, fig. 1, table 1 (distribution N. C. ants).—*ibidem*, 78: 1-18, tables 1-2 (distribution ants in N. C. Piedmont).—Van Pelt, 1963. *Amer. Midland Nat.* 69: 205-223, figs. 1-2, tables 1-2 (altitudinal distribution of ants in southern Blue Ridge Mts.)

Physiology: Schneirla, 1953. *Insect Physiology*. John Wiley and Sons, Inc., N. Y., ch. 25, pp. 656-685 (basic problems in insect behavior), *ibidem*, ch. 26, pp. 685-723 (insect behavior in relation to its setting), *ibidem*, ch. 27, pp. 723-748 (modifiability in insect behavior), *ibidem*, ch. 28, pp. 748-780 (collective activities and social patterns among insects).—Glockner, 1957. *Insectes Sociaux* 4: 83-90, figs. 1-3 (effect of hormones on metamorphosis).—Eisner and Wilson 1958 (1956). 10th. Int. Cong. Ent. Proc. 2: 509-513, figs. 1-3 (radioactive studies, food transmission).—Wilson, 1959. *Anat.*

- Rec. 134: 653 (pheromones in the organization of ant societies).—Eisner and Happ, 1962. *Psyche* 69: 107-116, text fig. 1; figs. 1-3, pl. 6 (infrabuccal pocket of a formicine ant, a social filtration device).—Roth and Eisner, 1962. *Ann. Rev. Ent.* 7: 107-136, tables 1-2 (chemical defenses of arthropods).—Wilson, 1963. *Sci. Amer.* 208: 100-106, illus. (pheromones).—Wilson and Bossert, 1963. *Recent Progress* 19: 673-716, figs. 1-10, table 1 (chemical communication in animals). Academic Press, Inc., N. Y.
- Biology: Lafleur, 1941. *N. Y. Ent. Soc. Jour.* 49: 227-231 (civil disturbances in ant communities), *ibidem*, pp. 199-204 (communal disaffection).—Flanders, 1945. *Sci.* 101 (2619): 245-246 (Are castes determined by rate of egg deposition?).—Brackbill, 1948. *Auk* 65: 66-77 (anting by four species of birds).—Nixon, 1951. The Association of Ants with Aphids and Coccids. Commonwealth Inst. Ent. (London) pp. 1-35.—Flanders, 1951. *Canad. Ent.* 83: 93-98 (role of ants in biological control of homopterous insects).—Flanders, 1952. *Jour. Econ. Ent.* 45: 38-39 (ovisorption as the mechanism causing worker development in ants).—Flanders, 1953. *Sci. Monthly* 76: 142-148, fig. 1 (caste determination in the social Hymenoptera).—Talbot, 1953. *Mich. Univ., Contrib. Lab. Vertebr. Biol.* 63: 1-13 (fauna and populations).—Wilson, 1953. *Psyche* 60: 15-20 (caste determination).—Gosswald and Bier, 1954. *Insectes Sociaux* 1: 229-246, figs. 1-5, tables 1-5 (caste determination in genus *Formica*).—Chapman, 1954. *Pan-Pacific Ent.* 30: 93-102, fig. 1, tables 1-2 (swarming of ants on summits of U. S. western mountains).—Bier, 1954. *Insectes Sociaux* 1: 1-19, figs. 1-2 table 1.—Gosswald, 1955. *Rev. Suisse de Zool.* 62: 372-386 (caste determination in ants).—Wilson and Eisner, 1957. *Insectes Sociaux* 4: 157-166, figs. 1-6 (liquid transmission of food).—Talbot, 1957. *Insectes Sociaux* 4: 375-384 (populations).—Brian, 1957. *Ann. Rev. Ent.* 2: 107-120 (caste determination).—Gosswald and Bier, 1957. *Insectes Sociaux* 4: 335-348, tables 1-9 (caste determination in genus *Formica*).—Weber, 1958 (1956). 10th. Int. Cong. Ent. Proc. 2: 459-473, figs. 1-12 (evolution of ants and feeding habits).—Wenner, 1959. *Amer. Midland Nat.* 62: 174-182 (ants of Bidwell Park, Chico, Calif.).—Kannowski, 1959. *Insectes Sociaux* 6: 115-162, fig. 1, tables 1-4 (flight activities and colony founding of bog ants in southeastern Mich.).—Downey, 1962. *Ent. News* 73: 57-66 (ants associated with larvae of a lycaenid butterfly).—Ayre, 1962. *N. Y. Ent. Soc. Jour.* 70: 159-167 (problems in using Lincoln Index for estimating size ant colonies).—Kincaid, 1963. *Amer. Micros. Soc. Trans.* 82: 101-105, figs. 1-5 (pollination of plants by ants).—Wilson, 1963. *Ann. Rev. Ent.* 8: 345-368, tables 1-2 (social biology).—Wilson, 1963. *Evolution* 17: 249-253, table 1 (social modification).—Ayre, 1963. *Canad. Ent.* 95: 712-715 (feeding habits).

Subfamily DORYLINAE

- Taxonomy: Borgmeier, 1958. *Studia Ent.* 1: 197 (key for identification of females to genera, in tribe *Ecitonini*).
- Biology: Schneirla, 1953. *Insectes Sociaux* 1: 29-41 (army ant queen).—Tafari, 1955. *N. Y. Ent. Soc. Jour.* 63: 21-41, pls. 1-3, table 1 (growth and polymorphism of larva of *Eciton hamatum* (F.)).—Schneirla, 1956 (1955). *Smithsn. Inst. Ann. Rpt.*, pp. 379-406, figs. 1-4, pls. 1-2 (army ants).—Schneirla, 1957. *Insectes Sociaux* 4: 259-298, figs. 1-2, tables 1-3 (comparison of functional patterns in army ants).—Schneirla, 1957. *Amer. Phil. Soc. Proc.* 101: 106-133, figs. 1-8, tables 1-4 (theoretical consideration of cyclic processes).—Schneirla, 1958. *Insectes Sociaux* 5: 215-255, figs. 1-6, tables 1-2 (behavior and biology of *Neivamyrmex nigrescens* (Cress.) and *N. opacithorax* (Emery)).—Brown, 1960. *Psyche* 66: 25-27 (alarm and attack behavior).—Schneirla, 1960. *Smithsonian Treasury of Science*. Simon and Schuster, N. Y., pp. 664-

696 (the army ants).—Schneirla, 1961. *Ztschr. f. Tierpsychol.* 18: 1-32, figs. 1-5, tables 1-4 (sexual broods and colony division of *Neivamyrmex nigrescens* (Cress.)).—Rettenmeyer, 1963. *Univ. Kans. Bul.* 44(9): 287-465, figs. 1-23, tables 1-4 (behavioral studies).

Morphology: Hagan, 1954. *Amer. Mus. Nat. Hist., Amer. Mus. Novitates* 1663: 1-12, figs. 1-2 (anatomy of queen of *Eciton*).—*Ibidem* 1664: 1-17, figs. 1-18 (reproductive system of queen of *Eciton*).—*Ibidem*, 1665: 1-20, figs. 1-21 (the oocyte cycle).—Lappano, 1958. *Insectes Sociaux* 5: 31-66, figs. 1-25, tables 1-2 (morphological study of larval development in all worker broods of *Eciton burchelli* (Westw.)).—Whelden, 1963. *N. Y. Ent. Soc. Jour.* 71: 158-178, figs. 10 (A-D4), 11 (A-G), 12 (A-1) (reproductive system of worker and female of *Eciton burchelli* (Westw.) and *E. hamatum* (F.)).—Whelden, 1963. *Ibidem*, pp. 246-261, figs. 1 ((A-K, 14 (A-E), 15 (A-D), 16 (A-E) (antennae and legs, *E. hamatum* and *E. burchelli*)).

Genus NOMAMYRMEX Borgmeier, Sup. 1, p. 108

Morphology: Borgmeier, 1957. *Rev. Brasil. Biol.* 17: 390.

Taxonomy: Borgmeier, 1958, *Studia Ent.* 1: 201.

Genus LABIDUS Jurine, Sup. 1, p. 108

Morphology: Borgmeier, 1957. *Rev. Brasil. Biol.* 17: 389.

coecus (Latreille). Ark.

Biology: Kempf, 1961. *Studia Ent.* 4: 551-552 (as a cave ant).—Rettenmeyer, 1963. *Univ. Kans. Sci. Bul.* 44 (9): 418-424.

Morphology: Borgmeier, 1957, *loc. cit. supra*, p. 390.

Genus NEIVAMYRMEX Borgmeier, Sup. 1, pp. 108-110

Morphology: Borgmeier, 1957, *loc. cit. supra*, pp. 392-393.

californicus (Mayr). Nev.

carolinensis (Emery). Ohio, Va.

fuscipennis (W. M. Wheeler). Kans.; Mexico.

harrisii (Haldeman).

Taxonomy: Borgmeier, 1958. *Studia Ent.* 1: 206-207.

melanocephalus (Emery). Honduras.

nigrescens (Cresson). Nebr., Colo.

Biology: Rettenmeyer, 1963. *Univ. Kans. Sci. Bul.* 44 (9): 446-452, fig. 23.

Morphology: Borgmeier, 1957, *loc. cit. supra*, p. 393.

Ecology: Gregg, 1963. *The Ants of Colorado*, pp. 286-288, map.

opacithorax (Emery). Va., Ariz.

Biology: Rettenmeyer, 1963. *Univ. Kans. Sci. Bul.* 44 (9): 437-446, fig. 22.

Morphology: Borgmeier, 1957, *loc. cit. supra*, p. 393.

pauillus (W. M. Wheeler). La.

pilosus mandibularis (M. R. Smith). N. Mex.

wheeleri (Emery). Ariz.

Subfamily CERAPACHYINAE

Biology: Wilson, 1958. *Insectes Sociaux* 5: 129-140 (behavior).

ACANTHOSTICHUS subgenus CTENOPYGA Ashmead, p. 782

texanus Forel.

Taxonomy: M. R. Smith, 1955. *Brooklyn Ent. Soc. Bul.* 50: 48-50 (type lost).

Subfamily PONERINAE

Revision: Brown, 1960. Harvard Univ., Mus. Comp. Zool. Bul. 122: 145-230, figs. 1-48 (tribe Amblyoponini).
 Biology: Wilson, 1958. Evolution 12: 24-31 (nomadic and predatory behavior).

*Genus AMBLYOPONE Erichson

(= *Stigmatomma* Roger of Catalog, pp. 782-783)

Amblyopone Erichson, 1842. Arch. f. Naturgesch. 8: 260.

Type: *Amblyopone australis* Erichson. By monotypy.

Taxonomy: Brown, 1960. *loc. cit. supra*, pp. 155-169.

Morphology: Eisner, 1957. Harvard Univ., Mus. Compar. Zool. Bul. 116: 476, pl. 22, fig. 91 (proventriculus).

Biology: Haskins, C. P. and E. F., 1951. Amer. Midland Nat. 45: 432-445, fig. 1 (colony founding of *A. australis* Erichson).

Amblyopone replaces *Stigmatomma*, which is a synonym (*teste* Brown, 1960, *loc. cit. supra*).

oregonense (W. M. Wheeler), changed status.

Stigmatomma pallipes oregonense W. M. Wheeler. Raised to sp. rank (*teste* Brown, 1960, *loc. cit. supra*, p. 169).

pallipes (Haldeman), changed status. Ariz., Colo., Okla.

Stigmatomma pallipes pallipes (Haldeman). Raised to sp. rank (*teste* Brown, 1960, *loc. cit. supra*, p. 169).

Stigmatomma pallipes montigena Creighton (syn. by Brown, 1960, *loc. cit. supra*).

Stigmatomma pallipes subterranea Creighton (syn. by Brown, 1960, *loc. cit. supra*).

Morphology: Whelden, 1957. N. Y. Ent. Soc. Jour. 65: 1-21, pl. 1, figs. 1-6; pl. 2, figs. 1-7.

Ecology: Gregg, 1963. The Ants of Colorado, pp. 279-280, 282, map.

pallipes montigena Creighton. Syn. of *pallipes* (Haldeman).

pallipes oregonense W. M. Wheeler. Raised to specific rank.

pallipes pallipes (Haldeman). Raised to specific rank.

pallipes subterranea Creighton. Syn. of *pallipes* (Haldeman).

Genus PLATYTHYREA Roger, p. 783

Taxonomy: Brown, 1952. Breviora 6: 4 (in key).

punctata (F. Smith).

Biology: Brown, 1957. Harvard Univ., Mus. Comp. Zool. Bul. 116: 229.

*Genus PRIONOPELTA Mayr

Prionopelta Mayr, 1866. Akad. der Wiss. Wien, Math.-Nat. Kl. Sitzber. 53: 503.

Type: *Prionopelta punctulata* Mayr. By monotypy.

Taxonomy: Brown, 1960, *loc. cit. supra*, pp. 173-178.

Place after *Platythyrea*, p. 783.

**antillana* Forel. Fla. (Juniper Springs in Marion County).

Prionopelta punctulata antillana Forel, 1909. Deut. Ent. Ztschr., p. 239.
 Biology: Kempf, 1961. Studia Ent. 4: 489-490.

