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A CHECKLIST OF THE CHIRONOMIDAE (INSECTA) OF FLORIDA (DIPTERA: CHIRONOMIDAE)

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A CHECKLIST OF THE CHIRONOMIDAE (INSECTA) OF FLORIDA (DIPTERA: CHIRONOMIDAE)

ELISABETH C. BECK AND WILLIAM M. BECK, JR.[1]

SYNOPSIS: An annotated list of the 110 described species of chironomids thus far found in Florida is presented. The list includes information on geographic and annual distributions of adults of the species listed. Of the 110 known species 79 were described from North America, 9 of them from Florida, 18 from Europe, 3 from Central or South America and a single species from Asia.

For the past 6 years we have been gathering information on the Chironomidae of Florida. These midges are of special interest taxonomically and ecologically. Information has also been sought for two entirely practical reasons. First, adults of certain species have become an enormous nuisance problem in some areas of the State and, secondly, immature forms of the midges have proved of great value as indicator organisms in stream and lake-water quality surveys.

Two extensive sources of material have been available to us. The first is the widespread network of regularly operated mosquito light traps run by the Bureau of Entomology, which have yielded adults from some 150 localities in 45 counties. The second is the great amount of larval material collected during stream and lake surveys by the Bureau of Sanitary Engineering.

In addition to the regularly operated light traps, after the impoundment of the Apalachicola River by the new Jim Woodruff Dam intensive work with light traps, truck traps, and live-bait traps yielded quantities of midges as well as mosquitoes. As a result, Jackson County, adjacent to the dam, has the longest list of midge species of any county in Florida. A number of these species (15) have not been found in Florida outside Jackson and Gadsden Counties. This is partly due to the intensity of collecting, but some of the records probably reflect the fauna of the relict areas of Jackson, Liberty, and Gadsden counties. For a discussion of this interesting area see Rogers (1933, pp. 24-25), Hubbell (1939), and Hubbell *et al* (1956).

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A less extensive quantity of material has been gathered around lights at night, and a number of adults have been reared from larvae by the junior author.

Recent developments associated with the rapid growth of Florida have given added impetus to the study of midges. With the apparent artificial eutrophication of waters naturally well supplied with nutrients (Odum, 1953), the production of midges in both lakes and streams has increased to the point where control measures have become necessary. A research laboratory sponsored by both the above mentioned bureaus is now studying the midge problem at Winter Haven, Florida.

That many fish feed on midge larvae and pupae is widely recognized, and limnologists realize the basic importance of these midges in lakes and streams. It is perhaps for the ecologist and zoogeographer, however, that this family has most to offer. Mosquitoes are known to have become adapted to a wide variety of habitats (Bates, 1949); the midges have not only become adapted to the same habitats, but they have also occupied running waters, an area avoided by most mosquitoes.

The first thorough study of a major group of aquatic insects published in Florida was that of Byers (1930). The opening sentence reads as follows: "The most casual reader of a bibliography of North American Odonata could not help but be impressed by the number of titles found therein dealing exclusively with the Odonata fauna of the various states of the United States." In the case of the Chironomidae one can only be impressed by the extreme dearth of state faunal lists. Only New York, Illinois, and Connecticut have produced such lists, and these are obviously incomplete. Lists for Louisiana, Alabama, and Iowa are in preparation.

Four major works on the Chironomidae of the United States have been published: Johannsen (1905), Malloch (1915), Johannsen (1937a, 1937b), and Townes (1945). In addition a number of shorter papers deal with local lists, descriptions of new species, and life history information.

The present paper forms an introduction to the known chironomid fauna of Florida. It makes no attempt to cover ecology, zoogeography, or life history of the species. Distribution records are based chiefly on adult records.

Our study thus far has hardly been a complete one, as most of the adult material has been from light traps, with a resultant concentration on those species that are attracted to light. As we have found

larvae of genera not represented in adult collections, it appears that many species either are not positively phototropic, or are so restricted ecologically that they were not found near any of the traps. Furthermore the identification of midges from these light traps has been a part-time project, and it has been impossible to study every collection or to make counts. Identification is difficult unless one has really good specimens, which is rarely the case in light trap material. Many key characters are based on the antennae, legs, and tibial spurs, frequently broken off in light traps. Females are difficult to key at best, as color is highly variable in these midges. All adult records in this study are based on the identification of male specimens, and especially on their genitalia.

