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NOTES ON SOME AMERICAN SPHECINÆ (HYM.).

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In 1913 it became possible for the writer to study the types of American Sphecinæ now in Europe as far as it was possible to locate them. They are widely scattered in the different European collections and my studies took me from Naples to Lund and from Vienna to Oxford. In all, eleven places were visited but I was unable to visit Genoa, Geneva and Copenhagen where a few presumably are. Nor could I locate the Spinola collection. Most of Lepeletier's Sphecid types seem to have been described from this collection and I supposed the types would be in Paris. This proved not to be the case and Lepeletier's descriptions, while not particularly brief, are models, in this group at least, for giving only non-distinctive characters. In most cases, therefore, his species remain unrecognized.

Genus **Chlorion** Lat. (**Sphex** of many authors.)

The reasons for changing the generic name *Sphex* to *Chlorion* have been given by the writer in Entomological News, xv, 117, 1904 and xvi, 163, 1905, and perhaps more clearly in Proc. U. S. Nat. Mus., xxxi, 292, 1906. It is unnecessary, therefore, to consider them here. The position taken in those articles is fully sustained by Opinion No. 32 of the International Commission on Zoological Nomenclature.

Chlorion (Chlorion) cyaneum Dahlb. This species has been and still is often referred to as *Chlorion* or *Sphex coerulea* L. This is incorrect. Linné in the tenth edition of the Systema Naturæ, p. 571, described *Sphex coerulea* from "America

meridionali." Kohl has expressed the opinion that this description refers to some southern species of *Pepsis*. In any case it does not agree with the species here concerned. In the twelfth edition of the Systema Naturæ Linné repeats this description on page 947 as species No. 38, while on page 941, as species No. 2, he describes another *Sphex coerulea* from "America septentrionali" which agrees with our North American species fairly well. The name cannot hold, however, for the other one (on page 947) is the same, word for word, as the one in the tenth edition which therefore has priority. Catesby, De Geer and Drury seem also to have written about the *coerulea* No. 2 of the twelfth edition but use either *coerulea* or no name at all. Fabricius recognizes both of the Linnean species, which in his Systema Piezatorum he places in the genus *Pepsis*, by references to the twelfth edition of the Systema Naturæ, but seemingly has noted the duplication of the name for he renames the preoccupied one, *cyanea*. This would seem to provide the species with a name, but in the Fabrician collection at Kiel, arranged both by name and number to correspond with the Systema Piezatorum, and presumably so arranged by Fabricius himself, are three specimens, placed under that name and number, which upon examination proved to be the common *Chalybion cyaneum* Dahlb, one of the mud daubers, and entirely different from the insect under consideration.

If Fabricius was acquainted with Linné's specimens and correctly identified his own, it would follow that neither Linné's nor Fabricius' names could apply here. In any case the Fabrician one cannot.

The first name to become available for the species is that given by Dahlbom (Hym. Eur., I, 24, 1843) who gave it the name *Chlorion cyaneum*. As he recognizes the Fabrician species also, as *Chalybion cyaneum*, with references to Linné, DeGeer and Fabricius, no confusion of the two is possible. Accordingly, *cyaneum* is the first available name for this insect and as it is still placed in the genus *Chlorion* its name is *Chlorion* (*Chlorion*) *cyaneum* Dahlb.

Chlorion (Priononyx) striatum (Sm.). The type of *Sphex* (*Priononyx*) *laerma* Cam. in the British Museum upon examination proves to be this species and the "?" before the reference to it on page 335 in my paper (Proc. U. S. Nat. Mus., xxxi, 1906) can be deleted. In Vienna, Kohl has labelled specimens of

striatum as *johannis* Fab., showing his opinion as to the identity of the two, but I was unable to find a positively Fabrician specimen of *Pepsis johannis*, as Fabricius called it, in any of the European collections, so the relation of the two cannot be considered as proven.

Chlorion (Priononyx) atratum (Lep.). I have now seen specimens of this species from Oregon and Washington, thus giving it a continuous distribution across the northern border states.

