SOME
ICHNEUMONIDAE
OF ALBERTA

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A Survey of the subfamily Joppinae

by

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The major portion of this paper is a taxonomic study of the parasitoidal subfamily Joppinae (Family Ichneumonidae). Their hosts are species of the family Noctuidae and many of these are of economic importance in the prairie provinces. A taxonomic study of the western joppines, therefore, may be of value in biological control work. The methods of increasing the natural efficiency of parasitoids are reviewed, as well as the factors that modify or nullify attempts at control.

The taxonomic treatment of the subfamily Joppinae is preceded by descriptions of the external morphological structures that may be used in the identification of the various groups within the subfamily, special attention being given to the genus Amblyteles Grav.(s.l.).

The methods of classification by various workers are discussed and keys formed for all species reported from the province. The sole genus of major importance is Amblyteles, in which nearly sixty species are discussed. In most cases the type has been re-described, emphasising the morphological structures rather than colour. Three new species have been named. Eleven others, mostly uniques, have been described and are probably new.

The thesis is in the nature of a preliminary survey.

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I. INTRODUCTION

A. The Faunal Areas of Alberta

1. Present Biotic Distribution

Alberta is not a homogeneous faunal area but has three fairly well defined zones. The south-eastern portion of the province consists of treeless, open prairie, being a part of the Great Plains. According to the United States biological survey zone map (Merriam et al., 1910) this area lies in the Transition zone of the Austral Region. Nearly all of the remainder of the province is covered by brush to a large extent with muskeg in the northern area; this general territory is named the Canadian zone of the Boreal Region. Along the south-west boundary of Alberta lie the Rocky Mountains with a Hudsonian type of life; large areas of the Hudsonian zone of the Boreal Region lie in B. C. adjacent to the northern third of the Alberta-British Columbia border. A Hudsonian area occurs in the extreme north-east of the province, this being the edge of a much larger area in the North West Territories. To a large extent the joppine specimens studied in this paper were collected within the Canadian zone, although a considerable number were gathered either near to or within the other two zones.

2. Migrations and the Formation of Races

According to Adams (1905) there were three main paths of migration of fauna in America:-

1. from south-west up both sides of the Rocky Mountains

into Canada

2. from the north-east into Alberta

3. from Siberia and Alaska and south along both sides of the Rocky Mountains

Webster (1903) also found evidence of the Siberian and Alaskan migration; however, no joppine species found by the Harriman Alaska Expedition (Ashmead, 1902) have been found in Alberta as yet. Many species to be found in eastern Canada or in Colorado are reported also from Alberta, thus adding to the evidence for the other two migrations.

It is to be expected that these migrations to different environments have caused a number of geographical races to be created.

B. Economic Importance of the Family Ichneumonidae and the Consequent Need for Taxonomic Study

1. Parasitoidal Habits

The family Ichneumonidae is one of the largest among the so-called parasitic Hymenoptera, although they are parasitoidal rather than parasitic in the precise meaning of the term.(Reuter, 1918; Wheeler, 1928). A parasitoid is an insect that is free-living in the adult stage; the larval stage lives within or upon a host insect, the tissues of which it devours; the host, however, does not die until the parasitoidal larva is ready to pupate.

According to Thompson (1930) the members of the family Ichneumonidae may be ectophagous or endophagous. In the subfamily Joppinae, however, the larvae feed within the

pupae of Lepidoptera only, so far as is known (Cushman, 1928); many of them are monophagous or oligophagous, although their life histories in general have not been studied intensively. Thompson and Parker (1927) regard the majority of parasitoids as "rather indefinitely polyphagous". Muesebeck and Dohanian (1927) find this especially true of hyperparasitoids.

As the completed life cycle of the parasitoid necessitates the death of the host, parasitoids frequently are of great importance in the control of insect outbreaks. When the numbers of a host species become greater, the chance of the survival of the individual parasitoid becomes greater due to the smaller proportion of superparasitism and multiparasitism, as well as the reduced mortality due to birds and other predators. The parasitoids, therefore, multiply until their numbers approach those of the host so that there is a great increase in the percentage of parasitised hosts and of the host mortality. Following this the parasitoids reach their maximum numbers and the host species is attacked so severely that it is reduced in numbers very much below normal. This method of control is slow and therefore occurs only when the necessary mortality has not been brought about previously by other factors such as climate, insect predators and other animals, diseases or man.

2. Utilisation of Parasitoids in the Control of Insect Pests

Howard (1924, 1930) has reviewed this subject historically in a very interesting manner, outlining the amount of control work that is being done in each country. Of

special interest is his account of the successful introduction by Berlese into Italy of the parasitoid Prospaltella berlesei How.; this parasitoid controlled completely the scale insect Diaspis pentagona Targ., which was ruining the silk industry of France and Italy by destroying the mulberry leaves on which the silkworms feed. Due to the sedentary habits and the incomplete metamorphosis of the scale insect as well as the insular type of crop, the introduction was entirely successful. Other similar and satisfactory introductions have been reported by Smith (1926) in California and by Pemberton and Willard (1918) and Willard and Bissell (1926, 1930) in Hawaii.

The control of insect species having a more complicated life cycle or living in continental areas has not been nearly as successful. Sometimes, however, the numbers of an introduced, parasitoidal species reach a significant percentage only after a number of years. In the case of Pleurotropis epigonus Wlk., a common parasitoid of Phytophaga destructor Say, the parasitoid was not recovered in the field until twenty-two years after its introduction (Howard, 1924). The difficulties of biological control in continental areas has been discussed ably by Thompson (1928).

At present the introduction of parasitoidal species may be carried out by one of two methods. Pemberton and Willard (1918) and Willard and Bissell (1926, 1930) consider that the indiscriminate introduction of parasitoids was not advantageous in the control of the Mediterranean fruit fly, Ceratitis capitata Wied. in the Hawaiian Islands; they preferred Berlese's method of introducing a single but prolific species, especially as they found that in Hawaii the more

prolific species was being destroyed by other parasitoids. Smith (1929) showed theoretically that rarely, if ever, could a parasitoidal introduction be detrimental and supported his case by a critical analysis of the data of the Hawaiian workers; according to Smith (loc. cit) a number of species should be introduced in order that as many ecological niches as possible may be filled, for, once an outbreak is controlled, the importance of fecundity is dominated by that of the maintainance of the numbers of the host species at the lowest possible level. This involves not only the ability to survive on other, less preferred hosts when the pest is scarce, but, as Nicholson (1933) states, also the effectiveness with which the parasitoid is able to find the host. A number of host species should exert a greater degree of control than a single one; however, the single, prolific species may be more effective in the immediate control of an insect outbreak. Thompson (1930) supports Smith's conceptions, but considers that there is insufficient evidence in support of it , so that the interrelationships between the various proposed parasitoids and their effects upon the native fauna should be studied closely before their introduction, as once a parasite has been imported it cannot be eradicated.

In the control of insects having more complicated life cycles, such as in the Lepidoptera, Fiske (1910), Howard and Fiske (1911), Tothill (1922) and Howard (1924) stress the importance of the host being attacked in successive stages of its life cycle so that the effects of multiparasitoidalism are minimised. Thompson (1923) supported the theory insofar

as it aids in the selection of a single, successful parasitoid, for there is no proof that such an insect cannot be successful; otherwise the sequence theory is applicable only to a very limited group of specialised cases. As stated before, however, Thompson (1930) believes that the introductions should be made singly.

There are numerous factors to be considered before introducing a parasitoid into a new area, the chief of these being the variations between the native and proposed climates, the fecundity of the parasitoid and the relationships between the imported fauna and the new flora and fauna.

Successful introductions of parasitoids are dependent upon climatic factors, particularly ~~with~~ temperature and humidity (Shelford, 1926). Climatic factors affect not only the number of eggs laid by the female of a species but also the number of generations in a year, the synchronism with suitable hosts and the pre-imaginal mortality. The fecundity is affected also by the sex ratio, some parasitoids being parthenogenetic, and by the adaptation of polyembryony, as in the Encyrtidae (Thompson and Parker, 1927).

The probable reactions of a parasitoid with the native fauna should be considered in relationship with hyperparasitism, multiparasitism and also the presence of alternate host species, if necessary, to carry the parasitoid through a season or through a period when the preferred host is scarce.

The flora should be studied not only for its indirect ecological effects upon the amount of temperature,

relative humidity, light, etc. but also as a source of food to the adult; Howard (1924) has shown that this is true of imagines in the family Scoliidae, while I frequently have observed adults of Meteorus vulgaris Cress.feeding upon wild asters.

Among other factors are the ability of the parasitoid to disperse through an infested area and the amount of mortality that is likely to occur due to mechanical means such as spraying, cultural methods and stubble-burning. Howard (1924) and Thompson (1930) list other significant factors.

With these factors interreacting to form a very intricate complex it is not surprising that attempts at biological control are frequently failures and are usually slow as well as being too late to save crops or commercial goods threatened by insect pests; this is due especially to the introduction of the parasitoids in small numbers and to their inability to kill the host immediately after parasitisation. Nevertheless, parasitoids exert a great importance in preventing outbreaks by keeping the numbers of the host species down so that the damage is of sub-economic importance; their effect is not a complete extermination of the host species but a prevention of violent fluctuations in the numbers of the host.

It can be understood readily, therefore, that the permanent suppression of imported insect pests can be carried out most economically by biological control with parasitoids. This is based upon an understanding of their life histories and this in turn on the systematic knowledge

of parasitoidal groups such as the family Ichneumonidae.

II. MORPHOLOGY OF THE FAMILY ICHNEUMONIDAE

A. Immature Stages with Special Reference to the genus Amblyteles

The immature stages in the Ichneumonidae have not been studied at all fully, although such work should assist in the reclassification of the family, based upon the natural affinities of the groups concerned.

1. Egg

The egg of Amblyteles subfuscus Cress. is elongate, cylindrical and rounded at the ends (Strickland,1923). In some Amblyteles species the eggs have one end of the egg more strongly rounded (Cushman, 1926). As a rule eggs laid within a host are placed in the body cavity but the fat body, gut, salivary glands, brain or other organs may be selected (Imms, 1931). Amblyteles subfuscus selects the spinning glands (Strickland, 1923). Eggs laid within a host usually have little yolk and the chorion may be thin, membraneous or absent (Imms, 1931).

2. Larva

The larvae of the Ichneumonidae have been described by Thompson (1930) as being apodous, with three thoracic and ten abdominal segments, the cuticle unpigmented, mandibles opposed and usually simple,the maxillary and labial appendages either present or else represented by definitely circumscribed maxillary and labial areas. The cephalic region is not notably reduced, a definite head capsule being present. There are four to five larval instars, Chewyreuv (1912) reporting

four in Amblyteles. Chewyreuv (1912) also describes the newly hatched larvae as having twelve segments but no spiracles until after the first moult, when nine pairs appear. Thompson (1930) states that nine pairs of functional spiracles are present in the later larval stages in the family Ichneumonidae.

3. Pupa

In the Ichneumonidae cocoons are usually formed (Thompson, 1930), the adult usually emerging from the chrysalis of the lepidopterous host (Cushman, 1926), while, so far as is known, the members of the Joppinae are parasitic in the pupae of Lepidoptera. The adults emerge through a neat, circular hole in the pupa of the host.

B. Adult Stages with Special Reference to the genus Amblyteles

1. General Description

The members of the Hymenoptera have developed a greater number of specialised structures in each individual than occurs in any other order; other orders may be specialised to a greater degree along certain lines but the Hymenoptera have modified their structures to a greater extent when the structures are considered in toto (Snodgrass, 1911).

The family Ichneumonidae is specialised for larval ecto- and endoparasitism (Cushman, 1926) and the morphological structures of the adults, therefore, have been modified profoundly in order to facilitate oviposition. The legs, more especially the posterior pair, have become elongated to hold

the intended host comparatively motionless about the region where the egg is to be laid. The petiole has become reduced in cross-section, allowing the abdomen to become more flexible than in the Chalastrogastra, permitting a more rapid and surer oviposition.

The main taxonomic characteristics of the adults of the Ichneumonidae have been listed by Schmiedeknecht (1930) as follows:-

> Trochanters two-jointed; wings with stigma and two recurrent veins and without lanceolate cells, the first cubital cell not completely separated from the discoidal but united as the disco-cubital cell; wings seldom absent; antennae straight with at least sixteen joints; abdomen petiolate or sessile but in the latter case not broadly attached to the thorax but joined to the ventral portion of the propodeum by a true articulation; the ovipositor of the female always present and often very long; legs bare with tibial spurs, very seldom with teeth or scopae. The second recurrent nervure is absent, however, in the genus Hymenopharsalia Morley (Cushman, 1922).

The following more detailed description of the Ichneumonidae (and of groups within this family) will be applicable to the genus Amblyteles unless otherwise specified.

2. Head Capsule

The head usually is about as broad as long, the vertex being more or less dilated; the head is narrowed or broad behind so that the temples are correspondingly broad or narrow. The ocelli are three in number and are variable both in size and in their position relative both to

each other and to the compound eyes so that the postocellar, lateral ocellar and ocellocular lines are of specific taxonomic significance. The frons extends from the stemmaticum to the clypeus, the portion lying below the antennae taxonomically being called the face by Smith (1906), Ceballos (1925) and other authors and the supraclypeal area by Viereck (1916), while Schmiedeknecht (1930) identifies the face with the frons. The frons is bordered laterally by the compound eyes, which are sinuate within at the level of the insertions of the antennae; the inner margins below the antennal insertions may be subparallel or strongly divergent. The genae are narrow or broad, according to the place of attachment of the mandibles. The shortest distance between the mandible and the compound eye is termed the malar space; being of specific value when compared with the basal mandibular width. The length and width of the face (according to Ceballos' use of the term) is of systematic interest. The clypeus usually is separated from the frons by a more or less feebly defined epistomal suture that is wanting medially but extending laterally to the two prominent clypeal foveae or anterior tentorial invaginations. The variations of the antero-ventral margin of the clypeus are noteworthy systematically, usually being narrowly or broadly truncate, but occasionally entire and convex, denticulate medially or concave; the clypeus varies somewhat in the degree of punctation, usually being much coarser than that of the frons. The posterior portion of the head has not been used to any great extent, if any, in the taxonomy of the genus Amblyteles.

3.Appendages of the Head

In the genus Amblyteles the antennae vary in the number of segments, the number apparently not being a specific character, Ceballos (1925) states that this is a worthless characteristic, although the degree of variation is used in descriptions of species. The proportionate lengths of the flagellar segments are of considerable specific value, while these segments vary specifically also in their shape, being parallel-sided, subserrate, gradually dilated apically or dilated abruptly as an annulus. The antennae in the genus Amblyteles is always setaceous, rather than filiform as in the Ichneumoninae. Ceballos (1925) observes that a secondary sexual characteristic of the females in the Amblytelini is the rolling of the flagellum The same author reports that the integument of the segments is roughened due to numerous sense organs scattered on their surface, their presence or absence in certain segments being greatly used in the separation of the specimen of Amblyteles. The antenna bears a white annulus, the location of which is important.

The mouthparts of the Ichneumonidae are mandibulate. The labrum, except its fringe of long hairs, is more or less hidden by the clypeus. The mandibles in the genus Amblyteles are prominent, overlap each other, each bears two apical teeth, the ventral one sometimes subobsolete; they vary considerably in the degree of slenderness. They are of taxonomic value but should be used with care because of the possibility of their shape being altered by erosion during emergence of the adult from the cocoon to the light, more especially in those species that have to make their way from below the

surface of the ground. The other mouthparts have not been used in systematic work (Ceballos, 1925). Chatin (1887) and MacGillvray (1912) have studied these structures among the Hymenoptera.

4. Thorax

The thorax in the family Ichneumonidae is always robust, although not at all short in the genus Amblyteles. Snodgrass (1911, 1927) has made a comparative study of the hymenopterous thorax. His work being the most acceptable at the present time, this description of the thorax is based upon these publications.

The prothorax consists of a large dorsal sclerite, the notum, that appears to belong to the mesothorax, and a smaller ventral sclerite, that Snodgrass terms the episternum, although Berlese (1906) and others regard it as the prosternum. Dorso-laterally the pronotum extends to the tegulae, often overlapping the mesothoracic spiracles that lie in the intersegmental membrane. The prosternum is a small sclerite lying between the procoxae, behind the ventral parts of the episternum and bearing two internal apodemes, the prosternal furca (Snodgrass, 1927).