Despite the somewhat unpatterned procedure, much interesting information has been amassed on what species occur in Florida and where. Also the extremely large light trap collections of these midges and the specimens sent in for identification with annoyance complaints have afforded sound information as to which species cause most of our troubles with "blind mosquitoes" in Florida. These nuisance species are: *Glyptotendipes (Phytotendipes) paripes* (Edwards), *Glyptotendipes (P.) lobiferus* (Say), *Chironomus (Chironomus) carus* (Townes), *Chironomus (C.) fulvipilus* Rempel, *Chironomus (C.) crassicaudatus* Malloch, and *Chironomus (C.) decorus* Johannsen. It is of interest zoogeographically that of these six species, one was described from England and two from South America.

Excellent discussions of Florida as a faunal area have already been published in a number of papers. Presentation of such a discussion here would be needlessly repetitious. The publications of Byers (1930), Rogers (1933), Hobbs (1942), Carr (1940), Hubbell (1939), Watson (1928), Hubbell *et al,* (1956) and Young (1954) describe the faunal areas of Florida at some length.

The method of reporting distribution of species has been the source of much discussion. County boundaries prove unsatisfactory because they are generally independent of topographic regions. In the past the topographic divisions of Cooke (1939) have been widely used in faunal studies. However, the above-mentioned relict areas straddle the Apalachicola River and occupy parts of both the Tallahassee Hills and the Marianna Lowland, and it would be difficult to support a contention that the fauna and flora of the area is typical of either of these regions. For this reason, we have chosen to consider Gadsden, Jackson, and Liberty Counties as a distinct region. In this paper distribution is reported by Cooke's divisions: Coastal Low-

lands, Central Highlands, Tallahassee Hills, Marianna Lowland, and Western Highlands, plus what we term the "relict areas".

We are pleased to acknowledge the aid and encouragement of J. A. Mulrennan, Director of the Bureau of Entomology, and David B. Lee, Director of the Bureau of Sanitary Engineering, Florida State Board of Health. We are grateful for assistance in identification given by Alan Stone and Willis W. Wirth, United States Department of Agriculture, and James E. Sublette, Northwestern State College of Louisiana.

In 1803 Meigen described the genera *Chironomus, Tanypus, Orthocladius,* and *Tanytarsus.* These were the basic genera in the family Chironomidae. Years later it was discovered that Meigen had published an obscure paper in 1800 describing the same genera under different names. Under this prior set of descriptions *Chironomus* was described as *Tendipes, Tanypus* as *Pelopia, Orthocladius* as *Hydrobaenus,* and *Tanytarsus* as *Calopsectra.* The existence of this earlier Meigen paper has been known to European workers for many years. Rather than confuse almost a century of literature they chose to ignore the 1800 paper. Meigen himself never again referred to the terminology of his earlier work. Townes (1949) in his review of the tribe Tendipedini aired the ancient controversy once again and chose to follow the 1800 classification. We have decided to follow the 1803 terminology because of its widespread acceptance.

COMPARISON OF THE TWO MEIGEN TERMINOLOGIES

MEIGEN 1803	MEIGEN 1800
Chironomidae	Tendipedidae
Tanypodinae	Pelopiinae
Tanypus	*Pelopia*
Orthocladiinae	Hydrobaeninae
Orthocladius	*Hydrobaenus*
Chironominae	Tendipedinae
Chironomini	Tendipedini
Chironomus	*Tendipes*
Tanytarsini	Calopsectrini
Tanytarsus	*Calopsectra*

The subfamily Tanypodinae is notorious for the large number of poorly defined species it contains. It is a difficult group to work with, and specific identifications must be made with caution. So far

we have positive identification of 19 species in Florida, and have studied many species that cannot be identified with certainty.

The subfamily Orthocladiinae is widespread ecologically and geographically. Unfortunately little taxonomic work has been done with this important subfamily in North America. Most species appear to be quite well defined. Ecologically this group includes some of the most interesting of the midges. Among these are: *Metriocnemus knabi* Coquillett which goes through its life history in the pitcher plant, *Sarracenia purpurea*, and *Metriocnemus abdomino-flavatus* Picado, an apparent migrant from Central America occurring in bromeliads in southern Florida. The 12 species we have been able to identify with certainty represent only a small part of the fauna.