Chlorion (Priononyx) thomæ (Fab.). In the Fabrician collection at Kiel are four specimens, all males, under the label *thomæ*; also a large female of the same species under the label *crucis*. Evidently Fabricius did not recognize their identity. *Thomæ*, having been described first, is the name which holds. In Paris is a specimen bearing the Fabrician label "P. crucis p in Guadeloupe fab" but it is *Chlorion (Ammobia) ichneumoneum aurifluum* Perty.

Chlorion (Priononyx) pubidorsum (Costa). In the Achille Costa collection at the University of Naples is undoubtedly the type of this species, published in 1862, labelled "M Zool No 7882"; "Enodia ♂ 11.76 pubidorsum A Cos Biogian." This is the species hitherto generally called *Chlorion (Priononyx) bifoveolatum* (Tasch.), published in 1869. The identity of these species (I have also seen Taschenberg's type) is certain, but I have not been able to learn the meaning of the word "Biogian" on the label. I have named and sent out many specimens of this species during the last twenty-five years labelled *bifoveolatum* Tasch. which should be corrected to *pubidorsum* A. Costa.

An examination of the type of *Chlorion (Priononyx) excisum* (Kohl) at Vienna confirms the belief I expressed in Proc. U. S. Nat. Mus., xxxi, 417 that this insect is only a variant of *pubidorsum*.

Chlorion (Priononyx) neoxenum (Kohl). I think that Kohl was correct in his opinion that the specimen from which he described this species bore a wrong locality label and that instead of coming from Vancouver Island was South American. It is the same as my *simillimum* from Argentina. From a study of the type of *Chlorion (Priononyx) ommissus* (Kohl) I am of the opinion that this will prove to be the male of *neoxenum*.

Chlorion (Isodontia) aztecum (Sauss.). The type of Cameron's *Isodontia robusta* ♀, in the British Museum is this species, but with an unusually dark costal margin of the wings.

Sphex apicalis Smith, (Hym. Brit. Mus., iv, 262, 1856) has generally been supposed to apply to the species now known as *Chlorion* (*Isodontia*) *harrisi* Fern., the name *apicalis* being preoccupied. Examination of Smith's type, however, shows that it is not this species, but the one known as *Chlorion* (*Isodontia*) *aztecum cinereum* Fern. Had the name *apicalis* not been made use of previously, this discovery would have necessitated a number of changes which fortunately are not needed.

Subgenus **Ammobia** Bilb.

When I proposed the subgenus *Proterosphex* (Proc. U. S. Nat. Mus., xxxi, 65, 1906) I failed to give sufficient consideration to Billberg's paper. Mr. Rohwer has correctly substituted Ammobia Billberg for my Proterosphex.

Chlorion (Ammobia) habenum Say. The type of *Sphex princeps* Kohl, "Vaterland unbekannt, wahrscheinlich Australien" in the Vienna Museum is unquestionably this species: *princeps* accordingly, is a synonym of *habenum*. I have now seen specimens from Honduras, Guatemala and Mexico in addition to the localities previously listed.

Cameron describes his *Sphex guatemalensis* from both sexes. In the British Museum I could find only two specimens so marked, both females. One of these is *Chlorion habenum* Say while the other is a true example of *guatemalensis* (see below).

Chlorion (Ammobia) opacum (Dahlb.). One male labelled "Sphex opaca Am. merd." in Dahlbom's writing is in the Dahlbom collection at the University of Lund and is what has been generally called *Chlorion* (*Ammobia*) *flavitarsis iheringii* (Kohl). In consequence, the names of the species and subspecies concerned must be rearranged, *Chlorion flavitarsis iheringii* (Kohl) becoming *Chlorion opacum* (Dahlb.); *Chlorion flavitarsis* Fern. becoming *Chlorion opacum flavitarsis* Fern.; *Chlorion flavitarsis saussurei* Fern. becoming *Chlorion opacum saussurei* Fern. and *Chlorion flavitarsis guatemalensis* (Cam.) becoming *Chlorion opacum guatemalensis* (Cam.).

In the British Museum is a male Chlorion labelled "flavovestita Type Sm." but with no locality or catalogue number. Smith described this species as from India but it is certainly *opacum*. It seems probable that the locality given by Smith is erroneous.