The mesonotum is divided into a large scutum and a scutellum. The notum in many members of the Ichneumonidae is divided into a prescutum and the scutum by two lateral grooves running posteriorly from the anterior margin, the notauli or parapsidal grooves. The latter term is applied incorrectly according to Tulloch (1929), being applicable only to sutures running anteriorly from the posterior region of the mesonotum. Crampton (1926) terms the notauli the

prescutal sutures. In the genus Amblyteles the notauli are short or absent. The scutum and scutellum are separated by a broad fossa, closed laterally by prominent carinae; the extent to which these carinae are produced is considered a generic character in the Joppinae, although in the genus Amblyteles it may vary intraspecifically. The scutellum is more or less convex in Amblyteles, this spparating this genus from the closely related genera Hoplismenus and Trogus, in which the scutellum is subpyramidal or strongly elevated.

The mesopleuron in the genus Amblyteles is separated from the mesonotum but is fused to the sternum posteriorly. The joppines are separated from the allied family Cryptinae by the absence of a grooved line or furrow, the sternaulus, (fig.6), separating the mesopleuron from the mesosternum (Smith,1904; Ceballos,1925). The epimeron is believed by Snodgrass (1911) to lie as a narrow strip parallel to the posterior margin of the segment. The sternum is divided by a suture, the mesosulcus (Ceballos,1925), the anterior portion, the prepectus, being more or less vertical and separated from the episternum by a raised line, the epicnemia (Schmiedeknecht,1930).

The metathorax is very much reduced, consisting dorsally of a notum (Snodgrass,1911; Viereck,1916; Crampton, 1931); this is commonly termed by taxonomists the scutellum and posterior to this lies a narros strip named the postnotum by Snodgrass (1911) and Viereck (1916) but as a part of the anepimeron by Crampton (1931). Crampton (1931) divides the metapleuron into four parts, the upper anepimeron and anepisternum, forming a more or less narrow strip above the larger katepisternum and katepimeron. Snodgrass (1911)

terms these four areas as pleuron only, the greater part of which lies ventral to the propodeal spiracle. The metasternum has fused to the pleuron. These areas are not defined exteriorly, the pleuron being fused indistinguishably with both the sternum and the propodeum, an area lying dorsoposteriorly to the pleuron. The metanotum bears the posterior pair of wings, the anterior pair being attached to the scutellum of the mesothorax.

5. Appendages of the Thorax

a. Wings

The veins in the hymenopterous wings have undergone so much change from the primitive type that the Comstock-Needham system of nomenclature (Comstock, 1918) evolves names that are too cumbersome for practical taxonomy. Cresson (1887) simplified the terms for the fore-wings while Rohwer and Gahan (1916) have produced a system that is of practical value. The wings have not been described as they have been illustrated instead according to the arrangement of Rohwer and Gahan (loc. cit.). The genus Amblyteles, and nearly the whole subfamily Joppinae, has the areolet pentagonal, the basal nervure interstitial or antefurcal and the nervellus reclivous as defined by Cushman and Rohwer (1920). In the Joppinae the wings are never absent or reduced.

b. Legs

The segments of the legs in the family Ichneumonidae are named in the customary manner except that the trochanter being divided secondarily, the proximal portion is named the trochanter (s.s.) and the distal portion the trochantellus (Ceballos, 1925; Schmiedeknecht, 1930). The anterior pair

of legs are the shortest and each bear a strigilis, while the two posterior pairs normally have two tibial spurs on each leg instead. The posterior pair of legs ~~are~~ is the longest and in some of the females of Amblyteles there is an area of dense, short pubescence, the scopa, borne on the posterior portion of the hind coxa; this is usually but not always of specific value.

There are five tarsal segments on each leg, the distal one bearing an empodium and two ungues, the latter being simple in the Joppinae, except in the tribe Listrodomini, that has pectinate claws.

6. Primitive Abdomen

The primitive abdomen in the Clistrogastra has divided into three areas, the propodeum, the pedicel or petiole and the gaster.

a. Propodeum

The propodeum is the first abdominal segment and has become fused so completely with the thorax that it has been confounded with the thorax by the earlier writers (Cresson, Provancher and Ashmead) as well as by Ceballos (1925) and Schmiedeknecht (1930). It is homologous with the the epinotum of the Formicidae (Wheeler, 1910) and this structure occurs throughout the higher Hymenoptera (Snodgrass, 1925).

The propodeum in the Ichneumonidae is more or less areolated by carinae, the areolation being developed to the greatest degree in the Amblytelini, somewhat less in the Joppini and Phaeogenini as well as in some of the Cryptinae, while in the other subfamilies the carination usually is almost

or entirely absent. The positions of the various carinated cells in the genus Amblyteles have been illustrated so that they need not be described; they have been used considerably as a generic or a specific characteristic by the earlier American workers as well as by European workers. It is useless, however, in separating the genera for American joppines. The aerolation, however, should be used with care due to inter-specific variations. Other specific propodeal characteristics are the posterior arcuate or angular sagittal reclivousness and the transverse posterior flatness or concavity.

The propodeal spiracle is borne in the antero-ventral angle of the propodeum, its shape being an excellent character-istic in dividing the Phaeogenini and Alomyini from the other tribes of the subfamily Joppinae, the latter having a linear spiracle and the former two an oval one.

b. Pedicel

The second primitive abdominal segment of the Ichneumonidae is homologous with the pedicel of the Formic-idae, except when the latter includes more than one abdominal segment. The tergite is large, the sternite being visible only postero-ventrally.

The pedicel of the Joppinae and Cryptinae is divided by a distinct dilation into two areas, the posterior one being termed the postpetiole. ~~While~~ Both the pedicel and the petiole proper have been vaguely referred to as the petiole (Cresson, 1887; Ashmead, 1901; Ceballos, 1925 and Schmiedeknecht, 1930), although the anterior part alone should be termed the petiole. The pedicel may be depressed basally so that the height may be less than the width, a

character used in all available works to place it in the group Ichneumonides platyuri. This character appears to be too unstable for American species to be of even specific value and certainly is valueless at times in the separation of Amblyteles from Platylabus and Eurylabus. The dorso-lateral margins bear the two pedicelar spiracles and the positions of these spiracles relative to each other and to the posterior margin of the tergite is used as a subfamily characteristic in most keys. The medio-dorsal portion of the postpetiole may be sculptured in various ways - striation is very common in some species of Amblyteles but some may be acioulate, scabrous, rugose or rugulose, punctate or polished.

c. Gaster

The gaster in the parasitic Hymenoptera consists of eight functional segments, the proctiger being the only postgenital one present (Snodgrass, 1933).

(i) Pregenital and Postgenital Gastric Segments. The gaster in the Joppinae is only rarely compressed, as in the genus Ectopimorpha Vier., and is usually somewhat depressed. In the genus Amblyteles the male gaster is strongly depressed, the female being somewhat depressed anteriorly and sub-cylindrical posteriorly.

The two or three basal sternites in the males form a median fold and its presence or absence on the third sternite is used to separate the genus Amblyteles from Ichneumon auct. nec Linn. by Cresson (1877, 1887), Viereck (1916), Ceballos (1925) and Schmiedeknecht (1930). The first two workers, however, dealt with American species and reduced the

two groups to subgeneric rank. Cushman has consolidated the two genera and this is justified for American species, the ventral fold being quite variable in some species.

The shape of the anterior tergites appears to be of specific value, more especially the proportions of the basal and apical widths and length of the first gastric segment, and should be more exact than the indefinite terms of elongate, short and broad when applied to the gaster. Bordering the anterior margins of the first segment are two depressions, the gastrocoeli; these vary in size, shape and depth and, although intraspecific variations occur, yet these structures are of considerable taxonomic value. Bordering the posterior margin of each gastrocoeli lies a smooth, translucent area, the thyridium. Each of the two basal gastric tergites in the Joppinae bears laterally a pair of polished spots, the lunulae or variolae, This character is of value in differentiating between the subfamilies Cryptinae and Joppinae, except in some tropical species in which the lunulae are concealed by the whole tergite being polished. The pedicel and two basal tergites have fused sufficiently to prevent their respective segments from being withdrawn anteriorly into the coelom (Ceballos, 1925); the others, however, have "telescoped", the proctiger being entirely concealed.

(ii) Male Genitalia. In the Hymenoptera the male genitalia have not been studied intensively, this being particularly true of the Ichneumonidae. The workers have confined themselves to small groups within the order with little real

attempt at homologisation of the various parts; the result has been to create a nomenclatorial chaos of synonyms and homonyms. Boulangé (1924), however, homologised the terminology of most of the previous workers, although he excluded the Ichneumonidae. Berthoumieu (1894) and Bordas (1897) discussed very briefly the structures of this family, while Ceballos (1925) dealt shortly with the genus Amblyteles; the terminology of the latter worker appears to be in disagreement with that of the other workers. Seurat (1898, 1899) and Genieys (1925) examined braconid males, the latter worker terming the structures simple and the subapical gastric segment the twelfth.

Within the order Hymenoptera there is superficially a similarity between the structures in different families; Crampton (1919) and Boulange (1924) emphasise the difficulty of homologising the various structures due to secondary torsion of the parts by muscles. Boulangé (1921, 1924) expresses the opinion that the volsella and sagitta in various hymenopterous groups may be similar in position but not in their muscular attachment and that unification of the nomenclature is impossible. A considerable amount of further study, especially with immature stages, appears to be necessary before the genital structures of the order have been homologised.

In the Hymenoptera the hypandrium or eighth sternum is prominent. Adjacent to it lies a concealed, circular, twisted band, commonly termed the cardo and named by Crampton (1919) the gonocardo; Crampton (loc. cit.) considers the gonocardo as possibly the sternite of some segment, rather than as a part of the outer appendages. The term gonocardo

is preferable to that of cardo as it avoids synonomy.

Attached to the gonocardo is a pair of prominent appendages termed the outer claspers or the genital forceps. In the lower members of the Hymenoptera these appendages are divided often into a distal harp or cochlearium and a proximal stipes or gonostipes. In Vespa germanica Fabr. these appendages are undivided but with a long, narrow apex (Kluge, 1895); this suggests the fusion of the harp and gonostipes. In the Ichneumonidae these appendages are unjointed and broadly rounded apically, the sclerite being large and functional.. In Apis mellifica Linn. the stipes are small, appearing reduced and non-functional according to the description of Snodgrass (1925). Rohwer (quoted by Crampton, 1919) regards the outer claspers of the Chalastrogastra as being the outer appendages of the ninøth sternite.

Attached to each of the forceps in the Chalastrogastra by a membrane lie the inner forceps. Boulangé (1924) terms these the volsellae and their clawlike apical sclerite the sagitta. In the Ichneumonidae there are two apical sclerites, termed in this paper the copulatory ossicles; this is a non-morphological term applied by Crampton (1919) to sclerites of the Chalastrogastra that lie in the same position. The terminology of these structures is confused with that of the spatha, penial sheathø and penis. Rohwer (quoted by Crampton, 1919) regards the inner forceps as the paired appendages of the eighth sternite.

Lying between the volsellae are two slender sclerites, the spatha or penial rods. These unite posteriorly and extend ventro-posteriorly to form the penis or penial

sheath. Saunders (1884) regarded this structure in the Aculeata as an appendage of the tenth segment. Rohwer (quoted by Crampton, 1919) believed that in chalastrogastrous males this structure is the penis and is the inner pair of appendages of the ninth sternite.

The taxonomic value of the genitalia in male ichneumonids is unknown. Berthoumieu (1894) believed that the genital structures in the Ichneumonidae have the same form and that no differences of generic or specific value had been discovered. Perez (1894), however, found that the copulatory organs were of distinct value for generic and specific characters for the Hymenoptera, provided that they were used with care. In the Ichneumonidae genitalic characteristics may prove to be of generic or specific value. Only a few males of the genus Amblyteles were examined but differences in shape and in the glandular areas were to be seen, although series were not available for examination.

The male genitalia may prove to be of taxonomic value in the future but only if long series are examined and care is taken always to examine the structures at the same angle. The difficulty of avoiding distortion is one of the chief objections to the use of genitalic characters. The volsellae and penial sheaths of the two Amblyteles species illustrated, however, appear to have characters that may prove constant. The serrate ventral margin in the penis of A. quebecensis Prov. was observed only in this species and apparently is a constant character.

The male genitalia may prove to be of value in separating the various species, more especially those

coloured black and yellow. Due to the need of preparation, and the distortion of parts, other morphological characteristics may prove preferable.

(iii) Female Genitalia. The hymenopterous ovipositor has been studied intensively by Snodgrass (1933), whose work has been drawn upon quite freely in this paper. Ceballos (1925) has studied the structures only superficially.

The hymenopterous ovipositor has the same basic structure throughout the order and resembles that of the Hemiptera rather than that of the Gryllidae and Acrididae, the true ovipositor in these orthopteroid groups consisting of the first and third pairs of valvulae, while that of the Hemiptera and Hymenoptera has the first and second pairs involved (Snodgrass, 1925, 1933).

In the Ichneumonidae the structures are not structurally different from those in the Braconidae. The large subgenital plate is the seventh sternum (5 th gastric sternite), lying below a vestibule for the ovipositor base. The eighth sternum is absent in the Ichneumonidae. (Baumann, 1923; Snodgrass, 1933), although Ceballos (1925) in Phaeonolobus construes the two pairs of valvifers to be the eighth and ninøth sternites in the Ichneumonidae, and Seurat (1898) finds an eighth sternite in the braconid genus Doryctes.

The first valvifers have separated from the remainder of the eighth segment except for the muscular connection. They articulate postero-dorsally with the ninøth tergum and

ventrally with the second valvifer; each bears anteriorly the ramus of the first pair of valvulae. The second valvifers are oblong plates, bearing anteriorly the rami of the second pair of valvulae and posteriorly the third pair, or ovipositor sheathes (Snodgrass, 1933).

The ovipositor shaft is composed of the ventral or first pair of valvulae and the dorsal or second pair; Riederer (1890) has shown in Cryptus samiae Pack. the "tongue-and-grooved" attachment between each ventral valvula and the corresponding dorsal valvula, the dorsal pair being united. Ceballos (1925), however, has illustrated the arrangement in Phaenolobus (Ichneumoninae) without any cohesion between the two pairs of valvulae.

While the ichneumonid ovipositor may be several times as long as the abdomen, as in many species of the Cryptinae and Ichneumoninae, yet in the subfamily Joppinae, it is short, rarely being more than subexserted. There is no need, therefore, for such modifications as re-orientation of the genital segments or the development of the "blister-membranes" of Baumann (1923) as in Thalessa leucographa Grav.

Taxonomically, the length of the ovipositor has been used in the separation of the females of different subfamilies (Ashmead, 1901), and occasionally in the separation of genera and species. Cushman and Rohwer (1920) have used effectively the shape of the apex to distinguish between the various tribes of the subfamily Ichneumonini.