Genus ECTATOMMA F. Smith

(= *Ectatomma* subgenus *Ectatomma* F. Smith of Catalog, p. 783)

Revision: Brown, 1958. Harvard Univ., Mus. Comp. Zool. Bul. 118: 206-211.

Ectatomma raised to generic rank (*teste* Brown, 1958, *loc. cit. supra*).

tuberculatum (Olivier).

Taxonomy: Brown, 1958, *loc. cit. supra*, pp. 209, 211, 298, 299.—Kempf, 1962. Studia Ent. 5: 2-3.

*Genus GNAMPTOGENYS Roger

(=*Ectatomma* subgenus *Parectatomma* Emery of Catalog, p. 783)*Gnamptogenys* Roger, 1863. Berlin. Ent. Ztschr. 7: 174.Type: *Ponera tornata* Roger. Desig. by Emery, 1911.*Ectatoma* subg. *Parectatoma* Emery (syn. by Brown, 1958, *loc. cit. supra*, p. 212.)*hartmani* (W. M. Wheeler). La. (Lucky); Honduras. Emendation in spelling of *hartmanni* ! of catalog.Taxonomy: Brown, 1958, *loc. cit. supra*, pp. 228, 230, 234, 302.Historical: Brown, 1961. *Psyche* 68: 69.

Biology: Echols, 1964. Ent. Soc. Amer. Ann. 57: 137.

Genus PROCERATIUM Roger, p. 784

Sysphincta Roger (syn. by Brown, 1958, *loc. cit. supra*, p. 241).Biology: Brown, 1958 (1957). *Psyche* 64: 115.*croceum* (Roger).Biology: Brown, 1958, *loc. cit. supra*, pp. 246, 247.*melinum* (Roger).Taxonomy: Brown, 1958, *loc. cit. supra*, pp. 243, 246-248 (also biology).Brown, *op. cit.*, p. 334 considers *melinum* a European species which very doubtfully occurs in North America.*pergandei* (Emery). Fla.Taxonomy: Brown, 1958, *loc. cit. supra*, pp. 243, 246, 247-248 (also biology).*silaceum* Roger. Okla.Taxonomy: Brown, 1958, *loc. cit. supra*, pp. 241, 245-248 (also biology).Genus *Sysphincta* Roger, p. 784Transfer to synonymy of *Proceratium*, p. 784.

Genus DISCOTHYREA Roger, pp. 784-785

Taxonomy: Borgmeier, 1957. Acad. Brasil. de Cien. An. 29: 124-125, figs. 36-39 (♂).—Brown, 1958, *loc. cit. supra*, pp. 248-253.Biology: Brown, 1958 (1957). *Psyche* 64: 115.*testacea* Roger. Okla., S. C.Taxonomy: M. R. Smith, 1955. Brooklyn Ent. Soc. Bul. 50: 98 (probable type locality, collector).—Brown, 1958, *loc. cit. supra*, pp. 253, 341-342.

PACHYCONDYLA subgenus PACHYCONDYLA F. Smith, p. 785

Taxonomy: Kempf, 1961. Rev. Brasil Ent. 10: 189-204, figs. 1-13 (Brazilian species).

harpax (Fabricius). Jamaica, Trinidad.Taxonomy: Kempf, 1961, *loc. cit. supra*, p. 194.Biology: Kempf, 1961. *Studia Ent.* 4: 493.

Genus BRACHYPONERA Emery

(=*Euponera* subgenus *Brachyponera* Emery of Catalog, p. 785)

Raised to generic rank by Wilson, 1958. Harvard Univ., Mus. Compar. Zool. Bul. 119: 346.

Genus TRACHYMESOPUS Emery

(=*Euponera* subgenus *Trachymesopus* Emery of Catalog, p. 786)Raised to generic rank by Wilson, 1958, *loc. cit. supra*, p. 352.*gilva* (Roger). Transf. to *Cryptopone* Emery, *infra*.*stigma* (Fabricius).**Ponera quadridentata* Smith, 1859. Linn. Soc. London Jour., Zool. 3:

143. (Syn. by Wilson, 1958, *loc. cit. supra*, p. 355.)
Biology: Kempf, 1960. *Studia Ent.* 3: 427-428.

*Genus **CRYPTOPONE** Emery

Cryptopone Emery, 1892. *Soc. Ent. de France Bul.* 61:CCLXXV.

Type: ? *Amblyopone testacea* Motschulsky. By monotypy.

Place after *Trachymesopus*, p. 786.

gilva (Roger). Ky., N. C. Transf. from *Trachymesopus*, p. 786 (*teste* Brown, 1963. *Breviora* No. 190, p. 6).

Genus **PONERA** Latreille, pp. 786-787

coarctata pennsylvanica Buckley. Ariz., Ark., Okla.

Biology: G. C. and J. Wheeler, 1963. *The Ants of North Dakota*, pp. 91-92, map.

Ecology: Gregg, 1963. *The Ants of Colorado*, pp. 281-282, 284, map.

**exotica* M. R. Smith. N. C. (Piedmont and Coastal Regions; apparently introduced).

Ponera exotica M. R. Smith, 1962. *Acta Hym.* 1 (4): 377-382, fig. 1, A, B, ♀, ♀.

inexorata W. M. Wheeler. Ariz. (Cochise County, 5400 ft.)

opaciceps Mayr. Uruguay.

Taxonomy: Kempf, 1962. *Studia Ent.* 5: 7-9, figs. 8, 9.

Biology: Kempf, 1960. *Studia Ent.* 3: 391.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 283-284, map.

trigona opacior Forel. Oreg.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 284-286, map.

Genus **ODONTOMACHUS** Latreille, pp. 787-788

Morphology: Eisner, 1957. *Harvard Univ., Mus. Compar. Zool. Bul.* 116: 475-476, pl. 22, fig. 90 (proventriculus).

haematoda insularis Guérin.

Biology: Taylor and Wilson, 1961. *Psyche* 68: 142.

Subfamily **PSEUDOMYRMECINAE**

Taxonomy: G. C. and J. Wheeler, 1956. *Ent. Soc. Amer. Ann.* 49: 376-379, pl. 3, figs. 1-6 (larva).

Genus **PSEUDOMYRMEX** Lund, *Sup.* 1, p. 112

Taxonomy: Kempf, 1958. *Studia Ent.* 1: 434 (*gracilis* (Fabricius) group).

Biology: Brown, 1960. *Ecology* 41: 590.

Morphology: Eisner, 1957, *loc. cit. supra*, pp. 452-453, pl. 1, fig. 5 (proventriculus).

apache Creighton.

Biology: Creighton, 1963. *Amer. Mus. Novitates* 2156: 1-4, table 1.

elongatus (Mayr).

Taxonomy: Creighton, 1955. *N. Y. Ent. Soc. Jour.* 63: 17-20 (also key U. S. species of *Pseudomyrmex*).

gracilis mexicanus (Roger). Fla. (Dade County). Probably introduced.

Taxonomy: G. C. and J. Wheeler, 1956, *loc. cit. supra*, pp. 385-386, pl. 1, figs. 18-21; pl. 2, fig. 3 (larva).—Brown, 1957. *Harvard Univ., Mus. Comp. Zool. Bul.* 116: 235.

pallidus (F. Smith).

Physiology: Blum and Callahan, 1963. *Psyche* 70: 69-74 (morphology and physiology of poison glands and venom).

Subfamily MYRMICINAE

Taxonomy: C. C. and J. Wheeler, 1960. Ent. Soc. Amer. Ann. 53: 98-110, pl. 1; figs. 1-3 (ant larvae).—G. C. and J. Wheeler, 1960. Ent. Soc. Wash. Proc. 62: 1-32, pl. 1-2 (ant larvae).

MYRMICA subgenus MYRMICA Latreille, pp. 789-791

Taxonomy: Collingwood, 1958. Roy. Ent. Soc., London Proc., Ser. A.33: 65-75, figs. 1-2 (*Myrmica* of Britian).—G. C. and J. Wheeler, 1960, *loc. cit. supra*, pp. 98-110, figs. 1-3 (larvae).—G. C. and J. Wheeler, 1963. The Ants of North Dakota, pp. 94-108, figs.

Biology: Brian, 1957. Insectes Sociaux 4: 177-190, fig. 1, table 1 (growth and development of colonies).—Weir, 1958. Insectes Sociaux 5: 315-339, figs. 1-7, tables 1-9 (polyethism in workers).—Weir, 1958. Jour. Ins. Physiol. 1: 352-360, figs. 1-5 (effect of temperature variation on queen oviposition and colony formation).—Kannowski, 1959. Insectes Sociaux 6: 143-144 (flight comparison).—Weir, 1959. Insectes Sociaux 6: 271-290, figs. 1-5 (influence of worker age on trophogenic larval dormancy).—*Ibidem*, pp. 167-201, fig. 1-tables 1-9 (egg masses and early larval growth).—Brian and Hibble, 1963. Insectes Sociaux 10: 71-82, figs. 1-2, tables 1-5.—Weir, 1959. Physiol. Zool. 32: 63-77, figs. 1-8 (interrelation of queen and worker oviposition).—Carr, 1962. Insectes Sociaux 9: 177-211.—Brian and Hibble, 1963. Insectes Sociaux 10: 71-82.

Physiology: Weir, 1958 (1957). Quart. Jour. Micros. Sci. 98: 499-506, figs. 1-2 (functional anatomy of mid-gut).

brevinodis brevinodis Emery.

Biology: Kannowski, 1959, *loc. cit. supra*, p. 121 (p. 155, pleometrosis).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 99-101, map.

Ecology: Gregg, 1963. The Ants of Colorado, pp. 291-292, 294, map.

brevinodis brevispinosa W. M. Wheeler. Alta., Wash.

Taxonomy: Kannowski, 1956. Amer. Midland Nat. 56: 176, ♂ (also *brevinodis discontinua* ♂).—Gregg, 1961. N. Y. Ent. Soc. Jour. 69: 211, ♀.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 296-297, 299, map.

brevinodis discontinua Weber.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 298-300, map.

brevinodis sulcinodoides Emery.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 293-295, 297, map.

laevinodis Nylander. Syn. of **rubra** (Linnaeus).**lobicornis fracticornis** Emery.

Biology: Kannowski, 1957. Psyche 64: 1-5 (host of *Leptothorax provancheri* Emery).—Kannowski, 1959, *loc. cit. supra*, pp. 121-124, 155-156.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 104-106, map.

Ecology: Gregg, 1963, *loc. cit. supra* pp. 300, 302-303, map.

punctiventris punctiventris Roger. Ark., Mass.

Taxonomy: Gregg, 1961. N. Y. Ent. Soc. Jour. 69: 211. ♀.

Biology: Kannowski, 1959, *loc. cit. supra*, p. 124.

punctiventris pinetorum W. M. Wheeler. N. Y.***rubra** (Linnaeus).

Formica rubra Linnaeus, 1758. Syst. Nat., Ed. 10, v. 1, p. 580.

Myrmica (Myrmica) laevinodis Nylander (syn. by Yarrow, 1955. Roy. Ent. Soc., London, Proc., Ser. B, 24: 113-115).

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, pp. 4-5 (larva).

Biology: Brian, 1951. Experimentia 7: 182 (caste determination).—Brian, 1951. Physiol. Compar. and Oecol. 2: 248-262, figs. 1-2, tables 1-7.—Brian, 1953. *Ibidem* 3: 25-36, tables 1-2 (oviposition by workers).—Brian, 1954. Insectes Sociaux 1: 101-122. fig. 1-3,

tables 1-6 (caste differentiation, larval dormancy, winter size, vernalization).—Brian, 1955. *Ibidem* 2: 1-34, figs. 1-5, tables 1-12 (caste differentiation, growth of workers and intercastes).—Brian, 1955. *Ibidem* 2: 85-114, figs. 1-5, tables 1-8 (caste differentiation, larval dormancy, winter size, and vernalization).—Brian M. V. and A. D., 1955. *Evolution* 9: 280-290, figs. 1-2, tables 1-3 (macrogyne and microgyne).—Brian, 1956. *Insectes Sociaux* 3: 369-394, figs. 1-3, tables 1-8 (caste differentiation, controlled larval nutrition).—Brian, 1956. *Jour. Anim. Ecol.* 25: 319-337, fig. 1, tables 1-2 (segregation of *Myrmica* spp.).—Brian, 1957. *Insectes Sociaux* 4: 191-210, fig. 1, tables 1-7 (serial organization of brood).—Brian, 1957. *Physiol. Compar. and Oecolog.* 4: 329-345, figs. 1-3, tables 1-8 (food distribution and larval size in cultures).—Weir, 1958. *Insectes Sociaux* 5: 315-339, figs. 1-6, tables 1-9 (polyethism in workers).—Brian 1962. *Ibidem* 9: 295-310, illus. (social conditions affecting early larval differentiation).—Brian, 1963. *Ibidem* 10: 91-102 (caste differentiation).

Morphology: Allen, 1957. *Ent. Monthly Mag.* 93: 136-139 (intercastes).
Physiology: Weir, 1959. *Insectes Sociaux* 6: 375-386, figs. 1-6, table 1 (retro-cerebral endocrine glands and their relation to larval growth and development).

sabuleti americana Weber. N. C., Ark.