Chlorion (Ammobia) nudum Fern. I now have records of captures of this species from King William Co., Va., July; and from Jocasse, S. C., August 19; and of its probable female, *Chlorion (Ammobia) bridwelli* Fern. from "near Alto Pass, Union Co., Ill." and Wesson, Miss., both taken in August, thus considerably extending the known range of these species.

Chlorion (Ammobia) caliginosum (Erichs.). Five specimens, all females, labelled *erythroptera* Cam. in the Biologia collection at the British Museum, none marked Type, agree with specimens of *caliginosum* Erichs. in the Berlin Museum labelled Type. One of these last is also marked "caliginosa N Brasil" enclosed by a black line and on green paper. I was informed that this is a Klug label. If so, it would seem that Erichson adopted Klug's museum label for his own to publish.

Chlorion (Ammobia) singularis (Smith). The type of this species; of Cameron's *singularis;* of Costa's *chlorargyrica* and of Kohl's *spiniger* have all been studied and are the same species. Smith's name, being the oldest, must hold for this insect. A male specimen in the Banksian collection at the British Museum, labelled *ichneumonea* is also this species. At Oxford, a female Chlorion bearing the four labels: "Ega Bras"; "singularis Ega Smith"; "I see no difference between this and specimens of S. barbara from Texas in Mus. Smith"; "Coll Smith 1879" does not agree with the London specimen at all well and is likely to prove to be *Chlorion (Ammobia) brazilianum* (Saussure). *Tinctipennis* Cam. is no more than a variety of this last.

Pepsis fervens Fab. (not Linné). The species so named by Fabricius in his Systema Entomologiæ, is recorded as from "India orientali." There are two specimens placed under this name in the Fabrician collection at Kiel, but being supposedly Asiatic, I did not examine them. In the Paris Museum, however, I found a specimen bearing the Fabrician label "p. fervens p St Domingue fab" and a second, "Museum Paris St Domingue Coll Bosc 1828. Whether this specimen is the same species as those at Kiel I am unable to say, but in any case the one in Paris is what has been known as *Chlorion (Ammobia) resinipes* Fern. As it is not the Linnean *fervens*, however, *resinipes* still holds as the name of the San Domingo species.

Chlorion (Ammobia) fuliginosum (Dahlb.). In the Berlin Museum are three specimens of this species, two males and a female. One male bears the labels: "Type"; "fuliginosus M Dahlb." and "fuliginosa N Brasil" (and an undecipherable word). This last label is Klug's usual one. The other male has the genitalia mounted on a card, below which are: a blank white label; "fuliginosa" in Dahlbom's writing; and "Type." These two would seem to be Dahlbom's types. The female is marked "Type"; and "Sphex congener Kohl." I suspect that as Kohl described *congener* from females, this is one of his types, sent here to go with the males as *congener* is undoubtedly the female of *fuliginosum*. At Lund is a specimen marked "73"; "Tranquebar"; and "Sphex fuliginosa Berl. Mus. Ent. Er. e Brasil." This insect does not seem to be of the same species as the others.

Chlorion (Ammobia) latro (Erichs.). At Berlin are two specimens, male and female. The latter has only one label, reading "Type": the male has four: "Type"; "latro Er. Br. Guy." followed by a word something like "Whonat"; "4701" and "Sphex roratus Kohl ♀." The identity of the two species had evidently been determined when this last label was prepared, though in Kohl's paper (Ann. k. k. naturh. Hofmus., v, 219, 1890) he only suggests the possibility that they may be the same. I have seen the types of both species and place *roratus* in the synonomy.

Chlorion (Ammobia) melanopum (Dahl.). A specimen of this species at the Berlin Museum carries three labels: "melanopa Dahl."; "Type"; and "Sphex *ruficauda* Taschenberg." It is probably Dahlbom's type as I found no specimens of this species at Lund. The type of *Sphex proxima* Smith in the British Museum and that of *Sphex ruficauda* Tasch. at Halle are both this species, thus proving Kohl's belief as to their identity to be correct.

