

THE ADOLPHO LUTZ COLLECTION OF TABANIDAE (Diptera). I. The described genera and species, condition of the collection, and selection of lectotypes *

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(With 2 plates)

INTRODUCTORY NOTE

Adolpho Lutz was born in Rio de Janeiro, December 18, 1855, the son of Swiss parents. His father, Gustav Lutz, was the first of a long line of "Burger of Bern" to emigrate from his native land. When Adolpho Lutz was slightly over two years old the family went to live in Bern for a time but on their return to Brazil left the three eldest boys at school in Switzerland. Lutz only saw the land of his birth again as a grown man.

As a quite small boy he was already sure of his vocation, the study of Natural History. Intending to live in Brazil he decided, however, as an adolescent, to study Medicine as it seemed the liberal profession most closely akin to biology that would enable him to make a living. This proved to be a wise decision since it was precisely the conjunction of medicine and biology that enabled him to make his pioneer contribution to the development of tropical medicine and medical zoology in Brazil.

Lutz' life and work can be divided into three main phases, the practitioner (1881-1892), the director of the Bacteriological Institute of the State of São Paulo (1893-1908) and the member of the Instituto Oswaldo Cruz (1909-1938), and always the research worker, until his death (October, 1940).

Lutz' scientific work was carried out under difficult circumstances. When practising medicine he lacked both time and laboratory facilities for research. While setting up new standards of public health and revolutionizing methods of dealing with endemic and epidemic diseases, he needed not only time but above all peace; even in the later years, at Manguinhos (Instituto Oswaldo Cruz), he never had adequate assistance for dealing with routine. Nevertheless, Lutz worked on doggedly. As a country doctor he devoted most of his spare time to the study of interesting diseases, such as leprosy, and of the parasites of man and his domestic animals. He observed the habits of mosquitoes before and during the great epidemic of yellow fever at Campinas (1899). In São Paulo, he started working systematically on blood-sucking Diptera, beginning with the mosquitoes, at first in cooperation with Theobald and later alone.

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During this period he discovered Forest Malaria (1898 published 1903) and saw the first known cases of Jungle Yellow Fever. From 1903 to 1907 he published papers on Culicidae, and also on blood-sucking Diptera as transmitters of disease.

However, being ever a restless pioneer, in search of new fields, he went on to the horse-flies. His first papers on Tabanidae were published while he was in São Paulo, the preliminary notes in the "Revista da Sociedade Scientifica de São Paulo", (1905-1906) and in *Zentralblatt für Bakteriologie* (1907) the first major synthesis on Brazilian Tabanids in *Zoologische Jahrbücher* (1909). After settling in Rio, most of his work came out in the "Memorias do Instituto Oswaldo Cruz", to which he was one of the main contributors for many years. In the first period of the Institute, the prestige of Oswaldo Cruz and the prosperity of the institution made it possible to publish in a foreign language as well as in Portuguese and to illustrate Lutz' taxonomic papers with color plates. During and after the first World War the Institute lost its best illustrators and for fairly long periods the policy of a double text could not be maintained. These circumstances led Lutz to postpone publishing on Tabanidae, especially on the genera of Tabaninae not dealt with in his former papers. Gradually, he got interested in other groups and returned only sporadically to the horse-flies, though he had probably intended to deal with the whole family, at least in regard to Brazil, and perhaps to expound his taxonomic system.

Many of Lutz' species and of his specimens were collected personally by him. Much of the work of preservation also devolved on him and that not only in the early days. In Lutz' time the Bacteriological Institute of São Paulo was constantly understaffed, with only from one to four doctors to attend to all the problems connected with Public Health arising in the state territory (247,222 Km²) and with either one preparator or no one to look after the collections. At the Oswaldo Cruz Institute, Lutz had a "laboratory servant" as his whole staff. The two successive incumbents were both unusually good but they had their limitations, as to literacy, technical training, etc. The sporadic secretarial help that Lutz enjoyed during his life-time would not make up even a tenth of his sixty years of research. In the early days literature was very hard to obtain. Everything had to be sent for from abroad with great delay and much difficulty. He could only examine types and older collections during his short and very infrequent journeys to Europe and North America.

Lutz made the best he could of the circumstances and worked out simple methods enabling him to keep up with his work. His specimens were kept in drawers in cabinets, not in little boxes, but grouped together under the right generic and specific names. Localities might be indicated very succinctly but in such a manner as to allow him to place the specimen correctly. Long series of the same kind might be given one collective label, delimiting them. Specimens that did not quite fit into any of these yet seemed very much akin were put at the periphery of the closest allied species. New forms received a provisory name and were placed in readiness for description, then or later, according as to whether there was hope of obtaining more specimens or not. Occasionally two names, mostly with the same meaning and derived from the main diagnostic character were put down. In a few cases this may have led to some confusion later, if the discarded name was not removed from all the specimens, for lack of time or through forgetfulness. The undetermined specimens left to the sides of the allied forms may also have caused some doubt when the Lutz' Collection was moved after his death. Some names may, of course, have been wrongly applied by him but this sort of error is inevitable, as in early days the paucity of known forms led to very generalized descriptions which later proved applicable to several different species. Some descriptions may also have escaped the pioneer working far from the main centers of research, despite his polyglot gifts.

Lutz' descriptions of new forms were short and succinct. They stressed the main diagnostic characters and left the unimportant ones, or those held in common with other forms, unmentioned. This criterium was consistently applied

by Lutz. When his attention was called to latter-day rituals of description, he was apt to remark that the main thing was to give the essential, differential characters, and he might add: "A bon entendeur, salut". Alas!

Lutz was keenly interested in the preservation of his collection and had worked out a technique described by him (1924, 1929-30) in: "Sammeln, Präparieren, Untersuchen und Bestimmen der hygienisch wichtigen Insekten." Kraus, R. und Uhlenhuth, P. *Handb. mikrobiol. Tech.* 3:2135-2182; 24 figs. (Berlin und Wien); re-ed by Kollé, Kraus & Uhlenhuth in *Hdb. path. Mikroorgan.* 3rd. ed., 10:551-590. Pls. 1-25. He desired the collection, or at least the types, to remain at the Instituto Oswaldo Cruz. Whenever he could he would pin a red label to types and blue labels to cotypes though, under the stress of excessive work and varying interests, this was sometimes overlooked. In his life-time the collection was carefully attended to.

After Lutz' death all his collections were very much neglected for several years. Occasionally, specimens, or whole drawers, were taken out, examined and not always returned in the right order or to the exact place. During Dr. Fairchild's visit, a number of specimens and even whole drawers of Lutz' horse-flies were found in other laboratories. One doubtful treatment against insect-pests and mould was also resorted to. Finally, the whole collection was taken from the original drawers and put into new cabinets, in small boxes. These circumstances may have disturbed the right order and have mixed up doubtful specimens with clear-cut forms. They certainly went counter to Lutz' personal methods of conservation and probably also to his original separation of forms.

When Lutz setted in Rio, he left part of his collections at the Bacteriological Institute in São Paulo. Later they were all sent to the Butantan Institute, where his pioneer collection of Pathology was lost. For a long time the only clue to the Lutz Tabanids that remained in São Paulo was a list given to his daughter by a former curator of insects at Butantan.

Some years after Lutz' death his daughter was invited to help organize her father's collections in a definitive way. Owing to the circumstances explained above she felt rather anxious about the results of alternate neglect and manipulation of the specimens. She also felt that the Lutz system of taxonomy of the Tabanids, based in part on characters of the living animal, such as the color and pattern of the eyes ought to be stressed; that the large number of nomina nuda needed to be checked and the collection examined, in case it still contained undescribed forms. Consequently, she invoked the help of the Conselho Nacional de Pesquisas (National Research Council) since at the time of the Lutz Centennial, the scientific director of the Conselho had offered any help that might be needed for the posthumous care of the Adolpho Lutz Collections and Documents. As Dr. Oliveira Castro, the former assistant of Lutz, had gone into Ecology, it was decided to consult Dr. G.B. Fairchild as to his willingness to undertake the revision. Dr. Fairchild accepted and worked for two months at the Instituto Oswaldo Cruz and a fortnight at Butantan, as a fellow of the Conselho Nacional de Pesquisas, being ably seconded by Mrs. Fairchild. A great deal of work was accomplished although the time available proved too short for total revision. The results are set forth in Dr. Fairchild's reports.

All that remains is to thank Dr. and Mrs. Fairchild, the directors of the Institutions, Prof. Amilcar Vianna Martins and Dr. Flavio da Fonseca, and above all, the President of the Conselho Nacional de Pesquisas, Prof. João Christovão Cardoso and the Scientific Director, Prof. Antonio Moreira Couceiro, for their enlightened views as to the importance of preserving the Adolpho Lutz Collection Tabanids. Also to express the hope that with increased facilities for traveling, Lutz' system based on the characters of the living specimens may be easier to expound and to use.

Bertha Lutz
Museu Nacional, Rio de Janeiro

In the fall of 1958 I was asked by Dr. Bertha Lutz if I could come to Rio de Janeiro for the purpose of studying and putting in order the collection of Tabanidae formed by her father, the late Dr. Adolpho Lutz. Other commitments prevented my undertaking the work until July 1959, and lack of time limited my stay in Brasil to two months, from July 15 to September 15. Financial support for the trip and my stay in Brasil was very generously furnished by the Conselho Nacional de Pesquisas, and I am most grateful to Prof. João Christovão Cardoso, President, and Prof. A.M. Couceiro, Scientific and Technical Director of the Conselho for their interest in the project.

Little of value could have been accomplished without the unfailing kindness, help, and cooperation, both personal and scientific of Dr. Bertha Lutz, Dr. Amílcar Vianna Martins, Dr. G. M. de Oliveira Castro, and Dr. Flavio da Fonseca, all of whom gave generously of their time and experience to help both us and the work. Dr. Herman Lent, Dr. Hugo de Souza Lopes and Dr. A. da Costa Lima at Oswaldo Cruz, Dr. O.P. Forattini, Dr. John Lane and Dr. Maria A. Vulcano in São Paulo, and Dr. M.P. Barretto in Ribeirão Preto, gave generously of study material and help in other ways, and put the collections under their care at my disposal. I cannot fail to acknowledge here the loyal assistance of my wife, Elva Whitman Fairchild, whose secretarial skills greatly speeded the work of taking and transcribing the notes.

After seeing the condition of the collection and after discussions with Dr. Bertha Lutz, I decided that the follow objectives should receive attention in the order listed.

1. To find and label the type specimens of Tabanidae described by the late Dr. Adolpho Lutz.
2. To put in order Dr. Lutz' collection of Tabanidae so that it can be used by others, following so far as possible in its arrangement the system of classification devised by Dr. Lutz.
3. To identify the species of Tabanidae published without descriptions by Dr. Lutz.
4. To identify and describe where necessary the Tabanidae bearing manuscript names in Dr. Lutz' collection.
5. To prepare for publication a report covering the condition of the collection, including designation of type specimens, redescription of obscure species and present status of the genera and species of Tabanidae described by Dr. Lutz.

This report is intended to cover the first two points listed above. It is hoped that the remaining objectives can be accomplished in the near future.

The collection of Tabanidae brought together by Dr. Adolpho Lutz, which forms the basis of this report, is one of the largest and richest regional collections in existence. Besides 89 of the 95 species described by Lutz, it contains an estimated 6000 specimens representing between 300 and 400 species, very largely from Brasil.

Dr. Lutz appears to have become interested in Tabanidae and to have commenced collecting them at least as early as 1900, as there are a few specimens of this date in the collection. His first paper on the family (1905) was based on the collections in the Instituto de Bacteriologia of the State of São Paulo, which he says then numbered about 100 species and represented the efforts of his colleagues as well as himself. Dr. Lutz was at this time Director of this Institute, where he remained until sometime in 1908. Upon his joining the staff of the Instituto Oswaldo Cruz, he seems to have divided his collections, taking

part with him to Rio de Janeiro and leaving part in São Paulo. It appears also that some material was sent to São Paulo some years later, as specimens dated as late as 1913 are now in São Paulo, although it is possible that all the material in São Paulo was sent back some time after he had settled in Rio. This part of his collection is now preserved at the Instituto Butantan in São Paulo.

After settling down in Rio, free from administrative duties, Dr. Lutz was able to devote a larger share of his time to the Tabanidae. Frequent collecting trips to favorite localities in the nearby mountains of Rio and neighboring States, as well as several long expeditions to various parts of Brasil resulted in very large additions to the collection. Since Lutz was the recognized authority on biting insects, working at the best known institute of its kind in South America, he received material for identification from all parts of the continent. He also corresponded widely with entomologists in Europe and North America, sending and receiving material in exchange and identifying specimens. His correspondence files show letters from Hine, Bequaert, Kröber, Ricardo and many others, while the collection contains a considerable number of North American and Old World species received in exchange. Voyages to Europe to attend medical and scientific congresses offered Lutz the opportunity to make all too brief but nevertheless important visits to museums. His manuscript notes, and references in his published papers indicate that he studied Brazilian material in Berlin, Vienna, Hamburg, Paris and London. There are specimens in his collection received from the British Museum, and specimens in that institution determined by him.

It was Dr. Lutz' intention to treat the Tabanidae of South America group by group, in a more or less uniform manner. He felt that this could only be done with the help of accurately made colored illustrations, and with only a few exceptions, all the species he described were thus illustrated. The increasing cost of publishing these and the difficulty of finding artists sufficiently skilled to meet his high standards, eventually forced him to lay aside his project, as he felt it useless to describe species without illustrating them accurately in colors. Except for his paper on Venezuelan Tabanidae in 1928, the drawings for which appear to have been made much earlier, and four short un-illustrated papers done with Dr. Oliveira Castro towards the end of his life, he practically ceased publishing on Tabanidae in 1915.

His publications are divisible into three general categories. First, his main papers, of which there were three and a supplement to the first, all entitled "Tabanidae of Brasil and some neighboring states", the first in German, the others in German and Portuguese in parallel columns. These were published in 1909, 1911a (the supplement), 1913 and 1915, and dealt respectively with the *Pangoniinae* and *Chrysopinae*, the *Diachlorinae* and *Lepidoselaginae*, and the genera *Acanthocera*, *Dichelacera* and *Stibasoma*. There is some indication, in his notes and in the many MS species in the collection, that the 1915 paper was to

have been followed by one on the genus *Dicladocera*. Second, his papers on the classification of the family as a whole (1907, 1913a, 1914, 1922). These have all the appearance of being tentative and preliminary, as if he had intended to expand and modify his ideas at some later date, perhaps at the conclusion of his major work, but felt that an exposition of his ideas was necessary to an understanding of his more extensive papers. Third, his faunal lists, in which he reports on the Tabanidae taken in various parts of Brasil and on expeditions made by himself and others. These lists contain numerous new species, but usually only a few of the more striking species are actually described. There are in addition several short papers, on seasonal distribution, early stages, collecting methods etc., and the two rather controversial lists of specimens in the collections of the Instituto Oswaldo Cruz (1909a, 1911) discussed previously (BORGMEIER 1933, BARRETTO 1950, FAIRCHILD 1950).

Further information, supplied by Dr. Bertha Lutz, suggests that the 1911 paper was a list of the specimens sent to Dresden with the collection of Tabanidae forming part of the exhibit of the Instituto Oswaldo Cruz at the International Hygiene Exhibition. Some or all of this material was not returned or was lost in transit, to Dr. Lutz' disgust, which may account for my not being able to find specimens of some species named in that list. There also seems a strong possibility that Dr. Lutz did not have an opportunity to check this list before publication, as there are a number of mistakes he would certainly have corrected in any final version.

The majority of Dr. Lutz' papers, I believe all those published in the Memorias of the Instituto Oswaldo Cruz except the last four, were printed in both German and Portuguese, in parallel columns. This was necessary because at that time there was no technical entomological terminology extant in the Portuguese language. It must be noted, however, that the two versions are not in all respects exact translations of each other. From his notes, and information supplied by Dr. Bertha Lutz, it appears that the German version was written first and probably should be taken as the definitive version where the two differ. It is usually the more detailed version as well. It is to be noted that being of Swiss parentage, German was the language of Dr. Lutz' youth and in which he received his education. The coincidence between his giving up publication in 1915 and the unpopularity of the German language arising from the first World War, which, on the entry of Brasil into the war, led to the abandonment of German in all official publications, including those of the Instituto, is also probably significant. The loss of his best illustrator, Rudolph Fischer, a German, at the same time and for parallel causes, was certainly also a strong factor. His later papers on all subjects, at least until 1920, usually bore English summaries or versions.

The thirty-three publications of Dr. Lutz containing references to Tabanidae are listed below in chronological order. This list supersedes

that published in 1950 (FAIRCHILD 1950). Here I am indebted for additional references and corrections to Dr. Bertha Lutz.

1905. Beitrage zur Kenntniss der brasilianischen Tabaniden. Rev. Soc. Sci. S. Paulo, 1(1):17-32.
1906. Beitrage zur Kenntniss der brasilianischen Tabaniden. Zweite Mittheilung. Rev. Soc. Sci. S. Paulo, 1(2-4) :172-175. Separatabdruck pp. 1-4.
1907. Bemerkung über die Nomenclatur und Bestimmung der Brasilianischen Tabaniden. Zentr. f. Bakt., 44(2) : 137-144. (Abt. 1).
1907. Estudos e observações sôbre o quebra-bunda ou peste de cadeiras. Diário Oficial do Estado do Pará (Belém) 17(4780):356-362. Reprinted in Rev. Soc. Sci. S. Paulo 3(3-7):34-58, 1908.
1909. (with Neiva, A.) *Erephopsis auricineta*, uma nova motuca da subfamília *Pangoninae*. Mem. Inst. Osw. Cruz, 1(1) : 12-13, Pl. 1, April. In Portuguese and German.
1909. (with Neiva, A.). Contribuições para o conhecimento da fauna indígena de Tabanidas. Mem. Inst. Osw. Cruz, 1(1):28-32. April. In Portuguese and German.
1909. Tabaniden Brasiliens und einiger Nachbarstaaten. Zool. Jahrb., Suppl. X, 4:619-692, Pl. 1-3. August.
1909. Instituto Oswaldo Cruz em Manguinhos, Rio de Janeiro, pp. 1-47. (Tabanidae pp. 28-30). An illustrated brochure explaining the functions and facilities of the Institute*.
1910. Notas Dipterologicas, I. "Habitat" e tempo de aparecimento da "Diatomi-neura longipennis Ricardo". Mem. Inst. Osw. Cruz, 2(1):58-59. (Reprint pp. 3-4). In Portuguese and German.
1911. Novas contribuições para o conhecimento das Pangoninas e Chrysopinas do Brazil. Mem. Inst. Osw. Cruz, 3(1):65-85, Pl. 4. In Portuguese and German (Reprint pp. 3-23).
1911. Internationale Hygiene—Ausstellung Dresden 1911. Institut Oswaldo Cruz. Manguinhos. Rio de Janeiro (Brazil). An illustrated brochure in German explaining the functions and facilities of the Instituto Oswaldo Cruz, presumably prepared in connection with the Institute's exhibit in Dresden. It contains lists of the collections of bacterial cultures, arthropods etc., and is similar to the 1909 brochure, but differs in many details. The list of Tabanidae is on pp. 33-35 and differs considerably from that in the 1909 brochure*.
1912. Comissão de Linhas Telegraphicas Estrategicas de Matto Grosso ao Amazonas. Anexo 5, Historia Natural, Zoologia, Tabanideos, pp. 1-9, Pl. 1 Papelaria Macedo, Rio de Janeiro*.
1912. Contribuição para o estudo da biologia dos dipteros hematofagos. III. Sangue verde em Tabanidas e outros dipteros. Mem. Inst. Osw. Cruz, 4(1):79-81.
1913. Tabanidas do Brazil e de alguns Estados vizinhos. Mem. Inst. Osw. Cruz, 5(2):142-191, Pls. 12-13 (reprint pp. 3-50). In Portuguese and German.

* (B.L.: unsigned; ?written by Lutz?)