III. CLASSIFICATION

A. Family Ichneumonidae with key to subfamilies

1758 Ichneumon Linnaeus, Syst, Nat, 10th ed: 343, 560.
1815 Ichneumonida Leach, Edinburgh. Encycl. 9: 142.
1837 Parasitica Hartig, Wiegmann's Archiv. 1: 158.
1840 Ichneumonidae Westwood, Intro. Mod. Class. Ins. 2: 83.
1862 Ichneumonidae; Cresson, Proc. Ent. Soc. Phila. 1: 205-211, 343.
1864 Ichneumonidae; Cresson, Proc. Ent. Soc. Phila. 3: 135-194.
1865 Ichneumonidae; Cresson, Proc. Ent. Soc. Phila. 4: 249-259.
1867 Ichneumonidae; Cresson, Trans. Amer. Ent. Soc. 1: 289-312.
1868 Ichneumonidae; Cresson, Trans. Amer. Ent. Soc. 2: 89-114.
1872 Ichneumonidae; Cresson, Trans. Amer. Ent. Soc. 4: 155-157.
1873 Ichneumonidae; Provancher, Nat. Can. 5: 435-452, 470-477.
1874 Ichneumonidae; Provancher, Nat. Can. 6: 29-32, 55-63, 78-81, 103-107; 143-151, 173-179, 200-205, 298-301, 331-336.
1875 Ichneumonidae; Provancher, Nat. Can. 7: 20-26, 48-53, 74-84, 109-121, 138-149, 175-183, 263-274, 309-317.
1876 Ichneumonidae; Provancher, Nat. Can. 8: 315-318, 327-328.
1877 Ichneumonidae; Provancher, Nat. Can. 9: 8-16, 365.
1877 Ichneumonidae; Cresson, Trans. Amer. Ent. Soc. 6: 129-212.
1878 Ichneumonidae; Provancher, Nat. Can. 10: 257-273, 289-299, 349-364.
1879 Ichneumonidae; Provancher, Nat. Can. 11: 1-13, 33-43, 65-74, 119-143, 109-122, 141-150, 172-185, 205-233, 248-266, 269-281.
1883 Ichneumonidae; Provancher, Nat. Can. 14: 3-33.
1883 Ichneumonidae; Brodié and White, Ck. List Ins. Dom. Can: 6-7.
1887 Ichneumonidae; Cresson, Trans. Amer. Ent. Soc. Suppl: 38-52, 183-221.
1889 Ichneumonidae; Provancher, Add. Faune Hym: 29, 221.
1889 Ichneumonidae; Provancher, Suppl. Add. Faune Hym: 357-370.
1901 Ichneumonidae; Ashmead, Proc. U.S. Nat. Mus. 23: 10-110.
1902 Ichneumonidae; Dalla Torre, Cat. Hym. 3: 10-1057.
1902-31 Ichneumonidae; Schmiedeknecht, Opusc. Ichn. and Suppls.
1903-14 Ichneumonidae; Morley, Ichn. Brit. 1-5.
1904 Ichneumonidae; Berthoumieu, Gen. Ins. fasc. 18.
1912 Ichneumonidae; Morley, Rev. of Ichn. Brit.
1914 Ichneumonidae; Viereck, U.S. Nat. Mus. Bu. 83.
1916 Ichneumonidae; Viereck, Hym. Conn: 243-360.
1916 Ichneumonidae; Cresson, Mem. Amer. Ent. Soc. 1: 12-64.
1918 Ichneumonidae; Viereck, Proc. Biol. Soc. Wash. 31: 71-74.
1924 Ichneumonidae; Ceballos, Estud. Ichn. Esp. 1: 1-335.
1925 Ichneumonidae; Ceballos, Him. Esp: 1-292.
1925 Ichneumonidae; Handlirsch, Handbuch Ent. 3: 733-741.
1928 Ichneumonidae; Cresson, Mem. Amer. Ent. Soc. 5: 11-26.
1928 Ichneumonidae; Cushman, Ins. N.Y: 920-960.
1930 Ichneumonidae; Schmiedeknecht, Hym. N. und M-Europ.
1932 Ichneumonidae; Brues and Melander, Mus. Comp. Zool. Bul. 73; 477.

In this paper the early European taxonomic history of the family Ichneumonidae has been taken almost entirely from the account of Morley (1903).

The name Ichneumon is of Greek origin, meaning a tracker of footprints or a hunter; the term is believed to have been applied by Aristotle to a member of the group Fossores.

Linnæus (1758) divided the Hymenoptera into ten genera, Ichneumon being characterised as "Aculeus exsertus! triplex", although supplementing this later by "Os maxillis absque lingua. Antennae articulis ultra 30. Abdomen petiolatum plerisque. Aculeus exsertus. Vagina cylindrica, bivalvi". Insofar as the family Ichneumonidae is concerned, the main advance in Linnæus' classification was the separation of the Parasitica from the Fossores, the grouping approximating that of today.

Fabricius (1904) divided the Hymenoptera into 83 genera upon mouth parts primarily and then upon antennal formation. This intermingled again the ichneumons with the fossorial wasps, sawflies and other groups.

In 1829 Gravenhorst summarised the contributions of workers such as Ray, Latreille, Schrank, Panzer and Jurine in his Ichneumonologia Europaea, this being exhaustive and accurate. Wesmael (1844-1857) added information, more especially upon the Joppinae, while Holmgren expanded and unified Wesmael's contributions, finally dividing the

Ichneumonidae into the five subfamilies that have been accepted until the last few years.

In 1904 Berthoumieu reviewed the Ichneumonidae of the world, while Dalla Torre (1901) published a catalogue of this group. Since this time there has appeared a number of publications on the taxonomy of the family, the most recent being those of Handlirsch (1925), Ceballos (1924, 1925) and Schmiedeknecht (1930).

The first entomologists of note to turn their attention to the American joppines were Say (1828-37), Cresson (1862-1887) and Provancher (1875-1889), although Harris (1835), Brullé (1846), and Fitch (1861) described one or more species. The material was collected almost entirely from eastern North America, Provancher being the only Canadian worker.

Cresson published the first key to the American joppines. Both the original descriptions and the key, however, were based almost entirely upon colour, a character that is affected by environmental effects (Chapman, 1931). The major objection to the use of colour alone is that in a large unexplored faunal area a large number of new species and races should be discovered and colour by itself becomes an unwieldy character when used too extensively. Schmiedeknecht (1930), however, uses color very extensively in specific keys.

Cresson's colour for key for American joppines has been imitated by Provancher (1875, 1877 and 1878) and Viereck (1916). Following these workers there was a lapse

of interest in the Joppinae, although Ashmead (1889-1902), Harrington (1894), Davis (1895,1897), Cockerell (1896), Skinner (1902), Viereck (1902-1924) and Cameron (1907-1908) each described one or more species. In 1916 Viereck published a key, based upon Cresson's, and this work has been supplemented to some extent by that of Cushman (1920-1933) and Cushman and Gahan (1921).

At the present time there are a number of species that have been described inadequately without a type being designated; some of the Say species, for example have not been identified,,appear in some of the keys, and merely clutter up the literature and cause confusion.

Check lists of the American joppines have been prepared by Brodie and White (1883), Cresson (1887), Dalla Torre (1901) and Berthoumieu (1904), as well as Cushman (1928). The lepidopterous hosts that are reported from Alberta have been taken from lists compiled by Bowman (1919, 1921, 1924).

The names of the various groups within the family have been in accordance with the arrangement of Cushman (1928), without reference to the Erlangen list (Morice and Durrant,1913).

The family Ichneumonidae belongs to the superfamily Ichneumonoidea which has a rather vague taxonomic limits but which always includes the Braconidaem Aulacidae and Gasteruptionidae, as well as a number of other families in regard to which modern opinion varies (Handlirsch,1925; Bradley,1928; Brues and Melander,1932).

The family Ichneumonidae usually is divided into

five subfamilies, although Handlirsch (1925) includes Myersiinae, Rothneyiinae and Banchiinae.

The construction of keys to tribes and genera of this subfamily is a task for a specialist having access to both the widely distributed types and to literature in many languages.

At present the keys to the subfamily Joppinae are unsatisfactory. Ashmead's key (1902) is perhaps the only one with a worldwide application but is now out of date. His work is unwieldy, especially as he used frequently a number of characters to separate two groups so that specimens often are intermediate between them. The more recent workers have either dealt only with the genera of a restricted region (Ceballos,1925; Schmiedeknecht,1930) or else have hot published keys for groups smaller than the subfamilies or even the family (Handlirsch, 1925; Brues and Melander,1932). If the complexity of the keys served to divide the family into natural groups, their use could be justified; the grouping, however, is highly artificial (Brues and Melander,loc.cit.). A simplified key, therefore, is entirely advantageous. Schmiedeknecht (1930) uses cumbersome keys to subfamilies, Ceballos (1925) has simplified the grouping somewhat and Handlirsch (1925) has boldly eliminated most of the complexity. The two latter keys have been included in this paper as there has been some regrouping due to the simplification.

In the specific keys single specimens, appearing to be new species, have been included sometimes with the species to which

they run and have been differentiated and described under the name of that species. Only new species with a number of specimens have been named as new.

In some of the Amblyteles species (more especially the males - with black and yellow and the females with black and ferrgineous) the literature is so meagre and the material so little that their taxonomy is necessarily of a superficial character.

Ceballos' key to the subfamilies of the ICHNEUMONIDAE

1 Abdomen petiolate, the pedicel being narrowed basally and broadened apically; spiracles of the pedicel sometimes placed centrally, most frequently in the apical half; if the abdomen is sessile it is also strongly compressed. 2

Abdomen sessile or, when more or less petiolate, the pedicel not divided clearly into petiole and postpetiole; spiracles of the pedicel placed centrally or in the basal half; antennae filiform, not setaceous. 4

2 (1) Gaster compressed; wings usually with areolet, which is never pentagonal but rhomboidal or frequently petiolate; ovipositor exserted but never longer than the abdomen. OPHIONINAE

Gaster depressed; areolet usually pentagonal. 3

3 (2) Mesopleuron not separated from the mesosternum by a suture; propodeum completely areolated; wings present with a regular pentagonal areolet; ovipositor hidden; spiracles of the pedicel more distant from each other than from the posterior border of the segment; first gastric segment with gastrocoeli. JOPPINAE

Mesopleuron separated from the mesosternum by a distinct suture; wingless forms present; areolet pentagonal or absent or quadrate or very small; ovipositor usually exserted; spiracles of the pedicel nearer each other than to the posterior border of the segment; first gastric segment with gastrocoeli absent or else small and shallow. CRYPTINAE

4 (1) Abdomen sessile; ovipositor exserted, often much longer than the body; head with broad vertex and at times cubical; propodeum not areolated, usually without transverse ridges; areolet absent or rhomboidal or petiolate; very rarely pentagonal; antennae filiform. ICHNEUMONINAE

Abdomen sessile, but little or no wider behind than in front, never with a well defined postpetiole; head with vertex narrow; propodeum with or without areolation but never with it complete; areolet absent or rhomboidal or petiolate; ovipositor always hidden. TRYPHONINAE

Handlirsch's Key to Subfamilies of the Ichneumonidae

1 Abdominal region with only three free segments
Rothneyiinae (Non-American)
Abdominal region with a normal number of free segments. 2

2 (1) Mesosternum without a prepectus; gaster apically compressed, at the most shortly swollen; pedicel straight, spiracles before the middle of pedicel; ovipositor of female very short. Banchinae
Mesosternum with a prepectus or otherwise differentiated 3

3 (2) First and second gastric segments fused as a single sclerite; pedicel considerable dilated longitudinally, spiracles behind the middle. Myersiinae
First and second gastric segments normal, separate. 4

4 (3) Pedicel slender anteriorly, swollen posteriorly, spiracles behind the middle, rarely at the middle; gaster almost always depressed. 5
Pedicel not or scarcely swollen apically, usually not narrowed slenderly, spiracles in front of or at the middle, very seldom behind. 6

5 (4) Spiracles of pedicel nearer posterior segmental margin than to each other; no furrow between mesopleuron and mesosternum; ovipositor of female short; scarcely exserted. Joppinae
Spiracles of pedicel nearer each other than to posterior segmental margin. Cryptinae

6 (4) Gaster always strongly compressed; ovipositor of female usually very short; gastric tergites not deeply or unevenly sculptured. Ophioninae
Gaster club-shaped or strongly depressed, not strongly compressed. 7

7 (6) Gaster depressed, generally not at all petiolate; coarsely sculptured or dorsally protuberant or hollowed; ovipositor of female exserted, often very long. Ichneumoninae
Gaster usually slender, more petiolate, seldom somewhat compressed; without deep sculpture; ovipositor short, usually concealed. Tryphoninae

III B. Subfamily Joppinae

1865 Ichneumonidae Cresson,Proc.Ent.Soc.Phila.4:249-259.
1867 Ichneumonides;Cresson,Trans.Amer.Ent.Soc.1:289-312.
1873 Ichneumonides;Provancher,Nat.Can.5:435-452,470-477.
1874 Ichneumonides;Provancher,Nat.Can.6:29-32,55-63,78-81,103-107, 143-151;173-179,200-205,298-301,331-336.
1875 Ichneumonidae verae;Provancher,Nat.Can.7:20-26,48-53,74-84, 109-121,348-350.
1878 Ichneumonidae verae;Provancher,Nat.Can.10:264-273,289-299, 349-365.
1879 Ichneumonidae verae;Provancher,Nat.Can.11:1-13,33-40.
1883 Ichneumonidae;Brodie and White,Ck.List Ins.Dom.Can:6-7.
1887 Ichneumoninae;Cresson,Trans.Amer.Ent.Soc.Suppl:41-42,183-192.
1900 Ichneumoninae;Ashmead,Smith's Ins.N.J:563.
1901 Ichneumoninae;Ashmead,Proc.U.S.Nat.Mus.23:10-24.
1903 Ichneumoninae;Morley,Ichn.Brit.1:1-312.
1904 Ichneumoninae;Berthoumieu,Gen.Ins.fasc.18.
1912 Ichneumoninae;Morley,Rev.of Ichn.Brit,1.
1918 Joppinae Viereck,Proc.Biol.Soc.Wash.31:73.
1924 Ichneumoninae;Ceballos,Estud.Ichn.Esp.1:1-335.
1925 Ichneumoninae;Ceballos,Him.Esp:60-93.
1925 Ichneumoninae;Handlirsch,Handbuch.Ent.3:7371
1928 Joppinae;Cushman,Ins.N.Y:920-927.
1930 Ichneumoninae;Schwiedeknecht,Hym.N.und M-Europ.1,fasc.1:7-240.

The subfamily Joppinae is divided naturally by the shape of the propodeal spiracle into two groups - however only a single species - Ischnus exilis Prov. - has been reported from Alberta as having the circular propodeal spiracle, characteristic of Phaeogenini. Both Ceballos (1925) and Schmiedeknecht (1930) divide the remainder - Joppinae stenopneusticae or Ichneumoninae stendpneusticae directly into genera; Ashmead (1901), Berthoumieu (1904), Handlirsch (1925) and Cushman (1928) divide the group into other tribes but unfortunately the two most recent have not published keys.

Ashmead's key is unworkable, consisting merely of a series of unweighted characters. Berthoumieu (1904) uses a key, tantamount to being dichotamous, that is employed in this paper to separate the Joppini from the Amblytelini. The characters used for separating male Listrodromini have been taken from the work of Schmiedeknecht (1930).

The key to the tribes does not fully show the affinities

of the groups. The tribe Phaeogenini is nearest to the Cryptinae, the tribes Alomyini and Heresiarchini next, followed by Amblytelini and finally the Joppini, perhaps the most specialised tribe of all.

2. Key to Tribes of Subfamily Joppinae

1 Propodeal spiracles circular or broadly oval and large; posterior ungues always non-pectinate.
Tribes Phaeogenini
Alomyini

Propodeal spiracles linear or long-oval but never rounded unless the posterior claws are pectinate. 2

2 (1) Mandibles simple, edentate. Heresiarchini
3

3 (2) At least two of the following characteristics present:- two anterior gastric tergites striated or aciculated; antennae of female dilated medially; antennae of males setaceous and usually dentate or nodose proximally; propodeum short, separated from metanotum by a deep suture; propodeum indistinctly areolated; gaster depressed with segments truncate and contracted; the wings brown or spotted with brown.
Joppini
4

Not as above.

4 (3) Posterior ungues pectinate, at least in females; males without pectinate ungues, with nervellus antefurcal and propodeal spiracles broadly oval.
Listrodromini

Posterior ungues never pectinate; propodeal spiracles longitudinal. Amblytelini

Tribes Phaeogenini and Heresiarchini

Only two genera, each with a single species, have been reported from Alberta; these are Ischnus exilis Prov. and Ischnopsidea alberta Cush. the determinations of both being made by Cushman (1920, 1922).

As the generic synonomy is not simple, no attempt has been made to compile a bibliography for these two genera. Ischnus was described originally by Gravenhorst (1829) and Ischnopsidea named by Viereck (1914). Ischnus auct. (nec Grav.) has been synonomised with Ischnopsidea Vier. and with Rhex-

idermus Ashmead (nec Foerster), according to Cushman (1920, 1922).

Ischnus exilis Prov. is separated from Ischnopsidea alberta Cush. by the former having an annulus on the antennae, the face, four anterior trochanters, four anterior coxae in part, all yellow or white, as well as by the sex.

Ischnus exilis Prov.

(male only)

1875 Ischnus exilis Provancher, Nat.Can.7:111.
1879 Cryptus exilis; Provancher, Nat.Can.11:113.
1883 Cryptus exilis; Provancher, Faune Ent.Can.:332.
1927 Ischnus exilis; Criddle, Ann.Rept.Ont.Ent.Soc.58:102.