Taxonomy: Kanno, 1956. *Amer. Midland Nat.* 56: 175. ♂.

Biology: P. B. and P. M. Kanno, 1957. *Ohio Jour. Sci.* 57: 371-374 (mating activities).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 96-99, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 308-310, 312, map.

sabuleti hamulata Weber.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 300-301, map.

scabrinodis mexicana W. M. Wheeler.

Taxonomy: Gregg, 1961. *N. Y. Ent. Soc. Jour.* 69: 211. ♀.

schencki emeryana Forel.

Biology: Kanno, 1959. *Insectes Sociaux* 6: 121.—Medler, 1958. *Ent. Soc. Wash. Proc.* 60: 258 (swarming).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 103-104, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 311-312, 314, map.

schencki spatulata M. R. Smith. ? N. Y.

striolagaster Cole. Colo.

Taxonomy: Cole 1957. *Tenn. Acad. Sci. Jour.* 32: 208-209 (♂).—Gregg, 1961, *loc. cit. supra*, p. 211. ♀.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 313-314, map.

*Genus **PARAMYRMICA** Cole

Paramyrmica Cole, 1957. *Tenn. Acad. Sci. Jour.* 32: 37-42.

Type: **Paramyrmica colax** Cole. By monotypy.

Taxonomy: G. C. and J. Wheeler, 1959. *Tenn. Acad. Sci. Jour.* 34: 219, fig. 1, A-G (larva).—Gregg, 1961, *loc. cit. supra*, pp. 209-220, fig. 1.

Place after *Myrmica* subg. *Myrmica*, p. 791.

***colax** Cole. Tex. (Limpia Canyon in Davis Mts., Jeff Davis Co.). Inquiline in nest of *Myrmica* (*Myrmica*) *striolagaster* Cole.

Paramyrmica colax Cole, 1957. *Tenn. Acad. Sci. Jour.* 32: 37-41, fig. 1, a, b, c. ♀ ♀.

Taxonomy: G. C. and J. Wheeler, 1959, *loc. cit. supra*, pp. 219-220, fig. 1, A-G (larva).—Gregg, 1961, *loc. cit. supra*, pp. 213-215. ♀ ♀.

rugiventris (M. R. Smith). Ariz., Colo. Transf. from *Tetramorium*, p. 824 (*teste* Gregg, 1961, *loc. cit. supra*, p. 215).

Taxonomy: Gregg, 1961, *loc. cit. supra*, pp. 210, 215-220 fig. 1. ♀ ♀ ♂.
Historical: Brown, 1957. *Breviora* No. 72, pp. 5-7.

Genus MANICA Jurine, p. 791

Taxonomy: Cole, 1957. Tenn. Acad. Sci. Jour. 32: 213 (key to males).—
G. C. and J. Wheeler, 1960. Ent. Soc. Wash. Proc. 62: 5 (larva).—
G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 108-110, figs.

bradleyi (W. M. Wheeler).

Taxonomy: Cole, 1957, *loc. cit. supra*, pp. 210-212, fig. 1a (♀ ♂).—G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 6 (larva).

hunteri (W. M. Wheeler).

Taxonomy: Cole, 1957, *loc. cit. supra*, pp. 212-213, fig. 1, b (♂).

mutica (Emery).

Taxonomy: Cole, 1957, *loc. cit. supra*, p. 213, fig. 1, c (♂).—G. C. and J. Wheeler, 1960, *loc. cit. supra*, pp. 5-6 (larva).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 314-317, map.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 109-110, map.

POGONOMYRMEX subgenus POGONOMYRMEX Mayr, pp. 791-794

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 2 (larva).

Morphology: Eisner, 1957. Harvard Univ., Mus. Compar. Zool. Bul. 116: 477-478, pl. 23, figs. 95-96 (proventriculus).

apache W. M. Wheeler. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 318-319, map.

badius (Latreille). La.

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 2 (larva).

Physiology: Wilson, Durlach, and Roth, 1959 (1958). *Psyche* 65: 108-114 (chemical releasers of necrophoric behavior).—Wilson, 1959 (1958). *Psyche* 65: 41-51, fig. 1, table 1 (chemical releasers of alarm and digging).

barbatus barbatus (F. Smith). Ark.

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 2 (larva).

Biology: Young and Howell, 1954. Okla. Acad. Sci. Proc. 35: 60-62 (mating swarms).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 319-321, 323, map.

Economics: Gordon, 1943. Jour. Econ. Ent. 36: 354 (damage to airplane runways).—Young and González, 1957. Mexico. Secretaria de agricultura y ganaderia, fol. tec. 23: 1-20, figs. 1-6, tables 1-5.

barbatus fuscatus Emery.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 322-324, map.

barbatus rugosus Emery. Colo., Tex.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 325, 327, map.

maricopa barnesi M. R. Smith. Utah.**maricopa maricopa** W. M. Wheeler. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 326-328, map.

occidentalis comanche W. M. Wheeler. La.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 332-334, map.

occidentalis occidentalis (Cresson).

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 118-120, figs., map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 328-333, map.

Physiology: Weber, 1959. Ent. News 70: 85-90 (stings, also population).

subdentatus Mayr. Nev., Oreg.

POGONOMYRMEX subgenus EPHEBOMYRMEX W. M. Wheeler, p. 794

Biology: Creighton, 1956. *Psyche* 63: 54-66, fig. 1.

imberbicus W. M. Wheeler. Colo.

Taxonomy: Creighton, 1956. *Psyche* 63: 63-64, fig. 1 (♀).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 334-336, map.

Genus *STENAMMA* Westwood, pp. 794-795

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 120-122, maps 10-11.

brevicornis (Mayr). ? Colo.

Biology: Kannowski, 1958. Ent. News 69: 231-233 (swarming of males).
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 346-348, 350, map.

diecki Emery. Colo.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 121-122, map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 349-350, map.

huachucanum M. R. Smith. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 350-351, 353, map.

impar Forel.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, p. 122, map.

meridionale M. R. Smith. N. C., Okla.

occidentale M. R. Smith. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 352-354, map.

APHAENOGASTER subgenus *ATTOMYRMA* Emery, pp. 795-798

ashmeadi (Emery). N. C.

flemingi M. R. Smith. Ala., Ky., La., N. C.

Aphaenogaster (Atomyrma) macrospina M. R. Smith (syn. by M. R. Smith, 1957. Brooklyn Ent. Soc. Bul. 52: 113).

floridana M. R. Smith. N. C., S. C.

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 7 (larva).

fulva Roger. Colo., Fla.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 336-337, 339, map.

huachucana huachucana Creighton. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 338-340, map.

macrospina M. R. Smith. Syn. of *flemingi* M. R. Smith.

mariae Forel. Ky.

**megommatus* M. R. Smith. Nev., Ariz., Calif., Oreg.

Aphaenogaster (Atomyrma) megommatus M. R. Smith, 1963. N. Y. Ent. Soc. Jour. 71: 244-246, fig. 1, A. B. ♀.

rudis picea Emery.

Biology: Haskins, 1960. N. Y. Ent. Soc. Jour. 68: 66-67 (longevity of fertile females).

rudis rudis Emery. Colo., Wyo.

Biology: Brown 1959 (1958). Psyche 65: 39-40 (nest raided by *Formica subintegra* Emery.)

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 340-342, map.

subterranea valida W. M. Wheeler. Rocky Mt. Region from Colo. to B. C. and west to Utah.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 342-344, map.

uinta W. M. Wheeler. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 344-345, 347, map.

Genus *NOVOMESSOR* Emery, pp. 798-799

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 8 (larva).

albisetosus (Mayr).

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, pp. 8, 10, pl. 2, fig. 1 (larva).

cockerelli (André).

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 10 (larva).

Genus VEROMESSOR Forel, p. 799

- Taxonomy: G. C. and J. Wheeler, 1956. *Psyche* 63: 142-143 (larva).
andrei (Mayr).
 Biology: McCluskey, 1958. *Science* 128: 536-537, fig. 1 (daily rhythm of male).
- lariversi** M. R. Smith.
 Taxonomy: Cole, 1963. *Ent. Soc. Amer. Ann.* 56: 680, 682, figs. 1, B; fig. 3, B; fig. 4, B (♀ ♀ ♂).
- lobognathus** (Andrews). N. Dak.
 Taxonomy: G. C. and J. Wheeler, 1956. *Psyche* 63: 143-145, fig. 2, A-J (larva).—Cole, 1963, *loc. cit. supra*, pp. 680-682, fig. 1, C; fig. 2, C; fig. 3, C; fig. 4, C (♀ ♀ ♂).
 Biology: G. C. and J. Wheeler 1956. *Psyche* 63: 140-142.—*Ibidem*, 1959. *Ent. Soc. Amer. Ann.* 52: 176-179, figs. 1-5 (behavior, nest structure).—*Ibidem*, 1963, *loc. cit. supra*, pp. 123-125, figs., map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 354-356 map.
- pergandei** (Mayr).
 Taxonomy: Cole, 1963, *loc. cit. supra*, p. 681 (♀).
- ***smithi** Cole. Nev. (Mercury in Nye County).
Veromessor smithi Cole, 1963. *Ent. Soc. Amer. Ann.* 56: 678-680, fig. 1, A; fig. 2, A; fig. 3, A; fig. 4, A. ♀ ♀ ♂.

PHEIDOLE subgenus PHEIDOLE Westwood, pp. 799-806

- Taxonomy: Creighton, 1957. *N. Y. Ent. Soc. Jour.* 65: 203-212 (*vasliti* complex).—Gregg, 1958. *N. Y. Ent. Soc. Jour.* 66: 7-48 (key to species of the U. S.).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 125-131, maps 13, 14.
 Biology: Weber, 1948. *Ent. News* 59: 31-35 (food of larvae and adults).
- bahai** (Forel).
 Taxonomy: M. R. Smith, 1955. *Brooklyn Ent. Soc. Bul.* 50: 99 (opinions of authors concerning correct taxonomic placement).
- bicarinata bicarinata** Mayr.
Pheidole (Pheidole) vinelandica buccalis W. M. Wheeler (syn. by Cole, 1956. *Tenn. Acad. Sci. Jour.* 31: 114).
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 126-127, map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 408-409, map.
- bicarinata longula** Emery. N. Dak.
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, p. 127, map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 408, 410, map.
- ***bicarinata paiute** Gregg. (*In subarmata* group.) Nev. (Goldfield).
Pheidole bicarinata paiute Gregg, 1958. *N. Y. Ent. Soc. Jour.* 66: 17-18. ♀ ♀.
- bicarinata vinelandica** Forel.
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 127-128, map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 410, 412-413, map.
 Economics: Reid and Nugara, 1961. *Jour. Parasitol.* 47: 885-889, pl. 1, figs. 1-16.
- californica micula** W. M. Wheeler. Raised to sp. rank.
- californica oregonica** Emery.
Pheidole (Pheidole) californica shoshoni Cole. (syn. by Gregg, 1958, *loc. cit. supra*, p. 33).
- californica shoshoni** Cole. Syn. of **californica oregonica** Emery.
- ceres** W. M. Wheeler.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 413-415, map.
- cockerelli** W. M. Wheeler. Colo.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 415-417, map.

- constipata* W. M. Wheeler. Subsp. of *floridana* Emery.
- creightoni* Gregg. Calif.
- davisi* W. M. Wheeler. N. C.
- dentata* Mayr.
Biology: Van Pelt, 1950. Ent. News 61: 161-163, fig. 1, A, B, C (parasitism by a chalcid).
- dentigula* M. R. Smith.
Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 12 (larva).
- desertorum* W. M. Wheeler. Okla., N. Mex.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 417-419, map.
- flavens sculptior* Forel. Delete from Catalog; a misdetermination (*teste* Gregg, 1958, *loc. cit. supra*, p. 45).
- floridana constipata* W. M. Wheeler.
Pheidole (Pheidole) constipata W. M. Wheeler. Reduced to subsp. rank (*teste* Gregg, 1958, *loc. cit. supra*, p. 35).
- floridana floridana* Emery, changed status, N. C.
Pheidole (Pheidole) floridana lauta W. M. Wheeler (syn. by Gregg, 1958, *loc. cit. supra*, p. 35).
Pheidole (Pheidole) floridana Emery. Reduced to subsp. rank (*teste* Gregg, 1958, *loc. cit. supra*, p. 35).
- floridana lauta* W. M. Wheeler. Syn. of *floridana floridana* Emery.
- grallipes* W. M. Wheeler.
Pheidole grallipes var. *vistana* Forel (syn. by Gregg, 1958, *loc. cit. supra*, p. 22).
- grallipes* var. *vistana* Forel. Syn. of *grallipes* W. M. Wheeler.
- hyatti hyatti* Emery. Okla., Tex.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 419-420, map.
- lamia* W. M. Wheeler.
Biology: Gregg, 1956. Ent. News 67: 37-39 (also distribution).
- maclendoni* W. M. Wheeler.
Taxonomy: Gregg, 1958, *loc. cit. supra*, pp. 46-47. ♀.—Cole, 1958 (1957). N. Y. Ent. Soc. Jour. 65: 130-131 (♀, especially ♀).
- megacephala* (Fabricius).
Biology: Broekhuysen, 1948. Union So. Africa Dept. Agr. Bul. 266, pp. 1-40, figs. 1-22, tables 1-10.—Brown, 1958. Acta Hym. 1: 47.—Weber, 1960. Ent. Soc. Wash. Proc. 62: 232.—Taylor and Wilson, 1961. Psyche 68: 143.—Kempf, 1962. Studia Ent. 5: 18-19.
- metallescens metallescens* Emery.
Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 12 (larva).
- micula* W. M. Wheeler, changed status.
Pheidole (Pheidole) californica micula W. M. Wheeler. Raised to sp. rank (*teste* Gregg, 1958, *loc. cit. supra*, p. 33).
- militicida* W. M. Wheeler.
Biology: Creighton, 1960 (1959). Psyche 66: 1-12, fig. 1 (major worker).
- **moerens* W. M. Wheeler. Ala. (Mobile). Apparently introduced. Originally described from Puerto Rico.
Pheidole moerens W. M. Wheeler, 1908. Amer. Mus. Nat. Hist. Bul. 24: 136-138. ♀ ♀.
- morrisii morrisii* Forel.
Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 12 (larva).
- **obtusospinosa* Pergande. Syn. of **subdentata* Pergande.
- pilifera coloradensis* Emery.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 128-130, map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 419, 421-422, map.

pilifera pilifera (Roger). N. Dak.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 130-131, map.