1913. Sobre a systemática dos tabanideos, subfamília tabaninae. *Brazil Medico*, 27(45):486-487, 1 Dezembro 1913. (Reprinted by Inst. Osw. Cruz, 1913, pp. 1-7).
1914. Notas Dipterológicas. Contribuição para o conhecimento dos primeiros estados de tabanideos brasileiros. I. Sobre ovos e larvas atribuídas a tabanideos. II. Sobre larvas adultas e ninfas de duas espécies de tabaninae. *Mem. Inst. Osw. Cruz*, 6(1):43-49 (reprint pp. 4-10). In Portuguese and German.
1914. (with A. Neiva) As "Tabanidae" do Estado de Rio de Janeiro. *Mem. Inst. Osw. Cruz*, 6 (2): 69-80 (reprint pp. 3-14). In Portuguese and German.
1914. Sobre a sistemática dos tabanideos, sub-família Tabaninae. *Mem. Inst. Osw. Cruz*, 6(3) : 163-168 (reprint pp. 3-8) . In Portuguese and German.
1915. (In Lutz, A. and A. Machado) Viagem pelo rio São Francisco e por alguns dos seus afluentes entre Pirapora e Joazeiro. Estudos feitos a requisição da Inspeção das Obras Contra a Secca, direção do Dr. Arrojado Lisboa. *Mem. Inst. Osw. Cruz*, 7(1):5-50 (List of Tabanidae, pp. 46-47).
1915. Tabanidas do Brazil e de alguns Estados vizinhos. Segunda Memoria. *Mem. Inst. Osw. Cruz*, 7(1):51-119, Pls. 19-21.
1918. (In Lutz, A., H.C. de Souza Araujo and O. Fonseca Filho) Viagem científica no rio Paraná e a Asuncion, com volta por Buenos Aires, Montevideo e Rio Grande. *Mem. Inst. Osw. Cruz*, 10(2)104-173, Pls. 1-56. (List of Tabanidae pp. 166-169). English version pp. 83-102.
1920. Observação de vermes e larvas terrestres ou limícolas em ambiente transparente. *Folha Medica*, Rio de Janeiro, 1(12):91, 1 fig.
1920. Novo metodo de fechar e conservar objetos pequenos destinados a exame microscopico. *Folha Medica*, 1(17):49-50, 4 figs. English version, 2(15):116-117.
1921. Motucas de Guaratuba. *Bol. Inst. Osw. Cruz*, 1(1)15.
1922. Zoologia Medica. Tabanidae ou Motucas. *Folha Medica*, 3(19):146-148. Also as separate publication of *Folha Medica*, pp. 1-17, 1922.
1922. Contribution aux methodes d'observations microscopiques et biologiques. *Ann. Biol. Lacustre*, 11(2):90-102, figs. 1-5.
1924. (in Kraus, R. and P. Uhlenhuth) Sammeln, Praeparieren, Untersuchen und Bestimmen der hygienisch wichtigen Insekten. *Handb. Mikrobiol. Techn.*, 3:2135-2182, 24 figs. Berlin-Wien. Also in ed. 3 of same, 10:551-590, Pls. 1-25. 1929-30.
1928. (with Nuñez Tovar in Lutz, A.) Estudios de Zoologia y Parasitologia Venezolanas. Tabanidae, pp. 51-64, Pls. 8-9. Rio de Janeiro. Reissued 1955 by Universidad Central de Venezuela.
1932. Sur *Tabanus importunus*. *Compt. Rend. Seanc. Soc. Biol., Soc. Biol. Rio de Janeiro*, 109(9):751 (Seance du 25 Nov. 1931).
1935. (with G.M. de O. Castro) Sobre algumas novas especies de motucas do genero *Esenbeckia* Rondani. *Mem. Inst. Osw. Cruz*, 30(3) : 543-562.
1936. (with G.M. de O. Castro) Considerações sobre especies afins do genero *Melpia* Walker, e descrição de um genero novo e duas especies novas. *Mem. Inst. Osw. Cruz*, 31(1):169-177.

1936. (with G.M. de O. Castro) Sobre duas especies novas do genero *Fidena* Walker. Mem. Inst. Osw. Cruz, 31(1):179-183.
1937. (with G.M. de O. Castro) Sobre uma especie nova do genero *Laphriomyia* Lutz, e descrição do macho de *L. mirabilis* Lutz. Mem. Inst. Osw. Cruz, 32(2):231-233.

CONDITION OF THE COLLECTION

In attempting to appreciate the condition of the collection at the present time, it is important to understand the conditions under which Dr. Lutz worked, the attentions the collection received after his retirement, and the general state of taxonomy of the time. Dr. Bertha Lutz has adequately covered the first two points in her biographical introduction, but a few remarks on the last point may help in understanding some of the anomalies otherwise incomprehensible to one trained in modern taxonomic methods. One cannot criticize a man for not following procedures which had not been devised at the time he worked.

The modern type method, whereby a single specimen is designated as the nomenclatural type, or name bearer, is in sharp contrast to the older, more biological approach, which considered all the material studied by the describer as "typical", or as examples of the describer's concept of the species. This modern approach is relatively recent, and developed slowly (MAYR, LINSLEY & USINGER 1953), not appearing in the International Rules of Zoological Nomenclature until 1913, and then only as a recommendation, although in the Entomological Code of BANKS & CAUDELL (1912), essentially the modern rules for types were proposed. Formal rules embodying this point of view did not come into full force until after 1948.

Although certainty is of course impossible, the evidence of the collection and of Dr. Lutz' published work strongly suggests, as would be expected, that he followed the general custom of the time in regard to types, accepting the modern viewpoint only as it gained favor among zoologists. This, I believe, will account for the lack of designation of single specimens as types in his published work, except for the last few papers published in collaboration with Dr. Castro, where such types are designated. It also explains satisfactorily those cases where specimens that would be considered types in modern eyes were not labelled as such in the collection, or where specimens that could not be types under present rules were labelled types in the collection. Dr. Lutz' failure to select type species for his new genera is explainable on the same basis, as the rules did not make this a mandatory procedure until 1930, and there are still some zoologists who dislike this restriction, feeling that a diagnosis of the genus is sufficient. In fact, it is only within the last twenty years that proposals of new genera without designated type species have become uncommon in the literature.

As explained by Dr. Bertha Lutz in the biographical introduction, Dr. Lutz, in working up his material, first attempted to identify specimens from the literature, placing similar species around those of whose identity he was fairly certain. This arrangement indicated clearly his ideas in the original collection, but was lost on the transference of the collection to new boxes, so that I often found several similar species under a single name in the collection, especially in groups Lutz had not studied intensively. Species which he believed to be new were given a MS name and a type label. He generally chose names descriptive of some outstanding characteristic of the species and not infrequently changed the form, but not the sense, of the name. This may be the reason for the appearance of several variants among some of his published names, such as *Katachlorops* and *Catachlorops*, *Laphriomyia* and *Laphriopsis*, for example.

The collection as it was arranged in 1935, and here I am especially indebted to a memorandum prepared for me by Dr. Castro, confirmed by my own rather hazy recollection, consisted of a series of 10 glass-topped drawers. Drawers 1 through 6 contained the groups on which Lutz had published revisional studies, drawers 7 through 10, those still unrevised. Specimens, generally not over a dozen and usually less, were pinned above a name label. Quite a few of these specimens also bore printed Lutz determination labels. This small but compact collection seems to have represented Dr. Lutz' master collection, in the sense that most of the material in it represented his best opinion on the species it contained. The remainder of the collection was in a further series of 20 or more glass topped drawers and in wooden boxes, some containing provisionally determined species or MS species with type labels, others duplicates or unsorted material.

Shortly before my arrival in Rio in 1959, the whole collection had been moved from the original, drawers and boxes, into cardboard pinning trays set in new, tight glass-topped drawers. This exacting job had been very carefully supervised by Dr. Rudolph Barth. The specimens associated with each name label, had been placed in a separate tray, each drawer and tray numbered to retain the order of the original arrangement, and each specimen numbered. The specimens had been carded, by drawer and tray and also by name. The original drawers, with their labels, had been left intact. After careful consideration, I decided that the arranged part of the collection followed closely Dr. Lutz' published conclusions as to the order of subfamilies and genera, that the labels in the now empty old drawers sufficiently preserved his ideas for subsequent checking, and that the bulk of the collection showed no useful order, but made it extremely difficult to search for the unlabelled type specimens. I therefore rearranged the collection for ease of working, but have listed below the order of genera and contained species as they are represented by the labels in the old drawers. From this I believe an adequate conception of Dr. Lutz' system can be gained. I have indicated by "Sp. MS" those unpublished names which

were in the collection. Specimens were arranged in from 3 to 6 columns in the drawers, column 1 being at the left hand end of the drawer. I believe this arrangement to have been made quite early, as some of Lutz' later generic names are missing, and some of the species were published under names different from those over which they stood in the boxes. There is also evidence of some changes in names on the specimens, and Lutz not infrequently made notes of changes in status in pencil or india ink on the glass top of the box over the species concerned. Since most of these are now illegible and tops of drawers may have been inadvertently changed, I have thought it best to disregard these factors.

DRAWER I

Erephopsis Rondani (in middle at bottom of drawer)

Column 1

E. lingens Wied.
E. nigripennis Guer.
E. flavicrinis Lutz
E. venosa Wied.
E. fulvithorax Wied.

Column 3

E. brevistria Lutz
E. bocainensis Lutz
E. sp. MS
E. incisuralis Macq.
E. leucopogon Wied.

Column 4

E. mattogrossensis Lutz
E. marginalis Wied.
E. nigricans Lutz
E. nubiapex Lutz
E. penicillata Big.
E. pubescens Lutz
E. pseudoaurimaculata Lutz

Column 2

E. albipectus Big.
E. ardens Macq.
E. aurimaculata Macq.
E. auricincta Lutz and Neiva
E. albitaeniata Lutz
E. beskii Wied.

Column 5

E. winthemi Wied.
E. soledadei Lutz
E. sorbens Wied.
E. xanthopogon Macq.

It is to be noted that the species in the first column are not in alphabetical order, while the remainder are, except for column 5. These first five species were the first five in the genus as revised by Lutz in 1909. *E. bocainensis* was not described until 1935, with Dr. Castro, and then in the new genus *Chrysochiton*.

DRAWER II

Column 1

Epipsila

E. eriomera Macq.
E. eriomeroides Lutz
E. basilaris Wied.

Ionopis

I. foetterlei Lutz
I. nitens Big.

Dicrania

D. cervus Wied.

Column 2

Bombylomyia

B. leonina Lutz
B. erythronotata Big.
B. pseudoanalis Lutz
B. splendens Lutz

Heteroscena

H. sp. MS
H. nana Walk.
H. sp. MS

Column 3	Column 5
Laphriomyia	Scione
<i>L. mirabilis</i> Lutz	<i>Sc. sp.</i> MS
Neopangonia	<i>Sc. claripennis</i> Ric.
<i>N. sp.</i> MS	<i>Sc. distincta</i> Schin.
<i>N. pusilla</i> Lutz	<i>Sc. flavohirta</i> Ric.
Column 4	<i>Sc. incompleta</i> Macq.
Diatomineura	<i>Sc. misera</i> O.S.
<i>D. exeuns</i> Walker	<i>Sc. sp.</i> MS
<i>D. fenestrata</i> Macq.	
<i>D. molesta</i> Wied.	
<i>D. tabanipennis</i> Macq.	
Pseudoscione	
<i>P. longipennis</i> Ric.	
<i>P. sp.</i> MS	

Here the spelling of *Ionopis* is to be noted, evidently not a lapsus as some have thought. The name *Heteroscena* was never published by Lutz, but did appear in a list of Ecuadorean Tabanidae published by CAMPOS (1952), evidently attached to specimens determined by Dr. Lutz. It is a synonym of the prior *Pseudelaphella* Kröber.

DRAWER III

Esenbeckia

Column 1	Column 3
<i>E. arcuata</i> Will.	<i>E. flavescens</i> Ric.
<i>E. bahiana</i> Big.	<i>E. fuscipennis</i> Wied.
<i>E. ferruginea</i> var. <i>nigrovillosa</i> Kröb.	var. <i>flavescens</i> Lutz
<i>E. clari</i> Lutz	var. <i>fenestrata</i> Lutz
<i>E. clari</i> var. <i>infuscata</i> Lutz	<i>E. sp.</i> MS
Column 2	Column 4
<i>E. esenbeckii</i> Wied.	<i>E. sp.</i> MS
<i>mattogrossensis</i> Lutz	<i>E. lugubris</i> Macq.
<i>E. fasciata</i> Macq.	<i>E. neglecta</i> Lutz
<i>E. sp.</i> MS	<i>E. nigrithorax</i> Lutz
<i>E. ferruginea</i> Macq.	Column 5
<i>E. filipalpis</i> Will.	<i>E. notabilis</i> Walk.
	<i>E. sp.</i> MS
	<i>E. biscutellata</i> Lutz
	Column 6
	<i>E. lata</i> Guerin.

In Column 1, the label *E. ferruginea* var. *nigrovillosa* Kröb. is in Castro's writing, obviously a late addition. In Column 2, the label *mattogrossensis* is placed directly beneath *esenbeckii*, as if it may have been a later conclusion that this was a possible synonym of *esenbeckii*. *E. nigrithorax* in Column 4 was never published, but I believe was an earlier name for *E. obscurithorax* Lutz and Castro, 1935. Some of the type series of *obscurithorax* date back to 1915.

DRAWER IV

Chrysops

Column 1

C. bivittatus Lutz
C. brasiliensis Ric.
C. brevifascia Lutz
C. bulbicornis Lutz
C. costatus Fab.
C. crucians Wied.

Column 2

C. fulviceps Walk.
C. fuscipex Lutz
C. intrudens Will.
C. laetus Fab.
C. leucospilus Wied.
C. molestus Wied.

Column 3

C. omissus Lutz
C. parvifascia Lutz
C. tristis Fab.
C. nigricorpus Lutz
C. varians Wied.
C. subfascipennis Macq.

DRAWER V

Diachlorus

Column 1

D. altivagus Lutz
D. bimaculatus Wied.
D. bicinctus Fab.
D. bivittatus Wied.
D. conspicuus Lutz
D. curvipes Fab.

Column 2

D. distinctus Lutz
D. fascipennis Lutz
D. flavitaenia Lutz
D. fuscistigma Lutz
D. immaculatus Wied.
D. neivai Lutz

Column 3

D. paradoxus Lutz
D. scutellatus Macq.
D. vitripennis Lutz

Column 5

Acanthocera

A. anacantha Lutz
A. coarctata Wied.
A. eristalis Lutz
A. extincta Wied.
A. intermedia Lutz
A. longicornis Fab.

Column 4

Lepidoselaga

L. aberrans Lutz
L. albitarsis Macq.
L. crassipes Fab.

Column 6

A. marginalis Walk.
A. nigricorpus Lutz
A. quinquecincta Lutz
A. tenuicornis Lutz

Selasoma

S. giganteum Lutz
S. tibiale Wied.

Himanthostylus

H. intermedius Lutz

Stigmatophthalmus

St. altivagus Lutz

Genero *Bolbodimyia* Big.

There were no specimens or species name under *Bolbodimyia*, and but one damaged specimen of the genus was found elsewhere in the collection, which suggests that Lutz had no specimens at the time and placed the genus on the basis of the inadequate original description.

DRAWER VI

(No generic name, but all are *Dichelacera*)

Column 1	Column 2
<i>D. alcicornis</i> Wied.	<i>D. fuscipes</i> Lutz
<i>D. bifascies</i> Walk.	<i>D. intermedia</i> Lutz
<i>D. callosa</i> Lutz	<i>D. januarii</i> Wied.
<i>D. cervicornis</i> F.	<i>D. marginata</i> Macq.
<i>D. damicornis</i> F.	<i>D. micracantha</i> Lutz
Column 3	Column 4
<i>D. modesta</i> Lutz	<i>D. unifasciata</i> Macq.
<i>D. submarginata</i> Lutz	<i>D. rubricosa</i> v. d. Wulp
<i>D. scutellata</i> Will.	<i>D. sp.</i> MS
<i>D. T-nigrum</i> F.	
<i>D. varia</i> Wied.	

In the above drawer, *submarginata*, is written *pseudomarginata*, the 'pseudo' crossed out and 'sub' written above it. A note signed R.B. (Rudolph Barth) above *T-nigrum* indicates there were no specimens here. *D. rubricosa* is written in pencil on bottom of box rather than being a typed label.

DRAWER VII

Column 1	Column 2
Catachlorops Lutz	Di cladocera Lutz
<i>C. bitinctus</i> Walk.	<i>D. sp.</i> MS.
<i>C. capreolus</i> Wied.	<i>D. furcata</i> Wied.-- <i>macrodonta</i> Macq.
<i>C. fuscipennis</i> Macq.	<i>D. sp.</i> MS.
<i>C. intereuns</i> Walk.	<i>D. guttipennis</i> Wied.
<i>C. rufescens</i> F.	<i>D. sp.</i> MS.
<i>C. immaculata</i> Macq.	<i>D. sp.</i> MS.
<i>C. sp.</i> MS	<i>D. luctuosa</i> Macq.
Amphichlorops Lutz	<i>D. macula</i> (<i>scutellata</i>) Macq.
<i>A. flavus</i> Wied.	<i>D. mutata</i> Lutz
<i>A. sp.</i> MS.	<i>D. sp.</i> MS.
<i>A. sp.</i> MS.	Column 4
Column 3	Stibasoma Schiner
<i>D. sp.</i> MS <i>D. sp.</i> MS (two names)	<i>St. thiotaenia</i> Wied.
<i>D. potator</i> Wied.	<i>St. euglossa</i> Lutz
<i>D. praetereuns</i> Walk.	<i>St. semiflavum</i> Lutz
<i>D. psoloptera</i> Wied.	<i>St. willistoni</i> Lutz
<i>D. rufipennis</i> Macq.	<i>St. dives</i> Walk.
<i>D. sp.</i> MS.	Column 5
<i>D. sp.</i> MS.	Rhabdotylus Lutz
Orthostylus Lutz	<i>Rh. viridiventris</i> Macq.
<i>O. ambiguus</i> Lutz	<i>Rh. planiventris</i> Wied.
	Cryptotylus Lutz
	<i>Cr. unicolor</i> Wied.
	<i>Cr. ochraceus</i> Macq.

In drawer VII the large number of MS *Di cladocera* is noteworthy, as is the fact that many of the species were placed in *Catachlorops* by later students. Lutz relied almost entirely on eye color to separate these groups. The two MS species of *Amphichlorops* would be placed in *Psalidia* now. There is a note by Barth indicating there were no specimens over *Cryptotylus ochraceus* Macq.

DRAWER VIII
Neotabanus Lutz

Column 1	Column 2
<i>N. angustus</i> Macq.	<i>N. sp.</i> MS.
<i>N. comitans</i> Wied.	<i>N. triangulum</i> Wied.
<i>N. consequa</i> Walk.	<i>N. trifascia</i> Walk.
<i>N. ditaenia</i> Wied.	<i>N. trinotatus</i> Wied.
<i>N. ferruginosus</i> Walk.	<i>N. trivittatus</i> F.
<i>N. fumatus</i> Wied.	<i>N. sp.</i> MS.
<i>N. pungens</i> Wied.	
	Column 3
Column 4	<i>N. dorsiger</i> Wied.
<i>N. callosus</i> Macq.	<i>N. modestus</i> Wied.
<i>N. desertus</i> Walk.	<i>N. obsoletus</i> Wied.
<i>N. procallosus</i> Lutz	<i>N. sp.</i> MS.
<i>N. bonariensis</i> Macq.	<i>N. ixyostactes</i> Wied.
<i>N. importunus</i> Macq.	
<i>N. missionum</i> Macq.	Column 5
<i>N. ornatissimus</i> Brethes	<i>N. plangens</i> Walk.
	<i>N. occidentalis</i> Wied.

The inclusion in *Neotabanus* of species later placed in several other groups underlines the importance placed by Lutz on eye color, as all the included species in drawer VIII have banded eyes.

DRAWER IX

Column 1	Column 2
Macrocornus	Poecilosoma
<i>M. trizonophthalmus</i> Lutz	<i>P. punctipenne</i> Macq.
<i>M. pseudosorbillans</i> Lutz	<i>P. quadripunctatus</i> F.
<i>M. sorbillans</i> Wied.	<i>P. histrio</i> Wied.
<i>M. oculus</i> Walk.	<i>P. cinereus</i> Wied.
<i>M. rubripes</i> Macq.	<i>P. monogramma</i> Wied.
<i>M. rubescens</i> Big.	
	Column 3
Column 4	Stenotabanus
Leptotabanus	<i>St. ixyostactes</i> Wied.
<i>L. nigrovenosus</i> Lutz	<i>St. sp.</i> MS
<i>L. incipiens</i> Walk.	<i>St. sp.</i> MS
	<i>St. sp.</i> MS
	<i>St. taeniotes</i> Wied.?
	<i>albidocinctus</i> Big.

In drawer IX the first two species of *Macrocornus* are nomina nuda as is also *Leptotabanus nigrovenosus*. *Incipiens* Walk. is probably a misdetermination; in any event neither Lutz' specimens nor the type in B.M. which I have seen are at all closely related to *nigrovenosus*. As pointed out previously (FAIRCHILD 1950) *Leptotabanus* Kröber is valid and the name cannot be used in Lutz' sense. Drawer X bore no labels in 1959. Two other drawers from the old collection bore name labels, but in one case, drawer No. 68 *, contained only the generic name *Tabanus* at the foot of column 1. The labels it contained are listed below.

* B.L.: Only the Roman Numerals were used by Lutz: others added latter.

DRAWER No. 68

Column 1	Column 2
<i>cinerarius</i> Wied.	<i>imponens</i> Walk.
<i>olivaceiventris</i> Macq.	<i>pellucidus</i>
sp. MS	<i>lineifrons</i> Lutz
<i>importunus</i> Wied.	sp. MS
<i>monochroma</i> Wied.	<i>fuscofasciatus</i> Macq.
sp. MS	<i>hilarii</i> Macq.
<i>monogramma</i> Wied.	<i>testaceus</i> Macq.
Column 4	Column 3
Tabanus	
<i>aurora</i> Macq.	<i>impressus</i> Wied.
<i>alboater</i> Walk.	sp. MS
<i>fuscus</i> Wied.	<i>flavibarbis</i> Macq.
sp. MS	<i>innotescens</i> Walk.
sp. MS	sp. MS
Column 5	<i>miles</i> Wied.
<i>albomaculatus</i> Walk.	sp. MS
sp. MS	
<i>vestitus</i> Wied.	
sp. MS	

The second drawer, labelled VIII and 12, contains a number of generic and specific name labels in no discernible order. The generic names are *Phaeotabanus*, *Leucotabanus*, *Chlorotabanus*, *Melanotabanus*, *Pseudacanthocera* and *Stictotabanus*. The specific names include eight species described by others and ten names of Lutz, either nomina nuda or MS names. There seems no point in listing these, as any order the presence of the specimens might have indicated is now lost, though judging from the rather erratic association of specific names with these generic names among the transferred specimens, Dr. Barth also found difficulty in interpreting what he found. Certainly the labels as they stand do not represent any arrangement made by Dr. Lutz, and suggest that the specimens had been hurriedly moved by another hand, perhaps from the now empty drawer X.