Only three species of the subfamily Clunioninae have been found in Florida. These are the only three species found in eastern North America. Two of these, *Thalassomyia bureni* Wirth and *Clunio marshalli* Stone and Wirth, were described from southern Florida. The third species of marine midge, *Telmatogeton japonicus* Tokunaga, was described from Japan and was subsequently found in the Hawaiian Islands. The discovery of this species at Pensacola, Florida and at Long Island, New York in 1947 came as a distinct surprise, as it had never been recorded from the Pacific Coast of North America. It has since been found at Mayport, Florida and Panama City, Florida.

Midges of the subfamily Diamesinae normally go through their life history in cold and frequently torrential waters. Their absence from Florida is, therefore, hardly surprising.

The subfamily Podonominae consists of relatively few species of doubtful taxonomic status. None is recorded from Florida.

The subfamily Chironominae is, from the standpoint of number of species occurring in Florida, the most important. This subfamily is divided into two tribes: Chironomini and Tanytarsini. So little study has been made of the Tanytarsini of the New World that little can be done with them at present. Townes recorded 34 species of Chironomini from Florida; we have found an additional 42 described species, making a total of 76. Thanks to Townes' careful work species of this tribe can be identified with reasonable ease and accuracy. In addition, we have on hand material representing at least seven undescribed species.

The following abbreviations are used to indicate the distribution of species in the topographic regions as shown in figure 1.

Cl Coastal Lowlands
Ch Central Highlands
Th Tallahassee Hills
Ml Marianna Lowlands
Wh Western Highlands
R Relict Areas (Apalachicola R.)

For the subfamily Chironominae the months are listed in which each species has been taken.

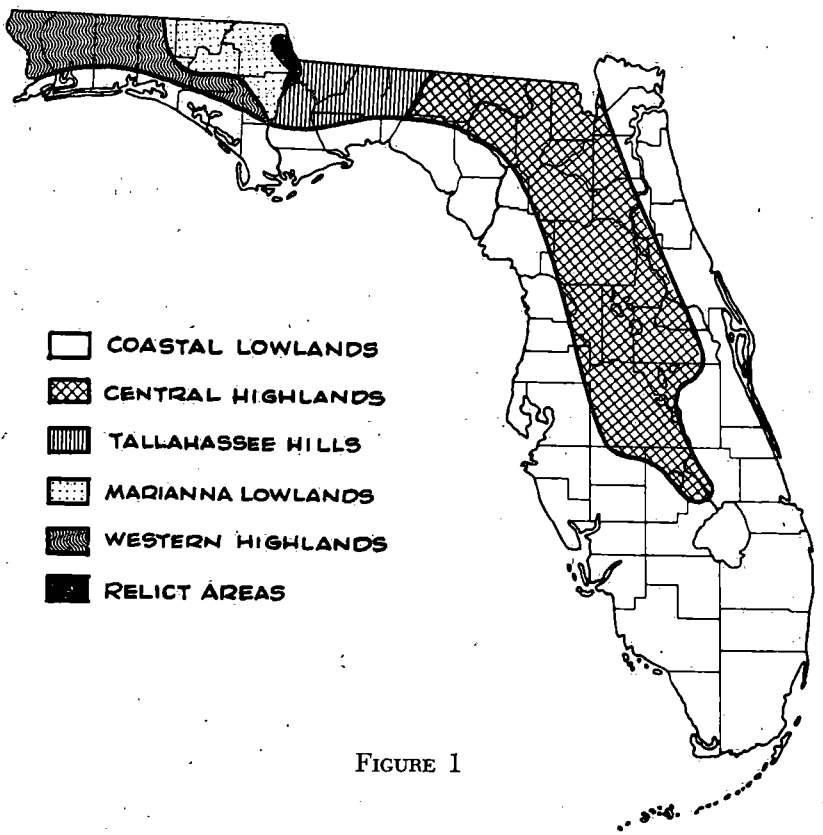

FIGURE 1

SUBFAMILY TANYPODINAE

Pentaneura cinctipes Johannsen. Cl.
Pentaneura illinoiensis (Malloch). R.
Pentaneura monilis (Linne). Cl, Ch.
Pentaneura carnea (Fabricius). Th.