**rugulosa* Gregg. (In subarmata group.) Ariz. (Harding's Ranch near Tucson.)

Pheidole rugulosa Gregg, 1958. N.Y. Ent. Soc. Jour. 66: 26-29. ♀ 2♂
♀ ♂.

senex Gregg.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 422-424, map.

sitarches campestris W. M. Wheeler, changed status. Tex. and Colo. to Mo. and Miss.

Pheidole (Pheidole) soritis W. M. Wheeler, in part of Sup. 1. Remove *sitarches rufescens* var. *campestris* W. M. Wheeler and its synonym, *rufescens* from synonymy of *soritis* and place as a subspecies of *sitarches* W. M. Wheeler (*teste* Gregg, 1958, *loc. cit. supra*, pp. 30, 38).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 424-425, map.

sitarches sitarches W. M. Wheeler. Tex.; Mexico.

Biology: Wilson, 1957. Psyche 64: 46-50 (nuptial flights).

sitarches soritis W. M. Wheeler, changed status. Ariz., N. Mex., Tex., Utah; Mexico.

Pheidole (Pheidole) soritis W. M. Wheeler. A subsp. of *sitarches* not a species (*teste* Gregg, 1958, *loc. cit. supra*, pp. 30, 38).

Pheidole (Pheidole) tepicana cavigenis W. M. Wheeler (syn. by Gregg, 1958, *loc. cit. supra*, p. 48).

soritis W. M. Wheeler, of Sup. I. A subsp. of *sitarches* W. M. Wheeler. N.B., *sitarches rufescens* var. *campestris* W. M. Wheeler and its synonym *sitarches rufescens* W. M. Wheeler, is another subsp. of *sitarches*.

**subdentata* Pergande. Ariz.; Mexico.

Pheidole subdentata Pergande, 1895. Calif. Acad. Sci. Proc. 5: 888. ♀.

Pheidole (Pheidole) vasliti arizonica Santschi (syn. by Creighton, 1957. N. Y. Ent. Soc. Jour. 65: 211).

**Pheidole obtusospinosa* Pergande, 1895. Calif. Acad. Sci. Proc. 5: 889. 2♂. (Syn. by Creighton, 1957, *loc. cit. supra*, p. 211.)

tepicana cavigenis W. M. Wheeler. Syn. of *sitarches soritis* W. M. Wheeler.

vasliti arizonica Santschi. Syn. of *subdentata* Pergande.

vinelandica buccalis W. M. Wheeler. Syn. of *bicarinata bicarinata* Mayr.

PHEIDOLE subgenus CERATOPHEIDOLE Pergande, p. 806

Taxonomy: Gregg, 1958, *loc. cit. supra*, pp. 9, 16 (key to species of U. S.).

grundmanni M. R. Smith.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 424, 426-427, map.

Genus EPIPHEIDOLE W. M. Wheeler, p. 806

inquilina W. M. Wheeler.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 427-429, map.

Genus SYMPHEIDOLE W. M. Wheeler, p. 807

elecebra W. M. Wheeler.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 429-431, map.

Genus CARDIOCONDYLA Emery, p. 807

Taxonomy: Weber, 1952. Amer. Mus. Novitates No. 1548: 5.

Biology: Wilson, 1960 (1959). Psyche 66: 29-34 (tandem running in genus *Cardiocondyla*).

emeryi Forel.

Taxonomy: Weber, 1952, *loc. cit. supra*, p. 5.

nuda minutior Forel. Calif., Tex., La. An introduced form. Probably a native of the Oriental Region.

CREMATOGASTER subgenus ORTHOCREMA Santschi, pp. 807-808

minutissima minutissima Mayr. N. C.

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 14, pl. 2, figs. 11-13 (larva).

minutissima missouriensis Emery. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 363-364, map.

CREMATOGASTER subgenus CREMATOGASTER Lund, pp. 808-810

Taxonomy: Buren, 1958. N. Y. Ent. Soc. Jour. 66: 119-134 (also biology).

Biology: Soulié, 1962. Insectes Sociaux 9: 181-195 (colony foundation and development).

cerasi (Fitch).

Biology: Kownowski, 1959. Insectes Sociaux 6: 125.

lineolata emeryana Creighton.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 358-360, map.

lineolata lineolata (Say).

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 132-133, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 357, 359, map.

punctulata Emery.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 361-362, 364, map.

vermiculata Emery. N. C.

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 13, pl. 2, figs. 14-15 (larva).

MONOMORIUM subgenus MONOMORIUM Mayr, pp. 810-811

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 133-136, fig., map 16.

floricola (Jerdon).

Biology: Brown, 1964. Ent. News 75: 15.

***metoecus** Brown and Wilson. Ala. (Tuscaloosa). Parasite of *Monomorium minimum* (Buckley).

Monomorium metoecus Brown and Wilson, 1957. Ent. News 68: 239-244, fig. 1, a and b, ergatogyne.

Taxonomy: Wilson and Brown, 1958. Ent. News 69, 33-38, fig. 1, A and B (♀ also biology).

minimum (Buckley). Change heading in Sup. 1, p. 128 from *minimum minimum* to **minimum**.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 133-135, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 366-368, map.

pharaonis (Linnaeus).

Biology: Peacock, Hall, Smith and Goodfellow, 1950. Scot. Dept. Agr. Misc. Pub. No. 17: 1-50, figs. 1-5, tables 1-3.—Sudd, 1953. Adv. of Sci. (Brit.) 10: 17-18 (colony formation).—Peacock, Waterhouse and Baxter, 1955. Ent. Monthly Mag. 91: 37-42 (viability in regard to temperature and moisture).—Brown, 1958. Acta Hym. 1: 36.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 135-136, map.—Brown, 1964. Ent. News 75: 14-15.—Eichler, 1963. Deut. Ent. Ztschr. 10: 207-215.

Morphology: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 16 (larva).

Embryology: Smith and Peacock, 1957. Roy. Soc. Edinbh. Proc., Section B, 66: 235-261, figs. 1-4, table 1 (cytology).

viridum peninsulatum Gregg. Fla. and Gulf Coast States to Ariz., including southern Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 368-370, map.

viridum viridum Brown. N. Y., Long Island (Coram, Selden).

MONOMORIUM subgenus PARHOLCOMYRMEX Emery, p. 811

destructor (Jerdon).

Economics: Kempf, 1960. *Studia Ent.* 3: 506-507.

Genus XENOMYRMEX Forel, p. 811

Taxonomy: G. C. and J. Wheeler, 1960. *Ent. Soc. Wash. Proc.* 62: 19-20 (larva).—Creighton, 1957. *Amer. Mus. Novitates* 1843: 1-14 (including key to species).

floridanus floridanus Emery, changed status. Cuba, Bahamas. Another subspecies, *f. skwarrae* W. M. Wheeler, occurs in Mexico.

Xenomyrmex stolli floridanus Emery. A subsp. of *floridanus* not a subsp. of *stolli* Emery (*teste* Creighton, 1957, *loc. cit. supra*, p. 6).

SOLENOPSIS subgenus SOLENOPSIS Westwood, pp. 812-813

Taxonomy: Snelling, 1963. *Calif. Dept. Agr., Bur. Ent., Occas. Papers* No. 3: 1-10, figs. 1-12 (keys to all castes).

Physiology: Blum, Walker, Callahan and Novak, 1958. *Science* 128: 306-307 (chemical, insecticidal and antibiotic properties of fire ant venom).

aurea W. M. Wheeler, changed status.

Solenopsis (Solenopsis) aurea amblychila W. M. Wheeler (syn. by Snelling, 1963, *loc. cit. supra*, p. 7).

aurea amblychila W. M. Wheeler. Syn. of *aurea* W. M. Wheeler.

aurea aurea W. M. Wheeler. Raised to sp. rank.

geminata geminata (Fabricius).

Biology: Kempf, 1961. *Studia Ent.* 4: 507.

saevissima richteri Forel.

Taxonomy: Wilson, 1953. *Evolution* 7: 262-263, fig. 1 (origin of variation).—Brown, 1957. *Quart. Rev. Biol.* 32: 258-261, figs. 4-7.—Wilson and Brown, 1958. *Evolution* 12: 211-218, figs. 1-3, table 1 (morphological changes in introduced population).

Biology: Wilson, 1958. *Sci. Amer.* 198: 36-41, maps, illus.—Green, 1962. *Jour. Econ. Ent.* 55: 1003-1004, table 1.

Morphology: Callahan, Blum and Walker, 1959. *Ent. Soc. Amer. Ann.* 52: 573-590, figs. 1-19 (also histology of poison glands and sting).

Physiology: Caro, Derbes and Jung, 1957. *Amer. Med. Assoc. Arch. Derm.* 75: 475-478, figs. 1-7.—Favorite, 1958. *U. S. Pub. Health Serv., Pub. Health Rpts.* 73: 445-448.—Wilson, Durlach and Roth 1959 (1958). *Psyche* 65: 108-114 (chemical releases of necrophoric behavior).—Wilson, 1959. *Science* 129: 643-644 (nature of odor trail).—Wilson, 1962. *Anim. Behavior* 10: 134-147, figs. 1-8, tables 1-4 (chemical communication among workers—mass foraging).—Blum and Callahan, 1960. *XI Int. Congr. F. Entom. Wien, Verh. B.* 111: 290-293 (chemical and biological properties of venom).—Wilson, 1962. *Anim. Behavior* 10: 148-158, figs. 1-5, tables 1-2 (chemical communication among workers—analysis of the odour trail).—Wilson, 1962. *Ibidem*, 159-164, table 1 (chemical communication among workers—induction of social responses).

xyloxi McCook. Colo.

Biology: Wray, 1962. *Jour. Econ. Ent.* 55: 145 (apparent introduction into N. C.).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 370-371, 373, map.

Physiology: Blum, Roberts and Novak, 1961. *Psyche* 68: 73-74 (chemical and biological characters of venom).

SOLENOPSIS subgenus EUOPHTHALMA Creighton, p. 813

globularia littoralis Creighton.

Taxonomy: G. C. and J. Wheeler 1960, *loc. cit. supra*, p. 22 (larva).

SOLENOPSIS subgenus DIPLORHOPTRUM Mayr, pp. 813-814

molesta molesta (Say). Colo.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 136-138, map.—Macnamara, 1945. *Canad. Ent.* 77: 40.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 372-373, 375, map.

molesta validiuscula Emery. Pacific Coast States east to Idaho, Colo., N. Mex.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 374-375, 377, map.

pergandei Forel.

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, pp. 21-22 (larva).

picta Emery. N. C.

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 22 (larva).

salina W. M. Wheeler. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 376-378, map.

tennesseensis M. R. Smith. Kans. (Kearny County), Calif. (near Azusa).

texana texana Emery. N. C.

texana truncorum Forel. Colo., Ariz., Calif.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 378-380, map.

Genus ANERGATES Forel, p. 815

atratus (Schenck). Md. (Baltimore), N. Y. (Suffolk County, Long Island).
Morphology: Meyer, 1955. *Insectes Sociaux* 2: 163-170, figs. 1-4.

Genus EREBOMYRMA W. M. Wheeler, p. 815

***Spelaomyrmex** W. M. Wheeler, 1922. *Amer. Mus. Novitates* No. 45: 9. (Syn. by Wilson, 1962. *Psyche* 69: 63.)

Type: **Spelaomyrmex urichi** W. M. Wheeler. By monotypy.

Biology: Wilson, 1962, *loc. cit. supra*, pp. 62-72, fig. 1.

longii W. M. Wheeler. Okla. (Fort Sill).

Genus MYRMECINA Curtis, pp. 815-816

americana Emery. Colo., N. Mex.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 364-365, 367, map.