There is still another very old drawer, apparently brought from São Paulo, as none of the specimens it contains are later than 1907. Its labels suggest it may have been used to demonstrate a proposed early scheme of classification, as it has "Neotabanidae" across the top and several numbered divisions down the sides. There were originally some twenty named species, but only scattered specimens and fragments remain. Poor but recognizable specimens of several species of *Macrocormus* are present under an earlier name of the same derivation, indicating that the long appendix at the fork of the third vein was the character Lutz felt of most importance in separating this group.

While the bulk of Dr. Lutz' collection is preserved in the laboratory he occupied at the Instituto Oswaldo Cruz, material studied, identified or collected by him was found in several other places. It must be realized

that there has been great freedom at Oswaldo Cruz, and that there have been many entomologists working there. Each maintained his own working collection, and several were interested at one time or another in Tabanidae, at least to the extent of collecting and preserving specimens. In many cases this material, or part of it, was identified by Dr. Lutz, and in others it represents a share of joint collecting expeditions or specimens given by Dr. Lutz. Examination of the collections now under the care of Dr. Costa Lima and of Dr. Lauro Travassos and Dr. Herman Lent at Oswaldo Cruz, turned up a good many specimens identified by Dr. Lutz, in some cases specimens which had formed the basis for some of his descriptions. Through the generous cooperation of these gentlemen, the type material in the collections under their care has been combined with the main collection in Dr. Lutz' room. I am informed that it is planned to combine all the insect collections in one place in the near future.

The physical condition of the specimens preserved at the Instituto Oswaldo Cruz is surprisingly good, considering that much of the material has been subjected to the notoriously difficult conditions of a tropical climate for nearly half a century. There has been some pest damage and scattered cases of molding, and some staining due to ill-advised treatment with creosote in an effort to combat mold some years after Dr. Lutz' death. I have known complete collections to disappear from pest attacks in much less time and under much better climatic conditions. Under discussion of the individual species, I attempted to note the condition of the specimens at the time I examined them, for the guidance of future students, and was surprised at how often their condition still agreed with Dr. Lutz' statements of condition at the time of description.

The part of the Lutz collection now in the Instituto Butantan in São Paulo, I was privileged to study through the great kindness of Dr. Flavio da Fonseca. This material had apparently been somewhat neglected in earlier years and many specimens were damaged by mold. Dr. Fonseca had wisely decided, that, in the absence of a regular curator of insects, it was safest to place each specimen, after disinfection, in a glass tube whose cork was sealed with paraffin. At some unknown date, whatever labels these specimens bore were very unwisely removed and substituted by numbers. A corresponding card file bore the available information on the specimens. The cards were typed in red if there was information indicating the specimen was a type. Still later, a second series of numbers was added to the outside of the vials, referring to a second, though less informative, series of cards.

The Lutz Tabanidae in this collection consist of 351 specimens belonging to 149 species. Of these 21 are species described by Lutz and 14 bear either MS names or names published without description. Since my available time in São Paulo was very brief, I confined my attention largely to the specimens of species actually described by Lutz. Among

these I was able to recognize type material of 17 species. In the case of undescribed species, most of which were also represented at Oswaldo Cruz, I was only able to make brief notes.

BASIS FOR SELECTION OF TYPES

Since Dr. Lutz, as explained earlier, did not designate, in print, a single specimen as type of any of his species, it was felt to be extremely important to do this while the collection was still intact. It was first necessary to find and recognize any specimens which might have been available to him at the time his description was published. It appears probable that Dr. Lutz, like many other workers, often drew up his descriptions considerably in advance of publication, in some cases perhaps several years. Often he had only one or a few specimens at the time, but by the actual date of publication, he had often secured additional material. This was generally included in the original description, often as a *Nachtrag*' or footnote, but apparently sometimes not mentioned at all. That he modified his description, where necessary, immediately before publication to include such later material is very probable. There is some evidence in his MS notes that he did so at times as there are often several versions of his published descriptions, though since none are dated they cannot usually be placed in sequence.

Dr. Lutz was also often not very specific in regard to localities in his published work, especially where long series of specimens were available. Thus he would frequently mention only the general region, or give the limits of the range of a species, without mentioning specific localities. The specimens, on the other hand, specially of the earlier described species, often bear simply the name of the place where collected and the date. Although these localities were well known to Dr. Lutz, they have sometimes been difficult for me, as a stranger, to localize, as some of them, e.g. Rio Claro, are repeated many times, often even within the same state. The matter was important only where it was necessary to determine whether a certain specimen came from a locality which fell within the range given in the published description.

For these reasons I have felt justified in taking a somewhat liberal course in deciding which specimens should be considered in selecting types. Several criteria have governed this selection. The specimens must agree with the description, since with very few exceptions Lutz' descriptions, though sometimes brief, adequately characterized the species. They must bear either a type label, a determination label, or be under the corresponding name in the collection, or they must bear a collecting date previous to the date of publication and a locality within the range given in the description. In all but a few cases it is reasonably certain that the specimens selected were actually studied by Lutz previous to the date of publication, and in the great majority there is little doubt that the specimens are at least part of the material on which the description was based. In some few cases selection is

based only on the specimen agreeing with the description and being placed under the name in the collection, but this has been done only where no other specimens exist which do not contradict the above criteria. It is quite possible that some few of these are not true types in the modern sense, but I believe that all represent their respective species in Lutz' sense, and that it is best, under the circumstances, to have specimens certainly seen by Lutz labelled as types, even though they may postdate the original description.

Where Dr. Lutz mentioned having seen more than one specimen, the specimens available must be considered syntypes. From these, even though but one may remain, I have selected a lectotype. I have tried to make these selections as carefully as possible, taking into consideration any indications such as 'Tipo' or 'Cotipo' labels, extra notes, sketches of eye color, indications that the specimen was figured, or clues in the description, that might suggest that the specimen was in any way singled out by Lutz. Failing any such hints, I have tried to select the best preserved specimen most closely agreeing with the description. In the case of species described from a single specimen, it has been labelled holotype.

All type material has been segregated into four glass topped drawers, each species in a separate pinning tray. Each specimen has been labelled with its name as published and whether a holotype, lectotype or paratype. The separate trays also bear the name as published by Lutz, and the trays and drawers are arranged according to Lutz' system of classification.

In the subjoined list I have listed the species described by Dr. Lutz alphabetically by genus and species. Each name is followed by its original citation and a quoted translation of the information concerning locality and number of specimens. This is followed by notes on the present number and condition of specimens in the collection and selection of a lectotype and paratypes from among them.

Since most of the species described by Lutz have been well illustrated by him, I have included on the two accompanying plates figures of only a few species. These were selected because they have not been elsewhere figured, because drawings of the head structures are necessary for their recognition, or because the species figured are types of Lutz genera. Time allowed me to make only a few drawings of especially critical species; head structures, especially, of many more species could have been profitably included.

Acanthocera anacantha Lutz and Neiva, Lutz 1915, Mem. Inst. Osw. Cruz, 7(1):65-66, Pl. 19, fig. 8, ♀ "Described from many female examples taken on the margins of the Rio Tietê, from the falls of Avandava to the confluence with the Paraná, where it was encountered also on the opposite bank, in the territory of Mato Grosso." Although there are no specimens with detailed data in the collection, there is a series of ten specimens labelled "Noroeste de S. Paulo 1910" and "Noroeste de

S. Paulo 1908". Four of these were numbered by Barth and were under this name in the collection, the other six being in the duplicate collection. All agree with Lutz' description and I believe were part of the syntype series. Specimen No. T-335, labelled Noroeste de S. Paulo 1910 has been selected and labelled as lectotype, the remaining nine specimens as well as an additional specimen in the collection in charge of Dr. Costa Lima with the same data, have been labelled as paratypes. The lectotype and most of the paratypes are reasonably well preserved. I cannot find that the species was described previous to 1915, and conclude that Lutz wished for some reason to share credit with Neiva for this species and indicated this by listing the species as above rather than as n. sp., as all the other new species were treated in this publication.

Acanthocera eristalis Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1):68-69, Pl. 19, fig. 11, ♀. "One well preserved female of this species was caught by Dr. Pinto Guedes in Sta. Catharina". The only specimen of this species in the collection stood under this name. It bears the number T-348 and is labelled "Santa Catharina, Serra da Bocaina, 12-IX-12." It has been labelled holotype. This Serra da Bocaina is a different one from the range of the same in extreme eastern São Paulo where Lutz himself made extensive collections over many years.

Acanthocera intermedia Lutz, 1915, Mem. Inst. Osw. Cruz 7(1):66-67, Pl. 19, fig. 9, ♀. "Two fairly well preserved specimens of this species were collected in Goyaz by Dr. Arthur Neiva." There were two specimens standing under this name in the collection, and no others were discovered. Number T-351 is labelled "M. de Peixe, VIII-12" and has been selected and labelled as lectotype. The antennae and one wing are glued on. The other specimen, No. T-350, labelled "M. do Pilar, Goyaz, 1-09-912" has its own antennae, but is very dirty. It has been labelled paratype. This species is a distinct one and not based upon composite specimens as I stated formerly (FAIRCHILD, 1939, p. 18). It is separable from *anacantha* by having the base of the first posterior cell (R_5) infuscated, the thorax with yellow stripes and spots at the incisures and a yellow scutellum, and the tibiae extensively white. It resembles *coarctata* Wied. as determined by both Dr. Lutz and myself in body and leg color, but differs in lacking any trace of a dorsal tooth on the third antennal segment as well as in the blackening of the base of the first posterior cell. The figure given by Lutz is excellent.

Acanthocera nigricorpus Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1):64-65, Pl. 19, fig. 7, ♀. "Described from a single female specimen, figured in perfect condition, but now a little defective. I believe that it came from Joinville in Santa Catharina, because it was sent by Mr. Schmalz." Only a single specimen, No. T-364 stood under this label. Although it bears no locality label, I believe it is the holotype and have so labelled it. It now lacks antennae. I have seen females from Corupá,

Hansa Humboldt, Sta. Catarina, in Dr. C.B. Philip's collection, which I was able to compare with Lutz' type and which agreed well.

Acanthocera quinquecincta Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1): 67-68, Pl. 19, fig. 10, ♀. "Of this species exist two considerably defective females which come from either Mato Grosso or the neighboring part of São Paulo". There were two damaged specimens standing under this name in the collection, numbers T-365 and T-366, both labelled "No-roeste de S. Paulo 1910". T-366 has been selected and labelled lectotype, the other specimen as paratype. No other specimens of the species were found in the collection.

Acanthocera tenuicornis Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1): 63-64, Pl. 19, fig. 6, ♀ "The species was encountered, with fair frequency, in the Serra de Cubatão, between Santos and São Paulo, during the summer, the male however, remains unknown. It exists also in the Serra da Mantiqueira (Pacáu), where it was encountered in February." There were two specimens, Nos. T-367 and T-368 under this name in the collection, both labelled "Pacáu, Minas II-912." Specimen No. T-368 has been selected and labelled as lectotype, T-367 as paratype. There are also two specimens, Nos. 344 and 345, in vials numbered 1453 and 1455 in the collection of the Instituto Butantan in São Paulo. The card for No. 344 gives the locality as "Rio Claro, 1904, Lutz", that for No. 345 as "Piassaguera, 1907, Lutz." Both these localities are in the Serra de Cubatão and the specimens have been labelled as paratypes. There is also another specimen, in the collection in charge of Dr. Lent at Oswaldo Cruz and probably once a part of Neiva's collection which has also been labelled paratype. It bears the data "Piassaguera 25-XI-906".

Bombyloopsis juxtaleonina Lutz and Castro, 1936, Mem. Inst. Osw. Cruz, 31(1):175-176, ♀. "Type: labelled Passa Quatro, Sul de Minas, 9-III-918. Deposited in the collections of the Instituto Oswaldo Cruz, Rio de Janeiro. Description based on various examples from the same locality". There were four specimens under this name in the collection, T-1540 labelled "Passa Quatro, sul de Minas, 9-III-918"; T-1541, "Passa Quatro, sul de Minas, 13-III-918"; T-1542, "Passa Quatro, sul de Minas, 9-III-918"; and an unnumbered specimen with the same data as T-1540. Specimen T-1542 has been selected and labelled as lectotype, the other three specimens as paratypes. In my opinion this species is no more than a slight color variant of *leonina* Lutz. There are no structural differences, and the color differences are of the same kind as those occurring in some related species as individual variants.

Bombyloopsis leonina Lutz, 1909, Zool. Jahrb., Suppl. 10(4):648, Pl. 2, fig. 25, ♀. "Locality: São Paulo (Capital, Serra da Cantareira). Time of flight: second half of April. 4 females." There are no specimens in the Lutz collection in Rio de Janeiro with dates early enough to be

considered types. However, in the Instituto Butantan in São Paulo there are two specimens which I believe formed part of Lutz' original series of four females, although the dates they bear are the wrong month. Both of these, No. 403 and 404, in vials 1512 and 1513, are labelled "Cachoeirinha 20-III-03." The cards corresponding to these specimens are written in red and bear the same data. This locality is in the Serra da Cantareira, not far from the city of São Paulo, and is still a favorite collecting place, as it was in Lutz' time. In spite of the difference in dates, March instead of April, I feel that these specimens formed part of the material studied by Lutz. Specimen 403 has been labelled lectotype, specimen 404 as paratype. The specimens are not well preserved, lacking antennae and being quite moldy. The species is represented by a good series from various localities in the mountains of eastern S. Paulo and southern Minas Gerais in the Lutz collection in Rio.

Bombyloopsis pseudoanalis Lutz, 1909, Zool. Jahrb. Suppl. 10(4): 647-648, Pl. 2, fig. 24, ♀, ♂. "The species is not abundant, yet I possess several males and one female. Locality: São Paulo, mountains near the coast, interior, (Cantareira, Capital), S. João de Boa Vista. Time of flight: Feb.-March." There is a male in the Lutz coll., No. T-53, labelled "Typus" and "S. João da B. Vista 25-II-905". In the Instituto Butantan there is a female, No. 407 in vial 1517 labelled "Cachoeirinha 20-III-03" and a male, No. 408 in vial 1517 labelled "Cantareira, E.S. Paulo, III-903". I believe all three of these specimens are syntypes, and No. 407, the female in Butantan, has been selected and labelled as lectotype, as the brief description refers chiefly to this sex. The other two specimens have been labelled as paratypes. The lectotype is very dirty, has been in some liquid and lacks one antenna and the tip of the proboscis. I have a compared specimen, and there is a short series in the Lutz collection. I can find no structural difference between this species and *B. erythronotata* Bigot, the only difference being the dark-haired rather than rufous-haired mesonotum. In long series of *erythronotata* there is much variation in color, and dark specimens bridge the gap between the two species. The ranges of the two seem also to be the same.

Bombylomyia splendens Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1): 69-70, Pl. 4, fig. 3, ♀. "I took on 2-10-08 two females of this species at the fazenda Ouro Fino, situated in Minas near the Parahyba at the station of Benjamin Constant, and belonging to Sr. Dr. Almeida Magalhães: it appears to me that another example was taken later, but it has been lost. --- It may enter into my genus *Bombyloopsis* whose name, being preoccupied, must be changed to *Bombylomyia*." There are only two specimens in the Lutz collection, one, No. T-60 is labelled "Tipo" but bears no locality label; the other, No. T-61 is labelled "B. Constant Minas II-10." No. T-60 has been labelled lectotype, T-61 as paratype. Both are well preserved and agree with Lutz' excellent figure.

I have not seen other specimens. The head structures of the paratype are figured herewith, Pl. 1, fig. 7.

Chrysochiton bocainensis Lutz and Castro, 1936, Mem. Inst. Osw. Cruz, 31(1):172-174, ♀. "Typo: labelled S. da Bocaina, F. do Bonito, 17 to 25-XII-1915. Description based on various (13) examples from the same place and on six from Passa Quatro, Sul de Minas II to III-918. This species was already recognized as new by A. Lutz, standing in his collection under the name of *Erephopsis bocainensis* Lutz, even though it had not been described". There are a total of 47 specimens of this species in the Lutz collection, of which one bears a large red "Tipo" label and two bear large green "Cotipo" labels. None of these three specimens, however, have locality and date labels which agree with those given in the description, and I believe were labelled by Lutz some time before the species was described. Two other specimens bear Lutz' hand-written determination labels reading "*Erephopsis bocainensis*", but again the data on only one of them agrees with that mentioned in the description. From among this material I have selected and labelled an unnumbered specimen labelled "Serra da Bocaina, F. do Bonito, 17/25 Dec. 1915" and bearing a label in Lutz' hand reading "*Erephopsis bocainensis* Lutz" as lectotype. I have labelled thirty additional specimens with the same data and from Passa Quatro, Minas, II to III-918 as paratypes. I have felt justified in this action, since none of the specimens mentioned in the description had been labelled as types and since the species had been recognized, named, and some specimens selected as types by the senior author previously, although most of these specimens were ignored in the published description. Aside from color characters, *bocainensis* differs from *auricinctus*, the genotype, in having the proboscis distinctly swollen at the base of the labella. The head in profile of a paratype is figured here, Pl. 1, fig. 2.

Chrysops bivittatus Lutz, 1909, Zool. Jahrb., Suppl. 10(4):688-689, Pl. 3, fig. 56, ♀. "Three females from Entrerios are before me, which come from the Montevideo Museum." There is a female with a green printed label reading "Entrerios" which I believe is one of the three mentioned in the description, the other two having probably been returned to Montevideo. This specimen, though unnumbered and lacking third antennal segments, has been selected and labelled lectotype. It agrees with Lutz' description and with a later specimen determined by Lutz.

Chrysops brevifascia Lutz, 1909, Zool. Jahrb., Suppl. 10(4):689-690, Pl. 3, fig. 57, ♀. "A female belonging to the Paris Museum from Chaco de Santa Fé, shows a length of fully 9 mm." A specimen, No. T-1226, bears a printed label reading "Mus. Paris, Chaco de Santa Fé... E. R. Wagner, 1903", a colored sketch of the eye pattern and a Lutz determination label. It is rather dirty, but intact and has been labelled holotype.

Six additional specimens from Paraguay determined as this species by Lutz seem to me a quite different species. I have a specimen agreeing with the type.

Chrysops bulbicornis Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):79-80, Pl. 4, fig. 12, ♀. "Of this species I only know one female, taken by Dr. Ruy Ladisláu in the northwest of São Paulo or in the neighboring zone of Matto Grosso." Specimen T-1233 is labelled "Noroeste de São Paulo 1910", "Holotipo" and bears a Lutz determination label. It has been given an additional red holotype label by me. One wing is broken, the third antennal segments are missing and there is a large hole through the base of the abdomen. It differs from specimens from Trinidad determined as this species in having the frontal callus wholly yellow, the first antennal segments largely black, and in having both frontal and facial calluses and first antennal segments more inflated. Color and wing pattern are the same, and I believe the Trinidad material to be no more than a local variant.

Chrysops ecuadoriensis Lutz, 1909, Zool. Jahrb., Suppl. 10(4):690-691, Pl. 3, fig. 58, ♀. "The description is from a female collected by Ohaus in April 1906 in San Antonio de Curaray, Ecuador, and belonging to the Hamburg Museum." No specimens of this species were found in the Lutz collection and it is believed that the type was returned to Hamburg and presumably destroyed during the last war. From the description and figure, it would seem most closely related to *C. crucians* var. *peruviana* Kröber. KRÖBER (1925) intimates that he saw the type in Hamburg and places the species as a variety of *crucians* Wied.

Chrysops fuscipex Lutz, 1909, Zool. Jahrb., Suppl. 10(4):684-686, Pl. 3, fig. 54, ♀. "Of this species I have before me, besides female examples from various regions in the state of São Paulo, also some from the state of Rio Grande do Sul (Santa Cruz) which belong to the Hamburg Museum." A single specimen, T-1260, without locality but bearing a large red "Holotipo" label has been selected and labelled as lectotype. This specimen is not well preserved, the abdomen somewhat crushed and third antennal segments missing, but it agrees with the description and figure in having a black frontal callus and extensively black basal cells. Among the extensive material in the collection, at least thirteen specimens bear Lutz determination labels, but only two of these bear collection dates earlier than 1909 and these do not entirely agree with the specimen selected as lectotype. I suspect that Lutz had several species before him, but considered the variation apparent not to be of specific importance. Specimens determined by Castro in the collection and others determined by various workers that I have seen seem to belong to other species in this complex. KRÖBER (1925) treats the species as a variety of *crucians*, but his figure indicates he was dealing with a species different from the lectotype. He mentions

specimens from Sta. Cruz, Rio Grande do Sul, but seems not to have realized that these might be part of Lutz' type series. The lectotype has the basal cells about two-thirds black and the hyaline triangle stops at the first longitudinal vein (R_1), clearly failing to reach the costa.

Chrysops nigricorpus Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):77-78, Pl. 4, fig. 9, ♀. "The example which served for the description was plains between Miguel Calmon and the falls of Avanhandava, in the northwest of São Paulo, on 28-IV-08. I visited the same locality in January of 1909 without finding another example." There are ten specimens in the Lutz collection and two in the Instituto Butantan in São Paulo, all labelled "S. Avanhandava, 28-4-08 E. S. Paulo". One of these, T-1345, which bears also a "Cotipo" label, has been selected and labelled lectotype, the others labelled paratypes. The specimens agree closely with Lutz' figure, except that the outer margin of the cross-band is slightly more irregular, having an indentation below the third vein (R_4).