Pentaneura flavifrons (Johannsen). Cl.
Pentaneura basalis (Walley). Ch.
Pentaneura pilosella (Loew). Cl, Ch. (Johannsen records from Winter Park, Florida.)
Pentaneura pallens (Coquillett). Cl.
Anatopynia johnsoni (Coquillett). R.
Tanypus stellata Coquillett. R.
Tanypus punctipennis Meigen. Cl, Th.
Procladius pusillus Loew. Ch, R.
Procladius bellus Loew. Ch.
Procladius pulcher Johannsen. Cl.
Procladius culiciformis (Linne). Cl, Ch, R.
Clinotanypus thoracicus (Loew). Ch.
Coelotanypus tricolor (Loew). Cl, Ch.
Coelotanypus scapularis (Loew). Cl, R.
Coelotanypus concinnus (Coquillett). Cl, Ch, R.

Subfamily Orthocladiinae

Corynoneura scutullata Winnertz. Ch.
Brillia par (Coquillett). R.
Metriocnemus knabi Coquillett. Wh.
Metriocnemus lundbeckii Johannsen. Th.
Metriocnemus abdomino-flavatus Picado. Cl.
Cardiocladius obscurus (Johannsen). R.
Cricotopus politus (Coquillett). R.
Cricotopus bicinctus (Meigen). Cl, Ch, Th, R.
Cricotopus varipes Coquillett. Cl.
Cricotopus trifasciatus (Panzer). Ch.
Orthocladius distinctus var. *basalis* (Malloch). R.
Orthocladius lasiops (Malloch). Wh.

Subfamily Clunioninae

Clunio marshalli Stone and Wirth. Cl.
Thalassomya bureni Wirth. Cl.
Telmatogeton japonicus Tokunaga. Cl.

Subfamily Chironominae

Tribe Tanytarsini

No attempt has been made as yet to classify the numerous species of this tribe. James E. Sublette is engaged in a study of this group.

TRIBE CHIRONOMINI

Pseudochironomus aix Townes. Cl. Mar., Nov.

Pseudochironomus banksi Townes. Cl. Apr., July.

Pseudochironomus fulviventris (Johannsen). Cl, Ch. July, Aug.

Pseudochironomus rex Hauber. Ch. Aug.

Pseudochironomus richardsoni Malloch. Cl. Mar., Apr.

Lauterborniella varipennis (Coquillett). Cl, Ch, R, Wh. Mar., Apr., May, June, Sept., Dec.

Lauterborniella perpulcher (Mitchell). Cl, R, Wh. Mar., May.

Microtendipes pedellus var. *aberrans* (Johannsen). Th., Feb. Middle and hind knees dark. Female has distinct femoral annulus. Superior appendage of male genitalia is sharply bent and about the same width throughout.

Microtendipes pedellus var. *pedellus* (De Geer). Cl, Th., Jan., Apr.

Microtendipes pedellus var. *stygius* Townes. Wh. Mar.

Apedilum elachistus Townes. Cl, R. Apr., July, Aug., Sept.

Apedilum nigrohalterale (Malloch). Cl, Ch. Mar., Apr., July.

Apedilum subcinctum Townes. Cl. Aug.

Kribioxenus babiyi (Rempel). Cl, Ch. Mar., June, July, Aug., Nov., Dec.

Polypedilum (*Tripodura*) *scalaenum* (Schrank). Cl, Ch, Th, R. Jan., Mar., July, Aug., Nov. Many specimens have wing marking between veins M and Cu darker and longer than figured by Townes. Anal point sometimes appears to lack the lateral teeth.

Polypedilum (*T.*) *pterospilus* Townes. Cl. May.

Polypedilum (*T.*) *parvum* Townes. Cl, Ch, Wh. Mar., Apr., June, July, Nov.

Polypedilum (*T.*) *floridense* Townes. Cl. July, Oct. The fork of vein Cu is far beyond R-M crossvein.

Polypedilum (*T.*) *simulans* Townes. Cl. Jan., Aug., Dec. Anterior wing veins yellow, posterior wing veins brownish, fork of Cu and apical end of vein M darkest.

Polypedilum (*T.*) *halterale* (Coquillett). Cl, Ch, R. Mar., Aug., July, Oct., Nov., Dec.

Polypedilum (*T.*) *digitifer* Townes. Cl, Ch, R. Feb., June, July.

Polypedilum (*Polypedilum*) *trigonus* Townes. Cl, Ch, R. Jan., Apr., June, July, Aug., Sept., Oct., Nov., Dec. Abdominal segment 1 is dark, segments 2, 3, and 4 with light lateral, triangular patches. Segment 5 is light except for a narrow, dark, basal band. Remaining segments dark.