Ischnopsidea alberta Cush.

(female only)

1927 Ischnopsidea alberta Cushman, Proc.U.S.Nat.Mus.72, art.13; 1-2.

3. Tribe Listrodromini

1868 Listrodromini Foerster, Verh.d.naturh.Ver.pr.Rheinl.25:144, 194.
1894 Listrodromini; Ashmead; Proc.Ent.Soc.Wash.3:278.
1901 Listrodromini; Ashmead, Proc.U.S.Nat.Mus.23:19-20.
1903 Listrodromides; Morley, Ichn.Brit.1:1-5.
1917 Listrodrominae; Viereck, proc.Biol.Soc.Wash.31:74.
1924 Listrodromini; Ceballos, Estud.Ichn.Esp.1:311-317.
1925 Listrodromini; Handlirsch, Handbuche Ent.3:737.
1930 Listrodromini. Schmiedeknecht, Hym.N.andM-Eur, fasc.1:26.

Key to Genera of the Tribe Listrodromini

1		Propodeal spiracles linear	2
		Propodeal spiracles round or oval	Ctenochares Foerst. (Non-American)
2	(1)	Propodeum bispinose or bidentate	Non-American Genera
		Propodeum unarmed	3
3	(2)	Basal nervure interstitial or antefurcal	Patroclus Cress.
		Basal nervure postfurcal	Neotypus Foerst.

The separation of the two latter genera has been based upon widely different characters. Berthoumieu (1904) distinguished Neotypus by the ventral clypeal margin being rounded, not triangular, and the antennae being as long as the the combined lengths of the head and thorax - Berthoumieu's work was not always accurate and the word triangular appears to have been substituted for truncate. Ashmead (1901) employs a number of characters of which the most significant appears to be the postfurcal basal nervure occurring in Neotypus, a character that is rare among other American joppines.

Genus Neotypus Foerster

Genotype:-Ichneumon lapidator Fabr. (Viereck,1914)

1868 Neotypus Foerster,Verh.Ver.Rheinl.25:194.
1901 Neotypus;Ashmead,Proc.U.S.Nat.Mus.23:20.
1902 Neotypus;Dalla Torre,Cat.Hym.3,pt.2:777.
1903 Neotypus;Morley,Ichn.Brit.1:4-5.
1904 Neotypus:Berthoumieu,Wytsman's Gen.Ins.18:27-28.
1914 Neotypus;Viereck,U.S.Nat.Mus.Bul.83:100.
1924 Neotypus;Ceballos;Estud.Ichn.Esp.1:313-317.
1926 Neotypus;Cushman,Proc.U.S.Nat.Mus.67,art.3:1.
1930 Neotypus;Schmiedeknecht,Hym.N.andM.Eur.1:fasc.1.

The only recorded Albertan species is N.americanus Cush., the specimen being determined by Cushman.

1926 Neotypus americanus Cushman,Proc.U.S.Nat.Mus.67,art.23,:1.

Genus Patroclus Cresson

Genotype:-Patroclus nigrocaeruleus Cresson

1893 Patroclus Cresson,Proc.Acad.Nat.Sci.Phila.3:104.
1901 Patroclus;Ashmead,Proc.U.S.Nat.Mus.23:22.
1903 Patroclus;Berthoumieu,Gen.Ins.18:28.
1904 Patroclus;Dalla Torre,Cat.Hym.3:778.

Patroclus montanus Cresson

1864 Ichneumon montanus Cresson,Proc.Ent.Soc.Phila.3:141.
1865 Ichneumon montanus;Cresson,Proc.Ent.Soc.Phila.4:249.
1887 Amblyteles montanus;Cresson,Trans.Amer.Ent.Soc.Suppl:186.
1903 Pseudamblyteles montanus;Viereck,Trans.Amer.Ent.Soc.29:80.
1911 Amblyteles montanus;Johansen and Patch, Maine Bul.195:242.
1928 Amblyteles montanus;Cushman,Ins.N.Y:924.

Distributions:-Colo.;Maine;N.Y.;N.Mex.

Host:-Autographa brassicae Riley (Alberta).

The type is female and characterised by the subtriangular head; ocellocular space 1½ times diameter of lateral ocellus; eyes almost parallel within, below antennae; clypeus emarginate, undefined dorsally; malar space 1 1/3 times basal mandibular width, cheeks flat; first flagellar segment 4 times apical width; apical flagellar segments not flattened, basal ones slightly enlarged apically.

Propodeum more or less rounded, not concave behind; propodeal carinae fairly strong; areola quadrate, slightly transverse; postpetiole somewhat abruptly dilated, moderate in size, striate, almost at right angles to petiole; gaster elongate; width and length of first gastric tergite subequal; gastrocoeli deep, large, transverse to oblique, intergastrocoelar space ½ of gastrocoelar width; subgenital plate large, not retracted.

Male (Paratype # 1263.3):-

Face rather longer than in female, malar space 1 1/3 basal mandibular width; basal flagellar segment three times as long as wide; flagellar segments not depressed, annulate or dilated apically, propodeum angulate, almost entirely sloping posteriorly, areola 1½ times as broad as long; gastric tergites purplish, basal one slightly longer than wide apically, Otherwise the paratype agrees with the description of the type.

The Alberta specimens agree with the original descriptions closely; the gaster, however, varies considerably in the amount of blue, the wings may be hyaline and have no "slight violaceous reflection", while the nervures are dark brown, not black. The Alberta females have the ocellocular space twice or almost twice the diameter of the lateral ocellus.

Wabamum	31-8-29	E.H. Strickland
Bilby	28-7-24	O. Bryant
Bilby	5-8-24	O. Bryant
Edmonton	3-7-32	O. Peck
Waterton	12-7-23	E.H. Strickland
Waterton	13-7-23	E.H. Strickland

Tribe Amblytelini

1868 Ichneumonoidae;Foerster,Verh.D.naturh.Ver.pr.Rheinl.25:144,149.
1877 Ichneumonides;Cresson,Trans.Amer.Ent.Soc.6:129-199.
1894 Ichneumonini;Ashmead,Proc.Ent.Soc.Wash.3:278.
1900 Ichneumonini;Ashmead,Smith's Insects of N.J.p.564.
1901 Ichneumonini;Ashmead,proc.U.S.Nt.Mus.23:16-19.
1903 Ichneumonides;Morley,Ichn.Brit.1:39-234.
1918 Amblytelinae;Viereck,Proc.Biol.Soc.Wash.31:74.
1919 Amblytelinae;Viereck,Proc.Biol.Soc.Wash.32:48.
1924 Amblytelini;Ceballos,Estud.Ichn.Esp.1:26-310.
1925 Ichneumonini;Handlirsch,Handbuch Ent.3:737.
1928 Amblytelini;Cushman,Ins.N.Y.pp.921-927.

Key to genera of tribe Amblyteline

1. Petiole of pedicel broader than high.
(Ichneumonides platyuri Wesm.)
(not in Alberta)
Petiole not as above. 2

2. (1) Gaster with seventh tergite exserted.
Ectopimorpha Vier.
(American, not Albertan)
Gaster not as above.

3. (2) Hypopygidium as long as or longer than the preceding segment, the ovipositor prominently exserted; junction of petiole and postpetiole non-angulate.
Trachichneumon Vier.
(American, not Albertan)
Not as above.

4. (3) Scutellum gibbous, abruptly declivous posteriorly; propodeum always bispinose.
Hoplismenus Grav.
Scutellum more or less flat or convex, gradually sloping posteriorly; propodeum rarely bispinose.
Amblyteles Wesm.

Genus Amblyteles Wesm.

Genotype:- Amblyteles fasciatorius Wesm.designated by Ashmead.

1901 (Viereck,1914)

1844 Amblyteles Wesmael,Nouv.Mem.Acad.Brux.18:111-112.
1846 Ichneumon;Brullé,Hist.Nat.Ins.Hym.:299-310(nec Ichneumon Linneus,Syst.Nat.1:343,560-568, according to Morice & Durrant, 1914); preoccupied.
1862 Ichneumon;Cresson,Proc.Ent.Soc.Phila.1:208-211.
1864 Ichneumon;Cresson,Proc.Ent.Soc.Phila.3:135-186.
1864 Ischnus;Cresson,Proc.Ent.Soc.Phila.3:186-194.
1865 Ichneumon;Cresson,Proc.Ent.Soc.Phila.4:249-259.
1867 Ichneumon;Cresson Trans.Amer.Ent.soc.1:290-312.
1868 Ichneumon;Cresson,Trans.Amer.Ent.Soc.2:89.
1872 Ichneumon;Cresson,Trans.Amer.Ent.Soc.4:155-157.
1875 Ichneumon;Provancher,Nat.Cna.7:20-26,48-53,74-84,349.
1875 Ischnus;Provancher,Nat.Can.7:109-112,350.
1877 Ichneumon;Cresson,Trans.Amer.Ent.Soc.6:130-194.
1877 Ichneumon;Provancher,Nat.Can.9:8-10.
1877 Amblyteles;Provancher,Nat.Can.9:10-11.
1878 Ichneumon;Provancher,Nat.Can.10:265-273,289-299,349-365.
1879 Amblyteles;Provancher,Nat.Can.11:4-13.
1882 Ichneumon;Provancher,Nat.Can.13:303-311,321-327.
1882 Amblyteles;Provancher,Nat.Can.13:327-329.
1883 Ichneumon;Brodie and White,Ck.List Ins.Dom.Can.pp.6-7.
1883 Amblyteles;Brodie and White,Ck.List Ins.Dom.Can.p.7.
1887 Ichneumon,Cresson;Trans.Amer.Ent.Soc.Suppl.41:183-189.
1887 Amblyteles;Cresson,Trans.Amer.Ent.Soc.Suppl.41:189-190.
1889 Ichneumon;Provancher,Add.Faun.Hym.:29-34.
1889 Amblyteles;Provancher,Add.Faun.Hym:34-35.
1889 Ichneumon;Provancher,Suppl.Add.Faun.Hym:256-257.
1901 Ichneumon;Ashmead,Proc.U.S.Nat.Mus.23:17.
1901 Stenichneumon;Ashmead,Proc.U.S.Nat.Mus.23:17.
1901 Melanichneumon,Ashmead,Proc.U.S.Nat.Muc.23:17.
1901 Cratichneumon;Ashmead,Proc.U.S.Nat.Mus.23:17.
1901 Barichneumon;Ashmead,Proc.U.S.Nat.Mus.23:17.
1901 Amblyteles;Ashmead,Proc.U.S.Nat.Mus.23:18-19.
1902 Amblyteles;Dalla Torre,Cat.Hym.3,pt.2:798-843.
1902 Ichneumon;Dalla Torre,Cat.Hym.3,pt.2:846-1019.
1902 Ichneumon;Ashmead,Proc.Wash.Acad.Sci.4:149.
1903 Ichneumon;Morley.Ichn.Brit.1:104-158.
1903 Amblyteles;Morley,Ichn.Brit.1:184-207.
1904 Ichneumon;Berthoumieu,Wytsman's Gen.Ins.18:31-45.
1904 Amblyteles;Berthounieu,Wytsman's Gen.Ins.18:50-53.
1914 Amblyteles;Viereck,U.S.Nat.Mus.Bul.83:9.
1914 pterocormus;Viereck,U.S.Nat.Mus.Bul.83:75.
1916 Ichneumon;Cresson,Mem.Amer.Ent.Soc.1:12-64.
1916 Amblyteles;Cresson,Mem.Amer.Ent.Soc.1:12-64.
1916 Amblyteles;Viereck,Hym.Conn.:256,344-360.
1918 Amblytelinae;Viereck,Proc.Biol.Soc.Wash.71:74.
1924 Amblyteles;Ceballos,Estud.Ichn.Esp.1:227-298.
1925 Pterocormus;Ceballos,Him.Esp.:68-73.
1925 Amblyteles;Ceballos,Him.Esp.:74-76.
1925 Amblyteles;Handlirsch,Handbuch Ent.3:737.
1925 Ichneumon;Handlirsch,Handbuch Ent.3:737.
1928 Amblyteles;Cushman,Ins.N.Y.:921-927.

1930 Ichneumon;Schmiedeknecht,Hym.N.&M.Eur.1.fasc.1:201-203.
1930 Amblyteles;Schmiedeknecht,Hym.N.&M.Eur. 1.fasc.1:158-199.
1930 Amblyteles;Schmiedeknecht,Opusc.Ichn.Suppl.7:1-140.
1930 Ichneumon;Schmiedeknecht,Opusc.Ichn.Suppl. 7:233-450.

Genus Amblyteles

Almost all of the Albertan records for this genus are reported by Criddle (1927), the material being collected by G. Salt and determined by Cushman. These species have been included in the key unless the identification is doubted by Cushman. The specimens are in the possession of the University of Alberta, Edmonton.

The types are almost entirely in two museums, the Quebec public museum for the Provancher types (Gahan and Rohwer, 1917) and the Cresson, Viereck and Davis types in the Philadelphia Academy of Natural Sciences (Cresson, 1916, 1928).

In the descriptions of the types the proportions of the gastric tergites and other dimensions were not measured with a micrometer,due to lack of time, so that the data in this regard is not as accurate as could be desired. The proportions in the Alberta specimens were measured.

The published keys for the American species of this genus are those of Cresson (1877), Provancher (1875, 1878) and Viereck (1916), the latter following Cresson's almost completely.

The specimens collected by Salt were determined by Cushman and recorded by Criddle (1927).

In the classification both of the Ichneumonidae and the genus Amblyteles colour has been used in specific keys in preference to shape. Cresson (1877) stated that colour is a better guide to the species and this in general is true as colour can be both seen and described more easily than structure.

At the same time colour alone is not an absolutely safe guide and should be correlated with shape, else a specimen with an extreme colour variation may be regarded as a new species. This is especially true of an area such as Alberta, in which the joppines have not been studied intensively and in which there are several zoological zones.

Colour variations may occur as a difference of pattern and then is probably of specific value. The amount of integumental pigment, however, may fluctuate due to mendelian segregation. Colour also may be modified by environmental conditions, more especially temperature, moisture, light, food and their interreactions. These environmental colour differences may be due to the rearing of insects under laboratory conditions, the killing of tenerals, to changes in local climatic conditions or to different climatic areas. In the latter case geographical races are formed. The use of cyanides for insecticides may change yellow pigment to a dull rufous one. Chapman (1931) has reviewed the literature on colour variations.

External form also may vary, especially size, due to the degree of parasitoidalism of the host and the species of host. Chapman (1931) has discussed some of the methods by which shape is modified.

It can be realised, therefore, that colour and shape are not absolutely reliable; they should be correlated in keys, if possible, but colour is a preferable character due to its being more easily described.

In the arrangement of the key to <u>Amblyteles</u> Cresson has been followed closely but, wherever possible, his characters have been supplemented by morphological

distinctions. Cresson's key to the females with entirely red gasters is unsatisfactory due to the scopa being a variable structure, the indefiniteness of the terms fuliginous and subhyaline and the wide interspecific colour variations that appear to exist. The morphological differences in the head, antennae, scutellum and propodeum appear to group the species satisfactorily; the propodeal shape, however, is not entirely constant.

Some portions of the key run only to a group, this occurring when there appears to be a number of species involved and sufficient data or material is not available for further division.

Key to Females of the Genus Amblyteles

1	Gaster black or blue without pale maculae or vittae except sometimes apically	2
	Gaster black with yellow maculae or vittae, sometimes varied with ferrugineous	11
	Gaster at least partially rufous or ferrugineous, without yellow except sometimes as apical maculae	14
2 (1)	Posterior femora not rufous	3
	Posterior femora rufous;gaster broadly fusiform	9
3 (2)	Posterior tibiae immaculate	4
	Posterior tibiae rufo-ferrugineous, at least basally; head transverse	Species I.
	Posterior tibiae with broad basal yellow annulus;head not transverse	Species II.
4 (3)	Scopa present on hind coxa	5
	Scopa absent on hind coxa	8
5 (4)	Gaster bright blue	caeruleus Cress.
	Gaster black	6
6 (5)	Antennae slender with depressed apical segments;head contracted ventrally	cincticornis Cress.
	Not as above	7
7 (6)	Gaster slender;wings hyaline or subhyaline	Species III.
	Gaster stout;wings strongly fuliginous	maurus Cress.