Chlorion (Ammobia) dubitatum (Cress.). The types of *Sphex micans* Tasch., described from five females are of the same species as Cresson's *dubitata*. I have seen the types of both. It is quite likely that Smith's *dorsalis* is also the same though I found no specimens in the British Museum bearing his label. Four at Oxford, named in his writing, are this species, though. Smith considered his specimens to be Lepe-

letier's *dorsalis* which may be correct, but this type, being in the Spinola collection, which I was unable to locate, makes it impossible to prove their identity at present. Until this point has been settled, therefore, this insect must be known by Cresson's name.

Genus **Sphex** L. (**Ammophila** of many authors).

Reasons for the use of the name *Sphex* instead of *Ammophila* have already been presented elsewhere. I may be permitted to repeat, however, the statement that the original species of the genus, published by Linné in the tenth edition of the Systema Naturæ, by rule must furnish the genotype. By 1805, though, all of these had been removed to other genera while other species, many of them really belonging elsewhere, had been added to *Sphex* by a number of describers. It may be well, therefore, to call attention here to the point that Fabricius seems to have realized this situation, for in 1804, in his Systema Piezatorum, he groups the different species in the genera *Pelopaeus*, *Sphex*, *Pepsis* and *Chlorion*. In *Sphex* he places four species: *sabulosa* L., the first one named by Linné; and three of his own. All of these belong in *Sphex* (s. str.) as used here. Under *sabulosa* he correctly gives as a synonym *Ammophila vulgaris* Kirby, and under *Pepsis arenaria* he gives as a synonym *Ammophila hirsuta* Kirby, now a *Podalonia*. This synonomy evidences that, at least as far as the species he (Fabricius) included in this book are concerned, he did not recognize *Ammophila* as a valid genus, and his restriction of *Sphex* to species which are still congeneric and one of which was Linné's *Sphex* No. 1, would indicate that he was trying to purify an assemblage of species belonging in numerous genera and select as members of *Sphex* those species congeneric with Linné's "chef de file."

In the following synonomy the names of species of which I have studied the types are preceded by a *.

Sphex abbreviatus (Fab.). In the collection at Kiel under "34 Pelopaeus"; "8 abbreviatus" are two male specimens. either would fit the description fairly well but they are different species. The first is the same as a specimen in the Berlin Museum marked "Brasilien"; "4851"; "melanaria N," and one at Lund marked "Brasilia Berl. mus"; "melanaria Kl";

"Am. binodis Fabr. certe, see Mus. Havn. p. 8, Am. melanaria K M. 13. Dlbm H. E. 15." Both of these last are males and one or both were undoubtedly the insect or insects used by Dahlbom in preparing his description of *Ammophila melanaria*. In view of the fact that Dahlbom gives "Kl. Mus. Berol" in connection with his description it would seem that type value should be given to the Berlin specimen rather than to the one at Lund.

With the original description of *abbreviatus* fairly applicable to either species at Kiel, and with the first one certainly the same as *melanaria*, I have decided to consider the Fabrician specimen standing second after the label as Fabricius' type, thus avoiding the synonomy which would otherwise be involved.

Many writers have identified and listed *abbreviatus* from North America. Thus far I have failed to find in any of these a true example of this species and doubt if it occurs any great distance, if at all, northward into Central America. The insect usually marked by this name, captured in the United States, is **Sphex aureonotatus* (Cam.). Sometimes it has been identified as *Sphex* or *Ammophila gracilis* Lep., but *gracilis* appears to have some ferruginous on its abdomen (Rohwer—in lit.—agrees with this) to judge from the description.

***Sphex binodis** Fab. This species has not been recognized from the description. In the Paris Museum I found an insect bearing the three labels: "S. binodis p. Cajanne fab" in Fabricius' writing; "Museum Paris Cayenne Coll Bose 1828"; "abbreviata det Kohl ♂." As Fabricius described the species from "Cajenne Mus. Dom. Bosc" there would seem to be little doubt that this specimen is the type. The last label probably means that Kohl saw this insect and considered it the same as *Sphex abbreviatus*, and that as it is a female, he regarded it as of the other sex of *abbreviatus*. This is probably correct.