LEPTOTHORAX subgenus NESOMYRMEX W. M. Wheeler, pp. 816-817

Revision: Kempf, 1959. *Studia Ent.* 2: 391-432, figs. 1-31.

wilda M. R. Smith. Tex.; Mexico.

Taxonomy: Kempf, 1959, *loc. cit. supra*, 421-423, figs. 8, 28 (♂ ♀).

LEPTOTHORAX subgenus MYRAFANT M. R. Smith, pp. 817-819

Taxonomy: Cole, 1958. *Ent. Soc. Amer. Ann.* 51: 535-538 (*nitens-carinatus* complex).—G. C. and J. Wheeler, 1960. *Ent. Soc. Wash. Proc.* 62: 23 (larva).

andrei Emery. Nev., Ariz., N. Mex.

Taxonomy: Cole, 1958, *loc. cit. supra*, pp. 537-538 (♂, ♀, ♂).

ambiguus ambiguus Emery. Slave of *L. duloticus* Wesson.

Biology: Kownowski, 1959. *Insectes Sociaux* 6: 124 (150-151, parasitism; 155 pleometrosis).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 140-141, map.

***carinatus** Cole. Tex. (Limpia Canyon, Davis Mts., 5,400 ft.), Ariz.

Leptothorax (Leptothorax) carinatus Cole, 1957, *Tenn. Acad. Sci. Jour.* 32: 213-215, fig. 1. ♀ ♀.

Taxonomy: Cole, 1958, *loc. cit. supra*, pp. 537-538 (♂, ♀).

curvispinosus Mayr. Okla., Ariz.

Biology: Talbot, 1957. *Ecology* 38: 449-456 (populations).—Kownowski, 1959, *loc. cit. supra*, p. 124.

- foveata** M. R. Smith. Va.
furunculus W. M. Wheeler. Wyo.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 381, 382, map.
- ***hispidus** Cole. Tex. (Limpia Canyon, Davis Mts., 5,400 ft.); Mexico.
Leptothorax (Leptothorax) hispidus Cole, 1957. Tenn. Acad. Sci. Jour. 32: 42-45, fig. 1, a, b, c. ♀ ♀.
- longispinosus** Roger.
 Biology: Kanno, 1959, *loc. cit. supra*, p. 125.
- mariposa** W. M. Wheeler, changed status.
Leptothorax (Myrafant) nitens nitens Emery, in part of Sup. 1. Remove **mariposa** W. M. Wheeler from syn. and raise to sp. rank (*teste*, Cole, 1958, *loc. cit. supra*, p. 536).
- nitens** Emery, changed status. Wash., Ore., Nev.
Leptothorax (Myrafant) nitens nitens Emery. Raised to sp. rank (*teste* Cole, 1958, *loc. cit. supra*, p. 536).
Leptothorax (Myrafant) nitens heathii W. M. Wheeler. (Syn. by Cole, 1958, *loc. cit. supra*, p. 536).
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 382-384, map.
- nitens heathii** W. M. Wheeler. Syn. of **nitens** Emery.
- nitens nitens** Emery of Sup. I. Raised to sp. rank; remove **mariposa** W. M. Wheeler from syn. and also raise it to sp. rank.
- obliquicanthus** Cole.
 Taxonomy: Gregg, 1953. Breviora No. 22, pp. 1-3, fig. 1. ♀.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 384-385, 387, map.
- rugatulus brunnescens** W. M. Wheeler. Colo. and Utah to Mont. and the Dakotas.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 388-389, map.
- rugatulus rugatulus** Emery.
 Taxonomy: Kanno, 1956. Amer. Midland Nat. 56: 178-179 (♀; also **rugatulus brunnescens** W. M. Wheeler).
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 141-143, map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 386-388, map.
- schaumi** Roger.
 Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 23 (larva).
- schmittii** W. M. Wheeler.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 388, 390-391, map.
- texanus texanus** W. M. Wheeler.
 Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 24 (larva).
- tricarinatus neomexicanus** W. M. Wheeler. Colo.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 393-394, map.
- tricarinatus tricarinatus** Emery. Ariz., Idaho, N. Dak.
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, p. 143, map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 391-393, map.
- tuscaloosae** Wilson. N. C.

LEPTOTHORAX subgenus DICHOTHORAX Emery, p. 820

- pergandei pergandei** Emery.
 Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, p. 23 (larva).

LEPTOTHORAX subgenus LEPTOTHORAX Mayr, pp. 820-822

- Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 143-148, figs., maps 21-23.
- crassipilis** W. M. Wheeler.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 401-402, 405, map.
- duloticus** L. G. Wesson. Enslaves *Leptothorax ambiguus ambiguus* Emery.

Biology: Talbot, 1957. Ecology 38: 449-456 (populations).—Kannowski, 1959. Insectes Sociaux 6: 124-125 (150-151, parasitism).

hirticornis Emery. Calif.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 145-146, map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 403, 405, map.

muscorum (Nylander).

Biology: Kannowski 1959, *loc. cit. supra*, p. 125.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 143-145, map.
Ecology: Brown, 1955. Ent. News 66: 47-50.—Gregg, 1963, *loc. cit. supra*, pp. 393-400, map.

provancheri Emery. Colo. Host: *Myrmica lobicornis fracticornis* Emery.

Biology: Kannowski, 1957. Psyche 64: 1-5.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 146-148, map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 404-407, map.

Genus HARPAGOXENUS Forel, pp. 822-823

americanus (Emery). N. C., Ont.

Genus TRIGLYPHOTHRIX Forel, p. 823

striatidens (Emery).

Biology: Taylor and Wilson, 1961. Psyche 68: 142.

Genus TETRAMORIUM Mayr, pp. 823-824

caespitum (Linnaeus).

Biology: Brown, 1964. Ent. News 75: 15.
Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, pp. 24-25 (larva).
Historical: Brown, 1957. Breviora 72: 1-4.

guineense (Fabricius).

Biology: Taylor and Wilson, 1961. Psyche 68: 138.—Brown, 1964. Ent. News 75: 14-15.
Ecology: Brown, 1958. Acta Hym. 1: 28.

rugiventris M. R. Smith. Transf. to *Paramyrmea* Cole, p. 791.

simillimum (F. Smith).

Biology: Taylor and Wilson, 1961. Psyche 68: 142-143.

Genus XIPHOMYRMEX Forel, p. 824

Taxonomy: Cole, 1957. Tenn. Acad. Sci. Jour. 32: 209-210 (♂).

PARACRYPTOCERUS subgenus HARNEDIA M. R. Smith, p. 825

Revision: Kempf, 1958. Studia Ent. 1: 65-144, pls. 1-8.

rohweri (W. M. Wheeler).

Taxonomy: Kempf, 1958, *loc. cit. supra*, pp. 129-132, pl. 2, fig. 8; pl. 4, fig. 2; pl. 6, fig. 12.

texanus (Santschi).

Taxonomy: Kempf, 1958, *loc. cit. supra*, pp. 123-127, pl. 2, fig. 5; pl. 4, fig. 4; pl. 6, fig. 7.
Biology: Creighton, 1963. Psyche 70: 133-143, figs. 1-3.

PARACRYPTOCERUS subgenus CYATHOMYRMEX Creighton, p. 825

Revision: Kempf, 1958. Studia Ent. 1: 144-158, pl. 8.

varians (F. Smith).

Taxonomy: Kempf, 1958, *loc. cit. supra*, pp. 155-158, pl. 8. figs. 7, 8.

STRUMIGENYS subgenus STRUMIGENYS F. Smith, pp. 825-826

Taxonomy: G. C. and J. Wheeler, 1960, *loc. cit. supra*, pp. 25-26 (larva).
—Brown, 1960 (1959). Psyche 66: 37-52, figs. 1-9 (*gundlachi* group).—Brown, 1962. Psyche 69: 238-267, figs. 1-30 (Neotropical species and key).

- Biology: Brown and Wilson, 1960 (1959). *Quart. Rev. Biol.* 34: 281.
- ***eggersi** Emery. Fla. (Miami, Fisher's Isl., Archbold Biol. Station). Probably introduced.
- Strumigenys eggersi* Emery, 1890. *Soc. Ent. Ital. Bul.* 22: 68, pl. 7, fig. 9. ♀ ♀.
- Taxonomy: Brown, 1960 (1959). *Psyche* 66: 46-47, figs. 2, 6 (♂, ♀).—Brown, 1962. *Psyche* 69: 249, 257, 264.
- Biology: Weber 1952. *Amer. Mus. Novitates* No. 1554: 5.—Kempf, 1958, *loc. cit. supra*, p. 554.—Kempf, 1961. *Studia Ent.* 4: 515.
- ***gundlachi** Emery. Fla. (Royal Palm Ranger Station, Everglades Natl. Park; Key Largo.) Probably introduced.
- Strumigenys gundlachi* Roger, 1862. *Berlin Ent. Ztschr.* 6: 253, pl. 1, fig. 18 a ♀ not ♀.
- Taxonomy: Brown, 1960 (1959). *Psyche* 66: 37-45, figs. 1, 5 (♂ ♀).—Brown, 1962. *Psyche* 69: 249, 257, 264.
- Biology: Weber, 1952, *loc. cit. supra*, pp. 4-5.
- louisianae** Roger. Ariz., Okla.
- Taxonomy: Brown, 1953. *Psyche* 60: 1-2.—G. C. and J. Wheeler, 1954. *Psyche* 61: 136-137, pl. 10, figs. 1-6 (larva).—Brown, 1957. *Quart. Rev. Biol.* 32: 271.—Brown, 1961. *Psyche* 68: 64-67, 68 (variation and synonymy).—Brown, 1962. *Psyche* 69: 246-247, 257, 263.
- Biology: Wilson, 1953. *Ent. Soc. Amer. Ann.* 46: 481-483.—Kempf, 1958. *Studia Ent.* 1: 555.
- ***silvestrii** Emery. La. (Paradise). Apparently introduced.
- Strumigenys silvestrii* Emery, 1905. *Soc. Ent. Ital. Bul.* 37: 168, fig. 27. ♀ ♀.
- Taxonomy: Brown, 1959. *Studia Ent. (n.s.)* 2: 25-28, fig. 1 (♂ ♀).—Brown, 1962. *Psyche* 69: 246, 257, 259.
- SMITHISTRUMA subgenus WESSONISTRUMA Brown, p. 826**
- Biology: Brown and Wilson, 1960 (1959). *Quart. Rev. Biol.* 34: 282.—Brown, 1964. *Amer. Ent. Soc. Trans.* 89: 190-197.
- angulata** (M. R. Smith). Ill. (Giant City State Park).
- pergandei** (Emery). N. C., Mo., Kans.
- Taxonomy: G. C. and J. Wheeler, 1954. *Psyche* 61: 144-145 (larva). Note: W. L. Brown, 1964, *loc. cit. supra*, p. 197 remarks that this species was taken at Billerica, Mass. "the northernmost locality from which any dacetine ant has been taken in the New World."
- SMITHISTRUMA subgenus SMITHISTRUMA Brown, pp. 826-828**
- Biology: Brown, 1964, *loc. cit. supra*, pp. 185-186, 189-191, 193-200.
- abdita** (L. G. Jr., and R. G. Wesson). N. C. (Great Smoky Mt. Natl. Park, 2600 ft.), Ill., Iowa and Va.
- Taxonomy: Brown, 1964, *loc. cit. supra*, pp. 199-200 (*abdita-missouriensis* complex).
- bimarginata** (L. G. Jr., and R. G. Wesson). Ill. (Red Hills State Park).
- brevisetosa** (M. R. Smith). Syn. of *pilinasis* (Forel).
- bunki** W. L. Brown. Fla. (Duvall Co).
- ***carolinensis** W. L. Brown. S. C. (U. S. Hwy. 17, 1 mile east Ravenel), N. C. (Marshville in Union Co.).
- Smithistruma carolinensis* W. L. Brown, 1964. *Amer. Ent. Soc. Trans.* 89: 185-186, pl. 16, fig. 1, ♀.
- clodyi** Pfitzer.
- Taxonomy: Brown, 1964, *loc. cit. supra*, p. 191.
- clypeata** (Roger). Ark., Ala., N. C. (Great Smoky Mts. Nat. Park at 2,000 ft.), N. J.
- Taxonomy: G. C. and J. Wheeler, 1954. *Psyche* 61: 143 (larva).
- Biology: Wilson, 1953. *Ent. Soc. Amer. Ann.* 46: 486.