Chrysops omissus Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):76-77, Pl. 4, fig. 9, ♀. "The example which served for the description was caught by me on the margins of the Rio Tietê, shortly above the falls of Avanhandava on 24-IV-08." A specimen, T-1308, labelled "S. Avanhandava, 28-IV-08, E. S. Paulo" and "Paratypo" has been selected and labelled as holotype. It agrees closely with the description and figure and is well preserved. There are three other specimens determined as this species by Lutz in the collection, one of which bears the same locality and date as the holotype, though but one specimen is mentioned in the description. Another specimen labelled Ypiranga, S. Paulo, 8-I-08 is of even earlier date. It also seems probable that the paratype label was placed on the specimen bearing it much later and not by Lutz, as it is neither the type of label he used, nor did he elsewhere use the term "paratype", only "type" and "cotype". It is also to be noted that the date on the holotype is 28-IV-08 rather than the 24-IV-08 given in the description. The second specimen above with the same date as the holotype differs considerably in the color and pattern of the abdomen, though in structure and wing pattern it agrees well.

Chrysops parvifascia Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):78-79, Pl. 4, fig. 11, ♀. This well characterized species was described from two females captured among other species of *Chrysops* in a plain near Porto de Faya, situated on the margin of the Paraná a little above the confluence with the Tietê, in the territory of Matto Grosso." The types of this species were found in the main Instituto Oswaldo Cruz collection and transferred to the Lutz collection. Specimen I.O.C. 1389 labelled "Matto Grosso, Porto de Faya I-09" has been selected and labelled lectotype. It is somewhat crushed and one wing is glued to a bit of

card, but the antennae are intact. The other specimen, I.O.C. 1425 is labelled "Matto Grosso I-909" and has been labelled paratype. It is very dirty but intact. A short series of a wholly different species with similar wing pattern stool under this name in the Lutz collection, and bore Lutz determination labels. The types agree closely with the description and figure.

Chrysops uruguayensis Lutz, 1909, Zool. Jahrb., Suppl. 10(4):687-688, Pl. 3, fig. 55, ♀. "There are two females before me, of which one is partly incompletely colored; I received them from the Museum in Montevideo. Locality: Tacuarembó, Uruguay." Two specimens, T-1360 and T-1361 are labelled "Tacuarembó" and "Cotypo" and bear Lutz determination labels. T-1361 has been selected and labelled as lectotype, the other as paratype. The abdomen is as figured by Lutz, though not as brilliantly yellow. The scutellum of the lectotype is reddish and the hyaline triangle of the wing pattern extends almost to the costa, making the apical spot appear more drop shaped than in Lutz' figure. The paratype appears teneral, the wing pattern fainter, the apical spot hardly more than a shade.

Diachlorus afflictus var. *trivittatus* Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2):189, ♀. "I received from Dr. Pirajá a Dichlorus from the south of Bahia which agrees with the description of Wiedemann (of *D. afflictus*), having however a third dark stripe in the middle of the dorsum of the abdomen from the fourth segment on. Probably it is a variety which may be called var. *trivittata*." This very brief description appended to Lutz' 1913 paper appears to apply to a specimen, T-1558, labelled "D. afflictus var.? Wied.", "Bahia 2-913" and with a red "Tipo" label. This specimen has been labelled holotype. It is not too well preserved and I had no material of undoubted *afflictus* with which to compare it. LUTZ (1913 p. 189) mentions having seen the type of *afflictus* Wied. which he says came from Bahia and was collected by Gomes. Lutz' name is listed by KRÖBER (1928) as a variety of *curvipes* Fab., without explanation, as he apparently never saw specimens.

Diachlorus altivagus Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2):152-153, Pl. 12, fig. 10, ♀. "Of this species there is but one female in the Institute collection; it is, however, nearly perfect. It was taken by Dr. H. Aragão in Pacáu (State of Minas) at an altitude of about 1270 meters above sea level." Specimen T-215 is labelled "Pacáu, Minas, Feb. 1912" and bears a plain red label and a sketch of the eye. It has been labelled as holotype and is still in good condition. The species resembles in some respects a *Stenotabanus*. KRÖBER (1928, 1934) lists this as a synonym of *glaber* Wied., but the evidence for this is not conclusive.

Diachlorus conspicuus Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2):156-158, Pl. 12, fig. 7, ♀, ♂. "The description was made from the first

female example, taken towards the end of 1909 by Dr. Arthur Neiva in Magé, State of Rio de Janeiro. I discovered the same species later in Sarapuhy, taking various females and a male, which I found resting on the ground." Specimen T-233 bears a red "Tipo" label and a locality label with "Sarapuhy, 24-X-09". Specimen T-235 has the same locality label, and there are two unnumbered specimens labelled "Sarapuhy 9-V-10". Specimen T-234 has a sketch of the eye pattern but no locality label and specimen T-236 is also unlabelled. While it is possible that one of the unlabelled specimens may be the specimen from Magé, I have thought it better to select a lectotype from among the specimens with a locality, and have therefore selected specimen T-233 as lectotype and so labelled it. The remaining three specimens from Sarapuhy have been labelled paratypes. The male mentioned in the description could not be found. The lectotype lacks antennae.

Diachlorus distinctus Lutz, 1913, Mem. Inst. Osw. Cruz 5(2):151, Pl. 12, figs. 2 and 3, ♀. "*Distinctus* is at least as common in the zone of Rio as the preceding species (*bivittatus* Wied.), having the same habits and frequently the same habitat. It was not encountered further south, but has been found in Minas, further north and distant from the coast." Since no specific specimens are mentioned in the description, I have thought it best to consider all material of the species from the vicinity of Rio with suitable dates as being part of the type series. I have therefore selected and labelled as lectotype a specimen, T-246, labelled "Rio, Cidade, 17-III-13". The following specimens have been labelled paratypes: T-230, T-243 and two unnumbered specimens labelled "Sarapuhy, 1909-1910", nine specimens labelled "Japuhyba 1913", and four specimens labelled "Magé 1909". The species is very close to *D. bivittatus*, and the two were not always separated in the collection. In addition to the characters mentioned by Lutz, *distinctus* has a much broader and more divergent frons.

Diachlorus distinctus var. *catharinensis* Lutz, 1913, Mem. Inst. Osw. Cruz, 7(1):51-52, ♀. "We received some examples of *Diachlorus distinctus*, collected by Dr. L. Travassos in Japuhyba, near Angra dos Reis (State of Rio de Janeiro). . . . The same (difference) I found constantly in six examples which I collected in São Bento, in the interior of the state of Sta. Catharina." I did not find the specimens from Japuhyba, though they may have been mixed in with *distinctus*. The six specimens from São Bento are all in the collection, T-232, 232a, b, c, d and e, all labelled "São Bento, Sta. Catharina, I-914". Specimen T-232d has been selected and labelled lectotype, the others paratypes. The differences in the color of the abdomen pointed out by Lutz do not seem to hold in the series examined, but the differences in leg color seem characteristic. All the types of *distinctus* have almost wholly pale mid legs, while all the specimens from São Bento have the mid femora and at least the apical halves of mid tibiae blackish. I do not detect any other differences.

Diachlorus fascipennis Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2): 166-167, Pl. 12, fig. 12, ♀. "Described from one female collected by Dr. Neiva in Goyaz, on the 20th day of July, 1912." Specimen T-247 is labelled "Tipo" and "Goyaz, 20-VII-12". It bears a colored sketch of the eye pattern and one wing was pinned separately. This specimen has been labelled holotype. Another unnumbered specimen without locality was found in the collection, and there is a third specimen in Dr. M.P. Barretto's collection.

Diachlorus flavitaenia Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2): 151-152, Pl. 12, fig. 5, ♀. "Rather common in the interior of S. Paulo where it accompanies principally the major rivers and also attacks people. Flies during the whole summer and probably also a large part of the winter. In Jacutinga it was found together with *bimaculatus*. Has been taken also in Paraguay, which indicates that it will probably occur also in Matto Grosso." There is a specimen, T-248, lacking head, abdomen, and one wing which bears a red "Tipo" label, but no locality. Since no specific specimens were mentioned however, I have felt free to disregard this specimen and to consider all specimens from S. Paulo localities with early enough dates as syntypes and to select from among these a lectotype. An unnumbered specimen labelled "S. Avanhandava 28-IV-08, E. S. Paulo" has been selected and labelled as lectotype, as it is the best preserved. The following specimens have been labelled as paratypes: T-248 no locality; T-249, "Noroeste de S. Paulo 1910"; T-252 "Margem do Rio Tietê, Jan. 1909"; two unnumbered specimens labelled "Jacutinga, fim de Abril 1907"; one labelled "Jacutinga II-III-07". There is also a headless specimen, T-254, labelled "Paraguay, C. Schrottky" which might be a paratype, but has been excluded because of its condition and lack of date. There are other later specimens from Paraná and Sta. Catharina.

Diachlorus fuscistigma Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2): 148-149, Pl. 12, fig. 9, ♀. "The description refers to a female example brought from the Rio Madeira by Dr. Oswaldo Cruz". Specimen T-255 is labelled "Tipo" and "Rio Madeira" and with a colored sketch of the eye pattern; it has been labelled holotype. The specimen is intact though greasy. Another specimen from Rio Tapajoz, Ducke coll. is of later date, and I have also seen material from Terr. Amapá. I suspect that this may be the species treated by KRÖBER (1928) as *ochracea* Macq. at least in part, but it is not Macquart's species, the type of which I have seen. It is also very probable that *angustifrons* Kröb. was based on a teneral specimen of this species.

Diachlorus neivai Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2): 167-169, Pl. 13, fig. 17, ♀. "This species was collected in Goyaz (from Duro to Natividade) by Dr. Arthur Neiva, to whom it is dedicated. He took many females attacking horses and, at times, people, during the day;....

The description is based principally on an especially well preserved specimen." There are two specimens bearing "Tipo" labels in the collection. T-265 has no locality and the abdomen is missing, while the other specimen is unnumbered but is labelled "Porto Nacional-Duro, Goyaz, 12-VII-12", though badly preserved. Since it is now impossible to tell which, if either, of these specimens was the one from which the description was drawn, I have disregarded both and selected a lectotype from among a series of fairly well preserved unnumbered specimens. This specimen is labelled "Porto Nacional, Duro, Goyaz, 12-VII-12". Twelve additional specimens with the same data, specimen T-265 without locality, T-267 and T-269, labelled "M. de Natividade, Goyaz, VIII-912", and T-270, labelled "Porto Nacional, Goyaz, 12-VIII-12" have been labelled as paratypes.

Diachlorus paradoxus Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2):160-161, Pl. 13, fig. 15, ♀. "The collection of the Institute possesses a female from Campos Novos (Matto Grosso), considerably altered in consequence of the attacks of a destroying insect." Specimen T-277 is labelled "Tipo" and "recebidos de Campos Novos I-XII-909". It lacks all but one leg, and one antenna is missing and the colors are obscured by glue. It is however, recognizable by the small transverse callus, the completely bare and shiny subcallus and frontoclypeus, and the swollen shiny genae. The wings are entirely hyaline with yellow veins. This specimen has been labelled holotype. Another specimen, T-278, from Rio Japurá, Ducke coll., II-XI-1912 under this name is a different species entirely, with narrow parallel sided frons and black palpi, perhaps the same as the material determined as *paradoxus* by BEQUAERT (1926).

Diachlorus vitripennis Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2):161-162, Pl. 12, fig. 11, ♀. "Description based on six females brought by Dr. Gomes Faria from Quixadá (Ceará)." Specimen T-279 is labelled "Tipo" and "Quixadá 3-V-912" and has been selected and labelled as lectotype. Specimens T-280, T-281 and T-282 bear the same locality label and have been labelled as paratypes. The species is close to *paradoxus* Lutz but has shorter first antennal segment and somewhat different frons. The two are not synonymous as thought by BEQUAERT (1926) and KRÖBER (1928) nor were Bequaert's specimens from the Amazon the same as either of Lutz species.

Dichelacera callosa Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1):91-93, Pl. 21, fig. 14, ♀. "The description is based on the study of many females, collected by Dr. Neiva in the states of Bahia (Município de Santa Rita) and Goyaz (between Porto Nacional and the capital) in the months of July and August." I was able to find a total of sixteen specimens scattered through the several separate collections at the Instituto Oswaldo Cruz. Two of these bore Lutz "Tipo" labels and two others had red cotype labels. All had locality labels indicating that they

were syntypes, either from Goyaz or Bahia and all collected in 1912. From among these I have selected and labelled as lectotype specimen T-394, bearing a red "Tipo" label, a locality label reading "Goyaz 28-VII-12" and a colored sketch of the eye. The remaining specimens have been labelled as paratypes and placed together in the Lutz collection. The specimens are mostly well preserved. It is curious that no other specimens of this species seem to have been taken by later collectors.

Dichelacera fuscipes Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1):95-96, Pl. 21, fig. 17, ♂, ♀. "This species, little conspicuous but clearly distinct, was described from one female, captured in Matto Grosso at the Fazenda Pontal, near the margins of the Paraná, in January 1909. There are other examples from the same zone. The figure represents a male. The abdominal design, never very distinct, is here more obsolete than in the females." Specimen T-418 is labelled "Matto Grosso, Fazenda Pontal, M. de Paraná, Jan. 1909" and has a pencil sketch of the eye pattern. This specimen has been selected and labelled as lectotype. It lacks abdomen, legs and one antenna, but agrees with current interpretations of the species. Specimen T-419, a male, is labelled "Noroeste de São Paulo, 1910" and has been labelled as allotype, as I believe it to be the specimen figured by Lutz. It is in fairly good condition. Specimen T-420, labelled "Noroeste de S.P. 1910" was labelled as a cotype by me in 1937 and could with some justice be considered a paratype, though I did not so label it. Other material from Paraguay and Rio Paraná in the collection is all of later date.

Dichelacera intermedia Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1):96, Pl. 21, fig. 18, ♀. "... I have two examples collected in the region where the northwest of São Paulo adjoins Matto Grosso." Although I saw a single specimen of this species labelled "Noroeste de São Paulo 1910" in the Lutz collection in 1937, I was unable to find it or any other specimens of the species in 1959. It resembles *alcicornis* very closely, but the wing markings are less clear cut, more blurred and the thoracic markings quite indistinct.

Dichelacera lacerifascia Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1):89, Pl. 20, fig. 10, ♀. "Approaching *D. rubricosa* is a form from S. Cruz, State of Rio Grande, which I describe with the name: 10. *Dichelacera lacerifascia* n. sp." No specimens of this species were found in the Lutz collection. BARRETTO (1949) places the name as a synonym of *D. januarii* Wied., an opinion which seems justified on the basis of Lutz' brief description and figure.

Dichelacera micracantha Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1):93-94, Pl. 21, fig. 15, ♀. "Our example was brought by Dr. Astrogildo Machado from the margins of the Tocantins." Specimen T-455 is

labelled "Tipo" and "Margem do Tocantins, Dr. Machado, olhos verdes com faixa escura no meio, 1911." It also has a colored sketch of the eye. The specimen is in good condition and has been labelled holotype.

Dichelacera modesta Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1): 97-98, Pl. 21, fig. 19, ♀. "The example, which has lost its hairs and a part of the antennae and legs, is well characterized as a new species in spite of this, distinct from *fuscipes* which it most nearly approximates. The example, a female, comes from Corumbá, in Matto Grosso." Specimen T-456 is labelled "Corumbá P. M. Grosso 1912" and with a sketch of the eye pattern. It lacks antennae, but agrees well with Lutz' figure. It has been labelled holotype. I have seen another specimen, also from Corumbá, which agrees closely.

Dichelacera multiguttata Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1): 90, Pl. 20, fig. 12, ♀. "One example, collected by Sello in Cassapava (Rio Grande do Sul) . . ." Specimen T-483 is labelled "Cassapava, Sello" and "multiguttata Berlin Mus." and bears a sketch of the eye pattern in colors. The antennae are missing and one wing is glued to a card pinned separately. It has been labelled as holotype. Another specimen, T-484 from Campos Novos, Sta Catarina, Bleyer coll. is larger and darker. Both specimens are larger than specimens from Matto Grosso in my collection.

Dichelacera salvadorensis Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1): 90-91, Pl. 21, fig. 13, ♀. "The description was made from one example, taken by Paessler in Acajutla (San Salvador) on 17 March 1903. It belongs to the Hamburg Museum." No specimens were found in the Lutz collection, and since KRÖBER (1934) indicates he saw the type, it was presumably destroyed with the other Hamburg collections during the war. The name is a synonym of *D. pulchra* Will., 1901 as pointed out by FAIRCHILD (1956).

Dichelacera submarginata Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1): 86-87, Pl. 20, fig. 8, ♀. "Of the two examples, one comes from Venezuela, the other is of uncertain locality. Later I received from Townsend four Peruvian examples collected on the Rio Charape on 13-IX-12, one of which corresponds to our type. The three others show on the second part of the marginal band near the margin, a clear comma-shaped window and have the apex clearer, so that one might speak of a divided fascia, as in *cervicornis*, and of an infuscated marginal area." Specimen T-457 bears the following labels: "Lindig, 1864, Venezuela", "duas strias verdes sobre fundo escuro", "D. marginata Macq.", "Dichelacera cervicornis F. Schiner." One wing is glued to a card. This specimen has been selected and labelled as lectotype. Specimens T-458, T-459, T-460 and T-462 are labelled "Rio Charape, 13 Sept. 1912" and the first has a colored eye sketch. These four specimens have been labelled

as paratypes. The differences pointed out by Lutz are of minor degree, and I believe all the specimens are conspecific.

Dichelacera trigonotaenia Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1): 89-90, Pl. 20, fig. 11, ♀. "In the three examples which I have before me... the size of these (abdominal) triangles varies much, being narrowest in one from Paraguay, of medium size in another from the vicinity of Porto Alegre, and very large in a third from Tacuarembó (Uruguay)." Specimen T-473 is labelled "Asuncion de Paraguay, 6058." It is intact though very faded and has been selected and labelled as lectotype. Specimen T-474 is labelled "Tacuarembó". It lacks head and one wing and has been labelled paratype. Specimen T-475 is labelled "Porto Alegre, Estado de Rio Grande" and as a colored sketch of the eye showing two green bands. The specimen is now in three pieces in a corked vial and has been labelled paratype. BARRETTO (1949) placed the species as a synonym of *unifasciata* Macq., a conclusion with which I agree.

Dicladocera conspicua Lutz and Neiva, 1914, Mem. Inst. Osw. Cruz, 6(2):79-80, ♀. "We give here a description of a new species from the Serra dos Orgãos... Of this rare species only one female is known." There are three specimens in the collection which agree very well with a colored figure among Lutz' manuscript notes labelled "*Amphichlorops conspicuus*", and with his published description of *conspicua*. There is also another specimen of the same species, T-592, placed in the collection under the name "*Dicladocera ocellata* Lutz", which bears a "Tipo" label, but no locality label. It is an old specimen, but well preserved, and I have selected and labelled it as holotype of *Dicladocera conspicua* Lutz and Neiva in spite of its lack of locality label. The name *ocellata* may well have been a MS name under which Lutz had placed the specimen, but for some reason he decided to change it upon publication. There is no other species in this area which could be *conspicua*, while I have seen a dozen or more specimens of this in various collections from the same general area. The species was later described by BARRETTO (1950a) as *Psalidia fairchildi*, but should be known as *Psalidia conspicua* (Lutz and Neiva) (New synonymy).

Dicladocera unicolor Lutz, 1912, Comm. Linhas Telegr. Estrat. Matto Grosso Amazonas, Anexo 5, Hist. Nat., Zool., Tabanideos, pp. 4-5, fig. 2, ♀. "Description taken from one somewhat denuded female." Specimen T-1814 under this name in the collection bears a blank green label and a pencilled label which seems to read "Campos da Coruja 24-VII-09". The specimen is very dirty and greasy. It agrees reasonably well with the description and is the only specimen found in the collection which is likely to be the type. I have therefore labelled this specimen as holotype. I have a specimen compared and agreeing, as far as this is possible considering the condition of the type. Attempts to

clean the type were not entirely satisfactory, and it is still covered with a whitish deposit.

Epipsila eriomeroides Lutz, 1909, Zool. Jahrb., Suppl. 10(4): 649-650, Pl. 2, fig. 27, ♀. "Locality: São Paulo, mountains near the coast (Capital, Cantareira). Time of flight: March, 2 females." Specimen T-19 is labelled "Cachoeirinha, 20-III-03". Since Cachoeirinha is a locality near the city of São Paulo and in the Serra da Cantareira, I believe this is one of the two syntypes mentioned in the description, and I have labelled it lectotype. There are four specimens of later date in the collection. A figure of head structures of a specimen agreeing with the type is given here, Pl. 1, fig. 6.

Erephopsis albitaeniata Lutz, 1911. Mem. Inst. Osw. Cruz, 3(1): 68-69, Pl. 4, fig. 4, ♀. "I received two females of this species from Mr. Zikan in Mar de Hespanha, (Minas) one taken at this locality on 10-XII-08 and the other at Rio Muriahé on 14-XI-08. Two others were collected at S. Paulo de Muriahé (1911) and sent by Dr. Braune." Specimen T-1095, labelled "Tipo" and "Mar de Hespanha, 10-XII-1908" bears a Lutz determination label also. I have selected and labelled this specimen as lectotype. It is well preserved. Specimen T-1096 is labelled "Rio Muriahé, Rio, Brasil 14-XI-1908 Zikan" and bears a Lutz determination label. Specimens T-1097 and T-1098 are labelled "Minas, Dr. Braune" and bear Lutz determination labels. All three have been labelled as paratypes.