Polypedilum (*P.*) *vibex* Townes. R. Mar.

Polypedilum (*P.*) *fallax* var. *fallax* (Johannsen). R. Mar.
Polypedilum (*P.*) *nigritum* Townes. Cl. Aug.
Polypedilum (*P.*) *angustum* Townes. R. July.
Polypedilum (*P.*) *illinoense* (Malloch). Cl, Ch, R. Jan., Mar., Apr., May, June, July, Aug., Oct., Nov., Dec.
Polypedilum (*P.*) *braseniae* (Leathers). Cl. June. Lateral vittae, dorsal part of postnotum, fore femora and tibiae pale brown.
Polypedilum (*P.*) *convictum* (Walker). Cl, R. July, Nov.
Polypedilum (*P.*) *obtusum* Townes. Cl. Nov.
Polypedilum (*Pentapedilum*) *tritum* (Walker). Cl, Ch, R. Feb., Mar., Apr., July, Oct., Nov., Dec.
Polypedilum (*P.*) *albulum* Townes. Cl. Aug.
Endochironomus (*Endochironomus*) *nigricans* (Johannsen). Cl, Ch., R, Wh. Jan., Feb., Apr., May, June, July, Aug., Oct., Nov., Dec. Specimens from the northwestern part of the State are more likely to have black mesonotum, those from peninsular Florida have a light brown mesonotum. Setae on inferior appendage are forked, usually with one longer seta at apex.
Endochironomus (*Tribelos*) *fuscicornis* (Malloch). Cl, R. June, July, Aug., Sept. The dististyle, anal point, superior and inferior appendages are whitish.
Endochironomus (*T.*) *quadripunctatus* (Malloch). Cl. (Record from Townes, no date.)
Endochironomus dyari (Townes). Cl, Ch. Aug., Dec.
Stictochironomus devinctus (Say). Cl, Ch. Feb., Mar., May, Aug. Anterior wing veins are darker than posterior. Inferior appendage has one longer seta set in a large, distinct tubercle.
Stenochironomus browni Townes. Ch. (from Townes, no date.)
Stenochironomus cinctus Townes. Ch. (from Townes, no date.)
Stenochironomus macateei (Malloch). R. July, Sept.
Stenochironomus hilaris (Walker). Cl, Th, R, Wh. Feb., May, June, Sept. Inferior appendage appears to end in a distinct point.
Xenochironomus xenolabis (Kieffer). Cl, Ch. Mar., July, Aug., Nov., Dec. Setae on inferior appendage forked.
Xenochironomus taenionotus (Say). R. Mar., Aug. Anal point black at tip.
Xenochironomus rogersi Beck & Beck. Cl, Ch, R. Feb., May, June, July, Oct.
Cryptochironomus fulvus (Johannsen). Cl, Ch, Th, R, Wh. Jan., Mar., Apr., May, June, July, Sept., Oct., Nov., Dec.
Chironomus (*Limnochironomus*) *leucoscelis* (Townes.). Cl, Ch. May, Oct., Nov.

Chironomus (*L.*) *modestus* Say. Cl, Ch, R. Jan., Feb., Mar., Apr., June, July, Oct., Nov., Dec.

Chironomus (*L.*) *aethiops* (Townes). Cl, Ch. July.

Chironomus (*L.*) *nervosus* Staeger. Cl, Ch, Th, R. Jan., Feb., Mar., July, Aug., Sept., Oct., Nov., Dec.

Chironomus (*Kiefferulus*) *dux* Johannsen. Cl, Ch, Th, R. Jan., July, Aug., Oct., Nov., Dec. Wing brownish with light brown veins.

Chironomus (*Einfeldia*) *brunneipennis* Johannsen. Cl, Ch, R. Feb., Mar., Apr., May, June, July, Aug., Sept., Oct.

Chironomus (*E.*) *dorsalis* Meigen. Cl, Ch, R. Feb., Mar., July, Aug., Sept., Oct., Dec. Palpi: segments 1-3 brown, segment 4 white, 3rd segment with an apical round "sensory pit" bearing a cluster of 5-6 shorter setae. The shape of the inferior appendage is extremely variable depending on how specimen is mounted.

Chironomus (*Chaetolabis*) *orchreatus* (Townes). Cl, Ch, R. Mar., Apr., July, Aug., Sept., Oct.

Chironomus (*Chironomus*) *carus* (Townes). Cl, Ch. January through December.