- creightoni** (M. R. Smith). N. C., Ga., Tenn.
- dietrichi** (M. R. Smith). N. C.
Taxonomy: G. C. and J. Wheeler, 1954. *Psyche* 61: 143 (larva).
Biology: Wilson, 1953, *loc. cit. supra*, p. 487.
- flirrhina** W. L. Brown. Mo.
- flitalpa** W. L. Brown. Ind. (Brown Co. State Park).
- laevinasis** (M. R. Smith). N. C., Ala.
Taxonomy: Brown, 1964, *loc. cit. supra*, p. 199 (*pilinasis-laevinasis* complex).
- missouriensis** (M. R. Smith). Iowa, Ill., N. C.
Taxonomy: G. C. and J. Wheeler, 1954. *Psyche* 61: 143 (larva).
Biology: Wilson, 1953, *loc. cit. supra*, pp. 485-486.
- ohioensis** (Kennedy and Schramm). Ga., Ind., N. J.
- ornata** (Mayr). Okla., Mich., Mo., Tenn., S. C., La., Ark., Tex., Del.
- pilinasis** (Forel). Mo., Ark., La., Tenn., N. C.
Smithistruma (*Smithistruma*) *brevisetosa* (M. R. Smith) (syn. by Brown, 1964, *loc. cit. supra*, p. 197).
Taxonomy: G. C. and J. Wheeler, 1954. *Psyche* 61: 143 (larva).—Brown, 1964, *loc. cit. supra*, p. 199 (*pilinasis-laevinasis* complex).
Biology: Wilson, 1953, *loc. cit. supra*, p. 485.
- pulchella** (Emery). Remove Iowa from range of states.
- reflexa** (L. G. Jr., and R. G. Wesson). Md.
- rostrata** (Emery).
Taxonomy: G. C. and J. Wheeler, 1954. *Psyche* 61: 144 (larva).
Biology: Wilson, 1953, *loc. cit. supra*, p. 485.
- talpa** (Weber). Ill. (Red Hills State Park).
Biology: Wilson, 1953, *loc. cit. supra*, p. 486.

Genus **TRICHOSCAPA** Emery, p. 829

Biology: Brown and Wilson, 1960 (1959). *Quart. Rev. Biol.* 34: 283.

- membranifera** (Emery). Calif. (near Stockton). Apparently introduced.
Taxonomy: G. C. and J. Wheeler, 1954. *Psyche* 61: 145 (larva).
Biology: Weber, 1952. *Amer. Mus. Novitates* No. 1554: 7.—Wilson, 1953, *loc. cit. supra*, pp. 483-485.—Brown, 1954. *Harvard Univ., Mus. Comp. Zool. Bul.* 112: 6.

Genus **QUADRISTRUMA** Brown, p. 829

Biology: Brown, 1954, *loc. cit. supra*, p. 6.—Brown and Wilson, 1960 (1959), *loc. cit. supra*, p. 281.

- emmae** (Emery).
Biology: Kempf, 1961. *Studia Ent.* 4: 516.

*Genus **EURHOPALOTHRIX** Brown and Kempf

Eurhopalothrix Brown and Kempf, 1960. *Studia Ent., Petropolis* (n.s.), 3: 202-203.

Type: *Rhopalothrix Bolau* Mayr. Desig. by Brown and Kempf, 1961.

Taxonomy: Brown and Kempf, 1961 (1960): *Psyche* 67: 44.

Place after genus *Quadristruma* Brown, p. 829.

- ***floridana** Brown and Kempf. Fla. (Highlands Hammock, Highlands County).

Eurhopalothrix floridana Brown and Kempf, 1960. *Studia Ent., Petropolis* (n.s.) 3: 207-208, fig. 34 (in key, p. 246). ♀.

CYPHOMYRMEX subgenus CYPHOMYRMEX Mayr, pp. 829-830

Biology: Weber, 1957. Ecology 38: 480-494, figs. 1-5 (cultivation of fungus).

rimosus (Spinola). Miss. (near Gulfport).

Taxonomy: Weber, 1958. Ent. Soc. Wash. Proc. 60: 259-260.—G. C. and J. Wheeler, 1960. Ent. Soc. Wash. Proc. 62: 28 (larva).

CYPHOMYRMEX subgenus MYCETOSORITIS W. M. Wheeler, p. 830

hartmani (W. M. Wheeler), corrected spelling of *hartmanni* (!) of catalog, p. 830.

Genus TRACHYMYRMEX Forel, pp. 830-831

Biology: Weber, 1960. Ent. News 71: 1-6 (comparison of worker and female behavior).

septentrionalis (McCook), changed status.

Trachymyrmex septentrionalis obscurior (W. M. Wheeler) (syn. by Weber, 1958. Ent. News 69: 52).

Trachymyrmex septentrionalis seminole (W. M. Wheeler) (syn. by Weber, 1958, *loc. cit. supra*, p. 53).

septentrionalis obscurior (W. M. Wheeler). Syn. of *septentrionalis* (McCook).

septentrionalis seminole (W. M. Wheeler). Syn. of *septentrionalis* (McCook).

septentrionalis septentrionalis (McCook). Raised to sp. rank.

Genus ATTA Fabricius, pp. 832-833

Revision: Borgmeier, 1959. Studia Ent. 2 (fasc. 1-4): 321-390, figs. 1-29.

Biology: Weber, 1962. Natural History (N. Y.) 61: 45-51, illus.—Smith, 1963. Ent. Soc. Wash. Proc. 65: 299-302.

mexicana (F. Smith). Extreme south. Ariz.; Mexico, Honduras, Guatemala, El Salvador.

Taxonomy: Borgmeier, 1959, Studia Ent. 2 (fasc. 1-4): 351-353, figs. 16, 28 (♀, ♀, ♂).

Biology: Smith, 1963, *loc. cit. supra*, pp. 299-302.

texana (Buckley). Thirteen parishes in western La., much of the eastern half of Tex.; States of Tamaulipas and Vera Cruz, Mexico.

Taxonomy: Borgmeier, 1959. Studia Ent. 2 (fasc. 1-4): 356-358, fig. 29 (♀, ♀, ♂).

Biology: Bennett, 1958. U. S. Dept. of Agr., For. Pest Leaflet 23, pp. 1-4, figs. 1-4.—Warter, Moser and Blum, 1962. La. Acad. Sci. Proc. 25: 42-46 (correlation between night hawk feeding and nuptial flights of *A. texana* and *Iridomyrmex pruinosus* (Rog.)).—Moser, 1962. Forests and People 12: 40-41, illus. (laboratory and field studies of nesting habits).—Moser, 1963. Ent. Soc. Amer. Ann. 56: 286-291, figs. 1-6, table 1 (contents and structure of nest in summer).—Smith, 1963, *loc. cit. supra*, pp. 299-302.

Physiology: Moser and Blum, 1963. Science 140: 1228 (trail marking substance, source and potency).

Subfamily DOLICHODERINAE

Morphology: Pavan, 1955. Riv. Sci. Nat., "Natura" 46: 135-145, figs. 1-6, table 1.

Physiology: Pavan and Trave, 1958. Insectes Sociaux 5: 299-308 (venom of *Tapinoma nigerrimum* Nyl.).—Torossian, 1959. *Ibidem*, 6: 369-374, pl. 1 (tropholactic and proctodeal exchange in *Dolichoderus quadripunctatus* (L.)).—Wilson and Pavan, 1960 (1959). Psyche 66: 70-76, tables 1-2 (glandular sources of chemical releasers of social behavior).

DOLICODERUS subgenus HYPOCLINEA Mayr, pp. 833-835

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 149-154, figs., maps 24, 25.

Biology: Kannoński, 1959. *Insectes Sociaux* 6: 144-145 (flights comparisons of species).—Torossian, 1960. *Insectes Sociaux* 7: 383-393, figs. 1-3 (biology of *Dolichoderus quadripunctatus* (L.)).

Morphology: Eisner, 1957. Harvard Univ., Mus. Compar. Zool. Bul. 116: 453-454, pl. 2, fig. 7 (proventriculus).

mariae Forel.

Biology: Talbot, 1956. *Psyche* 63: 134-139 (flight activities).—Kannoński, 1959, *loc. cit. supra*, 129-133.

plagiatus (Mayr).

Biology: Kannoński, 1959, *loc. cit. supra*, p. 133.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 149-151, map.

pustulatus Mayr.

Biology: Kannoński, 1959, *loc. cit. supra*, pp. 133-134 (155, pleometrosis).

taschenbergi (Mayr).

Biology: Kannoński, 1959. *Ent. Soc. Amer. Ann.* 52: 755-760, figs. 1-3 (flight activities).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 151-154, fig., map.

Genus LIOMETOPUM Mayr, p. 835

Morphology: Eisner, 1957, *loc. cit. supra*, p. 455, pl. 5, fig. 22 (proventriculus).

apiculatum Mayr.

Biology: Gregg, 1963. *Univ. Colo. Studies, Series in Biol. No.* 11, pp. 1-6, figs. 1, 2.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 438-441, map.

occidentale luctuosum W. M. Wheeler.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 441-443, map.

Genus IRIDOMYRMEX Mayr, pp. 835-836

Morphology: Eisner, 1957, *loc. cit. supra*, pp. 459-460, pl. 7, fig. 32; pl. 8, fig. 34 (proventriculus).

humilis (Mayr).

Biology: Flanders, 1943. *Calif. Citrograph* 28: 117, 128, 137, illus. (Argentine ant versus parasites of black scale).—McCluskey, 1958. *Science* 128: 536-537, fig. 1 (daily rhythm in male Argentine ant).

Morphology: Pavan, 1955. *Soc. Ital. di Sci. Nat. Atti* 94: 379-477, figs. 1-32; pls., tables 1-8, illus.—Nachtwey, 1963. *Insectes Sociaux* 10: 50-53, figs. 3, 4; photograph 8.

Physiology: Pavan, 1950 (1948). 8th Internatl. Cong. Ent. Proc., Stockholm, pp. 863-865, illus.—Weber, 1961. *Ent. Soc. Wash. Proc.* 63: 218 (use of poison).—Torossian, 1961. *Insectes Sociaux* 8: 189-191.

pruinus analis (André). Calif. to Tex., Okla., and Kans., north to Idaho, and N. Dak.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 154-155, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 436-438, map.

pruinus pruinus (Roger). N. Y. to Fla. west to Wisc., Tex., and N. Mex.

Biology: Warter, Moser and Blum, 1962. *La. Acad. Sci. Proc.* 25: 42-46 (correlation between night hawk feeding and nuptial flights of *pruinus pruinus*.)

Physiology: Blum, Warter, Monroe and Chidester, 1963. *Jour. Ins. Physiol.* 9: 881-885, fig. 1 (chemical releasers of social behavior-methyl-n-amyl ketone).

Genus FORELIUS Emery, p. 836

foetidus foetidus (Buckley). Kans., Okla. and Tex. to Colo. and Calif., south to Mexico.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 434-436, map.

DORYMYRMEX subgenus CONOMYRMA Forel, p. 837

Morphology: Eisner, 1957, *loc. cit. supra*, pp. 463-464, pl. 7, fig. 33; pl. 8, fig. 37; pl. 10, fig. 46 (proventriculus).

bicolor W. M. Wheeler, changed status.

Dorymyrmex (Conomyrma) pyramicus bicolor W. M. Wheeler. Raised to sp. rank (*teste* Cole, 1958 (1957). N. Y. Ent. Soc. Jour. 65: 130).

Taxonomy: Wilson, 1958 (1957). Psyche 64: 76.

pyramicus bicolor W. M. Wheeler. Raised to sp. rank.

pyramicus pyramicus (Roger). Entire U. S. with the possible exception of New England States north of Conn., and Wash.

Taxonomy: Wilson, 1958 (1957). Psyche 64: 76.

Biology: Wilson 1958 (1957). Psyche 64: 48.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 155-157, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 432-434, map.

Genus TAPINOMA Foerster, pp. 837-838

Morphology: Eisner, 1957, *loc. cit. supra*, pp. 456-457, pl. 6, fig. 26 (proventriculus).

Physiology: Torossian, 1960. Insectes Sociaux 7: 171-174 (tropholactic and proctodeal in *Tapinoma erraticum* (Latreille)).—Weber, 1961. Ent. Soc. Wash. Proc. 63: 217-218 (use of poison).

melanocephalum (Fabricius).

Biology: King, 1948. Iowa Acad. Sci. Proc. 55: 395.—Kempf, 1961. Studia Ent. 4: 520.—Brown, 1964. Ent. News 75: 14-15.

Physiology: Weber, 1961, *loc. cit. supra*, p. 218 (employment of venom by ant).

sessile (Say).

Biology: Kannoowski, 1959. Insectes Sociaux 6: 126-129 (155, pleometrosis).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 157-160, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 443-447, map.

Subfamily FORMICINAE

Biology: Pontin, 1960. Insectes Sociaux 7: 227-230 (experiments in colony founding in *Lasius niger* (L.) and *Lasius flavus* (F.)).—Kannoowski, 1963. Pavia Univ., Atti IV Cong. U.I.E.I.S., v. 12, pp. 74-102, tables 1-7 (flight activities).

Morphology: Eisner and Wilson, 1952. Psyche 59: 47-60, fig. 1, pls. 5, A, B, C, D; pl. 6, A, B, (proventriculus).

*PLAGIOLEPIS subgenus PLAGIOLEPIS Mayr

Plagiolepis subg. **Plagiolepis** Mayr, 1861. Europ. Formicid., p. 42.

Type: *Formica pygmaea* Latreille. By monotypy.

Insert before **Brachymyrmex** Mayr, p. 838.

***alluandi** Emery. Calif. (Catalina Isl.). Introduced. An Old World species that has been widely disseminated by commerce.

Taxonomy: M. R. Smith, 1957. N. Y. Ent. Soc. Jour. 65: 195-198 (also biology).

Biology: Taylor and Wilson, 1961. Psyche 68: 143.