8 (4) Gaster with two apical yellow maculae dorsally; basal flagellar segment three times as long as wide apically *bimembris* Cress.
Gaster immaculately black; basal flagellar segment not more than twice as long as wide apically *ater* Cress.

9 (2) Gaster slender *pedalis* Cress.
Gaster fusiform 10

10 (9) Posterior legs black; femora ferrugineous *mormonus* Cress.
Posterior legs ferrugineous *ormenus* Cress.

11 (1) Basal gastric tergite yellow apically, second immaculately black; subgenital plate strongly retracted 12
Two basal gastric tergites yellow basally; subgenital plate scarcely retracted 13

12 (11) Postpetiole strongly angular anteriorly to spiracles *uncinatus* Cress.
Postpetiole smoothly arcuate anteriorly to spiracles *feralis* Cress.

13 (11) Apex of gaster ferrugineous *robustus* Cress.
Apex of gaster black with white maculae *provancheri* Cush.

14 (1) Apical gastric tergite marked with yellow 15
Apical gastric tergite immaculately black 18

15 (14) Gaster short, stout; head contracted ventrally 16
Gaster elongate or, if not, the head quadrate 17

16 (15) Mesoscutum black; flagellum depressed apically Species IV.
Mesoscutum deep rufous; flagellum not depressed apically Species V.

17 (15) Scutellum yellow; subgenital plate not retracted *nortoni* Cress.
Scutellum rufous; subgenital plate strongly retracted Species VI.

18 (14) Gaster without black vittae 19
Gaster with black vittae 23

19 (18) Scutellum yellow; length 20 mm. 20
Scutellum black; length less than 16 mm. 21

20 (19) Posterior tibiae white basally; temples indistinctly, sparsely punctate *devinctor* Say
Posterior tibiae immaculately black; temples moderately punctate *grandis* Brullé
Posterior tibiae dull ferrugineous *lividulus* Prov.

21 (19) Wings deeply fuliginous, strongly violaceous; head strongly contracted ventrally *rufiventris* Brullé
Wings subhyaline and weakly violaceous; head quadrate 22

22 (21) Basal flagellar segment strongly dilated, 1½ times as long as wide apically; propodeum strongly concave posteriorly *inurbanus* Cress.
Basal flagellar segment weakly dilated, twice as long as wide apically *hudsonicus* Cress.

23 (18) Flagellum short, basal segment less than twice as long as wide basally 24
Flagellum rather long; basal segment fully twice as long as wide basally 25

24 (23) Middle gastric tergites black at base; thorax largely red *superbus* Prov.
Middle gastric tergites not black at base; thorax ventrally laterally largely black *subfuscus* Cress.

25 (23) Basal flagellar segment nearly three times as long as wide basally *subfuscus* Cress.
Basal flagellar segment not three times as long as wide at base *suturalis* Cress.

Key to Males of the Genus *Amblyteles*

1 Gastric and pedicelar tergites black or blue without pale bands or spots except sometimes on apical tergites 2
Gastric and pedicelar tergites black and yellow, sometimes varied with ferrugineous 15
Gastric and pedicelar tergites ferrugineous, sometimes marked with black or the gastric apex with yellow 27

2 (1) Posterior legs entirely black; if tibiae basally and subobsoletely yellow, then postpetiole coriaceous 3
Posterior legs not entirely black 8

3 (2) Apical gastric tergite with white macula; all flagellar segments with apex dilated abruptly and bearing short spines *citatus* Prov.
Apical gastric tergite immaculately black; basal flagellar segments not dilated abruptly 4

4 (3) Scutellum yellow, at least in part 5
Scutellum entirely black 6

5 (4) Wings fuliginous; abdomen fusiform *histricus* Cress.
Wings subhyaline; abdomen slender Species VII.

6 (4) Face broadly, laterally yellow; two basal gastric tergites antero-medially and postpetiole striated *citimus* Cress.
Face, except anterior orbits, black; two basal gastric tergites and postpetiole not striated 7

Key to Males of genus Amblyteles)

7 (6) Wings strongly fuliginous;length 16 mm. cincticornis Cress.
Wings subhyaline;length 10 mm. acerbus Cress.

8 (2) Gaster blue caeruleus Cress.
Gaster not blue 9

9 (8) Postorbitals entirely black;postpetiole distinctly striate 10
Postorbitals yellow,at least in part;postpetiole not distinctly striate 13

10 (9) Posterior legs black and ferrugineous 11
Posterior legs black and yellow 12

11 (10) Face black,rarely yellow laterally;length 15 mm.;wings with violaceous tinge pedalis Cress.
Face yellow;length 12 mm.;wings without violaceous tinge radnori,n.sp.(in part)

12 (10) Face black medially;postpetiole angular Species VII.
Face entirely yellow;postpetiole arcuate bryanti,n.sp.(in part).

13 (9) Posterior femora and tibiae black with basal white macula; head subtriangular 14
Posterior femora and tibiae ferrugineous,tibiae dusky apically;head strongly quadrate Species IX.

14 (13) Mandibles black:mesopleuron moderately,coarsely punctate ventrally Species X.
Mandibles yellow;mesopleuron finely punctate ventrally Species XI.

15 (1) Apical gastric tergite black,sometimes tinged with fuscous or fulvous 16
Apical gastric tergite entirely fulvous 25

16 (15) Two basal gastric tergites alone yellow,immaculate;length 10 mm. pictifrons Cress.group.
Two basal gastric tergites alone black and yellow,sometimes varied with ferrugineous 17
Three basal gastric tergites alone black and yellow,sometimes varied with ferrugineous 22
More then three basal gastric tergites black and yellow; length 14 mm. sexvittatus,n.sp.

17 (16) Tergites with yellow vittae at base 18
Tergites with yellow vittae at apex 19

18 (17) Gastric vittae lemon-yellow,sharply defined;head subtriangular;length 12 mm. stricklandi,n.sp.
Gastric vittae rarely entirely yellow or sharply defined; head usually quadrate;size not less than 15 mm. comes Cress.group.

19 (17) Length 15 mm.
Length 9 mm. 20
21

20 (19) Gaster with broad yellow vittae;gaster slender
trizonatus Prov. group
Gaster with four indistinct yellow maculae laterally, one on each side of two basal tergites
bryanti,n.sp.(in part).

21 (19) Flagellar segments black or almost entirely so;ultimate flagellae segment much longer than penultimate
parvus Cress.
Flagellar segments strongly ferrugineous;ultimate and penultimate flagellar segments subequal vescus Prov.

22 (16) Tergites with yellow vittae at base 23
Tergites with yellow vittae at apex 24

23 (22) Length greater than 15 mm.;gastrocoeli not subobsolete
comes Cress. group.
Length not greater than 10 mm.;gastrocoeli subobsolete
pomilius Prov.

24 (22) Flagellar segments black or almost entirely so;length at least 15 mm. laetus Brullé group.
Flagellar segments strongly ferrugineous ventrally;length not greater than 10 mm. parvus C^ress.

25 (15) Mesoscutum partially rufous;hypandrium large,elongate, laterally emarginate grotei Cress.
Mesoscutum entirely black;hypandrium not elongate, apically obtuse 26

26 (25) Postpetiole always yellow;gaster usually black and fulvous,never with yellow vittae;basal flagellar segment less than twice as long as wide apically
creperus Cress.
Postpetiole usually black;gaster usually with yellow vittae,sometimes subobsolete;basal flagellar segment more than twice as long as wide apically
variegatus Cress.

27 (1) Gastric apex not entirely ferrugineous,usually black or piceous;head ovately subtriangular 39
Gastric apex entirely ferrugineous 28

28 (27) Antennae annulate;length 6-9 mm. scitulus Cress.
Antennae without annulus;length usually 15 mm. 29

29 (28) Gaster black;more or less ferrugineous laterally;tyloides prominent on antennae radnori,n.sp.(in part).
Gaster with transverse black vittae;wings subhyaline 30
Gaster entirely ferrugineous 32

30 (29) Head and thorax entirely black 31
Head and thorax entirely or almost entirely ferrugineous
longulus Cress.

31 (30) Postpetiole black;basal flagellar segment twice as long as wide apically animosus Cress.
Postpetiole yellow;basal flagellar segment 1½ times as long as wide apically oreperus Cress.

32 (29) Wings deeply fuliginous 33
Wings subhyaline 36

33 (32) Posterior legs black, their tibiae with white annulus or spot basally;scutallum yellow;scape entirely black
devinctor Say
Not entirely as above 34

34 (33) Head large, strongly quadrate 35
Head small, subtriangular placidus-rufuventris group

35 (34) Tibiae and tarsi pale ferrugineous;face yellow laterally
lividulus Prov.
Tibiae and tarsi entirely black;face entirely yellow
grandis Brullé

36 (32) Pedicel entirely ferrugineous;length less than 10mm.
utilis Cress.
Pedicel entirely black;length greater than 12 mm. 37

37 (36) Posterior femora black 38
Posterior femora ferrugineous nuncius Cress.

38 (37) Four anterior coxae black;head subquadrate
nubivagus Cress.
Four anterior coxae yellow;head subtriangular
allapsus Cress.

39 (27) Scape beneath yellow wings not violaceous
quebecensis Prov.
Scape immacualtely black;wings with violaceous tinge
pedalis Cress.

Amblyteles acerbus Cresson

(male only)

1867 Ichneumon acerbus Cresson, Trans. Amer. Ent. Soc. 1:293.
1877 Ichneumon acerbus; Cresson, Trans. Amer. Ent. Soc. 6:146.
1878 Ichneumon acerbus; Provancher, Nat. Can. 10:291.
1903 Cratichneumon acerbus; Viereck, Trans. Amer. Ent. Soc. 29:76.
1928 Amblyteles acerbus; Cushman, Ins. N.Y: 921.

Distribution:-Eastern U.S.; Illinois; New Mexico; Quebec.

The type has the head moderately subtriangular; ocellocular space subequal to diameter of lateral ocellus; eyes divergent below antennae; cheeks flat; malar space 1/3 of basal mandibular width; basal flagellar segments twice as long as wide apically, all except basal segments dilated medially; scutellum carinate latero-anteriorly; propodeum moderately rounded, strongly striate, not concave posteriorly, carinae moderate, distinct; areola quadrate, slightly longer than broad; costula present; pedicel depressed basally; postpetiole narrowly dilated, coriaceous, smoothly outlined; gastrocoeli subobsolete, transversely-oblique; gaster elongate, depressed except apically; length of basal gastric tergite 1½ apical tergal width.

In the Alberta specimens the malar space varies between ½ and 1/3 of the basal mandibular width.

Wabamum	9-vii-31	E.H. Strickland
Gull Lake	24- vi-29	E.H, Strickland
Edmonton	11- vi-32	O.Peck
Edmonton	2-vii-32	O.Peck

Amblyteles allapsus Cress.

1864 Ichneumon allapsus Cresson, Proc. Ent. Soc. Phila. 4:256.
Ichneumon allapsus Cresson, Trans. Amer. Ent. Soc. 6:176.

Distribution:-Colorado.

The two Alberta specimens that run to this species differ, the Bilby specimen having the head subquadrate, not transverse, the areola square, not suborbicular and the propodeum rugose not scabrous. These characteristics, if constant are sufficient to distinguish the Bilby specimen from A. allapsus.

The type has the head transverse and subtriangular, ocellocular space 1¼ times as great as the diameter of the lateral ocellus, clypeus weakly truncate, cheeks flat, basal flagellar segment 2½ times as long as wide, the apical segments weakly dilated medially.

The scutellum is convex and the propodeum angulate, not concave posteriorly, with moderate carination forming a demi-circular areola; postpetiole slender, arcuate, finely striate medially; gastrocoeli small, moderate in depth, transverse - oblique, their width scarcely equal to 2/3 of intergastrocoelar space; gaster elongate; hypandrium not elongate.

Slave Lake	10-viii-24	O. Bryant
Bilby	14- vii-24	O. Bryant

Amblyteles animosus Cresson

(male only)

1864 Ichneumon animosus Cresson, Proc.Ent.Soc.Phila.3:164.
1865 Ichneumon rubellus Cresson, (nec Gravenhorst; Kollar, Treat.Ins.Tran.Louden,:229,1840) Proc.Ent.Soc.Phila.4:254; preoccupied.
1865 Ichneumon animosus; Cresson, Proc.Ent. oc.Phila.4:257.
1877 Ichneumon animosus; Cresson, Trans.Amer.Ent.Soc.6:176.
1877 Ichneumon animosus, var.rubellus; Cresson, Trans.Amer.Ent. Soc.6:176.
1927 Amblyteles animosus; Criddle, Ann.Rept.Ont.Ent.Soc.58:101.
1927 Amblyteles animosus rubellus; Criddle, Ann.Rept.Ont.Ent. Soc.58:101.

Distribution:-Colorado, New Mexico, Rocky Mountains, Alberta.

Amblyteles discus Cress.

(male only)

1864 Ichneumon discus Cresson,Proc.Ent.Soc.Phila.3:169.
1865 Ichneumon discus;Cresson,Proc.Ent.Soc.Phila.4:176.
1877 Ichneumon discus;Cresson,Trans.Amer.Ent.Soc.6:176.
1927 Amblyteles discus;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.

Distribution:-Colorado,Rocky Mountains,Alberta.

Cresson (1877) separates these two species on the colour of the posterior femora; in the Alberta series, however, there are intergrades.

The type of A. discus differs from that of A. animosus in the areola being quadrate and slightly transverse and the head transversely subovate. These characteristics are to be found in the Alberta series of A. animosus as well as in the type of A. rubellus. A comparison of the colour from the original descriptions indicates that A. discus is merely a darker specimen. The subobsolete rufous areas on the mesoscutum of A. discus is present within the series of A. animosus as well.

The latter differs, according to the original descriptions, in the antennae being 2/3, not ½, of the length of the body and the thorax closely not sparsely, punctate. It is very doubtful if these characters hold in separating the two groups.

The name A. discus can be considered, at least tentatively as a synonym of A. animosus, especially as the distribution is similar.

One Beaverlodge specimen differs considerably from the series in having the basal flagellar segment barely twice as long as wide and covered with short, stiff setae instead of being sericeous. The posterior orbits are partially ferrugineous, the gaster with broad black vittae, the fourth and fifth largely black and the hypandrium elongate, laterally emarginate.

Beaverlodge	19 -vii-31	O. Peck
Beaverlodge	28 -vii-31	E. H. Strickland
Beaverlodge	29 -vii-31	O. Peck
Beaverlodge	31 -vii-31	O. Peck (3)
Beaverlodge	10-viii-31	O. Peck (6)
Slave Lake	25-viii-24	O. Bryant
Bilby	28 -vii-24	O. Bryant
Bilby	10-viii-24	O. Bryant
Edmonton	14 -vii-32	O. Peck (2)
Edmonton	15 -vii-32	O. Peck
Edmonton	30 -vii-32	O. Peck

Amblyteles ater Cresson

(female only)

1804 Ichneumon ater Cresson,Proc.Ent.Soc.Phila.3:138.
1877 Ichneumon ater;Cresson,Trans.Amer.Ent.Soc.6:146.
1925 Amblyteles ater;Cushman,Jour.Wash.Acad.Sci.15:388.
1928 Amblyteles ater;Cushman,Ins.N.Y.:922.

Distribution:-New York, Illinois.

The type has the head subquadrate, broader than long;ocellocular space 1¼ times the diameter of lateral ocellus;eyes strongly divergent below antennae;face transverse, cheeks buccate; clypeus broadly truncate; length of first flagellar segment 1¼ times apical width; apical flagellar segments strongly flattened.

Propodeum and postpetiole smoothly rounded, latter narrow, finely striate; gaster rather elongate, basal tergal length and width equal; gastrocoelar space slightly less than length of gastrocoelus; subgenital plate very retracted.

The type and Alberta specimen disagree with the original description of the pedicel being "rather broad". In the Alberta specimen there is no white spot anterior to the tegulae. In Cresson's key the couplet"wings fuliginous" places it in the A. orpheus group,the Alberta specimen being weakly but distinctly fuliginous.