Erephopsis auricineta Lutz and Neiva, 1909, Mem. Inst. Osw. Cruz, 1(1):12-13, Pl. 1, ♀. "The description was founded on the examination of five females taken in Barbacena (Minas Gerais) in the month of March 1907 by Dr. Belisario Penna." An unnumbered specimen with a "Tipo" label, a Lutz determination label, and a locality label reading "Barbacena, Dr. Belisario Penna", has been selected and labelled lectotype. Two other unnumbered specimens bear locality labels reading "Barbacena Dr. Penna" and "Barbacena, 6-IV-907 B. Penna", the latter also with a Lutz determination label, have been labelled paratypes. All the specimens lack antennae and are rather dirty. There is another specimen, not a type, in Butantan, from Jacutinga, S. Paulo 1908. This species was made the type of the genus *Chrysochiton* by LUTZ and CASTRO in 1936. Pl. 1, fig. 1, shows the head structures of a paratype.

Erephopsis brevistria Lutz, 1909, Zool. Jahrb., Suppl. 10(4):643-644, Pl. 2, fig. 20, ♀. "My three examples, all females, were taken in Chanaán (São Paulo) towards the end of March." Specimens T-1126 to T-1128 are all labelled "Chanaán 26-III-906" and all bear Lutz determination labels. Specimen T-1126 has been selected and labelled lectotype, the other two paratypes. There are four additional specimens with Lutz determination labels but from different localities and later

dates. Lutz believed this species might be the same as *longirostris* Macq. 1847, a preoccupied name for which VON RÖDER supplied the substitute *nigripes* in 1886, though I believe VON RÖDER misidentified his specimens, as Macquart's species does not have black feet. KRÖBER (1934) places *brevistria* as a synonym of *longirostris*, but comparison of a specimen I compared with Macquart's type and one compared with Lutz' type shows them to be quite different.

Erephopsis flavicrinis Lutz, 1909, Zool. Jahrb., Suppl. 10(4):633, Pl. 1, fig. 6, ♀, "Locality: São Paulo (Chanaán). Time of flight: March. 3 examples." Specimen T-1093, labelled "Chanaán III-06" and with a red "Tipo" label and Lutz determination label has been selected and labelled lectotype. Specimen T-1094 is labelled "Chanaán 24-III-906" and bears a green "Cotipo" label and Lutz determination label. It has been labelled paratype. The third specimen is in Instituto Butantan, No. 360 in vial 1469 and has also been labelled paratype. Dr. Barretto had determined specimens of this species as *Fidena pseudo-fulvithorax* Kröber, 1931, but KRÖBER's figure of his species shows a narrower frons, about 3 1/3 times as high as wide, although his text says 2 1/3. The synonymy seems likely, though comparison of specimens will be necessary to settle the matter.

Erephopsis florisuga Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):80-81, ♂. "...; the example was taken in the state of Espirito Santo, on the Rio Itabapoana, on 19-XI-08. Two other males were taken in December 1909. All were sucking flowers." Specimen T-1139 is labelled "Tipo" and "Rio Itabapoana, Espirito Santo, 19-XI-1908. Zikán" and bears a Lutz determination label. This specimen has been labelled holotype. There are six other specimens, including a female erroneously labelled "Tipus" from Duas Barras, Minas, 1918, but the two males mentioned at the end of the description are missing, all the specimens bearing dates of 1910 or later.

Erephopsis matto-grossensis Lutz, 1912, Comm. Linhas Telegr. Estrat. Matto Grosso Amazonas, Anexo 5, Hist. Nat., Zool., Tabanideos, p. 4, fig. 1, ♀. The description is based on two females which are considerably denuded and differ a little in color." Specimen T-1165 is labelled "M. Grosso Mir. Ribeiro" and bears a red "Tipo" label and a Lutz determination label. It has been selected and labelled as lectotype. The specimen is very dirty and broken, lacking antennae and the abdomen and one wing pinned separately. The other syntype, T-1166, bears the same locality and determination labels as the lectotype and is slightly better preserved. It has been labelled paratype. The species resembles *pubescens* Lutz and *castanea* Perty, but is readily separated by the bulbous, shiny, frontoclypeus and short, blunt, flattened palpi.

Erephopsis nigricans Lutz, 1909, Zool. Jahrb., Suppl. 10(4):637-638, Pl. 1, fig. 11, ♀. "I possess only one female from the state of Espirito

Santo." There is a specimen, T-1168 labelled "F. Jerusalem, Villa de Alegre, Espirito Santo, 20-III-912" which bears a red "Neotypus" label and a Lutz determination label and two other specimens, T-1169-1170, from Villa de Alegre, 9-II-914, Zikán coll., also with Lutz determination labels. The true type is apparently lost, but these specimens, and others from the same locality agree well with Lutz' description and figure. Specimen T-1168 could well stand as a neotype whenever this category receives recognition from the International Commission on Zoological Nomenclature. The head structures of this specimen are shown on Pl. 1, fig. 9.

Erephopsis nubiapex Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):66-67, Pl. 4, fig. 1, ♀. "In the collection of the Institute exist two females from Barbacena (Minas) where they were collected by Dr. Belisario Penna in March of 1907." An unnumbered specimen without locality label bears a pink "Tipo" label and a Lutz determination label. It has been selected and labelled as lectotype, and agrees well with the description. There are six other specimens, from various localities in Minas Geraes, but all collected in 1913 or later, so that the specimen here selected in spite of its lack of data, is the only possible type in the collection.

Erephopsis pseudo-aurimaculata Lutz, 1909, Zool. Jahrb., Suppl. 10(4):643, Pl. 1, fig. 18. "The figure is from an example coming from the Amazon region, which is somewhat rubbed." A specimen, T-12 is labelled "Tipo" and "Xapury, Manaus. 7-I-913" but this date is too late for this to be a true type as is also the case with three other identical specimens, T-13, T-13a, and T-13c labelled "Empreza, Rio Acre, Manaus, 26-XI-912". There are also six other specimens, all bearing Lutz determination labels, which are larger and with a more produced and shiny face than those first mentioned above. Three of these are without data, two are from the Amazon region, but of later date, and one is labelled "Rio Irirí, Xingu, 1909". This last is poorly preserved, lacking most of wings, proboscis broken and thoroughly denuded, but is the only labelled specimen of early enough date to have been before Lutz. A further nine specimens from various localities in the Amazon valley, 1912 and 1913, one of which bears a Lutz determination label, are smaller, with short, pollinose face. This name is based largely on the colored figure, Lutz merely saying "In general it seems to agree closely with the description (of *aurimaculata*), only the beard is whitish yellow, the other differences are without great importance. I name this species *pseudo-aurimaculata*, for since then I have found the true types in Petropolis. The very fine example of Macquart, which I formerly saw, resembles closely the male of *E. besckii*." A specimen from Lassance, Minas Geraes, which I compared with Macquart's type of *aurimaculata*, in Paris, does not agree with specimens so determined by Lutz. KRÖBER's redescription and figure (1933) of *pseudo-aurimaculata*, based on material from Surinam and Amazonas agrees well with

the first specimens mentioned above and with other material from the Amazon region I have seen. Lutz' colored figure, although excellent, does not show the structural details necessary to decide with which of the several forms labelled as *pseudo-aurimaculata* it agrees best. The specimen from Irirí is so badly preserved as to color and vestiture that it would be useless as a type. It therefore seems to me best to select a neotype from among the specimens determined by Lutz. For this purpose the specimen, No. T-12, labelled "Tipo" and "Xapury, Manaus, 7-I-913" is hereby selected as neotype of *Erephopsis pseudo-aurimaculata* Lutz. It agrees well with Lutz' figure, and with Kröber's redescription and figure, while the specimen from Manaus recorded by BEQUAERT (1926) as *Melpia pseudo-aurimaculata* was compared with it and found to agree.

Erephopsis pubescens Lutz, 1909, Zool. Jahrb., Suppl. 10(4):644-645, Pl. 2, fig. 21, ♀. "Locality: São Paulo (Jacutinga). Time of flight: beginning of April, 4 females." Specimen T-1176 bears a red "Tipo" label and a locality label reading "Jacutinga 7-8-IV-07" and a Lutz determination label. It has been selected and labelled as lectotype, and is the only one of the four syntypes remaining in the collection. There are other specimens, some with Lutz determination labels, from other localities, but all of later dates.

Erephopsis soledadei Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):67-68, ♀. "Described from three females, taken in Minas between Theophilo Ottoni and the margins of the Rio Doce by Dr. Soledade, to whom the species has been dedicated. The examples are all a little defective. A figure will be given in another publication." Only two specimens, neither with locality labels, could be found in the collection. One of these, T-1189 bears a red "Typus" label and a Lutz determination label and has been selected and labelled as lectotype. It lacks antennae. The other, T-1190, bears a Lutz determination label and has been labelled as paratype. I have seen no other specimens.

Esenbeckia arcuata var. *ricardoae* Lutz and Castro, 1935, Mem. Inst. Osw. Cruz, 30(3):559-561, ♀. "Type: Labelled S. Thomé, Tarauacá, Manaus, 20-XI-912. Description based on four examples. Two are labelled: "Bocca do Auty, Tarauacá, Manaus, 17-XI-912" and one: "Empreza Rio Acre, Manaus, 26-XI-912." Specimen T-1509 is labelled "Typus" and "S. Thomé, Tarauacá, Manaus, 20-XI-913" and has been labelled lectotype. Specimen T-1510, labelled "Cotypus" and "Bocca do Auty, Tarauacá, Manaus, 17-XI-912", and two unnumbered specimens, both labelled "Cotypus", one with same data as T-1510, the other from Empreza Rio Acre, Manaus, 26-XI-912, have all been labelled as paratypes. There are other specimens from the same general region. The species is apparently correctly placed as a variety of *arcuata*, and

belongs in *Proboscoides* Philip, with greatly enlarged and forceps-like labella.

Esenbeckia biscutellata Lutz, 1909, Zool. Jahrb., Suppl. 10(4):666, Pl. 3, fig. 43, ♀. "Here also the description follows only the figure, since the original has already been returned to the Museum in Montevideo. Locality: Paraguay, one female of 18 mm." There are several specimens under the name in the collection, though none bear determination labels. The type is presumably in Montevideo. Lutz' somewhat ambiguous statement above refers to the fact that the previous species, *E. dubia* Lutz, was also described from the colored figure. KRÖBER (1932) placed the species as a synonym of *E. esenbeckii* (Wied.), together with *E. pangonina* (Rond.) and *E. fasciata* (Macq.). I believe this synonymy should stand unless contraverted by later information. A homotype of *E. fasciata* (Macq.) loaned by Dr. C. B. Philip agreed with specimens under *biscutellata* in the collection.

Esenbeckia bitriangulata Lutz and Castro, 1935, Mem. Inst. Osw. Cruz, 30(3):546-548, ♂. "Type: labelled Verrugas Canyon, Peru A. 16 April Townsend. The description is based on two examples, labelled the same." Specimen T-1507 is a male labelled "Typus" and "Verrugas Canyon, 16 Apr. Townsend, Peru." It has been labelled holotype. The other specimen is unnumbered, bears a "Cotypus" label and the same data. It has been labelled paratype. I have a badly denuded female from the same general locality.

Esenbeckia clari Lutz, 1909, Zool. Jahrb., Suppl. 10(4):663-664, Pl. 3, fig. 39, ♀. "I possess 3 female examples from the region of Rio Feio, and name them after the collector, Monsenhor Claro Marcondes, who was murdered there by wild indians. In the Vienna Museum are 2 females, which were found by Natterer in Ipanema and show a transitional form (between *clari* and var. *infuscata*). Locality: São Paulo, interior. Time of flight: January to March. Addendum. Many females of the species and variety were collected in 1907 and 1909. They average much darker, dark yellow and nearly black (the paleness of the originals was probably due to the cyanide jar)." The three original specimens (2 *clari* and 1 var. *infuscata*) could not be identified, though they may still be among the unlabelled specimens. In the absence of these specimens, I have felt justified in considering the 1907 and 1909 specimens mentioned in the addendum as syntypes, and in selecting a lectotype from among them. Specimen T-134, labelled "No-roeste de S. Paulo I-08" has been selected and labelled as lectotype. The following specimens have been labelled as paratypes: 2 ♀, same data as lectotype, one numbered T-135, the other unnumbered in the Division of Zoology of Institute Oswaldo Cruz; 1 ♀, labelled Itapura, Jan. 1909; 2 ♀, in Instituto Butantan, Nos. 272 and 273 in vials 1381 and 1382, no locality, but mounted on circular cards, and the accompa-

nying data cards in red, indicating types. These last may, of course, be part of the material collected by Marcondes, but there is no way of being certain of this. There are also specimens from Rio Feio in the Lutz collection, but taken in 1916. A specimen agreeing with the type of *E. lemniscata* End., 1925 loaned by Dr. C. B. Philip agrees with the lectotype of *E. clari*.

Esenbeckia clari var. *infuscata* Lutz, 1909, Zool. Jahrb., Suppl. 10(4):664, Pl. 3, fig. 40, ♀. See discussion of *E. clari*. I have decided to consider the following specimens as syntypes as they were collected in 1909 or earlier and very probably formed part of the material mentioned by Lutz in the "Nachtrag" to his description. Four females, Nos. T-139 to T-142, labelled Noroeste de S. Paulo, I-08; 2 ♀, Nos. T-143 and T-144, Itapura, I-09; 2 ♀, T-145, T-146, Rio Tietê abaixo do Canal de Inferno, I-09. All these localities are in northwestern São Paulo, near the Matto Grosso border. From these I have selected and labelled specimen No. 142, labelled "Noroeste de S. Paulo, I-08" as lectotype. There are three additional paratypes, so labelled, in Instituto Butantan, Nos. 280-282 in vials 1389 to 1391, all from Jacutinga 1907. As recognized by Lutz, this form is no more than a color variety of *clari*, though from the material seen, it appears to be the more abundant phase. The species listed as *Esenbeckia clari* var. *nigricans* in LUTZ, ARAUJO and FONSECA (1918, p. 166) I believe to be a lapsus for var. *infuscata*, as I can find no other reference to this name, nor is it in the collection.

Esenbeckia distinguenda Lutz and Castro, 1935, Mem. Inst. Osw. Cruz, 30(3):551-552, ♀. "Type: labelled Mendes 18-III-10. Description based on three examples". No specimens of this species were found in the Lutz collection. Dr. Castro (personal communication) believes the types were destroyed by a cockroach shortly after the description was published. There is no indication of what country the species came from, nor was Dr. Castro able to supply any further information on this point.

Esenbeckia dubia Lutz, 1909, Zool. Jahrb., Suppl. 10(4):665-666, Pl. 3, fig. 42, ♀. "Description after the colored figure. The original is in the Montevideo Museum. Locality: Argentina (Entrerios). One female". No specimens of this species were found in the Lutz collection. The type is presumably in Montevideo.

Esenbeckia ecuadorensis Lutz and Castro, 1935, Mem. Inst. Osw. Cruz, 30(3):556-558, ♀. "Typo: Naranjal, Ecuador, Prof. F. Campos, VII-918. Description based on three examples". There are four unnumbered specimens in the collection, two without data. Of the other two, one is labelled "Naranjal, Ecuador, Prof. F. Campos, VII-918" and has been selected and labelled as lectotype. The other is labelled "Ecuador, Naranjal, Campos" and has been labelled paratype. All four specimens

agree with the description, and one of the unlabelled specimens may be the missing syntype.

Esenbeckia fuscipennis var. *fenestrata* Lutz, 1909, Zool. Jahrb., Suppl. 10(4):662, Pl. 2, fig. 36, ♀. This variety was included with the species and var. *flavescens* in Lutz' description. It was defined in the following brief terms "Among (those) with less yellow wings there occurs frequently extensive fenestrae (var. *fenestrata*); an indication of this condition is found in most examples in the appearance of isolated light spots inside some cells." I have selected and labelled specimen T-181, no locality, but standing under the name in the collection, as lectotype. There are also three specimens in Instituto Butantan which have been labelled as paratypes, as follows: No. 284 in vial 1393 from Retiro, 1905; No. 285 in vial 1394 from Mendes, 1909; No. 286 in vial 1395 labelled Museum de Paris 1902. The cards for these are in black, which suggests they were considered as *fuscipennis* and not a new species. The wings are variable, numbers 284 and 286 showing the most fenestrae in the cells. These specimens differ from true *fuscipennis* as exemplified by a specimen compared with Wiedemann's type, in having at most only the extreme base of the wing yellow, the frons considerably narrower, without denuded callus but with a more prominent pollinose ridge, and in broader but more acutely pointed palpi. The species is, in my opinion, distinct, and should be known as *Esenbeckia fenestrata* Lutz, 1909.

Esenbeckia fuscipennis var. *flavescens* Lutz, 1909, Zool. Jahrb., Suppl. 10(4):662, Pl. 2, fig. 37, ♀. "On the basis of the examination of 16 examples (of *fuscipennis*)... The broad yellow wing base is found in only a fourth of the cases and must be separated as a variety (var. *flavescens* fig. 37)... Locality: Rio, mountains near the coast (Petropolis), São Paulo, mountains near the coast (Serra de Cubatão, Guararema, Island São Sebastião etc.). The varieties occur promiscuously. Two examples from the Hamburg Museum have the locality label La Plata. ded. Gercke. Both have moderately light greyish brown wings without fenestrae and with less yellow bases." Among a long series scattered through the collection only two were found with dates previous to 1909 and neither of these were from localities mentioned by name in the description, though they are from within the general range suggested by Lutz. There are also four early specimens in Instituto Butantan, but again without localities mentioned in the description. I feel justified, in considering all these early specimens as syntypes and in selecting a lectotype from among them. I have also considered a numbered specimen without locality or date, but found under the name in the collection, as a syntype.

Specimen T-177 labelled "Sabauna 3-4-1904" has been selected and labelled lectotype. Specimen T-2138, no data, and an unnumbered specimen labelled "Alcobaça, E. Pará XI-08" have been labelled paratypes. Four specimens in Instituto Butantan, Nos. 265 and 266 in vials

1374 and 1375 from Retiro, 1905, No. 267 in vial 1376 from Villa Bella, 1904 and No. 268 in vial 1377 from Villa Thereza 1905 have been labelled paratypes.

A specimen on loan from Dr. Philip which agreed with Wiedemann's type of *fuscipennis* also agreed with the syntypes of var. *flavescens*. Since there is an earlier *flavescens* of Ricardo, ENDERLEIN (1925) renamed the variety as *lutzi* and it is so listed in KRÖBER's catalogue (1934). Specimens considered typical *fuscipennis* and var. *fenestrata* by Lutz (q.v.), without the yellow wing bases, are, in my opinion, a different species.

Esenbeckia inframaculata Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1): 75-76, Pl. 4, fig. 6, ♀. "Described from one female taken towards the end of March in Valença (State of Rio de Janeiro). Other examples were taken in Benjamin Constant, and in the mountains of Bocaina and in Caxambu de Cima, near Petropolis." There are no specimens under this name in the collection nor could the specimen from Valença be found. There are, however, five specimens under *Esenbeckia notabilis* Walk., two of which, Nos. T-197 and T-198 are labelled "B. Constant, Minas 2-10". These have been labelled as paratypes. I believe it probable that Lutz decided, sometime after the species was described, that his species was the same as *notabilis* Walk. Lutz' decision may have been based on KRÖBER's (1932) synonymizing of *inframaculata* with *notabilis*. The type of *notabilis* seen by me in 1953, lacks antennae and proboscis and I had no material agreeing with it, but my notes indicate that it is probably the same as *inframaculata*, so that Kröber's synonymy should stand unless upset by later information.

Esenbeckia infrataeniata Lutz and Castro, 1935, Mem. Inst. Osw. Cruz, 30(3):554-556, ♀. "Type: labelled Pto Bertoni, Paraguay, coll. Bertoni. Description based on this unique example." Specimen T-1508 is labelled "Typus" and "Pto. Bertoni, Paraguay, coll. Bertoni"; I have added a holotype label.

Esenbeckia mattogrossensis Lutz, 1911, Mem. Inst. Osw. Cruz, 3(3): 74-75, Pl. 4, fig. 7, ♀. "Described from three females taken in the region of the Rio Guaporé, on the frontier of Bolivia, by the pharmacist Cesar Diogo." Specimen T-151 is labelled "Tipo" and "Recebidos de Campos Novos I-XII-09". Specimens T-152 and T-153 bear the same data. All three were also labelled as cotypes by me in 1937. I believe these are the three specimens mentioned in the description, in spite of the labels. It seems probable that Lutz received the specimens second-hand from someone in Campos Novos —there are numerous places of that name — and neglected to re-label the specimens upon subsequent receipt of the true locality. I have labelled T-151 as lectotype, the others as paratypes. None of the specimens are intact, only T-152 having part of one antenna remaining. The species differs from *E. clari*

Lutz in narrower frons as well as in wing pattern. KRÖBER (1932) lists the species without comment, but places it erroneously in *Mycteromyia* in his catalogue (1934). Some specimens have the abdomen red in ground color.

Esenbeckia melanogaster Lutz and Castro, 1935, Mem. Inst. Osw. Cruz, 30(3):548-550, ♂, ♀. "Typo: labelled Verrugas Carrijon (Canyon), Peru, A, 16 Abril Townsend. The description is based on three examples, two males and one female, labelled with the same indications." Specimen T-1504 a male, is labelled "Typus" and "Verrugas Canyon, 16 April, Townsend, Peru" and has been selected and labelled lectotype. Specimen T-1506, a female, is labelled "Typus" and "Verrugas Canyon, April 16" and "6093" and has been labelled allotype. An unnumbered male specimen is labelled "Cotypus" and "Verrugas Canyon, 16 Apr. Townsend Peru" and has been labelled paratype.