BRACHYMYRMEX subgenus BRACHYMYRMEX Mayr, pp. 838-839

Biology: Arnaud and Quate. 1951. Pan-Pacific Ent. 27: 171 (note on swarming).

depilis Emery. N. S. and B. C. south to Fla. and Calif.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 161-163, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 447-449, map.

heeri var. **obscurior** Forel. Raised to sp. rank.

obscurior Forel, changed status.

Brachymyrmex (Brachymyrmex) heeri var. **obscurior** Forel. Raised to sp. rank (*teste* Brown, 1957. Harvard Univ., Mus. Compar. Zool. Bul. 116: 237).

Morphology: Eisner, 1957. *Ibidem* 116(8), pl. 20, fig. 84 (cuticular framework of proventriculus of worker).

CAMPONOTUS subgenus CAMPONOTUS Mayr, pp. 839-842

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 163-170, figs., maps 30-32.

Biology: Riordan, 1960. *Insectes Sociaux* 7: 353-355 (location of nests of carpenter ants, *Camponotus* spp. by a radioactive isotope).

Morphology: Eisner, 1957, *loc. cit. supra*, pp. 470-473, pl. 15, fig. 67; pl. 16, fig. 68; pl. 17, figs. 70-74 (proventriculus).

americanus Mayr.

Morphology: Eisner and Wilson, 1952. *Psyche* 59: 47-60, fig. 1; pl. 5, A, B, C, D; pl. 6, A, B, C (proventriculus).

herculeanus herculeanus (Linnaeus).

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 164-165, map.

Ecology: Brown, 1955. *Ent. News* 66: 47-48.—Gregg, 1963, *loc. cit. supra*, pp. 656-660, map.

Physiology: Ayre 1964 (1963). *Ent. Exp. and Appl.* 6: 165-170.

herculeanus modoc W. M. Wheeler.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 665-669, map.

laevigatus (F. Smith).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 660-663, map.

noveboracensis (Fitch).

Biology: Kanno, 1959. *Insectes Sociaux* 6: 134-135.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 165-168, figs., map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 663-665, map.

pennsylvanicus (DeGeer).

Morphology: Forbes and McFarlane, 1961. *N. Y. Ent. Soc. Jour.* 69: 92-103, figs. 1-5 (comparative anatomy of digestive glands of female and male).—Keister, 1963. *Ent. Soc. Amer. Ann.* 56: 336-340, figs. 1-3 (anatomy of tracheal system).

Biology: Van Pelt, 1958. *Tenn. Acad. Sci. Jour.* 33: 120-122, fig. 1 (parasitism by a fungus).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 168-170, map.

CAMPONOTUS subgenus TANAEMYRMEX Ashmead, p. 843

sansabeanus sansabeanus (Buckley).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 669-671, map.

sansabeanus torrefactus W. M. Wheeler. Colo., Nev.

vicinus Mayr. Alta., N. Dak. and Okla. to Calif. and B. C.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 170-171, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 671-675, map.

CAMPONOTUS subgenus MYRMOTHRIX Forel, pp. 843-844

abdominalis floridanus (Buckley). Dauphine and Horn Islands in the Gulf of Mexico.

CAMPONOTUS subgenus MYRMENTOMA Forel, pp. 844-845

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 171-174, figs., maps 34, 35.

caryae discolor (Buckley). N. Dak.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 172-173, map.

nearcticus Emery.

Biology: Kownowski, 1959. *Insectes Sociaux* 6: 134.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 173-174, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 675, 677, map.

rasis W. M. Wheeler. N. C., Calif. (Imperial County).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 677-679, map.

subbarbatus Emery. N. C., Md., N. Y.

CAMPONOTUS subgenus **COLOBOPSIS** Mayr, p. 846

pylartes fraxinicola M. R. Smith. N. C.

mississippiensis M. R. Smith. N. C., Md. (Plummers Island).

PARATRECHINA subgenus **PARATRECHINA** Motschoulsky, pp. 847-848

longicornis (Latreille).

Biology: Brown, 1964. *Ent. News* 75: 14-15.

Economics: Fox and Garcia-Moll, 1961. *Jour. Econ. Ent.* 54: 1065-1066, figs. 1-2.

PARATRECHINA subgenus **NYLANDERIA** Emery, pp. 848-849

parvula (Mayr). Ariz., N. Dak., ? Utah.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 175-176, map.

Genus PRENOLEPIS Mayr, pp. 849-850

imparis coloradensis W. M. Wheeler.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 496-498, map.

LASIUUS subgenus **LASIUUS** Fabricius, pp. 850-851

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 177-188, maps 37-40.—Gregg, 1963, *loc. cit. supra*, pp. 449-453.

Biology: Kownowski, 1959. *Insectes Sociaux* 6: 145-146 (flight comparisons).

alienus (Foerster).

Biology: Kownowski, 1959. *Insectes Sociaux* 6: 135-136.—Judd and Benjamin, 1958. *Canad. Ent.* 90: 419.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 178-179, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 454-457, map.

crypticus Wilson.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 179-182, map.

neoniger Emery.

Biology: Ayre, 1962. *Canad. Jour. Zool.* 40: 157-164, figs. 1-5 (parasitism).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 182-185, fig., map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 457-461, map.

sitkaensis Pergande.

Biology: Medler, 1958. *Ent. Soc. Wash. Proc.* 60: 258 (emergence of males, winged females for flights).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 185-188, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 461-465, map.

LASIUUS subgenus **CAUTOLASIUUS** Wilson, *Sup.* 1, pp. 148-149

Taxonomy: Gregg, 1963, *loc. cit. supra*, pp. 449-453.

flavus (Fabricius). N. Dak.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 189-191, map.—Waloff, 1957. *Insectes Sociaux* 4: 391-408, tables 1-11 (effect of number of queens on their survival and the development of first brood).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 465-469, map.

nearcticus W. M. Wheeler.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 469-471, map.

LASIUS subgenus **CHTHONOLASIUS** Ruzsky, pp. 851-852

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 191-194, maps 42, 43.—Gregg, 1963, *loc. cit. supra*, pp. 449-453.

Biology: Kannoowski 1959. *Insectes Sociaux* 6: 145-146.

***atopus** Cole. Calif. (3 miles south of Leggett, Mendocino County).

Lasius (Chthonolasius) atopus Cole, 1958. *Tenn. Acad. Sci. Jour.* 33: 75-77, fig. 1, A, B. ♀.

humilis W. M. Wheeler.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 473-475, map.

minutus Emery.

Biology: Kannoowski, 1959. *Insectes Sociaux* 6: 136-138 (151-153, colony founding; possible parasitism on *Lasius alienus* (Foerster) and *Lasius sitkaënsis* (Pergande)).

Physiology: Kannoowski, 1959. *Ecology* 40: 162-165 (radioactive phosphorus in study of colony distribution).

speculiventris Emery. Host ant, *Lasius minutus* Emery.

Biology: Kannoowski, 1959, *loc. cit. supra*, pp. 138-141 (153-154, parasitism on *minutus* and possibly other *Lasius* spp.).

subumbratus Viereck.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 191-192, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 475-478 map.

umbratus (Nylander). N. Dak.

Biology: Kannoowski, 1959, *loc. cit. supra*, p. 141 (154-155, possible parasitism of other *Lasius* spp.).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 192-194, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 478-481, map.

Genus ACANTHOMYOPS Mayr, *Sup. 1*, pp. 150-151

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 194-204, figs., maps 45-49.—Gregg, 1963, *loc. cit. supra*, pp. 449-453.

claviger claviger (Roger).

Biology: Talbot, 1963. *Ecology* 44: 549-557, tables 1-3, (local distribution, flight activities).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 195-197, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 481-482, map.

Physiology: Chadha, Eisner, Monro and Meinwald, 1962. *Jour. Ins. Physiol.* 8: 175-179, figs. 1-4 (citronellal and citral in mandibular gland secretions).

claviger coloradensis (W. M. Wheeler).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 481, 483-484, map.

interjectus interjectus (Mayr).

Biology: Talbot, 1963. *Ecology* 44: 549-557, tables 1-3 (local distribution, flight activities).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 197-200, figs., map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 484-486, map.

latipes (Walsh).

Biology: Talbot, 1963. *Ecology* 44: 549-557, tables 1-3 (local distribution flight activities).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 200-202, fig., map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 486-488, map.

murphyi (Forel).

Biology: Talbot, 1963. *Ecology* 44: 549-557, tables 1-3 (local distribution, flight activities).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 489-490, map.

- occidentalis** (W. M. Wheeler). N. Dak., ? Wis.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 490-493, map.
- parvulus** (M. R. Smith). Ill., N. Dak.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 202-203, map.
- pogonogynus** (Buren). Idaho.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 493-494, map.
- subglaber** (Emery). Wis., Tenn.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 203-204, map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 493. 495-496, map.
- Genus MYRMECOCYSTUS** Wesmael, pp. 854-857
- comatus** W. M. Wheeler. Colo.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 643-645, map.
- lugubris** W. M. Wheeler. Nev., Ariz.
- mendax** W. M. Wheeler.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 645-648, map.
- mexicanus hortideorum** McCook.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 648-651, map.
- navajo** W. M. Wheeler. Colo.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 651-653, map.
- pyramicus** M. R. Smith. Calif., Idaho.
Taxonomy: Cole, 1958 (1957). N. Y. Ent. Soc. Jour. 65: 129-130 (♀, ♂).
- semirufus** Emery.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 653-655, map.
- FORMICA** subgenus **PROFORMICA** Ruzsky, p. 857
- Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 206-214, figs., maps 50-53.
- bradleyi** W. M. Wheeler.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 206-209, fig., map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 602-606, map.
- lasioides** Emery. Coast to coast in south. Canada and north. U. S. with extensions in Rocky Mts. to N. Mex. and Appalachians.
Biology: Kincaid, 1963. Amer. Micros. Soc. Trans. 82: 101-105, figs. 1-5, (as pollinators of plants).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 209-211, map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 498-500, 502, map.
- limata** W. M. Wheeler. Utah.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 211-212, map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 502, 504 map.
- manni** W. M. Wheeler.
Formica (Formica) manni W. M. Wheeler. Transf. by Wilson and Brown, 1955. Psyche 62: 126.
Taxonomy: Wilson and Brown, 1955, *loc. cit. supra*, pp. 127-128.
- neogagates** Emery. Coast to coast in south. Canada and north. U. S. with extensions in the Appalachians to N. C. and in the Rocky Mts. to N. Mex. Slave of *Formica wheeleri* Creighton.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 212-214, fig., map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 503-505, map.
- obtusopilosa** Emery.
Formica (Formica) obtusopilosa Emery. Transf. by Wilson and Brown, 1955. Psyche 62: 128.
Taxonomy: Wilson and Brown, 1955, *loc. cit. supra*, p. 128.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 217-219, fig., map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 608-611 map.

perpilosa W. M. Wheeler. Wyo.

Formica (Formica) perpilosa W. M. Wheeler. Transf. by Wilson and Brown, 1955. Psyche 62: 128.

Taxonomy: Wilson and Brown, 1955, *loc. cit. supra*, p. 128.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 611-613, map.

FORMICA subgenus NEOFORMICA W. M. Wheeler, pp. 858-860

Biology: Kanno, 1959. Insectes Sociaux 6: 147 (flight comparisons).

pallidefulva pallidefulva Latreille.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 625-628, map.

pallidefulva nitidiventris Emery.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 628-630, map.

schaufussi dolosa W. M. Wheeler. Va. to Fla. west to Iowa, Mo., Tex., and Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 630-632.

FORMICA subgenus FORMICA Linnaeus, pp. 860-873

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 214-228, figs., maps 54-60 (*sanguinea* group); pp. 229-252, figs., maps 61-71 (*rufa* group); pp. 252-253, map 72 (*microgyna* group); pp. 254-258, figs., map 73 (*exsecta* group); pp. 258-274, figs., maps 74-79 (*fusca* group).

Biology: Gosswald, 1957. Insectes Sociaux 4: 335-348, tables 1-9 (caste determination in the genus *Formica*).—Kanno, 1959. Insectes Sociaux 6: 147.

Morphology: Eisner, 1957, *loc. cit. supra*, pp. 473-474, pl. 25, figs. 100-103 (proventriculus).

Physiology: Osman and Kloft, 1961. Insectes Sociaux 8: 383-395 (venom).

altipetens W. M. Wheeler. N. Dak., Mont., and B. C. to Mex.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 260-261, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 507-509, map.

aterrima Cresson.

Taxonomy: Gregg, 1963, *loc. cit. supra*, pp. 544, 546.

ciliata Mayr. N. Dak. Temporary parasite of *Formica cinerea lepida* W. M. Wheeler.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 233-234, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 545-547, map.

cinerea var. **canadensis** Santschi. Syn. of **cinerea lepida** W. M. Wheeler.

cinerea lepida W. M. Wheeler. Sask., Utah, Tex. Host of temporary parasites, *Formica ciliata* Mayr, *F. dakotensis* Emery and *F. criniventris* W. M. Wheeler.

Formica (Formica) cinerea var. **canadensis** Santschi (syn. by M. R. Smith, 1960. Ent. Soc. Wash. Proc. 62: 251-252).