***Sphex arvensis** (Dahlb.) The type is in the Dahlbom collection at Lund, marked: "Ammoph. arvensis Berl. mus. eul (col?) Er. ♂ ♀ Pensylv. Zimrmn." It is a male. Dahlbom writes after his description of this species: "Ammophila id. Klug. Mus. Berolin. Exemplar unicum e Pensylvania Americae borealis amice communicavit Cel. Dr. Zimmermann."

The one in the Berlin Museum referred to is probably the one marked: "N. Amerika"; "inepta Cr. det. Kohl"; "arvensis

N Am. sept."; this last in Klug's handwriting. As the specimen at Lund has a petiolated third cubital cell in each fore wing it is evidently Dahlbom's type which he placed under *Miscus* because of this venation. I have examined nearly two thousand insects of this species from all parts of North America but have found no other case of a petiolated third cubital cell, so consider the type as having an abnormal venation. The Berlin specimen has the normal venation. This view is also supported by the fact that in the right fore wing of the type only the front third (about) of the first transverse cubital vein is present. I find, though rarely, an example of some species of *Sphex* in which the third cubital cell is almost petiolated, but one or two, only, among hundreds of the specimens examined. I am not prepared to attack the validity of *Miscus* as an Old World genus, but am positive that it is not present in North America and that any specimen of Sphex having a petiolated third cubital cell is only an individual deviation from the normal.

As synonyms of *Sphex arvensis* I place **Ammophila urnaria* Dahlb., of which at Lund are two specimens, one from "S. Carolina Zimrmn"; the other marked "urnaria Kl. Mus. Berl." As Dahlbom gives South Carolina and Pennsylvania for habitat and states that he received specimens from Zimmermann the former is undoubtedly one of those from which his description was made. I could not find any specimens at Berlin which I could feel certain had been seen by Dahlbom. As synonyms I also place **Ammophila vulgaris* Cress.; **Ammophila mediata* Cress, and **Ammophila inepta* Cress.

This species is the most widely distributed of any American *Sphex*. I have seen an example from Fort McLeod, about 55° north latitude; from Guatemala, and from practically every State and from Mexico. As might be expected, it varies greatly and Cresson's descriptions are of variations, with specimens he identified as *urnaria* the typical *arvensis*.

The chief varying characters in this species are the degree of pilosity and its color; the area covered by ferruginous; and size. *Vulgaris* is a very pilose, white haired form; *mediata* averages slightly larger and the hairs on the head (and sometimes on the prothorax) are brown, while *inepta*, found more frequently in the southern states, is liable to be more slender in proportion to its length and rather sparsely pilose. The

amount of surface which is ferruginous seems to be determined by the humidity of the locality where the insect occurs, a relation already discussed in connection with *Sphex procerus* (Ann. Ent. Soc. Am., xix, 88, 1926). Size seems to be extremely variable in the same species and it has been suggested that this may be due to different amounts of food supply stored for the young to feed upon, either from difficulty in finding enough, or possibly from haste because of a necessity for immediate egg deposition. Examples which might almost be termed dwarfs are certainly often met with in *Sphex* and *Podalonia*, while others, almost gigantic in comparison, also occur.

Aside from the differences just named, and between the limits of which all intermediate conditions occur, I have been unable to find any stable morphological characters by which the above named species can be separated.

***Sphex procerus** (Dahlb.). This species, like the last, has a very wide distribution and is very variable. Its synonyms are: **Ammophila gryphus* Sm., ♀ ♂; **A. saeva* Sm., ♀; **A. conditor* Sm. ♀; **A. macra* Cress., ♂; *A. barbata* Sm., (no type found, either in the British Museum or at Oxford); **A. ceres* Cam. ♂; **A. championi* Cam., ♀; and **A. striolata* Cam., ♀.

The range in size of this species is enormous and the amount of ferruginous on the abdomen also varies greatly. In *saevus* Sm. from California and *striolatus* from Ventanas, Mex. the black is greatly reduced, giving the abdomen an almost entirely ferruginous appearance above. When one female is eighteen millimeters long and another is twice that length, and when in some cases the abdomen shows only slight traces of ferruginous while in others it is nearly all of that color it seems almost impossible that only one species is involved. Yet structurally no fixed differences seem to occur, and reluctantly I have come to believe that all the different names listed above belong to the same species.