Esenbeckia neglecta Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):72-73, Pl. 4, fig. 8, ♀. "The description was taken from a large number of females, captured by Dr. Soledade in Minas, between Theophilo Ottoni and the margins of the Rio Doce." There are seven specimens, T-191 to T-196 without locality labels, and one T-190, labelled "Rio Muriahé, E. Rio, Brasil, 14-XI-1908 J. F. Zikán." under this name in the collection. T-190 has the wrong data to be a type, but I believe the unlabelled specimens are probably syntypes, since Lutz sometimes omitted to label all the specimens in a large series. There are also three specimens in Instituto Butantan, Nos. 269 to 271 in vials 1378 to 1380. These also bear no data but their card is in red and says "n. sp.", indicating types. Specimen T-194 has been selected and labelled lectotype, the remaining specimens, including those at Butantan, labelled paratypes. The name was published first in a list by LUTZ and NEIVA (1909) for 15 specimens from the state of Espirito Santo and mentioned also as occurring at the type locality given above, but there is no description furnished, so the name must be credited to Lutz as of 1911. KRÖBER (1932, 1934) credits the name to LUTZ and NEIVA (1909), but appears to have seen no material.

Esenbeckia nigricorpus Lutz, 1909, Zool. Jahrb., Suppl. 10(4):662-663, Pl. 3, fig. 38, ♀. "The example belongs to the Hamburg Museum collection and was captured in the Hansa Colony (State of Santa Catharina)". No specimens of this species were found in the collection. The type was presumably destroyed during the war. KRÖBER (1932) saw the type in Hamburg and added a description of the supposed male.

Esenbeckia obscurithorax Lutz and Castro, 1935, Mem. Inst. Osw. Cruz, 30(3):553-554, ♂, ♀. "Type: Male. Labelled *Esenbeckia ferruginea* Macq.; Faz. Murtinho, Matto Grosso, R. Spitz, XII-1929. Description based on one male and four females, these labelled: Bigorna, Cuyabá,

31-III-1915 --Rosario Oeste, Dr. G. Correa, XII-1914 -- Faz. Murтинho, R. Spitz, XII-1929, determined by Kröber as *E. aff. ferruginea* Macq., 1930. All three, as is seen, come from Matto Grosso; the fourth is labelled Assumpção, Paraguay 9-XI-1915." Specimen T-1502 is the male first mentioned above, labelled as stated in the description and with a small red "Typus" label. It has been selected and labelled as lectotype. The specimen is much damaged, having lost the abdomen, antennae, half the head and most of the wings. Specimens T-1503, Faz. Murтинho, labelled "Cotypus", T-1505, Bigorna, Cuyabá labelled "Cotypus" and T-1511, Paraguay, labelled "Typus", have all been labelled paratypes. The specimen from Rosario Oeste seems to be missing.

Esenbeckia tetragoniphora Lutz and Castro, 1935, Mem. Inst. Osw. Cruz, 30(3):543-546, ♀. "Type: Labelled: Bolivia; *Pangonia lugubris* Macq.; (in pencil) *erosa*." Specimen T-1501 is labelled "Typus and *Pangonia lugubris*", but bears no locality label. It agrees with the description and has been labelled holotype.

Fidena atra Lutz and Castro, 1936, Mem. Inst. Osw. Cruz, 31(1): 180-181, ♀. "Type: labelled: Pernambuco, Tapera: 12-III-932. Description based on this one example." I was unable to find this specimen in the collection, but enquiry of Dr. Castro resulted in his finding two specimens in his collection which he believes are types of this species. These agree with the description but are both labelled "Pernambuco, Tapera, 1935-V." Dr. Castro believes that the discrepancy in the published data was due to an error in transcribing the data, the information for *F. chrysopyga* L. and C. being used for *atra* as well. I have therefore labelled one of these specimens lectotype, the other paratype. They differ from *Chrysopyga* Lutz and Castro, 1936 only in lacking the yellow hairs on tip of abdomen, a character of little importance in this group.

Fidena chrysopyga Lutz and Castro, 1936, Mem. Inst. Osw. Cruz, 31(1):181-183, ♀. "Type: Labelled Pernambuco, Tapera: 12-III-932. Description based on this one example." Dr. Castro found the type, labelled as above, in his collection. I have labelled it holotype and placed it in the collection. See remarks under *Fidena atra* L. and C. The species is a synonym of *atra* in my opinion.

Himantostylus intermedius Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2): 183-184, Pl. 13, fig. 22, ♂. "The following form, for which I have thank Mr. Ch. T. Townsend, was collected by him in eastern Peru,... I give here the description of the only known example... Locality: Yahuar-mayo, Peru." Specimen T-326 is labelled "Tipo" and "Yahuarmayo, Peru, Feb. 10. C.H.T. Townsend coll." It has been labelled holotype. The specimen is a male and lacks one wing. The labella are membranous; the genae swollen and shiny; palpi inflated, shiny; subcallus inflated,

shiny; eyes bare, upper eye facets enlarged and well demarcated; a small tubercle in notch at vertex; antennae as in *Lepiselaga*; basitarsi all white. Otherwise the specimen is as described, and shows close relationship to *Lepiselaga*. STONE (1934) has described the female.

Ionopsis foetterlei Lutz, 1909, Zool. Jahrb., Suppl. 10(4):651, Pl. 2, fig. 29, ♀. "Locality: Rio de Janeiro B (= coastal mountains; Petropolis). Time of flight: beginning of February. Two females in somewhat rubbed condition." Specimen T-27 is labelled "Villa Thereza, 5-II-05" and has been selected and labelled as lectotype. A specimen in Instituto Butantan, No. 410 in vial 1519, is also from Villa Thereza 1905 and its accompanying card is typed in red, indicating a type. This specimen has been labelled paratype. The lectotype has the head detached and pinned separately. Villa Thereza is a suburb of Petropolis, and these two were the only specimens seen from Petropolis with dates earlier than 1909.

Laphriomyia longipalpis Lutz and Castro, 1937, Mem. Inst. Osw. Cruz, 32(2):231-232, ♀. "Type: labelled Juquiá, S. Paulo, J. Lane coll. XII-1929; determined by Kröber as *Laphriomyia mirabilis* Lutz. Description based on two examples, but the other collected by L. Travassos in Angra dos Reis, XII-932." An unnumbered specimen labelled "Juquiá, S.P., J. Lane, Dec. 1929" has been selected and labelled as lectotype, another unnumbered specimen labelled "Angra dos Reis, Jan. 1932" has been labelled paratype. The species is no more than a rather minor color variant of *L. mirabilis* Lutz. Both specimens were found under *mirabilis* in the collection.

Laphriomyia mirabilis Lutz, 1911, Mem. Inst. Osw. Cruz, 3(1):70-72, text fig. and Pl. 4, fig. 5, ♀. "The knowledge of this remarkable form I owe to Dr. Hermann, professor in the University of Erlangen, and well known dipterologist, who very kindly presented to me the only known example. . . . The unique known example comes from the state of Espirito Santo." Lutz and Castro, 1937, Mem. Inst. Osw. Cruz, 32(2):233, ♂. "Type: collected in Angra dos Reis by L. Travassos in I-932." Specimen T-77 is labelled "Typo" and "Brasilia, Espirito Santo". It has been labelled holotype. A male labelled "Angra dos Reis 1932" and with Oswaldo Cruz No. 1473 has been labelled allotype. There is also a specimen from "Iguapé 1912" which bears a "Tipo" label in error, and several other specimens of later date.

Lepiselaga aberrans Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2):186-187, Pl. 13, fig. 18, ♀. "The description is based on a large material of females collected by Dr. Arthur Neiva in the Municipality of Santa Rita (State of Bahia) in the month of July 1912." There are nineteen syntype specimens labelled "Pedra de Fogo, M. de Santa Rita, Bahia, VII-912" in the collection. Fifteen of these are numbered T-287 to T-301,

the rest unnumbered. One of the unnumbered specimens has been selected and labelled lectotype, as it is the best preserved, the remainder have been labelled paratypes. There are other paratypes in existence, sent in exchange by Lutz, including at least two sent to Dr. J. Bequaert and now before me. There are also specimens from Asuncion, Paraguay, and Urucuya, Minas Geraes in the collection, so that the distribution is wider than Lutz originally thought.

Melanotabanus fuliginosus Lutz and Neiva, 1914, Mem. Inst. Osw. Cruz., 6(2):77, ♀. "Description taken from one badly preserved female, captured in Xerem." Specimen T-656 is labelled "Xerem". It was in very poor condition, covered with glue and lacking antennae. The wings are blackish along the veins with a strong appendix at fork of third vein. The frons is barely twice as high as wide, narrowed above, the callus as wide as frons and as wide as high, with a slender upper median prolongation and a strong tubercle at vertex. The palpi are curved and strongly inflated, clothed with rather long hairs. Attempts to clean the specimen enabled a better study of the head, but left the body coated with a chalky residue. The specimen has been labelled holotype, and the frons and palpus are figured here on Pl. 2, fig. 3.

Myiotabanus sarcophagooides Lutz, 1928, Est. Zool. Parasit. Venezolanas, 58-59, Pl. 8, fig. 4, ♀. "Note: this tabanid was captured in July of 1925, near the lake of Taguay-guay, State of Aragua". Specimen T-1499 bears no locality label, the antennae are missing, one wing badly broken, the abdomen crushed and greasy. The specimen agrees quite well with Lutz' description and figure, except that it has a sharply defined bare area in the middle of the subcallus, which is not mentioned in Lutz' description nor indicated in his figure. Although I retain some doubts as to the authenticity of this specimen, I have labelled it as holotype, as it is the only specimen of the species found, and was under the box label *Leucotabanus sarcophagooides* Lutz in the collection. BARRETTO (1949 a) has redescribed and figured the species, based on material from São Paulo. His figure shows a bare patch on the subcallus, like the holotype, though he does not seem to have examined this specimen.

Neopangonia pusilla Lutz, 1909, Zool. Jahrb., Suppl. 10(4):652, Pl. 2, fig. 30, ♀. "Locality: São Paulo B (= mountains near coast) (Cantareira) four females in two different years. Time of flight: April." Specimens T-82 and T-83 are labelled "Cantareira 20-IV-07", the first labelled "Typus", the second "Cotypus". T-82 has been selected and labelled as lectotype, T-83 labelled paratype. There are also two specimens, Nos. 420 and 421 in vials 1529 and 1530 in Instituto Butantan. The card accompanying them is in red indicating type material, but they are without locality. These have been labelled paratypes. The head structures of a specimen agreeing with the types are shown on Pl. 1, fig. 3.

Neotabanus ochrophilus Lutz, 1914, Mem. Inst. Osw. Cruz, 6(1): 46, 49, ♂, ♀; 1928, Est. Zool. Parasit. Venezolanas, p. 56, Pl. 9, fig. 10, ♀. The first mention of this name accompanied by descriptive remarks occurs in 1914. Here the species is referred to as "*ochrophilus mihi*" on p. 46. On p. 49 Lutz says he obtained from some twenty larvae, collected near Manguinhos, two ♀ which he considered a variety of *N. triangulum* Wied. and 2 ♂, 5 ♀ of a very common and widespread species which he could not identify with certainty." The color of the abdomen in this species is more ochraceous than in the others which also have three light lines on the abdomen, for this reason I chose the name of *ochrophilus*. Formerly I identified it with *T. trivittatus* F. but both the identity and priority of that name appear to be completely uncertain." The 1928 reference consists only in a listing of the name and a colored figure of the female. I have taken as types of this species the specimens reared by Lutz, which are pinned with their pupal cases. Of these, seven pupal cases remain accompanied by 1 ♂ and 2 ♀ adults in good condition and three fragmentary adults. I have selected and labelled as lectotype the unnumbered male, labelled "Manguinhos 8-6-914". The remaining specimens with the same data have been labelled paratypes. This material represents the small form of *T. lineola* var. *carneus*, with the male eye facets relatively undifferentiated. The colored figure also seems to represent *carneus*.

Orthostylus ambiguus Lutz and Neiva, 1914, Mem. Inst. Osw. Cruz, 6(2):75-76, ♀. "The description is based on a female taken November 27, 1906 by Lutz in the Serra de Cubatão, near Santos; later Mr. R. Fischer took in Therezopolis another female which agrees in all important details, except that the color is much more intense and darker." Specimen T-619 is labelled "Tipo" and "Alto da Serra, 27-XI-1906" and bears a colored sketch of the eye showing the upper half dark green, the lower lighter green. This specimen has been labelled lectotype, though it is more properly the holotype. Specimen T-621 is labelled "Therezopolis, XII-912" and has been labelled paratype. I give a figure here of wing and head structures of a specimen agreeing with the type, Pl. 1, figs. 10, 11.

Selasoma giganteum Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2):182-183, ♀. "Of this species there exist but two much mutilated females. . . . The examples come from Campos Novos (Matto Grosso) where they were taken on 1 December 1911." Specimen T-318 labelled "Tipo" and "Recebidos de Campos Novos I-XII-09" has been selected and labelled as lectotype. Specimen T-319 with the same data has been labelled paratype. I believe the discrepancy in date between labels and publication was due to a typographic error. The specimens are fragmentary and lack antennae and palpi. From what remains, the species seems to have been wholly black with intensely black wings, possibly with their apexes lighter. The frons is narrow, about six times as high as basal width, with a club-shaped callus. The proboscis is greater than

head height, wholly sclerotized and shiny. All tibiae are greatly swollen, and the basicosta is bare. A specimen with antennae kindly loaned to me by Dr. C. B. Philip agrees well with the types and shows the species to have a long dorsal spine on the third antennal segment and clear wing tips. The abdomen beneath shows small white hair tufts at the posterior corners of all sternites. The species is not a *Selasoma* but seems to fit best into *Stibasoma*, differing chiefly in having the legs less hairy than in most species of that group. The head structures and wing tip are shown on Pl. 2, fig. 5.

Stibasoma euglossa Lutz, 1915, Mem. Inst. Osw. Cruz, 7 (1): Pl. 1, fig. 22, ♂. "The male here described and figured was taken at Pará in February 1913." Only the explanation of the figure bears this name, the text treating the specimen as the male of *St. flaviventre* Macq., which it undoubtedly is. The discovery of the synonymy was probably made after the plates and explanation had been printed, though there is no statement to this effect. Specimen T-625 is labelled "Pará II-913" and has been labelled holotype. It is in good condition and certainly the specimen figured by Lutz.

Stibasoma semiflavum Lutz, 1915, Mem. Inst. Osw. Cruz, 7(1): 115-116, ♂. "I possess a male from Santa Catharina, collected by Mr. J. Schmalz in Joinville." Specimen T-626 labelled "Joinville, Schmalz ded. Jan. 1914." has been labelled lectotype, though it is surely the holotype. It is a male in good condition. A female specimen agreeing with Lutz' description and figure of *St. triste* Wied., though not the same specimen, seems to match quite well with this male, so that it seems highly probable that *semiflavum* is but the male of *triste*. *Tabanus tristis* Wied., 1828 is the same as *bicolor* Bigot, as suspected by Lutz and as listed by KRÖBER (1934), but Wiedemann's name is preoccupied by *T. tristis* Fab., 1798, so that the species takes Bigot's name.

Stibasoma willistoni Lutz, 1907, Zentralbl. f. Bakt. etc., Abt. 1, 44(2):143. New name for *St. theotaenia* Will., 1895, not Wied., 1828; 1915, Mem. Inst. Osw. Cruz, 7(1):104-106, Pl. 21, fig. 21, ♀. "The species has been encountered in the states of Rio de Janeiro, São Paulo, Paraná and Santa Catharina. The example from Chapada, Matto Grosso (described but not named by Williston) shows that, at the same latitude, it also occurs very far from the coast." Williston's specimen, a male, came from Chapada (Matto Grosso) and would be the type of the name. Lutz had females of *willistoni* and both sexes of *theotaenia* Wied. in 1907, and described and figured both species in 1915. The female No. T-627 which I erroneously labelled lectotype in Dr. Lutz' collection is in reality the allotype. It is labelled "Piassaguera, 25-XI-1906." Two other females from the same locality, Nos. 628 and 629, 8-XII-06 and 6-III-06 have been labelled paratypes, as they were certainly before Lutz when he discussed the species. An unnumbered specimen with no date labelled "Joinville" may be the specimen from

Sta. Catarina mentioned in 1907. SURCOUF and GONZALEZ-RINCONES (1912) described and figured the species under Lutz' name, using a specimen received from Bezzi, evidently provided and determined by Lutz.

Stigmatophthalmus altivagus Lutz, 1913, Mem. Inst. Osw. Cruz, 5(2):184-185, Pl. 13, fig. 23, ♀. "Described from three female examples proceeding from Petropolis and captured at an altitude of 800 to 2150 meters, at the beginning of December and the second half of April. Two other examples were captured in January and March in the Serra da Bocaina at an elevation of over 1200 meters. Still later, I received from Dr. Pinto Guedes examples taken on a mountain range in the state of Santa Catharina." Specimen T-333 is labelled "5-XII-08 Petropolis, Pedra Assu, 2150 metros" and is the only one of the first three specimens of the description remaining in the collection. It has been selected and labelled lectotype. Specimen T-328, labelled "Formoso, I-III-10", specimen T-332 labelled "Formoso, S. Bocaina, 1 de 1911" and specimen T-334 labelled "Sta Catharina, Morro do Cedro, 12-912", all are mentioned in the description and have been labelled paratypes. There is also a specimen, unnumbered, in the main Institute collection labelled "Formoso, S. Bocaina 1 de 1911" which has been labelled paratype. The head structures are figured here, Pl. 2, fig. 2.

Tabanus glandicolor Lutz, 1912, Comm. Linh. Teleg. Estrat. Matto Grosso Amazonas, Anexo 5, Zool., Taban., p. 5, fig. 3, ♀. "Of this species there are many females, though generally badly preserved." There are a total of 14 specimens, numbered T-1815 to 1823, 1826 to 1827, 1829 to 1831, all labelled "M. Grosso, M. Ribeiro." The best preserved specimen T-1820 has been selected and labelled lectotype, the remainder labelled paratypes. The species belongs to the group for which KRÖBER (1934) uses the name *Stypommisa* End.

Tabanus hesperus Lutz, 1912, Comm. Linh. Teleg. Estrat. M. Grosso Amazonas, Anexo 5, Zool., Taban., pp. 8-9, fig. 7, ♀. "The description refers to a female collected in Matto Grosso by Mr. A. Miranda Ribeiro." Specimen T-1794 is labelled "Tipo" and "M. Grosso Dr. M. Ribeiro", and has been selected and labelled holotype. The specimen is in fair condition and agrees with the description. It is a synonym of *Chlorotabanus (Cryptotylus) innotescens* Walk., having bare basicosta and sclerotized labella.

Tabanus lineifrons Lutz, 1912, Comm. Linh., Teleg. Estrat. M. Grosso Amazonas, Anexo 5, Zool., Taban., pp. 7-8, fig. 6, ♀. "Of the nine examples coming from Matto Grosso none shows indication of bands on the eyes, even after considerable time in the humid chamber. If they existed in the fresh state, which I do not believe, the species will enter into my genus *Macrocornus*." Specimen T-984 bears a red label with "T. lineifrons M. Gro. M. Ribeiro." written in pencil. It has been selected and labelled as lectotype. Specimen T-982 is labelled

"Cotypo" and "M. Grosso M. Ribeiro", while specimens T-1804 to T-1808 bear the same locality labels. These six specimens have been labelled as paratypes. There is another specimen, T-983, labelled "Cotypo" and "Maria Mobra, 25-II-11 M. Grosso" under this name, but it is a different species, not agreeing with types above or description. *T. lineifrons* has the basicosta setose, and is placed in the subgenus *Macrocornus* by KRÖBER (1934), with a query. Pl. 2, fig. 4, shows the head structures of the lectotype. The antenna is red, the style dusky but not black. The palpus is white, the hairs black.

Tabanus procallosus Lutz, 1912, Comm. Linh. Teleg. Estrat. M. Grosso Amazonas, Anexo 5, Zool., Taban., p. 6, fig. 4, ♀. "The description is based on three females quite well preserved with the exception of the hairs." Specimens T-1825 and T-1828 stand under this name in the collection, are labelled "M. Grosso M. Ribeiro" and I believe are two of the syntypes mentioned. Neither is very well preserved, but they agree with Lutz' description. I have selected and labelled T-1828 as lectotype and labelled T-1825 as paratype. The basicosta is setose, the frons about 4 times as high as wide. The callus is flat and wrinkled, not as wide as frons and prolonged above in a ridge halfway to vertex. There is a tubercle at vertex, without vestiges of ocelli, from which two diverging grooves extend downwards nearly to the callus. The subcallus is wholly shiny, yellow. The antennae are rather broad, the dorsal angle rounded and obtuse. The palpi are moderately slender, whitish, but dark-haired. The frons and antenna are shown on Pl. 2, fig. 6. The palpi are as figured here for *T. prunicolor*.