Waterton 12-vii-33 E.H. Strickland

Amblyteles bimembris Provancher

(female only)

1875 Ichneumon bimembris Provancher, Nat.Can.9:8.
1877 Ichneumon bimembris; Cresson, Trans.Amer.Ent.Soc.6:150.
1878 Ichneumon bimembris;Provancher,Nat.Can.10:267,293.
1925 Amblyteles bimembris;Cushman,Jour.Wash.Acad.Sci.15:388.
1928 Amblyteles bimembris;Cushman,Ins.N.Y.1:922.

Distribution:-Quebec, N.Y.

The type has the head narrowed ventrally; ocell-ocular space 1½ times the diameter of lateral ocellus; malar space 1 1/3 as long as basal mandibular width; clypeus strongly truncate; first flagellar segment 2½ times as long as wide apically, the second 1½; apical flagellar segments flattened.

Propodeum somewhat weakly carinate; gaster strongly punctate; gastrocoeli broad, moderate in depth; ovipositor subexserted.

The Alberta specimen has the clypeus weakly truncate and differs from the original description in the nervures being brown, the postpetiole very finely striate and the anteorbitals fulvous. The Gahan homotype and other specimens in the U. S. National Museum have the latter three characteristics, the first not being noted, while the type agrees in the neuration and sculpture.

27-vi-32 Radnor O. Peck

Amblyteles bryanti, n.sp.

(male only)

This species can be placed in Cresson's key with either the group having entirely black gastric tergites or with the one having black and yellow tergites, due to the yellow not being constant.

In the former group this species runs to Amblyteles cinctitarsis Prov., especially if the final couplet is amended to read "posterior coxae white below" in accordance with the original description. (Provancher, 1875, p.50, Ichneumon varipes Prov.). From this species A. Bryanti

differs in the length being 0.6 inches, not 0.7; the face immaculately yellow; the stigma fulvous, not black; the gaster black, not bluish and in other characteristics. The type of A. cinctitarsis and an Ottawa specimen determined by Viereck both have the ocellocular space subequal, not distinctly greater.

In Cresson's second group A. bryanti runs to A. trizonatus Prov. but differs in the cheeks and postorbitals not being yellow, the scutellum without lateral carinae and in a broader abdomen. The type of A. trizonatus has the head subovate, the eyes strongly divergent below the antennae and the malar space subequal.

Description:- Male; length 15 mm.; head subquadrate, moderately narrowed ventrally; ocellocular space 2/5 greater than width of lateral ocellus; eyes moderately divergent below antennae; malar space scarce half the basal mandibular width; basal flagellar segment two thirds as wide as long at base; at least apical fourth of flagellum with subserrate segments.

Thorax shining, not distinctly striate; scutellum usually flat but in one specimen from Wabamum convex; propodeum rounded posteriorly, scabrous, or weakly rugulose, strongly carinate; areola quadrate, large, usually longer than wide, weakly carinate posteriorly; wings subhyaline.

Postpetiole arcurate dorsally, moderately dilated, strongly bicarinate, moderately finely striate medially; gastrocoeli deep, oblique, the width subequal to intergastrocoelar space; first gastric tergite about 4/5 as wide apically as long; two basal gastric tergites closely and

moderately finely punctate; ventral fold prominent on three basal gastric sternites.

Black; scape anteriorly; anterior orbits; face, mandibles medially, palpi; scutellum, sometimes notum of third thoracic segment, tegulae with line in front and another below, four anterior legs with coxae and trochanters apically, their trochantelli and tarsi entirely, the femora partially and tibiae, almost entirely yellow; posterior legs with trochantelli entirely, their femora narrowly basally, their tibiae and two proximal tarsi at base broadly, all yellow; two basal gastric tergites black, with or without apical yellow bands or lateral yellow maculae; stigma fulvous, nervures brown.

Bilby	28-vii-24	O. Bryant
Bilby	5-viii-24	O. Bryant
Bilby	10-viii-24	O. Bryant (2)
Slave Lake	17-viii-24	O. Bryant
Wabamun	11-vii-31	E. H. Strickland
Wabamun	2-viii-26	E. H. Strickland
Wabamun	2-viii-29	E. H. Strickland
Wabamun	14-viii-29	E. H. Strickland

Amblyteles caeruleus Cresson

1864 Ichneumon caeruleus Cresson, Proc. Ent.Soc.Phila.3:149; female.
1877 Ichneuman caeruleus;Cresson,Trans.Amer.Ent.Soc.6:146; male, female.
1878 Ichneumon caeruleus;Provancher,Nat.Can.10:267,270,292; male, female.
1916 Amblyteles (Pterocormus) caeruleus;Viereck,Hym.Conn: 344,359, male.
1922 Amblyteles caeruleus;Champlain,Psyche 29:100.
1926 Amblyteles caeruleus;Flanders,Pan-Pac-Ent.2:158.
1927 Amblyteles caeruleus;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.
1928 Amblyteles caeruleus;Cushman,Ins.N.Y:922.
1930 Amblyteles caeruleus;Breakley,Ann.Ent.Soc.Amer.23:184-7.

Distribution:-Eastern U.S.A., Illinois, Texas, Quebec, Alberta.

Hosts:-Hemerocampa leucostigma S.&A.
Achatodes zeae Harr.

The Alberta specimen agrees with Cresson's descriptions and with the following characteristics of the type:-

Ocellocular space 1¼ times as long as diameter of lateral ocellus; head strongly, transversely subovate; eyes divergent below antennae; clypeus strongly truncate; malar space 2/3 of basal mandibular width; propodeum rounded posteriorly; propodeal carinae distinct, broadly flattened, areola quadrate; postpetiole slender, punctate apically, striate medially; gastrocoeli large, deep, slightly wider than intergastrocoelar space; subgenital plate small, strongly retracted.

Edmonton 12-v-24

Bilby June O.Bryant (Criddle, 1927)

Amblyteles cincticornis Cresson

1864 Ichneumon cincticornis Cresson,Proc.Ent.Soc.Phila.3:139; female.
1867 Ichneumon galenus Cresson;Trans.Amer.Ent.Soc.1:292;male.
1877 Ichneumon cincticornis;Cresson,Trans.Amer.Ent.Soc.6:143; female.
1877 Ichneumon galenus;Cresson,Trans.Amer.Ent.Soc.6:143;male.
1878 Ichneumon cincticornis;Provancher,Nat.Can.10:267,290; female.
1878 Ichneumon galenus;Provancher,Nat.Can.10:267,290;male.
1904 Platylabus cincticornis;Berthoumieu,Gen.Ins.15:57.
1916 Amblyteles (Pterocormus) cincticornis;Viereck,Hym.Conn. 344:female.
1916 Amblyteles (Pterocormus) galenus;Viereck.Hym.Conn.351; male.
1921 Amblyteles cincticornis;Cushman,Jour.Wash.Acad.Sci.15: 388;male,female.
1928 Amblyteles cincticornis;Cushman,Ins.N.Y:922.

Distribution:-Eastern United States,Illinois,Quebec.

Host:-Autographa brassicae Riley (Alberta).

The type is female and has the head subtriangular, strongly narrowed ventrally; ocellocular space 1½ times diameter of lateral ocellus; eyes not strongly divergent below antennae; cheeks not buccate; malar space ¾ of basal mandibular width; clypeus rounded ventrally; first flagellar segment four times as long as wide apically; apical flagellar segments flattened.

Propodeum almost rounded with fairly strong carinae; areola large, quadrate; petiole depressed basally; postpetiole narrow with indistinct, fine, non-parallel striae and a few punctations; gastrocoeli large, transverse, deep, almost confluent; length of second gastric tergite 5/4 the width; subgenital place retracted.

The Alberta specimens have punctation unusually close and the postpetiole somewhat angular.

The allotype #9171 has the head subtriangular, narrowed ventrally; ocellocular space 1 1/3 greater than diameter of lateral ocellus; face closely, coarsely punctate; cheeks flat; malar space 2/3 basal mandibular width; clypeus large, deep, rounded ventrally; scutellum strongly convex, densely punctate; propodeum rounded, not concave, posteriorly; areola quadrate, large, concave posteriorly; propodeal carinae prominent; petiole depressed basally; postpetiole angular, ~~to~~ fairly narrow; gastrocoeli broad, deep, almost meeting; basal gastric tergite 2/3 as wide as long.

Bilby	28-vii-24	O. Bryant
Bilby	5-viii-24	O. Bryant
Edmonton	viii-27	H. A. MacGregor
Edmonton	6-viii-32	O. Peck
Edmonton	11-vii-21	E. H. Strickland
Edmonton	5-vii-21	———
Edmonton	27-vii-31	O. Peck

Amblyteles citatus Provancher

(male only)

1877 Ichneumon citatus Provancher, Nat.Can.9:8.
1877 Ichneumon citatus; Cresson, Trans.Amer.Ent.Soc.6:148.
1878 Ichneumon citatus; Provancher, Nat.Can.10:269, 293.
1927 Amblyteles citatus; Criddle, Ann.Rept.Ont.Ent.Soc.58:101.

Distribution:-Quebec; N.H.; Alberta.

The type has the head quadrate, ocellocular space twice as wide as diameter of lateral ocellus: eyes divergent below antennae; malar space equal to basal mandibular width; clypeus shortly truncate; flagellar segments with setiferous annulae; propodeum not strongly carinate, neither concave posteriorly nor rounded; strongly punctate and striate; postpetiole slender, weakly punctate; two apical gastric tergites marked with yellow.

Some of the Alberta specimens run to A. brevicinctor Say in Cresson's key but the head and thorax are not immaculate. While no sex was mentioned in the original description, yet, according to Cushman and Gahan (1921), the male was described as I. brevicornis, a few having the partially white posterior trochanter of I. extrematatis Cress. These Alberta specimens running to A. brevicinctor are conspecific with those having the postpetiole partly white.

Wabamun	17-vii-31	E.H.Strickland
Wabamun	10-viii-31	E.H.Strickland
Edmonton	16- vi-26	E.H.Strickland
Edmonton	20- vi-26	E.H.Strickland
Edmonton	22- vi-32	O.Peck
Bilby	June	G.Salt (Criddle, 1927)

Amblyteles citimus Cresson

(male only)

1877 Ichneumon citimus Cresson, Trans.Amer.Ent.Soc.6:144.
1925 Amblyteles citimus; Cushman, Jour.Wash.Acad.Sci.15:388.
1927 Amblyteles citimus; Criddle, Ann.Rept.Ont.Ent.Soc.58:101.

Distribution:-New Hampshire; Alberta.

A. citimus may be the male of A. torvinus Cress. (Cresson, 1877).

The type of this species was overlooked. The Alberta specimen is conspecific with one collected by Salt at Bilby, Alta, now in the U. S. National Museum and determined as A. citimus.

The specimen runs to this species in the Cresson key but differs from the original description in the propodeum being scabro-rugose, not rugose and the wings fuliginous but not blackish-fuliginous.

Wabamum	8-vii-31	E. H. Strickland
Bilby	June	G. Salt (Criddle, 1927)

Amblyteles comes Cresson

(male only)

1864 Ichneumon comes Cresson, Proc.Ent.Soc.Phila.3:158.
1867 Ichneumon comes; Cresson, Trans.Amer.Ent.Soc.1:301.
1875 Ichneumon comes; Provancher, Nat.Can.7:23,74,233.
1877 Ichneumon comes; Cresson, Trans.Amer.Ent.Soc.6:162.
1878 Ichneumon comes; Provancher, Nat.Can.10:350.
1916 Amblyteles (Pterocormus) comes; Viereck, Hym.Conn:352.
1925-6 Amblyteles comes; Petch and Armstrong, Prov.Que.Soc. Prot.Plants.18:95.
1927 Amblyteles comes; Criddle, Ann.Rept.Ont.Ent.Soc.58:101.
1928 Amblyteles comes; Cushman, Ins.N.Y:922.

Distribution:-widespread.

Cresson (1867, 1875), Viereck (1916) and Criddle (1927) consider that Amblyteles aleatorius Harris is a colour variety, although such a division should not be

recognised (Ferris, 1928).

Probably a large number of very closely related species are included under this specific name. Any attempt in this paper to divide the A. comes group with the available material would be of no significance.

The type has the head quadrate, weakly narrowed ventrally; ocellocular space 1½ times the lateral ocellar width; eyes divergent below antennae, reaching the anterior tentorial foveae; clypeus rounded; malar space 1/3 of the basal mandibular width; basal flagellar segment twice as long as wide apically and weakly barrel-shaped; propodeum strongly carinate, not cavate, weakly angulate; areola quadrate; petiole not depressed; postpetiole fairly broad, moderately striate and strongly bicarinate; gastrocoeli obliquely subquadrate, scarcely one-third as wide as intergastrocoelar space; basal gastric tergite scarcely 4/5 as wide apically as long. The posterior portion of the gaster of the type has been eaten.

The Alberta specimens vary in the colouration of the propodeum and gastric tergites, the ocellocular and malar spaces, the proportions of the flagellar segments, both the shape and sculpture of the propodeum and pedicel, the scutellar shape, the proportions of the gastrocoeli and in other characters.

The yellow colour in the propodeum is correlated with the basal flagellar segment being more than twice as long as the apical width, four Alberta specimens having these characters and the remaining nine without either.

Amblyteles creperus Cresson

(male only)

1867 Ichneumon creperus Cresson, Trans. Amer. Ent. Soc. 1:298.
1878 Ichneumon creperus; Cresson, Trans. Amer. Ent. Soc. 6:167.
1878 Ichneumon creperus; Provancher, Nat. Can. 10:354.
1925 Amblyteles creperus; Cushman, Jour. Wash. Acad. Sci. 15:388.
1928 Amblyteles creperus; Cushman, Ins. N.Y.:922.

Distribution: West Virginia, Illinois, New York and Quebec.

The single Alberta specimen agrees entirely with Provancher's description (1878) and with the original description. The scutellum, however, is only weakly convex, although "convex" in Provancher's description. This species is recognised by the black and fulvous gaster and the black and yellow pedicel.

The type has the head quadrate-subovate with the eyes strongly divergent; the ocellocular space 1¼ times the diameter of the lateral ocellus; the cheeks almost entirely hidden from in front; basal flagellar segment 1½ times as long as wide apically; the apical two thirds of flagellum with the segments moderately barrel-shaped; propodeum angulate, not concave posteriorly, the carination strong and areola twice as wide as long; petiole moderately depressed basally; postpetiole moderately but abruptly dilated, finely striate medially; gastrocoeli moderately deep, oblique, the intergastrocoelar space 1½ times the gastrocoelar width; hypandrium broadly rounded.

Beaverlodge	28-vii-31	E.H.Strickland
Edmonton	26-viii-27	H.A.MacGregor

Amblyteles devinctor Say

1825 Ichneumon devinctor Say, Amer. Ent. 2:48.
1836 Ichneumon devinctor; Say, Bost. Jour. Nat. Hist. 1:3, 230.
1846 Ichneumon tibialis Brullé, Hym: 301; female.
1859 Ichneumon devinctor; Leconte, Writ. of Th. Say, 1:48; 2:687.
1865 Ichneumon montivagus Cresson, Proc. Ent. Soc. Phila. 4:255; male.
1877 Ichneumon devinctor; Cresson, Trans. Amer. Ent. Soc. 6:174.
1878 Ichneumon devinctor; Provancher, Nat. Can: 10:360.
1883 Ichneumon devinctor; Provancher; Faune Ent. Can. Hym: 286.
1916 Amblyteles (Pterocormus) devinctor; Viereck, Hym. Conn: 358.
1921 Amblyteles devinctor; Cushman and Gahan, Proc. Ent. Soc. Wash. 23:164.
1928 Amblyteles devinctor; Cushman, Ins. N.Y: 923.

Distribution:-Eastern United States, Illinois, Colorado, Quebec.

The Alberta specimen is a female and runs to this species in Cresson's key (1877). It resembles the A. grandis specimen closely but differs to the hind tibiae being white basally, the tegulae black, the temples indistinctly black, not distinctly or closely punctate and the thoracic pleurae polished and strongly striate.

Neither the type of A. grandis nor the neotype of A. devinctor were seen. The Alberta specimen agreed closely with the A. devinctor specimens in the Cresson collection.

High River 15-vii-21 O. Bryant

Amblyteles feralis Cresson

(female only)

1867 Ichneumon feralis Cresson, Trans. Amer. Ent. Soc. 1:301.
1877 Ichneumon feralis; Cresson, Trans. Amer. Ent. Soc. 6:159.
1878 Ichneumon feralis; Provancher, Nat. Can. 10; 349.
1916 Ichneumon feralis; Walker, Can. Ent. 48:259.
1927 Amblyteles feralis; Criddle, Ann. Rept. Ont. Ent. Soc. 58:101.
1928 Amblyteles feralis; Cushman, Ins. N.Y: 923.