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 261-263, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 509-512, 514, map.

cinerea montana Emery. Ohio to Dakotas, Nebr., Colo., and N. Mex.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 263-264, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 513-514, map.

comata W. M. Wheeler. N. Dak.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 547-548, 550, map.

criniventris W. M. Wheeler. Probably a temporary parasite of *F. cinerea lepida* W. M. Wheeler.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 234-236, fig., map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 549-551, map.

curiosa Creighton.

Taxonomy: Wilson and Brown, 1955. Psyche 62: 123-125, fig. 2.

- dakotensis** Emery. Alaska, Nev., N. Dak., Ohio.
Formica (Formica) dakotensis var. *montigena* W. M. Wheeler (syn. by Brown, 1957. Ent. News 68: 167).
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 236-238, map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 551-554, map.
- dakotensis** var. *montigena* W. M. Wheeler. Syn of *dakotensis* Emery.
- densiventris** Viereck. Utah.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 589-593, map.
- exsectoides** Forel. Miss. (Holly Springs).
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 597-599, map.
 Physiology: Eisner and Happ, 1964. Sci. 134: 329-331, figs. 1-4 (haemorrhage of a coccinellid beetle and its repellent effect on ants).
- fossiceps** Buren. N. Dak.
 Biology: King, 1949. Iowa Acad. Sci. Proc. 56: 367-370 (mixed colony with *F. obscuriventris clivia* Creighton).—King, 1951. *Op. cit.*, pp. 487-489.—King, 1952. *Op. cit.* pp. 469-474, figs. 1, 2 (macropseudogynes, or ? pterergates).—King and Sallee, 1957. *Op. cit.* 64: 667-669, table 1 (mixed colony with *F. obscuriventris clivia*).—King and Sallee, 1959. *Op. cit.* 66: 472-473 (slave of *F. rubicunda* Emery).—King and Sallee, 1962. *Op. cit.* 69: 531-539, figs. 1-12, table 1 (mixed colony with *F. obscuriventris clivia*).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 238-239, map.
- fusca** Linnaeus. Holarctic. Labrador and Alaska south through Canada. Occurs in every state in U. S., but absent from certain unfavorable habitats, such as deserts.
 Biology: King, 1949. Iowa Acad. Sci. Proc. 56: 367-370 (in mixed colony with *Formica reflexa* Buren).—King, 1951. *Op. cit.* pp. 487-489 (*ibidem*).—Kannowski, 1959. Insectes Sociaux 6: 141-142.—Wallis, 1960. *Op. cit.* 7: 187-190, figs. 1-8, tables 1-2 (spinning movements of larvae).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 264-267, map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 514-525, map.
- hewitti** W. M. Wheeler.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 526-527, map.
- integra haemorrhoidalis** Emery.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 854-857, map.
- integroides coloradensis** W. M. Wheeler.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 557-560, map.
- integroides planipilis** Creighton. Utah, Colo., Wyo., N. Dak., Wash.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 560-561, map.
- integroides propinqua** W. M. Wheeler. Colo., Utah.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 562-564, map.
- laeviceps** Creighton. N. Dak., Colo.
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 239-240, map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 564-565, map.
- manni** W. M. Wheeler. Transf. to *Formica* subg. *Proformica* Ruzsky, p. 857.
- marcida** W. M. Wheeler. N. Dak., S. Dak.
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 267-268, map.
- mucescens** W. M. Wheeler.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 566-567, map.
- microgyna** W. M. Wheeler. Wyo., Utah, N. Mex.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 584-587, map.
- neoclara** Emery.
 Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 268-271, fig., map.
 Ecology: Gregg, 1963, *loc. cit. supra*, pp. 526, 528-530, map.

- neorufibarbis gelida** W. M. Wheeler. Calif. to Alaska to Sask. and south through Rocky Mts. to N. Mex.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 533-536, map.
- neorufibarbis neorufibarbis** Emery. Nebr.
Biology: Kannoowski, 1959. *Insectes Sociaux* 6: 142.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 271-273, map.
Ecology: Brown, 1955. *Ent. News* 66: 47-50.—Gregg, 1963, *loc. cit. supra*, pp. 530-533, map.
- obscuripes obscuripes** Forel. South. Canada and north. U. S. from Ind. and Mich. to Calif. and B. C., also the Rocky Mt. states.
Biology: King and Sallee, 1957. *Iowa Acad. Sci. Proc.* 63: 721-723, tables 1-3.—Talbot, 1959. *Amer. Midland Nat.* 61: 124-128 (flight activities).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 240-244, fig., map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 566, 568-572, map.
- obscuripes ravida** W. M. Wheeler. Colo.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 579-581, map.
- obscuriventris clivia** Creighton. Colo., N. Mex.
Biology: King, 1949. *Iowa Acad. Sci. Proc.* 56: 367-370 (mixed colony with *Formica fossiceps* Buren).—King and Sallee, 1951. *Op. cit.* 58: 487-489 (*ibidem*).—King, 1955. *Op. cit.* 62: 509-513, figs. 1, 2 (winged workers).—King and Sallee, 1959. *Op. cit.* 66: 472-473 (slave of *Formica rubicunda* Emery).—King and Sallee, 1962. *Op. cit.* 69: 531-539, figs. 1-12, table 1 (mixed colonies with *Formica fossiceps* Buren).
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 574-577, map.
- obscuriventris obscuriventris** Mayr.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 244-246, map.
Ecology: Gregg, 1963, *loc. cit. supra*, 572-574, map.
- obtusopilosa** Emery. Transf. to *Formica* subg. *Proformica* Ruzsky, p. 858.
- opaciventris** Emery. N. Dak.
Biology: Scherba, 1961. *N. Y. Ent. Soc. Jour.* 69: 71-87, tables 1-6 (reproduction, nest structure).—Scherba, 1963. *Op. cit.* 71: 219-231, tables 1-6, figs. 1-3.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 254-256, map.
- oreas comptula** W. M. Wheeler.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 246-248, map.
- oreas oreas** W. M. Wheeler.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 577-579, map.
- oregonensis** Cole.
Biology: Kincaid, 1963. *Amer. Micros. Soc. Trans.* 82: 101-105, figs. 1-5 (pollinates a plant).
Taxonomy: Cole, 1956. *Tenn. Acad. Sci. Jour.* 31: 212-214.
- parcipappa** Cole.
Taxonomy: Wilson and Brown, 1955. *Psyche* 62: 125.
- perpilosa** W. M. Wheeler. Transf. to *Formica* subg. *Proformica* Ruzsky, p. 858.
- postoculata** Kennedy and Dennis. Pa. (Mt. Morris).
- pruinosa** W. M. Wheeler.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 537-539, map.
- puberula** Emery.
Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 220-221, map.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 613-616 map.
- rasilis** W. M. Wheeler.
Ecology: Gregg, 1963, *loc. cit. supra*, pp. 587-589, map.
- reflexa** Buren. N. Dak.
Biology: King, 1949. *Iowa Acad. Sci. Proc.* 56: 367-379 (mixed colony

with *fusca* L.).—King, 1951. *Op. cit.* 487-489 (*ibidem*).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 249-250, map.

rubicunda Emery.

Biology: King and Sallee, 1959. Iowa Acad. Sci. Proc. 66: 472-473 (slaves—*Formica fossiceps* Buren and *F. obscuriventris clivia* Creighton).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 221-223, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 616-618, map.

rufibarbis gnava Buckley.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 539-541, map.

spatulata Buren.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, p. 253, map.

subintegra Emery.

Biology: Brown, 1959 (1958). *Psyche* 65: 39-40.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 225-227, map.

sublucida W. M. Wheeler. New England states to S. Dak., Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 622-623, map.

subnitens Creighton. N. Dak., Oreg., Colo.

Taxonomy: Miller, 1957. *Insectes Sociaux* 4: 253-257, figs. 1-4 (♀, ♀, ♂).

Biology: Ayre, 1957. *Insectes Sociaux* 4: 173-176 (ecological notes).—Ayre, 1958. *Op. cit.* 5: 1-7.—Ayre, 1958. *Op. cit.* 5: 147-157, fig. 1 (meteorological factors affecting foraging).—Ayre, 1959. *Op. cit.* 6: 105-114, figs. 1-3 (food habits).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 581-584, map.—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 250-252, map.

subnuda Emery.

Biology: G. C. and J. Wheeler 1963, *loc. cit. supra*, pp. 223-225, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 618-621, map.

subpolita ficticia W. M. Wheeler.

Ecology: Gregg 1963, *loc. cit. supra*, pp. 541-542, map.

ulkei Emery. Iowa, Ind., Wyo.

Biology: Scherba, 1958. *Insectes Sociaux* 5: 201-213, figs. 1-5 (reproduction, mounds).—Kannowski, 1959. *Op. cit.* 6: 142-143.—Talbot, 1959. *Amer. Midland Nat.* 61: 128-132 (flight activities).—Scherba, 1959. *Op. cit.* 61: 499-508, figs. 1-2 (moisture regulations in mounds).—Talbot, 1961. *Ecology* 42: 202-205 (mounds).—Scherba, 1962. *Amer. Midland Nat.* 67: 373-385, figs. 1-4 (mound temperatures).—G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 256-258, fig., map.

wheeleri Creighton. N. Dak. Slave: *Formica neogagates* Emery.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 227-228, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 623-625, map.

whymperi alpina W. M. Wheeler.

Taxonomy and Ecology: Gregg, 1963, *loc. cit. supra*, pp. 593-596 (♀).

Genus POLYERGUS Latreille, pp. 873-875

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 274-277, figs., maps 80, 81.

Biology: Dobrzanska and Dobrzanska, 1960. *Insectes Sociaux* 7: 1-8 (new observations on *Polyergus rufescens* Latr.).

Morphology: Forbes and Brassel, 1962. *N. Y. Ent. Soc. Jour.* 70: 79-87, pl. 1, figs. 1-5; pl. 2, figs. 8-19 (male genitalia and terminal segments of *Polyergus rufescens bicolor* Wasmann, *P. r. breviceps* Emery, *P. r. umbratus* W. M. Wheeler, and *P. lucidus* Mayr).

lucidus longicornis M. R. Smith. Ga., N. C.

lucidus lucidus Mayr. N. Dak., Ark., Colo.

Biology: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 274-275, map.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 633-635, map.

rufescens bicolor Wasmann. Colo.

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 275-277, map (as *rufescens* Latr.).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 635-638, map.

rufescens breviceps Emery.

Taxonomy: G. C. and J. Wheeler, 1963, *loc. cit. supra*, pp. 275-277, map (as *rufescens* Latr.).

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 638-641, map.

rufescens umbratus W. M. Wheeler. Colo.

Ecology: Gregg, 1963, *loc. cit. supra*, pp. 641-643, map.

Superfamily VESPOIDEA

Family VESPIDAE

Taxonomy: Bohart and Bechtel, 1957. Calif. Ins. Survey Bul. 4: 73-101, 34 text figs., 7 maps, 2 pls. (social Vespidae of Calif.).—Richards, 1962. A Revisional Study of the Masarid Wasps, 294 pp., 241 figs.

Biology: Krombein, 1961. Wash. Acad. Sci. Jour. 51: 89-93, 6 figs. (symbiosis between saproglyphid mites and solitary vespid wasps).

Richards (1962) proposed dividing the Vespidae into three families. In North America the Vespidae would include the social wasps (Vespinae, Polistinae and Polybiinae of the Catalog), and the solitary wasps would be assigned to the Eumenidae (Zethinae and Eumeninae of the Catalog) and the Masaridae (Masarinae and Euparagiinae of the Catalog).

Genus VESPA Linnaeus, p. 875

crabro germana Christ. W. Va., Ohio, Ind., Ala.

Genus VESPULA Thomson, pp. 875-877

Revision: Miller, 1961. Canad. Ent., Supp. 22, Vol. 93, 52 pp.

VESPULA subgenus VESPULA Thomson, pp. 875-877

acadica (Sladen), changed status.

Vespula (Vespula) rufa acadica (Sladen). Restored to sp. rank (*teste* Miller, 1961, *loc. cit. supra*, p. 15).

Vespula (Vespula) rufa sladeni Bequaert (syn. by Miller, 1961, *loc. cit. supra*, p. 15).

atropilosa (Sladen), changed status.

Vespula (Vespula) rufa atropilosa (Sladen). Restored to sp. rank (*teste* Miller, 1961, *loc. cit. supra*, p. 17).

consobrina (Saussure), changed status.

Vespula (Vespula) rufa consobrina (Saussure). Restored to sp. rank (*teste* Bohart and Bechtel, 1957, *loc. cit. supra*, p. 79).

intermedia (Buysson), changed status.

Vespula (Vespula) rufa intermedia (Buysson). Restored to sp. rank (*teste* Miller, 1961, *loc. cit. supra*, p. 23).

maculifrons (Buysson).

Biology: Haviland, 1962. Ent. Soc. Wash. Proc. 64: 181-183 (colony size).

pennsylvanica (Saussure).

Biology: Chapman, 1963. Ecology 44: 766-767 (predation on winged ants).

rufa acadica (Sladen). Raised to sp. rank.

rufa atropilosa (Sladen). Raised to sp. rank.

rufa consobrina (Saussure). Raised to sp. rank.