***Sphex breviceps** (Sm.), ♀. I am unable to separate **Ammophila pruinosa* Cress. and **A. varipes* Cress. from Smith's *breviceps*. **A. comanche* Cam. is also a synonym. The species is a variable one, in some regions being only slightly pubescent, but densely clothed with erect hairs, while in others the pubescence is very complete and the erect hairs rather few. All intergrades between these extremes occur and the

amount and distribution of the ferruginous is also very variable. No fixed morphological differences have thus far been found, however, though a typical *pruinosa* looks quite different from a typical *breviceps*.

***Sphex placidus** (Sm.). This species, described from California, proves to be the same as the later published *Ammophila pictipennis* Walsh, **A. extremitata* Cress., **A. anomala* Tasch. and *Sphex nigropilosus* Rohwer. I have not myself seen Rohwer's type but have examined specimens from the same locality, loaned me by the U. S. National Museum and do not find two teeth on any of the claws. Others, who have examined the type, also fail to find a second claw and are of the opinion that *longispinus* might well be placed as identical with *pictipennis*.

Western and southern specimens of this species are larger, stouter and more coarsely marked than northern and eastern ones, which probably explains why *placidus* has not heretofore been recognized.

Sphex aberti (Hald.). The type has been lost, but the insect is so distinctive in its typical condition there can be little doubt as to its identity. **Ammophila yarrowi* Cress. and **A. montezuma* Cam. are synonyms.

This is such a variable species in different parts of its range that only a long series of intergrading examples has kept me from describing several new species from the lot!

***Sphex politus** (Cress.), ♀. The male of this tiny species has since been described by Kohl as **Ammophila nearctica*.

***Sphex ferruginosus** (Cress.). This striking species is in all probability the female of Cresson's *collaris* ♂, though proof of this is lacking. Nor can I separate it from *Coloptera wrightii* Cress. structurally, except by the size. The original basis for the establishment of *Coloptera* was the presence of two (first and second) cubital cells only, caused by the obliteration of the second cubital cross-vein, or by the fusion of the second and third cross veins. This distinction now seems to be of little value owing to abnormalities of venation which are quite common in this group, but others, such as the form of the collar and its transverse rugosity, etc., have led Kohl to include several species in an "Artengruppe" with the name *Coloptera*. As *wrightii* and *ferruginosus* have these characters in common

and differ only in size (and with intermediates, here) I find no reason for separating them. The type itself of *wrightii* has two cubital cells in the left fore wing and three in the other, the third, however, lacking the central third of the third transverse cubital vein! This subject will be discussed further, elsewhere.

Sphex harti new name. The species described by Hart as *Ammophila argentata* had not previously been named but its transfer to the genus *Sphex* as *Sphex argentatus* is not possible as Fabricius described a *Sphex argentatus* in 1787. I therefore replace this preoccupied name by the specific name *harti* in recognition of the original describer of the species.

Genus **Chalybion** Dahlb.

Chalybion cyaneum (Fab.). The discussion above, on *Chlorion coeruleum* should have made it plain that the name *coeruleum* cannot be used, either for the digger wasp, *Chlorion*, or the common mud dauber, *Chalybion*, as has even recently been done. The first name hitherto recognized as available for the mud dauber was given by Dahlbom, but under his description he gives references to Linnè, Systema Naturæ, Ed. 12 and Amoen, Acad., 6; DeGeer, Mem. 3; Fabr., Ent. Syst., 2, 201, and Syst. Piez., 211. These follow his words: "*Sphex cyanea,*" but the first three when checked (by Dalla Torre's Catalogus) prove to be under the name *coerulea!* The Fabrician references are to the name *cyanea* and as the types at Kiel under the name and number referred to by Dahlbom are the same species as those so named in the Dahlbom collection we can safely attribute the name *cyanea* to Fabricius rather than to Dahlbom.