Distribution:-Eastern U.S.; Newfoundland; Quebec; Alberta.

The type has the head subquadrate, eyes strongly

divergent below antennae; malar space equal; cheeks buccate; basal flagellar joint slightly longer than wide apically, basal flagellar joints broad apically; petiole somewhat depressed, postpetiole not subpyramidal anteriorly (unlike A. uncinatus Cress.); basal gastric tergal length ¾ of width.

The Alberta specimens resemble A. uncinatus Cress. very closely but differ in the wings not being fuliginous, the two basal gastric tergites not deeply punctate, the pedicel not subpyramidal in profile and the gastrocoeli not moderately large and deep. Cresson (1877) uses the coxal scopa to differentiate the two species but this is a variable character. A. uncinatus was reported from Edmonton by Salt, (Criddle, 1927).

The size of head varies as well as the presence of rufous anteorbitals giving the head a variable appearance. The orbitals are not mentioned in Provancher's or Cresson's descriptions. The specimens were not divisible satisfactorily into groups, although a correlation occurred between size of head and the anteorbitals; of the available specimens; the unusual coloration and morphological similarities indicate that the larger forms with rufous anteorbitals are tenerals from a different host rather than different species or subspecies.

Two specimens with large heads and distinct rufous orbitals have been referred dubiously to this species.

Bilby	28- vii-24	O.Bryant
Slave Lake	28-viii-24	O.Bryant
Slave Lake	29-viii-24	O.Bryant (2)
Beaverlodge	16- vi-31	E.H.Strickland
? Edmonton	1 - iv-24	O.Bryant
Edmonton	April,May	G.Salt (Criddle,1927)

Amblyteles grandis Brulle

1846 Ichneumon grandis Brulle,Hym:300;female.
1864 Ichneumon ambiguus Cresson,Proc.Ent.Soc.Phila.3:161;male.
1864 Ichneumon regnatrix Cresson,Proc.Ent.Soc.Phila.3:179;female.
1865 Ichneumon ambiguus;Cresson,Proc.Ent.Soc.Phila.4:255.
1877 Ichneumon grandis;Cresson,Trans.Amer.Ent.Soc.6:173.
1878 Ichneumon grandis;Provancher,Nat.Can.10:359.
1883 Ichneumon grandis;Provancher,Faune Ent.Can.Hym.284.
1916 Amblyteles (Pterocormus ?) grandis;Viereck,Hym.Conn: 347,354.
1927 Amblyteles grandis;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.
1928 Amblyteles grandis;Cushman,Ins.N.Y:923.

Distribution:-Eastern United States,Colorado,Quebec, Alberta,Vancouver Island.

The type of this species is unavailable, no record of it being found. The description of the type is scanty. Cresson has described the male as A. ambiguus and the female as A. regnatrix.

A. grandis is recognisable by the completely ferrugineous gaster, the large, quadrate, not subquadrate, head and convex cheeks. A. grandis has considerable variation in colour and apparently in the shape of the scutellam and areola as well.

The coxal scopa is absent in the Alberta specimens but the usual location of the scopa is occupied by a very finely punctation. The scutellum differs from the descriptions in being yellow, not flavous (Brulle), nor black (Cresson).

Wabamun	2-viii-26	E.H.Strickland
Calgary	June	G.Salt (Criddle,1927)

Amblyteles grotei Cresson

(male only)

1864 Ichneumon Grotei Cresson,Proc.Ent.Soc.Phila.3:155.
1865 Ichneumon Grotei;Cresson,Proc.Ent.Soc.Phila.4:254.
1877 Ichneumon Grotei;Cresson,Trans.Amer.Ent.Soc.6:167.
1927 Amblyteles grotei;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.

Distribution:-Colorado,Illinois,Rocky Mountains,Alberta.

This species is characterised morphologically by the large ocelli, the ocellocular space being subequal to the diameter of the lateral ocellus, the basal flagellar segment not more than twice as long as wide apically, the mesoscutum rufous and black, the scutellum convex and the hypandrium elongate with lateral emarginations. One specimen has the lateral margins of the hypandrium straight and the hypandrial apex obtuse.

The type has the head quadrate, the ocellocular space subequal to the diameter of the lateral ocellus, the malar space half the basal mandibular width, clypeus subtruncate, basal flagellar segment 1½ times as long as wide apically, the apical flagellar segments strongly nodose, and scutellum strongly convex, propodeum rounded and not concave behind, the areola quadrate, twice as wide as long and indented posteriorly, postpetiole moderately but sharply dilated, coarsely aciculated and strongly bicarinate, the hypandrium elongate.

Radnor	10- ix-32	O.Peck (2)
Edmonton	29-vii-30	O.Peck
Beaverlodge	29-vii-31	O.Peck
Beaverlodge	31-vii-3[illegible]	O.Peck
Tofield	25-viii-23	E.H.Strickland
Calgary	August	G.Salt (Criddle, 1927)

Amblyteles histricus Cresson

(male only)

1867 Ichneumon histricus Cresson, Trans.Amer.Ent.Soc.1:294.
1877 Ichneumon histricus; Cresson, Trans.Amer.Ent.Soc.6:147.

Distribution:-West Virginia.

The type of A. histricus is characterised by the ocellocular space 1½ times diameter of lateral ocellus; eyes divergent ventrally; clypeus truncate; cheeks flat; malar space 2/3 of basal mandibular width; ventral mandibular tooth strongly developed; basal flagellar segment 1½ times as long as wide apically, supra-annular segments strongly nodose; propodeum very coarse, rounded, not incised posteriorly, carinae very strong, areola subcircular, medium in size; postpetiole strongly bicarinate, very finely striate, coarsely punctate latero-apically; gastrocoeli large, deep and slightly broader than intergastrocoelar space, length of basal gastric tergite equal to its width; gaster elongate, strongly depressed, dull, deep, reddish.

The Alberta specimen has the clypeus not especially large and the malar space is nearer half the basal mandibular width rather than two thirds.

(?) Amblyteles hudsonicus Cresson

(female only)

1877 Amblyteles hudsonicus Cresson, Trans.Amer.Ent.Soc.6:192.

Distribution:-Hudsons Bay Territory.

Because the type in Philadelphia has not been seen and the original description is meagre, the determination of a specimen from Radnor is questionable; the specimen agrees

entirely with the original description.

Four other specimens have been placed tentatively in this species as they resemble the Radnor specimen closely, especially in the shape of the head, antennae, scutellum, postpetiole and gaster. They differ in the hind legs being chiefly black and both the tibiae and tarsi subobsoletely ferrugineous. As colour is so variable in females with entirely ferrugineous gasters and because this species has been recorded only once, it can be assumed that Cresson probably described an extreme colour form. The whole group, moreover, has appeared early in the season and in similar localities so that it appears to be a single species.

Radnor	27-vi-32	O.Peck
Edmonton	29- v-26	E.H.Strickland
Edmonton	16-vi-26	E.H.Strickland (2)
Edmonton	5-vi-32	O.Peck

Amblyteles inurbanus Cresson

(female only)

1867 Ichneumon inurbanus Cresson,Trans.Amer.Ent.Soc.1:302.
1877 Ichneumon inurbanus;Cresson,Trans.Amer.Ent.Soc.6:173.
1887 Ichneumon inurbanus;Cresson,Trans.Amer.Ent.Soc.Suppl.,185.

Distribution:-West Virginia,Colorado.

The Alberta specimens agree closely with the type, with specimens determined by Cushman and with keys. The antennal annulus, however, may be subobsolete or absent and the posterior pair of tibiae and their tarsi may be dull rufous. The wings are subhyaline with a violaceous tinge, rather than violaceous and black as in the original description.

The Calgary specimen differs from the others in

the orbits being almost entirely rufous and the mandibles slender with the dorsal tooth elongate.

The type has the head quadrate and rugged; ocell-ocular space subequal; cheeks buccate, broad; eyes not nearly reaching the level of clypeal foveae; clypeus truncate, shining, sparsely and shallowly punctate; malar space equal; first flagellar segment 1½ times as long as wide apically and dilated apically; flagellum flattened apically; seventh to fourteenth flagellar segments with annulus interrupted; scutellum subtriangular, flat; propodeum sharply declivous, concave posteriorly, carinae flattened, areola 1½ times as long as wide, costula weak; posterior coxae very finely punctate; wings strongly violaceous, nervures piceous; postpetiole fairly broad, finely aciculate; gaster stout; gastrocoeli shallow, transverse-oblique; intergastrocoelar space slightly greater than width of gastrocoelus; subgenital plate retracted.

Beaverlodge	23- v-31	O.Peck (3)
Bilby	28-vii-24	O.Bryant
Calgary	1- ii-24	O.Bryant
High River	12- vi-25	O.Bryant

Amblyteles laetus Brullé

1836 Ichneumon parata Say, Boston Jour.Nat.Hist.1, pt 3:228 (nec Ichneumon parata, Say, Contrib.Maclur.Lyc.2:68, 1828); preoccupied; male only.
1846 Ichneumon laetus Brullé, Hist.Nat.Ins.Hym.4:303.
1859 Ichneumon parata; Leconte, Writ.of Thos.Say Entom.2: 686, male only.
1864 Ichneumon laetus; Cresson, Proc.Ent.Soc.Phila.3:156.
1867 Ichneumon laetus; Cresson, Trans.Amer.Ent.Soc.1:300, male only.
1877 Ichneumon laetus; Cresson, Trans.Amer.Ent.Soc.6:163, male only.
1878 Ichneumon laetus; Provancher, Nat.Can.10:351.
1883 Ichneumon laetus; Provancher, Faune Entom.Can., Hym:277.
1903 Gratichneumon laetus; Viereck, Trans.Amer.Ent.Soc.29:76.

1914 Ichneumon laetus;Baker,Rept.Ont.Ent.Soc.45:86,econ.
1915 Amblyteles laetus;Gibson,Can.Dept.Agr.Ent.bul.9:95,econ.
1915 Ichneumon laetus;Knight,Jour.Econ.Ent.8:514-515.
1915 Ichneumon laetus;Fyles,Rept.Ont.Ent.Soc.46:54.econ.
1916 Ichneumon laetus;Knight,Cornell bul.376:761,econ,host.
1916 Ichneumon (Pterocormus) laetus;Viereck,Hym.Conn:352.
1921 Amblyteles laetus;Cushman and Gahan,Proc.Ent.Soc.Wash. 23:166.syn.
1928 Amblyteles laetus;Cushman,Ins.N.Y:923-924.
1931 Amblyteles laetus;Breakley,Ann.Ent.Soc.Amer.24:40-44.

Distribution:-Eastern and Western U.S.,Quebec.

Hosts:-Cirphis unipuncta Haw. (Alberta)
Papaipema duplicata Bird.
Macronoctua onusta Grote
Pyrausta ainsliei Hein.

Cushman (1928) synonomises A. canadensis Prov. (1878,Nat.Can.10:361,etc.) with A. laetus, while Knight (1915, 1916) includes also A. funestus Cress. (1864, Proc. Ent.Soc.Phila.3:166) and A. haesitans Prov.(1875,Nat.Can.7:80), these being synonyms of the female.

Amblyteles quadrizonatus Vier.

1916 Ichneumon (Pterocormus) quadrizonatus Viereck,Hym. Conn:352.
1927 Amblyteles quadrizonatus;Criddle,Rept.Ont.Ent.Soc. 58:101.
1928 Amblyteles quadrizonatus;Cushman,Ins.N.Y:925.

While Cushman (1928) considers A. quadrizonatus as a species, yet he considers it to be a variation of A. laetus (unpublished data).

The types of neither A. laetus nor A. quadrizonatus were seen, the former probably being in France and the latter in Connecticut. Both Brullé's and Cresson's descriptions of A. laetus are indefinite, while there are several species included under this name in the Cresson collection. Viereck's description of A. quadrizonatus is only contained in his key and is inadequate. Because of the lack of types the Alberta

specimens cannot be named to species.

One distinct species with five specimens, all from the Edmonton district, has the head small and markedly transversely ovate with the eyes strongly divergent, the basal flagellar segment 1½ times as long as wide apically and the postpetiole and gaster slender with clearout, lemon-yellow markings without a ferrugineous tinge; the length is about 11 mm. A single specimen agrees with shape of the head and colour of gaster but differs in the basal flagellar segment being twice as long as wide, the propodeum with yellow maculae and the gaster stout. Another group, taken in July and August in Edmonton and west of there is characterised by a quadrate head, weakly narrowed ventrally, with the face yellow laterally. The postpetiole and gaster have uniformly orange vittae. A group of two specimens have the upper postorbits yellow and the postpetiole scabrous, but differ in their size and postpetiolar shape. Five specimens from the Canadian zone have the head broadly subtriangular with the face and gastric vittae lemon-yellow. Five specimens from Edmonton, Bilby and Slave Lake have the ventral portion of the frons with a broad, transverse fuscous vitta; a transversely quadrate head; small, transverse areola and scabrous postpetiole. Only one specimen agrees with Brullē's description of brown antennae and yellow orbits. Another has the mesopleuron spotted with yellow.

The first specimen of A. lactus in the Cresson collection has the flagellar segment 2½ times as long as wide apically, while no Alberta specimen has this segment even twice as long. The Cresson series, however, appears to be composed of several species.

As the types of neither A. laetus or A. quadrizonatus were available and the descriptions are inadequate, the possible species have been indicated only as groups. While it is believed that a number of species are included under this name, yet the colour differences at least may be due to Mendelian segregation. At the present, knowledge on this subject is needed, especially as the synonomy is not satisfactory.

Amblyteles lividulus Prov.

1877 Ichneumon lividulus Provancher,Nat.Can.9:10;female only.
1877 Ichneumon lividulus;Cresson,Trans.Amer.Ent.Soc.6:174; female only.
1878 Ichneumon lividulus;Provancher,Nat.Can.10:360;female only.

Distribution:-Quebec.

The type has the head subquadrate, narrowed ventrally but with buccate cheeks; the ocellocular space $1\frac{3}{4}$ times as great as the diameter of the lateral ocellar width; eyes not extending far below the antennae but strongly divergent, malar space 1 1/3 times the basal mandibular width, first flagellar segment twice as long as wide apically and the fourth subequal.

The male has not been described but a single Alberta specimen runs very closely to it in Cresson's key for the females, while in Cushman's unpublished data for males this specimen runs to the species. It resembles the female closely.

This male specimen has the head quadrate with strongly buccate cheeks, ocellocular space $1\frac{1}{2}$ times the lateral ocellar width, malar space $\frac{3}{4}$ of basal mandibular width, face and clypeus coarsely, closely punctate, the

former raised medially below antennae, clypeus rounded, tentorial invaginations unusually large and deep, mandibles slender, basal flagellar segment 2 1/3 times as long as wide apically, the segment only slightly dilated with apical suture angular; penultimate flagellar segment ½ as long as ultimate, apical segments not strongly dilated.

Thorax dull, closely, fairly coarsely punctate, scutellum strongly convex, propodeum short (as in Joppinae) and strongly carinate, areola transversely quadrate, posterior slope of propodeum steep.

Postpetiole weakly angular, rather broad with moderately coarse striae, gastric tergites finely punctate; gastrocoeli transverse, small, deep and each equal in width to half of intergastrocoelar space, gonostipites large, hypandrium large, elongate.

Black; face and clypeus laterally, anterior orbits, tegulae, tegular lines, tibiae and tarsi, all yellow; posterior pair of tibiae and tarsi apically fuscous; antennal brownish ventrally; wings violaceous, fuligineous with piceous nervures and ferrugineous stigmata; gaster entirely ferrugineous. Length 16 mm.

Slave Lake 17-viii-24 O.Bryant

Amblyteles longulus Cresson

(male only)

1864 Ichneumon longulus Cresson, Proc.Ent.Soc.Phila.3:171.
1865 Ichneumon longulus; Cresson, Proc.Ent.Soc.Phila.4:257.
1877 Ichneumon longulus, Cresson, Trans.Amer.Ent.Soc.6:183.
1916 Amblyteles (Pterocormus ?) longulus; Viereck, Hym.Conn:359.
1921 Amblyteles longula; Jones, Horner and Corkins, Colo.Ext. Serv.Ser.I, 179A.
1927 Amblyteles longulus; Criddle, Ann.Rept.Ont.Ent.Soc.58:101.