Tabanus prunicolor Lutz, 1912, Comm. Linh. Teleg. Estrat. M. Grosso Amazonas, Anexo 5, Zool. Taban., pp. 6-7, fig. 5, ♀. "The description is based on five females, collected in the state of Matto Grosso by Mr. A Miranda Ribeiro." Specimens T-1824 and T-1832 to T-1834 are all labelled "M. Grosso M. Ribeiro" and seem certainly syntypes. Specimen T-1832 has been selected and labelled lectotype, the other specimens as paratypes. There is another specimen under the name, T-1835 from Bahia, 1912, but it is a different species. The basicosta is setose. The frons about 4.5 times as high as basal width, parallel sided and with nearly square dark brown protuberant basal callus which is very nearly as wide as frons. There is a median raised denuded ridge reaching from callus nearly to vertex, and a large flat shiny area filling about half the area on each side of this ridge to a distance halfway to vertex. The latter bears a round tubercle set at the lower apex of a bare brown triangular area. The antennae are moderately slender, wholly yellow, the dorsal angle marked but obtuse, near base of plate; the palpi are moderately slender, as shown on Pl. 2, fig. 1.

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The time at my disposal did not permit an extended study of the literature, nor did I have available the extensive series of determined comparative material necessary to undertake a detailed analysis of all of the species described by Dr. Lutz. Some synonymies and changes of names however, appear to be necessary, and these are briefly abstracted below.

Acanthocera intermedia Lutz, 1915. A valid species and not a synonym of *A. anacantha* Lutz and *A. coarctata* Wied. as supposed by FAIRCHILD (1939).

Bombyloopsis juxtaleonina Lutz and Castro, 1936. A synonym of *B. leonina* Lutz in my opinion.

Bombyloopsis pseudoanalis Lutz, 1909. I can detect no structural differences from *B. erythronotata* (Bigot) and believe the species but a color variant of the latter.

Diachlorus fuscistigma Lutz, 1913. I believe that *D. angustifrons* Kröb. was based on a teneral specimen of this species, and that *D. ochraceus* Kröber, 1928, not Macquart, 1850 is also the same.

Dicladocera conspicua Lutz and Neiva, 1914. *Psalidia fairchildi* Barr., 1950 is a synonym.

Erephopsis brevistria Lutz, 1909. This is not the same as *Fidena longirostris* Macq., as listed by KRÖBER (1934).

Erephopsis flavicrinis Lutz, 1909. *Fidena pseudo-fulvithorax* Kröb., 1931 is a very probable synonym, though checking with Kröber's type will be necessary for certainty.

Esenbeckia arcuata var. *ricardoae* Lutz and Castro, 1935. Structure of the proboscis indicates that this form belongs in *Proboscoides* Philip.

Esenbeckia fuscipennis var. *fenestrata* Lutz, 1909. This concept is not the same as *fuscipennis* Wied. and should be known as *Esenbeckia fenestrata* Lutz.

Esenbeckia fuscipennis var. *flavescens* Lutz, 1909. This is the same as *fuscipennis* Wied., and its replacement name, var. *lutzi* End. also falls into the synonymy of *fuscipennis*.

Esenbeckia clari Lutz, 1909. *E. lemniscata* End. appears to be a synonym.

Fidena chrysopyga Lutz and Castro, 1936. A slight color variant of *F. atra* Lutz and Castro, 1936, which has page priority.

Laphriomyia longipalpis Lutz and Castro, 1937. A minor color variant of *L. mirabilis* Lutz, 1911.

Selasoma giganteum Lutz, 1913. This species belongs in *Stibasoma* Schiner, as structure of antennae of additional material shows.

Stibasoma semiflavum Lutz, 1915. I believe this to be only the male of *St. bicolor* Bigot (= *triste* Wied., 1828, not *tristis* Fab., 1798).

Tabanus hesperus Lutz, 1912. A synonym of *Chlorotabanus* (*Cryptotylus*) *innotescens* Walk.

LUTZ' SYSTEM OF CLASSIFICATION

At the time when Dr. Lutz began to seriously consider the *Tabanidae*, the general classification of the family was in a rather primitive condition. Only two subfamilies were recognized, the *Pangoniinae* with hind tibial spurs and the *Tabaninae* with the hind tibiae unarmed. Dr. Lutz early realized that the Neotropical fauna, in which he was primarily interested, showed great diversity, and he felt that more major divisions were necessary to express their relationships. Using the character of the hind-tibial spurs, he therefore divided the family (1909) into two groups, the *Opisthacanthae* with hind tibial spurs and the *Opisthanoplae* without them. The *Opisthacanthae* were further divided into the *Pangoniinae*, with eight divisions in the third antennal segment, and the *Chrysopinae* and *Silviinae* with five. Since he believed no *Silviinae* to occur in South America, this subfamily was not further considered, and I do not know on what characters he intended to separate it from the *Chrysopinae*. The *Opisthanoplae* were divided (1913) into three subfamilies, the *Diachlorinae*, *Lepidoselaginae* and *Tabaninae*. The first contained only the genus *Diachlorus*, the second, *Lepidoselaga*, *Selasoma*, *Stigmatophthalmus* and *Himanthostylus*, and the *Tabaninae* the remaining genera.

This arrangement foreshadows the later systems of ENDERLEIN (1922, 1925) and KRÖBER (1932b) and differs from the system of four subfamilies proposed by MACKERRAS (1954), based on an extensive study of the world fauna, especially of genitalic characters. MACKERRAS places the S. American *Scepsis* in a separate subfamily with two aberrant African genera, but there is no evidence that Lutz had specimens of *Scepsis* for study at the time his system was developed.

It must be clearly understood, in comparing Lutz' classification with later arrangements, that he clearly limited himself to a consideration of the fauna of Brasil and neighboring states, and that even within this limitation he generally refrained from attempting to place definitely species which he did not know personally from specimens. His treatment of the few species he knew only from the literature is marked by extreme caution. Neotropical genera which he did not know personally, e. g. *Bolbodimyia*, *Scione*, *Mycteromyia*, are hardly discussed and are not included in his scheme of classification. If consideration is given to these facts, it will be seen that his classification was an admirable one, and enabled students of the family to place the bulk of the Brazilian *Tabanidae* in a logical scheme, as well as greatly facilitating identification of species by breaking up an unwieldy mass of species into rather sharply defined groups of manageable size.

In the following table the four systems are shown for comparison. Brackets have been placed around the categories not represented in the Neotropical region.

<i>Groups</i>	<i>Subfamilies</i>	<i>Tribes</i>
LUTZ		
Opisthacanthae	Pangoniinae Chrysopinae Silviinae	None
Opisthanoplae	Diachlorinae Lepidoselaginae Tabaninae	(series) Schistocerae Haplocerae
ENDERLEIN		
Opisthacanthae	Melpiinae Pangoniinae Silviinae (Scarphiinae) (Chasmiinae)	Melpiini Pangoniini Pityocerini Scionini Silviini (Rhinomyzini) Chrysopini (2 tribes) (1 tribe)
Opisthanoplae	Diachlorinae Tabaninae Bellardinae (Haematopotinae)	Diachlorini Acanthocerini Lepiselagini Tabanini Dichelacerini Psalidiini Bellardini (Haematopotini)
KRÖBER		
Opisthacanthae	Silviinae Pangoniinae	Silviini (incl. <i>Scepsis</i>) Chrysopini Pangoniini Scionini Pityocerini
Opisthanoplae	Lepidoselaginae Diachlorinae Stenotabaninae Bellardiinae Tabaninae	Diachlorini Acanthocerini Bellardiini Psalidiini Tabanini Dichelacerini
MACKERRAS		
None	Pangoniinae Scepsidinae Chrysopinae Tabaninae	Pangoniini Scionini (Philolichini) Bouvieromyiini Chrysopini (Rhinomyzini) Diachlorini (Haematopotini) Tabanini

The *Pangoniinae* of Lutz includes also Enderlein's *Melpiinae* and is essentially the same as the *Pangoniinae* of Mackerras. Lutz *Chrysopinae* and *Silviinae* are the same as the *Silviinae* of Enderlein and the *Chrysopinae* of Mackerras. The *Diachlorinae* of Lutz includes only the genus *Diachlorus*, while Enderlein includes two tribes and eleven genera under this concept. Mackerras includes an even larger assemblage of genera, but considers the group to be no more than a tribe of the *Tabaninae*, including those genera placed in the *Lepidoselaginae* by Lutz. Enderlein treats the *Lepidoselaginae* as a tribe, *Lepiselagini*, of the *Tabaninae*, but includes nine genera and excludes two of the four placed here by Lutz. The *Tabaninae* of Lutz includes most of the groups placed in *Diachlorinae* and *Bellardiinae* by Enderlein, as well as the latter's *Tabaninae*, while the *Tabaninae* of Mackerras includes all of Lutz' *Diachlorinae*, *Lepidoselaginae* and *Tabaninae*.

It is thus seen that there is moderate agreement among the three systems in the treatment of the *Opisthacanthae*, but very little in the *Opisthanoplae*. In treating the *Tabaninae*, Lutz introduced a further division into two roughly parallel series of genera, the *Tabaninae Schistocerae* and the *Tabaninae Haplocerae*, the former to include species with a long tooth on the third antennal segment, the latter those with but a short tooth or angle. These are not to be considered equivalent to the tribes of Enderlein and Mackerras, but were stated by Lutz (1914 p. 163) to represent two series of parallel evolution. Lutz clearly considered the color patterns of the eye in life of greater phylogenetic significance, and realized that there were many exceptions giving rise to difficulties in using the length of the antennal tooth as a major character.

In establishing his generic names, Lutz, in conformity with the custom at the time, rarely specifically cited a type species, and except in a few cases, gave only a brief diagnosis in the form of a key. Included species were often not listed at the time the diagnosis published, and it is only through his various published lists of species that it has been possible to establish genotype species for many of his genera. Several subsequent students, notably BEQUAERT (1924), ENDERLEIN (1925) and BORGMEIER (1933) have done this, while BARRETTO (1950) and FAIRCHILD (1950) independently summarized and discussed the nomenclatural status of all the generic names proposed by Dr. Lutz. Study of Dr. Lutz' collection has enable me to check the identity of most of the species selected by others as genotypes for his genera, so that, although he himself probably would have objected to the modern insistence on tying every generic name to a single type species, it has been possible to understand in all cases Lutz' concept of his genera.

I give below a list of the genera published by Lutz with comments on their genotypes (and included species) as represented in his collection. The status of many of these names, in the sense of whether they are useful concepts to be retained for groups of species or relegated to synonymy, must remain a matter of opinion, since all supra-specific

categories are highly subjective. My personal bias is towards large and easily definable genera, so that quite a number of Lutz' genera appear to me to be too finely drawn, but until the Neotropical *Tabanidae* are more completely known it would be foolish to indulge in premature synonymizing. I have, however, indicated in most cases below the treatment accorded the names by subsequent students together with my own opinion as to their utility.

Amphichlorops Lutz. Type *Tabanus flavus* Wied., 1828, BEQUAERT (1924). BORGMEIER (1933); KRÖBER (1934); BARRETTO (1950); FAIRCHILD (1950). Specimens in the Lutz collection agree with current interpretations of the species. Only the bright green eyes in life separate this from *Catachlorops*.

Bombylopsis Lutz. Type *Mycteromyia nitens* Bigot, 1892, FAIRCHILD (1950). ENDERLEIN (1925) selected *M. erythronotata* Bigot, 1892, a species not included in the original proposal. MACKERRAS (1955) treats as a synonym of *Fidena* Walk. A specimen from the Lutz collection agrees closely with a homotype in my collection except for having the antennae dark reddish instead of nearly black. A series of fresh specimens show dark antennae. I believe Lutz erred in including *nitens* in this group in his original mention of the name, which was in the form of a list, as in his definitive paper on the *Pangoniinae* in the same year it was placed in *Ionopsis*. It is at most a poorly defined subgenus of *Fidena*. A figure of the head structures of *nitens* Big. is given here, Pl. 1, fig. 5, and of *erythronotata* Big. on Pl. 1, fig. 8.

Bombylomorpha Lutz. Type *Mycteromyia erythronotata* Bigot, 1892, BORGMEIER (1933), FAIRCHILD (1950), a substitute name for *Bombylopsis* and hence taking the same type, *nitens* Big.

Bombylomyia Lutz. Type *Mycteromyia erythronotata* (ENDERLEIN, 1925). FAIRCHILD (1950) a substitute name for *Bombylopsis* and hence taking the same type, *nitens*. ENDERLEIN (1925), treats *Bombylopsis* and *Bombylomyia* as synonyms of *Sackenimyia* Bigot, 1892 (type *Pangonia fulvithorax* Wied.). KRÖBER (1934) treats all three of Lutz' names plus *Sackenimyia* as synonyms of *Melpia* Walk., 1850 (type *Pangonia fulvithorax* Wied.), while MACKERRAS (1955) considers all these names, including *Melpia*, to be synonyms of *Fidena* Walk. (1850) (type *Pangonia leucopogon* Wied.). I believe that some, at least, of Lutz' names will find use as subgenera when the Neotropical *Fidena* species become more completely known.

Chelotabanus Lutz. Type *Tabanus fuscus* Wied., 1819, BEQUAERT (1924). ENDERLEIN (1925) as a synonym of *Stigmatophthalmus* Lutz. KRÖBER (1934) recognizes and places in *Bellardiinae* with six species. In my opinion the group for which the name was proposed is of no

more than subgeneric value. Specimens under *fuscus* Wied. in the Lutz collection agree with a homotype of *ferreus* Walk. in my coll. and with KRÖBER'S (1932a) redescription of *fuscus*, based in part on Wiedemann's material. *Odontotabanus* Lutz, 1918 (*q. v.*), I believe is a synonym.

Chlorotabanus Lutz. Type *Tabanus mexicanus* Linn., 1767, BEQUAERT (1924). ENDERLEIN (1925) as synonym of *Stenotabanus* Lutz. KRÖBER (1934) as subgenus of *Tabanus*. PHILIP and FAIRCHILD (1956) as full genus with *Cryptotylus* Lutz as subgenus. Specimens under this name in Lutz' collection are a mixture of *inanis* Fab., *parviceps* Kröber and *ochreus* Philip and Fairchild. It is doubtful if Lutz had true *mexicanus* before him, as it does not seem to occur in Brasil, and only four unlabelled specimens were in the collection mixed with *inanis* etc.

Chrysochiton Lutz and Castro. Type by original designation *Erephopsis auricineta* Lutz and Neiva, 1909. MACKERRAS (1955) treats as a queried synonym of *Fidena* Walk. The three species I have seen, *auricineta*, *nubiapex* Lutz and *bocainensis* Lutz and Castro differ considerably from each other, *auricineta* being the most similar to *Fidena* and *nubiapex* the most aberrant, approaching *Scaptia* (*Pseudoscione*) in several respects. Only study of genitalic characters will throw light on the status of this name, but I doubt if the genotype at least is separable from *Fidena*. See figures of *auricineta* and *bocainensis* on Pl. 1.

Cryptotylus Lutz. Type *Tabanus unicolor* Wied., 1828, BORGMEIER (1933). KRÖBER (1934) treats as synonym of *Amphichlorops* Lutz. PHILIP and FAIRCHILD (1956) as subgenus of *Chlorotabanus* Lutz. Specimens in the Lutz collection agree with current interpretations of *unicolor* Wied., possibly with some admixture of *chloroticus aeratus* Philip and Fairchild, a recently distinguished form.

Dicladocera Lutz. Type *Tabanus guttipennis* Wied., 1828, ENDERLEIN (1922). BEQUAERT (1924), BEQUAERT and RENJIFO (1946), BARRETTO (1950) and FAIRCHILD (1950, 1958) have discussed the status of this name. Specimens of *guttipennis* in the collection agree with current concepts of the species. Lutz, however, included all species with dark unicolorous eyes, claviform frontal callus, and a long antennal tooth in this group (1914, p. 79), stating that there were at least twenty species in Brasil. Many of those in his collection under *Dicladocera* have been placed by later workers in other genera, especially *Amphichlorops* and *Catachlorops*. The selection of *guttipennis* was in some ways unfortunate, as its frequently pilose eyes led to the restriction of the name to those species with this character, (KRÖBER, 1932b) though this was obviously not Lutz' intention. In Lutz' sense, the group is separable from *Catachlorops* and *Amphichlorops* only on eye color, while with *guttipennis* as genotype it is useful for a large group of mostly Andean species, as noted by FAIRCHILD (1958).

Dyspangonia Lutz. Type *Pangonia fuscipennis* Wied., 1828, BEQUAERT (1924). LUTZ (1909) places correctly as synonym of *Esenbeckia* Rond., 1863. Specimens of *fuscipennis* in Lutz' collection are, however, not Wiedemann's species, as comparison with a homotype loaned by C. B. Philip shows. LUTZ mentioned and figured (1909) two varieties of *fuscipennis*, *fenestrata* and *flavescens*. The latter is true *fuscipennis*, and its renaming as var. *lutzi* by ENDERLEIN (1925) turns out to have been unnecessary. Lutz' name *fenestrata* is thus available for the species he considered *fuscipennis* Wied. It is to be noted that Dr. Lutz attached little nomenclatural value to varietal names, as in his first paper (1905) he says that the variety "fenestrata", with light spots or fenestrae in the cells of darker wings, occurs in a number of species of several genera, which he lists by name.

Epipsila Lutz. Type *Epipsila eriomeroides* Lutz, 1909, ENDERLEIN (1925). ENDERLEIN (*l. c.*) places as synonym of *Fidena* Walk., in which he is followed by KRÖBER (1934) and MACKERRAS (1955). I doubt if the name is useful even as a subgenus. The head (Pl. 1, fig. 6) is very like *nitens*.

Himantostylus Lutz. Type by monotypy *Himantostylus intermedius* Lutz, 1913. ENDERLEIN (1925) places in his tribe *Lepiselagini*, while KRÖBER (1934) considers it to belong in his subfamily *Stenotabaninae*. STONE (1934) describes the female. The holotype and only specimen in the Lutz collection has most of the characters of *Lepiselaga*, to which Stone considered it closely related. I agree.

Ionopsis Lutz. Type *Mycteromyia nitens* Bigot, 1892, ENDERLEIN (1925), as synonym of *Fidena* Walk., in which he is followed by KRÖBER (1934) and MACKERRAS (1955). See remarks under *Bombylopsis*. The spelling *Ionopsis* seems to have appeared first (BORGMEIER 1933, FAIRCHILD 1950), but from the evidence of the collection, where only *Ionopsis* occurs, appears to have been a lapsus. I believe the name is from Greek *ion* = violet and *ops* = eye, in reference to the bluish eyes of some species. Enderlein's *Ionopsis* is an unwarranted emendation. The group is not separable from *Fidena* in my opinion.

Catachlorops Lutz. Type *Dichelacera fuscipennis* Macq., 1847, BEQUAERT (1924). ENDERLEIN (1925) treats as synonym of *Dichelacera* Macq., while KRÖBER (1934), BARRETTO (1951) and FAIRCHILD (1950) consider it a valid genus. Several variant spellings were used by Lutz (*Cathachlorops*, *Katachlorops*, *Gatachlorops*) but were either mis-transliterations or typographical errors. A fresh specimen compared and agreeing with material of *fuscipennis* in Dr. Lutz' collection also agrees with a homotype of *fuscipennis* in my collection and with specimens det. as *psoloptera* Wied. by Dr. Barretto.

Laphriomyia Lutz. Type *Laphriomyia mirabilis* Lutz, 1911, sole species. The name was also spelled *Laphriopsis*, in the original proposal,

obviously a lapsus. ENDERLEIN (1925) recognizes, as does KRÖBER (1934) who lists four species. MACKERRAS (1955), however, treats as queried synonym of *Fidena*. At least the type species, the only one I have seen, is quite aberrant, though apparently related to such species as *erythronotata* Bigot and *leonina* Lutz, and in my opinion can be maintained as at least a subgenus, though the head structures are hardly different from *erythronotata*.

Leptotabanus Lutz. This is a nomen nudum, as listed by ENDERLEIN (1925) and KRÖBER (1934) and as discussed by FAIRCHILD (1950). Although specimens of probably two different species were associated with this name in the Lutz collection, it cannot be revived, as it has been subsequently used for a New Zealand species by KRÖBER (1931a).

Leucotabanus Lutz. Type *Tabanus leucaspis* Wied., 1828, BEQUAERT (1924). (= *T. exaestuans* Linn.). Treated by ENDERLEIN (1925) as a synonym of the earlier *Pseudoselasoma* Brethes, but recognized by KRÖBER (1934) and most subsequent students as a full genus (STONE, 1938; FAIRCHILD, 1941; PHILIP, 1947). Specimens in the Lutz collection agree with current interpretations of this common and widespread species.

Macrocornus Lutz. Type *Tabanus sorbillans* Wied., 1828, BEQUAERT (1924). ENDERLEIN (1925) treats as a synonym of *Stenotabanus* Lutz, while KRÖBER (1934) considers it a subgenus of *Tabanus*. From the definition of the group given by Lutz in his key and the specimens standing under the name in the collection, it is apparent that he considered the group to contain species without a long antennal spine and with banded eyes, a claviform frontal callus and a long appendix on the fork of third vein. Whether *sorbillans* Lutz is the same as *sorbillans* Wied. it is impossible to tell, since several closely allied species stand under the name in the collection. The only specimen with a Lutz determination label actually on it which I could find was a specimen labelled "*pseudosorbillans* Lutz" from Trinidad. This specimen is the same as the species identified at various times by Bequaert, Philip and myself as *sorbillans* Wied. A specimen in my collection from Maracaju, Matto Grosso, which I compared in 1936 with Lutz' specimens of *pseudosorbillans*, is also the same, while a specimen from Goyaz determined at the same time by comparison with Lutz material as *sorbillans* seems to be *rubripes* Macq. It will obviously be necessary to compare material with Wiedemann's type, if this can be surely identified, before we can know precisely what true *sorbillans* is. The name will, I believe, be useful on the subgeneric level essentially in the sense that Lutz used it.