Chironomus (*C.*) *fulvipilus* Rempel. Cl, Ch. January through December. Color variant. Head and thorax light brown. Vittae, postnotum, sternum brown, R-M not darkened. Apex of fore femur, base and apex fore tibia and all tarsi except the basal part of middle and hind tarsi brown.

Abdomen light brown with narrow dark brown apical bands.

Wing length, AR and LR as recorded for *C. fulvipilus*. Specimens from Duval Co. (Aug.), Brevard Co. (June, Oct.), Volusia Co. (July, Aug.) and Broward Co. (June). Both this color phase and the typical green *T. fulvipilus* have appeared in the same collections.

Chironomus (*C.*) *pungens* (Townes). Cl, Ch. Mar., July, Aug., Sept., Oct.

Chironomus (*C.*) *stigmaterus* Say. Cl, Ch, Th. Jan., Feb., Apr., May, June, July, Oct., Dec.

Chironomus (*C.*) *decorus* Johannsen. Cl, Ch, Th, R. Feb., Mar., Apr., May, June, July, Aug., Oct., Nov., Dec.

Chironomus (*C.*) *tuxis* Curran. R, Cl. Jan.

Chironomus (*C.*) *crassicaudatus* Malloch. Cl, Ch, R. Jan., Mar., Apr., May, June, July, Sept., Oct., Nov.

Glyptotendipes (*Demeijerea*) *atrimanus* (Coquillett). R. May, June, Nov.

Glyptotendipes (*Phytotendipes*) *testaceous* Townes. Cl, Ch, R. May, June. Anal point is white in Florida specimens.

Glyptotendipes (*P.*) *paripes* (Edwards). Cl, Ch, Th. Jan., Feb., Mar., May, June, July, Sept., Oct. Dististyle of almost uniform width throughout its length, with small mucronate tip.

Glyptotendipes (*P.*) *lobiferus* (Say). Cl, Ch, R, Wh. Jan., Feb., Mar., May, June, July, Aug., Sept., Oct., Nov.

Glyptotendipes (*Glyptotendipes*) *seminole* Townes. Cl. July, Sept.

Harnischia (*Harnischia*) *frequens* (Johannsen). Cl, Ch, R. July, Sept., Dec.

Harnischia (*H.*) *carinata* Townes. Cl, Ch, R. June, July, Aug., Sept., Oct., Dec.

Harnischia (*H.*) *potamogeti* Townes. Cl, Ch, R. Jan., Apr., May, July, Aug., Sept., Oct., Nov., Dec. Apical ⅔ of dististyle is blackish.

Harnischia (*H.*) *monochromus* (Wulp). R. Aug.

Harnischia (*H.*) *emorsa* Townes. Ch. Nov.

Harnischia (*H.*) *casuaria* Townes. Ch. Jan., Aug.

Harnischia (*H.*) *nigrovittata* (Malloch). Cl. May, July. Abdomen is mostly pea green above rather than fuscous in Florida specimens.

Harnischia (*H.*) *edwardsi* (Kruseman). Ch. Aug.

Harnischia (*H.*) *viridulus* (Linne). R. Sept.

Harnischia (*H.*) *collator* Townes. Cl, R. Aug., Oct. Dec.

Harnischia (*H.*) *galeator* Townes. Ch. Nov.

To summarize briefly, the known midge fauna of Florida consists at the present time of 110 described species, representing 4 of the 6 recognized subfamilies. On the basis of present adult and larval records, it appears probable that the total number of species in Florida may well exceed 200. Of the 110 known species 70 were described from North America (9 of them from Florida), 18 from Europe, 3 from Central or South America, and a single species from Asia.

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Manuscripts should be of medium length—12 to 200 printed pages. Examination for suitability is made by an Editorial Board.

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PREPARATION OF MANUSCRIPT

Highly recommended as a guide is the "Style sheet for the scientific serial publications of the American Museum of Natural History," second edition, revised, 1953.

Manuscripts should be typewritten with double spacing, with ample margins, and on only one side of the paper. The author should keep a copy; the copy submitted must be the original. Tables, legends of figures, and all footnotes should be assembled separate from the text. Several legends or footnotes may be placed on a single sheet.

Illustrations, including maps and photographs, should be referred to as "figures" wherever possible. All illustrations are reduced to a maximum of 4¼ by 7⅛ inches. The scales, wherever it is necessary, should be incorporated into the figure.

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