Melanotabanus Lutz and Neiva. Type by monotypy *Melanotabanus fuliginosus* Lutz and Neiva, 1914. ENDERLEIN (1925) and KRÖBER (1934) both recognize as a valid genus on the basis of the description, though neither appears to have seen specimens. Study of the type specimen

(see notes on species) and of specimens of other, apparently related species, suggests that the genus will be nearest *Stenotabanus*, *Dasybasis*, and the African *Limata*. The basicosta is bare.

Micropangonia Lutz and *Microtabanus* Lutz. These two names were treated by FAIRCHILD (1950), the former as a synonym of *Neopangonia*, the latter as a nomen nudum. In the Zikán collection at Oswaldo Cruz was found a series of four males and one female labelled "Micropangonia nigricans Lutz". These had been determined as "Neopangonia nigricans" by Barretto and are the same as specimens under a different MS name in the Lutz collection. This tends to confirm the action taken by me in 1950. No material under *Microtabanus* was found and neither name has been further noted in the literature.

Myiotabanus Lutz and Nuñez Tovar, 1928. Type by monotypy *Myiotabanus sarcophagoides* Lutz and Nuñez Tovar, 1928. KRÖBER (1934) treats as a synonym of *Leucotabanus* Lutz on the basis of the description. FAIRCHILD (1942a) however, points out that the genus is closely related to *Stenotabanus*, while BARRETTO (1949a), recognizes the genus as valid and gives a redescription, which however, is based on material from São Paulo, and may refer to a species different from the Venezuelan *sarcophagoides*. The name is useful for a group of arboreal species showing marked resemblance to sarcophagid flies, even to having brick-red eyes in life.

Necpangonia Lutz, 1909. Type by monotypy *Necpangonia pusilla* Lutz. ENDERLEIN (1925) treats as a synonym of *Melpia* Walk., while KRÖBER (1934) and MACKERRAS (1955) place it under *Fidena* Walk. External characters indicate placement between *Fidena* and *Pseudoscione*, and I believe the name will be useful as at least a subgenus of *Fidena* with several peculiar characters. There are other species, and study of the male genitalia should clarify its status. The head characters of the type species are shown in Pl. 1, fig. 3.

Neotabanus Lutz. Type *Tabanus trilineatus* Latr., 1814, BEQUAERT (1924). ENDERLEIN (1925) treats as a synonym of *Theriopectes* Zeller, 1842 and gives the type as *triangulum* Wied. BORGMEIER (1933) and KRÖBER (1934) recognize as a subgenus of *Tabanus*, as did FAIRCHILD (1942), while PHILIP (1947) places it in the synonymy of *Tabanus*. BARRETTO (1950) however, considers the name to have been validly proposed only in 1911, and hence a homonym of *Neotabanus* Ricardo, 1911. Its use will depend upon decision as to the availability of the publication in which it first appeared, as discussed by BARRETTO (1950) and FAIRCHILD (1950). *Taeniotabanus* Kröber seems to be the next available synonym, but it also was not formally proposed, and there is some disagreement as to its date (BORGMEIER, 1933; KRÖBER, 1934; BARRETTO, 1950). Specimens under the name *trilineatus* Latr. in the Lutz collection are a mixture of what FAIRCHILD (1942) has treated as

T. lineola var. *carneus* Bell. and *lineola* var. *stenocephalus* Hine. The identity of *trilineatus* Latr. is in doubt, KRÖBER (1934) treating it as a synonym of *lineola*, though Kröber's *lineola* is apparently different from the species treated under this name by OSTEN SACKEN (1876), HINE (1906), BEQUAERT (1940), FAIRCHILD (1942) and PHILIP (1942). In any case, it is doubtful if the group for which Lutz proposed the name is more than a subgenus of *Tabanus*. Lutz' characterization of the group, and the species placed in it in his collection and publications, indicates that he considered species with banded eyes, without a long spur on third vein, without a median frontal callus and without contrasting thoracic markings and spotted wings to belong here.

Odontotabanus Lutz, in Lutz, Araujo and Fonseca, 1918. Type *Tabanus aurora* Macq., 1838, BORGMEIER (1933). KRÖBER (1934) treats as a synonym of *Tabanus* (*Tabanus*). LUTZ used the name first (1918) in several lists of species for *aurora*, *fuscus*, *cinerarius* and *impressus*. In this same paper, some of the same species also are cited under *Chelotabanus*, which appeared first in 1913 and in a list with these same species in 1914. Clarification of these two names has come with the finding of a letter from Dr. Lutz to O. Kröber, written in 1930, in which he says that "To *Chelotabanus* belong numerous large species with long antennal spine mostly from Amazonas; to *Odontotabanus* those with short antennal spine". No species are mentioned. In Dr. Lutz' collection, there are three species under *aurora* Macq., one of which agrees quite well with my notes on Macquart's type in Paris. None of the three, however, is *innotescens* Walker, the species treated as *aurora* by BEQUAERT (1926). I believe the name to be a synonym of *Chelotabanus* Lutz, and the latter no more than a poorly marked subgenus of *Tabanus*.

Orthostylus Lutz and Neiva, 1914 (*nec* Beck, 1837) = *Orthostyloceras* Lutz, in Borgmeier, 1933. Type by monotypy *Orthostylus ambiguus* Lutz and Neiva, 1914. ENDERLEIN (1925) treats as a synonym of both *Dichelacera* and *Di cladocera* while KRÖBER (1934) recognizes as a valid genus in his tribe *Dichelacerini*. The type species combines characters of *Catachlorops*, *Dichelacera* and *Psalidia*, and in my opinion is no more than a subgenus of *Dichelacera*.

Phaeoneura Lutz, 1909. Type by monotypy *Pangonia basilaris* Wied., 1828. The spelling *Phaeomyia* which appeared in 1911 in the German version only, is an obvious misspelling. ENDERLEIN (1925), KRÖBER (1934) and MACKERRAS (1955) all treat as a synonym of *Fidena* Walk. The specimen standing under *basilaris* in the Lutz collection bears no locality label, but there was another specimen agreeing with it from Venezuela among the duplicates. Both these can be distinguished specifically from *rhizophora* Bell. as treated by FAIRCHILD (1941a, 1953) only in slightly broader frons. These are not, however, the species figured by Lutz as *basilaris*. A specimen in my collection

determined by Castro as *F. basilaris* var. *acutipalpis* Kröb. agreed with the type of *basalis* Walker, in B. M. and also agrees quite well with Lutz' figure of *basilaris* Wied. A homotype of *basilaris* Wied. loaned by Dr. Philip is again different, lacking dark wing bases and having a broader frons, though otherwise similar to *rhizophora*. Wiedemann's description calls for a species with bicolored legs, and agrees much better with the *rhizophora*-like specimens in Lutz' collection than it does with his published figure. LUTZ (1909) noted that at least one specimen in B. M. labelled *basalis* Walk. agreed with his specimens of *basilaris*. KRÖBER (1933) seems to have followed Lutz, but omits any mention of *basalis* in his catalogue (1934). Whether founded on *basilaris* Wied. or *basilaris* Lutz, the name is, in my opinion, hardly separable from *Fidena*.

Phaeotabanus Lutz. Type *Tabanus litigiosus* Walk., 1850, BEQUAERT (1924). ENDERLEIN (1925) treats as a synonym of *Tabanus*, KRÖBER (1930, 1934) as a subgenus of *Tabanus*, while BARRETTO (1950) and FAIRCHILD (1942b) recognize as a valid genus. Specimens standing under *litigiosus* in the Lutz collection agree with current interpretations of the species, with KRÖBER'S (1930) redescription and with a homotype in my collection.

Poeciloderas Lutz, 1921 (= *Poecilosoma* Lutz, 1909, 1911, 1913, nec Hubn., 1816 = *Poecilochlamys* Lutz, 1928). Type *Tabanus quadripunctatus* Fab., 1805, ENDERLEIN (1925), who treats as a synonym of *Atylotus* O. S. KRÖBER (1931, 1934) considers it a valid subgenus of *Tabanus*, while FAIRCHILD (1942b) and PHILIP (1947) have treated it as a synonym of *Hybomitra* End. I believe the name is useful in a subgeneric sense for a small group of Neotropical species related to the genotype. Specimens in the Lutz collection agree with current interpretations of the species.

Pseudacanthocera Lutz, 1913. Type by monotypy *Silvius sylveirii* Macq., 1838. ENDERLEIN (1925) treats as a synonym of *Pseudoselasoma* Brèthes, 1910, while KRÖBER (1929, 1934) recognizes as a full genus in his subfamily Stenotabaninae. Specimens under this name in the Lutz collection agree with current interpretations of the species and with a homotype in my collection. Study of male specimens indicates that the group is closely allied to *Leucotabanus* Lutz and may be better as a subgenus of that group.

Plesiophthalmus Lutz, 1911, with *P. fenestratus* Lutz n. sp. Neither the genus nor the species seem to have been described nor were any specimens found under the name in Dr. Lutz' collection. The name is a homonym of *Plesiophthalmus* Moutschouldsky, 1858, Coleoptera, according to BORGMEIER (1933).

Pseudoscione Lutz, in Lutz, Araujo and Fonseca, 1918. Type *Diatomineura longipennis* Ricardo, 1902, FAIRCHILD (1950). The name was

overlooked by BORGMEIER (1933) and KRÖBER (1934), its type species being placed in *Listriosca* End., 1922. MACKERRAS (1955) recognizes as a subgenus of *Scaptia* with six generic names of Enderlein as synonyms. Specimens under *longipennis* in the Lutz collection appear to be correctly identified, and the head characters are shown in Pl. 1, fig. 4.

Rhabdotyius Lutz. Type *Tabanus planiventris* Wied., 1828, BEQUAERT (1924). ENDERLEIN (1925) treats as a synonym of *Dicladocera* although he makes *pianiventris* the type of his genus *Gymnochela* in the same publication. KRÖBER (1934) treats both genera as synonyms of *Amphichlorops* Lutz. FAIRCHILD (1942b) pointed out its relationship to *Stibasoma* and suggested it might be best placed as a subgenus of that concept. Specimens under *planiventris* in the Lutz collection agree with current understanding of the species.

Stenotabanus Lutz. Type *Tabanus taeniotes* Wied., 1818, ENDERLEIN (1922). ENDERLEIN (1925) expanded the concept to include a large assemblage of divergent forms from all regions, while KRÖBER (1929, 1934) made the genus the central element in his subfamily *Stenotabaninae*, although limiting the genus to species fairly closely related to the genotype. FAIRCHILD (1942a) and PHILIP (1941) have proposed the use of several additional names in a subgeneric sense. Specimens under *taeniotes* in the Lutz collection agree fairly well with a homotype in my collection although the femora are somewhat paler.

Stictotabanus Lutz. Type *Tabanus maculipennis* Macq., BORGMEIER (1933). ENDERLEIN (1922) and FAIRCHILD (1950) consider the name invalid, a nomen nudum, while KRÖBER (1934) places as a synonym of *Catachlorops*. There are unfortunately two different "*T. maculipennis*" of MACQUART, 1834 and 1846, both homonyms of *T. maculipennis* Wied., 1828. The types of both appear to be lost, but from the descriptions the 1834 species may have been a *Catachlorops*, evidently the belief held by KRÖBER, and the 1846 species very possibly equalled *Poeciloderas quadripunctatus*. The latter was made genotype of *Dasyphyrtia* by ENDERLEIN (1922). Specimens determined as "*maculipennis* Macq." by Lutz, however, are quite different, and belong to *Stypommia* End. or *Stypommisa* End. From study of material in the Lutz collection, it appears that he distinguished three species in the group. His *Stictotabanus anonymous* of 1914 is a nomen nudum, but specimens under this name in the collection agree with a homotype of *Tabanus rubrithorax* Macq. in my collection. The group I believe is a definable one, at least as a subgenus, and it is unfortunate that it was not validly established.

Stigmatophthalmus Lutz. Type by monotypy *Stigmatophthalmus altivagus* Lutz, 1913. ENDERLEIN (1925) included a number of unrelated species from various parts of the world, but KRÖBER (1934) rightly retained the name in its original sense. The species shows some resemblance to the *guttipennis* group of *Dicladocera*, as previously

defined (FAIRCHILD, 1958) having membranous labella, bare eyes and setose basicosta. The tibiae are somewhat swollen and the hind pair fringed.

SUMMARY

A study of the Adolpho Lutz Collection of Tabanidae at the Instituto Oswaldo Cruz and of additional Lutz material at the Instituto Butantan in São Paulo is reported.

Of the ninety-four species of Tabanidae validly described by Lutz, type material of eighty-four was recognized, either holotypes, allotypes or syntypes. Lectotypes were selected from among syntype series or remaining specimens and all type material was labelled.

Of the ten species of which no type material could be found, neotypes were designated in the case of two species, *Erephopsis nigricans* and *Erephopsis pseudo-aurimaculata*. Types of three species, *Chrysops ecuadoriensis*, *Dichelacera salvadorensis* and *Esenbeckia nigricorpus* are believed to have been in Hamburg and destroyed during the last war. Types of two species, *Esenbeckia biscutellata* and *E. dubia*, and additional type material of several others are believed to have been in Montevideo. A request for information about them remains unanswered. Types of the remaining three species, *Dichelacera intermedia*, *Dichelacera lacerifascia* and *Esenbeckia distinguenda* could not be found, and it is believed that at least the type of the last species was accidentally destroyed.

Three specific or subspecific names proposed by Lutz but placed by others in synonymy have been revalidated, *Acanthocera intermedia*, *Erephopsis brevistria* and *Esenbeckia fenestrata*. Generic placement of two names has been changed, *Esenbeckia arcuata ricardoae* to *Proboscoides*, and *Selasoma giganteum* to *Stibasoma*.

Seven specific names proposed by Lutz appear to be synonyms of earlier names, as follows: *Bombyloopsis juxtaleonina* Lutz and Castro, 1936 = *B. leonina* Lutz, 1909. *Bombyloopsis pseudoanalis* Lutz, 1909 = *B. erythronotata* (Bigot, 1892). *Esenbeckia fuscipennis* var. *flavescens* Lutz, 1909 = *Esenbeckia fuscipennis* Wied., 1828. *Fidena chrysopyga* Lutz and Castro, 1936 = *F. atra* Lutz and Castro, 1936. *Laphriomyia longipalpis* Lutz and Castro, 1937 = *L. mirabilis* Lutz, 1911. *Stibasoma semiflavum* Lutz, 1915 = *St. bicolor* Bigot, 1892. *Tabanus hesperus* Lutz, 1912 = *Chlorotabanus (Cryptotylus) innotescens* (Walker, 1854).

Four Lutz names appear to antedate names proposed by others, viz.: *Diachlorus angustifrons* Kröber, 1930 and *D. ochraceus* Kröb., 1928 not Macquart, 1850 = *Diachlorus fuscistigma* Lutz, 1913. *Psolidia fairchildi* Barretto, 1950 = *Di cladocera conspicua* Lutz and Neiva, 1914. *Fidena pseudo-fulvithorax* Kröb., 1931 = *Erephopsis flavicrinis* Lutz, 1909. *Esenbeckia lemniscata* Enderlein, 1925 = *Esenbeckia clari* Lutz, 1909.

Some comments on Lutz' system of classification are given together with notes on the genotypes and included species of his genera as revealed by his collection and notes.

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PLATE 1

- Fig. 1 — Profile of head of *Chrysochiton auricinctus* (Lutz and Neiva), paratype.
- Fig. 2 — Same of *Chrysochiton bocainensis* Lutz and Castro, paratype.
- Fig. 3 — Same of *Neopangonia pusilla*, homotype, Horto Florestal São Paulo, May 1944.
- Fig. 4 — Same of *Pseudoscione longipennis* (Ricardo) det. Lutz, Alfenas, Minas Gerais, July 1909.
- Fig. 5 — Same of *Ionopsis nitens* (Bigot), homotype, Nova Teutonia, Plaumann coll.
- Fig. 6 — Same of *Epipsila eriomeroides* Lutz, homotype, Horto Florestal, São Paulo.
- Fig. 7 — Same of *Bombylomyia splendens*, Lutz, paratype.
- Fig. 8 — Same of *Bombylopsis erythronotata* (Bigot), specimen from Serra da Cantareira, S. Paulo, Sept. 1943, J. Navas coll.
- Fig. 9 — Same and dorsal view of palpus of *Fidena nigricans* (Lutz), specimen labelled Neotypus.
- Fig. 10 — Frons, antenna and palpus of *Orthostyloceras ambiguus* Lutz, homotype from Alto da Serra de Cubatão, S. Paulo, 25-II-922.
- Fig. 11 — Wing of same specimen of *O. ambiguus* Lutz.

(The first nine species have pilose eyes, not shown in the drawings. All figures except fig. 11 are to the scale indicated at fig. 10; the wing is to the smaller scale indicated).

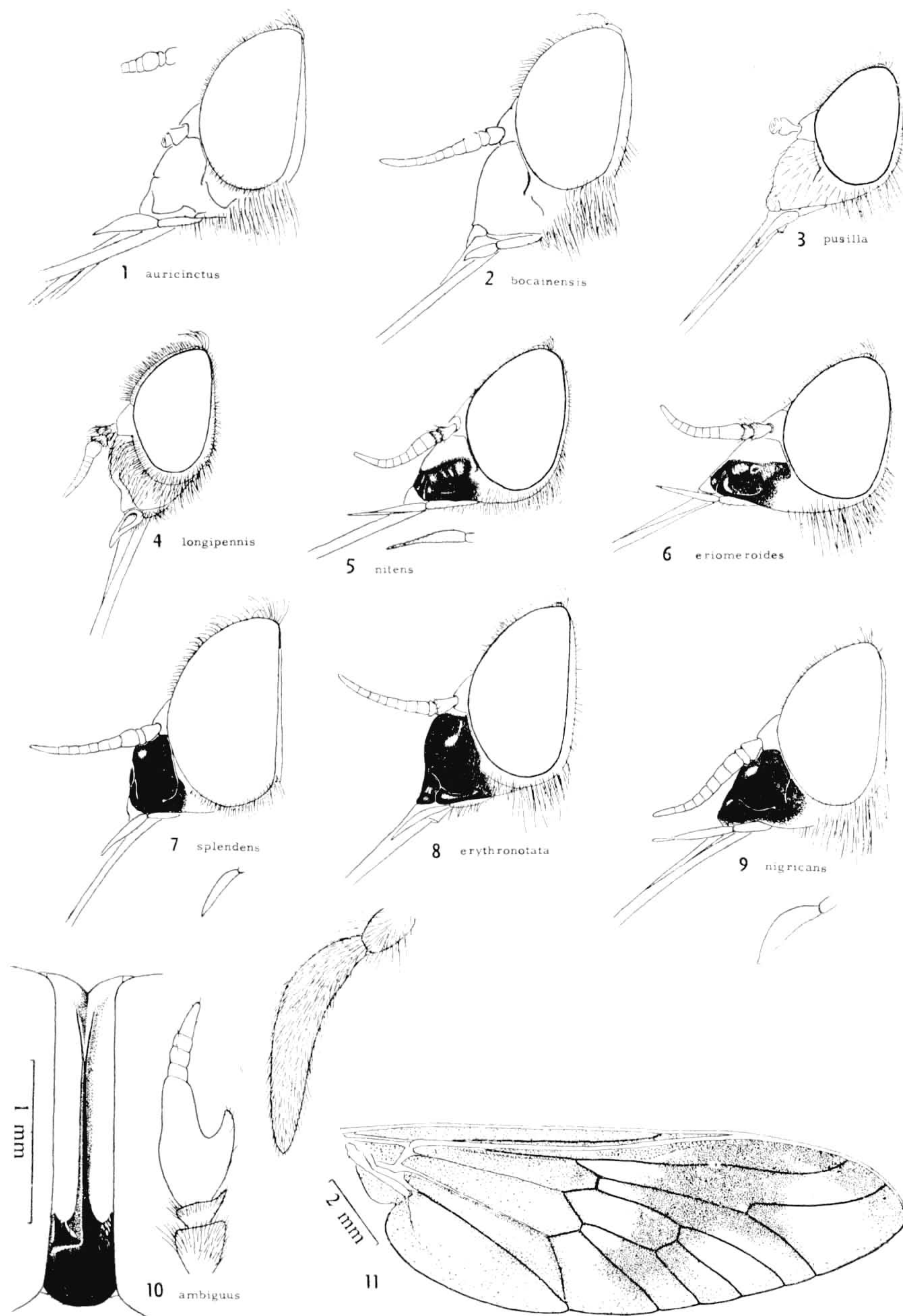


PLATE 2

- Fig. 1 — Palpus, frons and antenna of *Tabanus prunicolor* Lutz, paratype.
- Fig. 2 — Same of *Stigmatophthalmus altivagus* Lutz, homotype det. Lutz. Petropolis I-III-914. The callus is reddish brown, quite flattened on lower half.
- Fig. 3 — Frons and palpus of *Melanotabanus fuliginosus* Lutz, holotype.
- Fig. 4 — Frons, antenna and palpus of *Tabanus lineifrons* Lutz, frons from lectotype, antenna and palpus from paratype. The small figure of frons to show proportion, the large to show detail of callus.
- Fig. 5 — *Stibasoma giganteum* (Lutz), frons, antenna, palpus and wing tip of a homotype from Villa Braga, Tapajós river, XII-1919, S.M. Klages coll. The whole wing is black proximal to the distal margin of the band shown.
- Fig. 6 — *Tabanus procallosus* Lutz, frons and antenna, lectotype. The palpus is as in *T. prunicolor*, the subcallus wholly shiny yellow.