Distribution:-Colorado, New Mexico, California, Vancouver Island, Alberta.

Host:-Chorizagrotis auxiliaris Grt. (Alberta).

This is an extremely variable species for morphological characters or else a group of species. The head varies from quadrate to transversely subtriangular or ovate, the cheeks may be flat or buccate, the scutellum always convex but sometimes very strongly so, the postpetiole distinctly aciculate, subobsoletely so, or coriaceous and the hypandrium elongate or not, as well as the shape of the abdomen, one specimen alone has the antennae largely ferrugineous.

There appears to be no correlation between these characters. Even though the specimens from any one locality appear within a few days of each other yet each group is heterogenous. At the present time, therefore, this group appears to be a highly variable species.

The type is characterised by the head being transverse and subovate; ocellocular space subequal to diameter of lateral ocellus; eyes extending to level of clypeal foveae; malar space half of basal mandibular width; cheeks flat; basal flagellar segment twice as long as wide apically; propodeum weakly angulate and concave posteriorly, the carinae distinct but depressed; areola quadrate, 1½ times as wide as long; postpetiole slender, arcuate, strongly bicarinate, medially aciculate, coarsely sparsely punctate laterally; gastrocoeli deep, transverse, their width equal to intergastrocoelar space; basal gastric tergite one third longer than wide apically; hypandrium not especially elongate.

Beaverlodge	28- vii-31	E.H.Strickland
Beaverlodge	26- vii-31	O.Peck
Beaverlodge	29- vii-31	O.Peck (5)
Beaverlodge	31- vii-31	O.Peck
Slave Lake	25-viii-24	O.Bryant (2)
Bilby	28- vii-24	O.Bryant
Edmonton	13- vii-32	O.Peck
Edmonton	25- vii-32	O.Peck
Lethbridge	27- vii-25	E.H.Strickland
Lethbridge	2-viii-25	H.E.Gray

Amblyteles maurus Cresson

(female only)

1864 Ichneumon maurus Cresson,Proc.Ent.Soc.Phila.3:135.
1877 Ichneumon maurus;Cresson,Trans.Amer.Ent.Soc.6:142.
1901 Ichneumon maurus;Doane and Brodie,Wash.Sta.Bul.47:10.
1906 Ichneumon maurus;Viereck,Trans.Amer.Ent.Soc.32:226.
1921 Amblyteles maurus;Cushman and Gahan,Proc.Ent.Soc. Wash.23:168.
1927 Amblyteles maurus;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.
1928 Amblyteles maurus;Cushman,Ins.N.Y:924.

Distribution:-Eastern U.S.;Alberta.

Host:-Peridroma saucia Harr. (Alta.)

The type has the head quadrate, not narrowed ventrally; ocellocular space subequal to width of lateral ocellus; eyes divergent below eyes; cheek buccate; face with median quadrate elevated area; clypeus broadly truncate; first flagellar segment 2½ times as long as wide apically; apical flagellar segments flattened; propodeum rugged, angular, carinae prominent, areola hexagonal.

Postpetiole fairly broad, finely aciculated; gastrocoeli narrow, intergastrocoelar space 2/3 width of gastrocoeli; basal gastric tergite slightly broader than long; subgenital plate strongly retracted.

Bilby	14-viii-24	O.Bryant
Waterton	13- vii-23	E.H.Strickland
Bilby	June	O.Bryant (Criddle, 1927)

Amblyteles mormonus Cresson

(female only)

1877 Amblyteles mormonus, Cresson; Proc. Acad. Nat. Sci. Phila: 355.

Distribution:-Utah.

The type has the first flagellar segment more than three times as long as wide apically, apical flagellar segments not flattened, apices of basal segments slightly swollen; ocellocular line 1½ times as long as diameter of the lateral ocelli; head strongly subtriangular; clypeus somewhat truncate, defined dorsally; cheeks flat; malar space 1½ times as long as basal mandibular width; scutellum strongly convex; propodeum rounded, sloping steeply posteriorly; propodeal carinae not prominent, areola transversely quadrate; gastrocoeli large, transversely-oblique, medium in depth, intergastrocoelar space equal to gastrocoelar width; gaster stout; apical width of first gastric tergite 1 1/3 tergal length; subgenital plate retracted a little.

The Alberta specimens agree with this and also with the original description except that the wings may be termed subhyaline rather than fuliginous. M. Cushman (unpublished data) synonomises Ichneumon adjunctus Prov. with A. mormonus. In the original description of the latter species (Add. Faune Hym.:29-30) the wings are lightly fuliginous; this is applicable to the Alberta specimens. The scape in one of the Alberta specimens differs from the Provancher description in having a reddish tinge, instead of being immaculate, but without other variations.

Provancher reports I. adjunctus from Quebec and Cresson from Utah.

Gull Lake	27- vi-29	E.H.Strickland (2)
Bilby	28-vii-29	O.Bryant

Amblyteles nortoni Cresson

(female only)

1867 Ichneumon Nortonii Cresson, Trans. Amer. Ent. Soc. 1:304.
1877 Amblyteles nortoni; Cresson, Trans. Amer. Ent. Soc. 6:192.
1916 Amblyteles nortoni; Viereck, Hym. Conn: 360.
1926 Amblyteles nortoni; Cushman, Ins. N. Y: 924.

Distribution:-Connecticut, New York.

The type has the head transverse, slightly narrowed ventrally; ocellocular space greater than diameter of lateral ocellus; eyes divergent below antennae; clypeus weakly truncate, ventral margin extending almost to eye, then parallel to and close to inner margin of eye; malar space ¾ of basal manidibular width; first flagellar segment more than three times as long as wide apically, segments of the annulus laterally longer than broad.

Propodeum weakly carinate, smoothly rounded behind; areola twice as long as wide, indentate behind; pedicel basally somewhat flattened; postpetiole shining, sparsely punctate, non-carinate, smooth slender; intergastrocoelar space 2/3 gastrocoelar width; apical width of first gastric tergite ¾ tergal length; subgenital plate large, rounded, not retracted.

This species differs markedly from the typical Amblyteles species in the "clypeal" carinae, the flagellar segments, the areolation, the postpetiole and the subgenital plate. The cumulative value of these characters appear to be almost strong enough to be of generic rank.

Edmonton 22-6-32 O.Peck

Amblyteles nubivagus Cresson

(male only)

1864 Ichneumon consimilis Cresson,Proc.Ent.Soc.3:163.(nec Wesmael,Nouv.Mēm.Acad.Sci.Brux.18:22,1844);preoccupied.
1864 Ichneumon juxta Cresson,Proc.Ent.Soc.Phila.3:163.
1875 Ichneumon aequalis Provancher,Nat.Can.7:76.
1877 Amblyteles nubivagus Cresson,Trans.Amer.Ent.Soc.6:193.
1877 Amblyteles nubivagus var.juxta;Cresson,Trans.Amer.Ent. Soc.6:193.
1879 Amblyteles nubivagus;Provancher, Faune Ent.Can.Hym:301.
1883 Amblyteles nubivagus;Provancher, Faune Ent.Can.Hym:301.
1906 Amblyteles nubivagus;Viereck,Trans.Amer.Ent.Soc.32:225.
1927 Amblyteles nubivagus;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.
1928 Amblyteles nubivagus;Cushman,Insects N.Y:924.

Distribution:-Eastern U.S.,Colorado,Arizona,Quebec,Alberta.

The Alberta specimen agrees with the original description entirely except that the mesoscutum has two longitudional rufous vittae on the mesoscutum, resembling the form juxta.

This specimen and the type have the head quadrate, weakly narrowed ventrally, odellocular space 1¼ times as great as diameter of lateral ocellus, cheeks weakly buccate, malar space 2/3 the basal mandibular width, clypeus almost truncate, basal flagellar segment scarcely twice as long as wide, basal segments not dilated and apical ones barrel-shaped.

Scutellum strongly convex; propodeum rounded posteriorly, not concave, strongly carinate, the areola longitudinal, pointed anteriorly, indented posteriorly; postpetiole arcuate, bicarinate to apex, moderately striate and moderately wide; gastrocoeli oblique, moderately deep, their width almost 2/3 the intergastrocoelar space; basal gastric tergite 1 1/3 times as long as wide apically; hypandrium moderately elongate, laterally emarginate.

The Radnor specimen from the original description

in the stigma being almost piceous, not fulvous; the gaster ferrigineous, not rufous and the areola quadrate and not rounded in front. In the descriptions of A. juxta and A. aequalis these characters vary but not to this extreme.

Beaverlodge	19-vii-31	O.Peck
Radnor	10- ix-32	O.Peck

Amblyteles nuncius Cresson

(male only)

1877 Ichneumon nuncius Cresson,Trans.Amer.Ent.Soc.6:176.
1878 Ichneumon nuncius;Cresson,Proc.Acad.Nat.Sci.Phila:352.
1927 Amblyteles nuncius;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.

Bilby	August	G.Salt (Criddle, 1927)

Amblyteles ormenus Cresson

(female only)

1864 Ichneumon ormenus Cresson,Proc.Ent.Soc.Phila.3:141.
1877 Amblyteles ormenus;Cresson,Trans.Amer.Ent.Soc.6:190.
1879 Amblyteles ormenus;Provancher,Nat.Can.11:8.
1916 Amblyteles (Amblyteles) ormenus;Viereck,Hym.Conn:349.
1927 Amblyteles ormenus;Criddle,58th.Ann.Rept.Ont.Ent.Soc.:101.
1928 Amblyteles ormenus;Cushman,Ins.N.Y:924.

Distribution:-Eastern United States and Canada,New Mexico, Utah,Rocky Mountains,Alberta.

No data of the type was taken.

Tofield	May,July	O.Bryant (Criddle, 1927)

Amblyteles parvus Cresson

(male only)

1864 Ichneumon parvus Cresson,Proc.Ent.Soc.Phila.3:159.
1877 Ichneumon parvus;Cresson,Trans.Amer.Ent.Soc.6:163.
1916 Ichneumon parvus;Viereck,Hym.Conn:163.
1928 Amblyteles parvus;Cushman,Ins.N.Y:925.

Distribution:-Eastern Canada and U.S.A.,Illinois.

This species is not the same as Ischnus parvus Prov., which is in Hemiteles (Cryptinae) (Dalla Torre, 1901), although early workers divided Ischnus from Ichneumon on the smooth postpetiole.

In Cresson's key this species is differentiated from A. vescus Prov. on the depth of the gastrocoeli. In Cresson's original description of A. parvus these structures are "small, not deep", as in A. vescus, and this is true of the type. This character is useless in differentiating the two species.

The two species may be separated by A. parvus having the flagellum with the segments not strongly ferrugineous below, the apical segments barrel-shaped, not subserrate, and the ultimate segment much longer than the penultimate; the postorbitals are black and the postpetiole finely aciculated, not coriaceous. These characters were taken from an Alberta specimen compared with the type. The types of A. vescus and A. parvus resemble each other closely, but the malar space of A. parvus being 2/3 the basal mandibular width and that of A. vescus ½.

The Alberta specimen differs from the original description in the four anterior femora being without black. It is small, only eight mm. long.

Edmonton 15-viii-32 O.Peck

Amblyteles pedalis Cresson

1864 Ichneumon pedalis Cresson, Proc.Ent.Soc.Phila.3:141.
1864 Ichneumon pedalis; Cresson, Proc.Ent.Soc.Phila.4:249.
1877 Ichneumon pedalis; Cresson, Trans.Amer.Ent.Soc.6:158.
1903 Cratichneumon pedalis; Viereck, Trans.Amer.Ent.Soc.29:76.
1927 Amblyteles pedalis; Criddle, Ann.Rept.Ont.Ent.Soc.58:101.

Distribution:-New Mexico,Colorado,Rocky Mountains,Alberta.

In the Alberta specimens one has a short broad line on the anterior orbits below the antennae yellow, as well as the labrum. Both specimens disagree with the original description in the nervures and stigmata being brown not black. The violaceous tinge to the wings is apparent only to the naked eye. The posterior margins at least of the basal gastric tergites are rufous.

This species is characterised by the violaceous wings, the head distinctly subtriangular with long concave cheeks, visible only slightly above the lower eye margin, the malar space being $\frac{3}{4}$ of the basal mandibular width; the antennae are long, the scutellum convex and the gaster densely punctate.

The sculpture of the postpetiole does not appear to be constant, varying from finely scabrous to finely aciculate. Cresson almost always mentioned this character in his descciptions but did not do so in this species.

Slave Lake	25-viii-24	O.Bryant (male)
Bilby	28- vii-24	O.Bryant (male)
Calgary	May,June	G.Salt (Criddle, 1927)

Amblyteles pictifrons Cresson

(male only)

1864 Ichneumon pictifrons Cresson,Proc.Ent.Soc.Phila.3:160.
1865 Ichneumon pictifrons;Cresson,Proc.Ent.Soc.Phila.4:255.
1877 Ichneumon pictifrons;Cresson,Trans.Amer.Ent.Soc.6:111.

Distribution:-Rocky Mountains,Colorado.

Amblyteles lachrymans Provancher

(male only)

1875 Ichneumon lachrymans Provancher, Nat.Can.7:78.
1877 Ichneumon lachrymans; Cresson, Trans.Amer.Ent.Soc.6:171.
1878 Ichneumon lachrymans; Provancher Nat.Can.10:357.
1925 Amblyteles lachrymans; Cushman, Jour.Wash.Acad.Sci.15:388.
1928 Amblyteles lachrymans; Cushman, Ins.N.Y:923.

Distribution:-Quebec, New York, New Hampshire.

A number of species run to A. pictifrons and to A. lachrymans Prov. because of the yellow-ferrugineous colour and the small size. Insufficient material is available to group the species but all differ from the two types.

The type of A. lachrymans has the head subtriangular, the ocellocular space 1¼ times as great as width of lateral ocellus, inner margins of eyes parallel below antennae, malar space 2/3 of basal mandibular width, basal flagellar segment 2 ½ times as long as wide apically, median and apical flagellar segments somewhat nodose, postpetiole slender and very finely aciculated, gastrocoeli moderately deep, large, transverse, the width equal to intergastrocoelar space, basal gastric tergite 1/5 longer than wide apically, subequal in the second.

The type of A. pictifrons has the head transverse, subtriangular and small, ocellocular space 1½ times the diameter of lateral ocellus, malar space slightly greater than half the basal mandibular width, clypeus weakly emarginate, basal flagellar segment twice as long as wide apically, apical flagellar segments subserrate, propodeum not angular or concave posteriorly but strongly carinate, areola twice as wide as long, petiole depressed basally, postpetiole, slender, weakly dilated, strongly bicarinate with striae moderate.

(?) Amblyteles placidus Provancher

(male only)

1875 Ichneumon placidus Provancher,Nat.Can.7:76.
1877 Ichneumon placidus;Cresson,Trans.Amer.Ent.Soc.6:174.
1878 Ichneumon placidus;Provancher,Nat.Can.10:360.

Distribution:-Quebec.

This species was described from a single specimen, the description, however, being unaltered by Provancher (1878). In Cresson's key (1877) the Alberta specimens run unsatisfactorily on colour characteristics to A. rufiventris Cress.; paratype 1461.2, however, has the head transverse and only slightly narrowed ventrally, while the malar space is ¼ of the basal mandibular width, so that the Alberta specimens are not this species.

The Alberta specimens agree with A. placidus in the head being subtriangular and the malar space subequal. In colour they disagree in the face and clypeus being only partially yellow, the mandibles entirely black and the scape black or subobsoletely yellow, the thorax and coxae immaculate. The postpetiole is finely or subobsoletely aciculated, the postpetiole of the type being dirty so that the description as granular (Provancher, 1864) is valueless.

The type has a broad, subtriangular head; the ocell-ocular space 1 1/3 times as great as the width of the lateral ocellus; malar space equal to the basal mandibular width; basal flagellar segment twice as long as wide apically, the basal segments not dilated and the apical ones somewhat barrel-shaped; the propodeum is very coarsely sculptured with strong carinae, angulate and concave posteriorly; postpetiole broad, indefinitely striate or punctate; gastrocoeli quadrate, large, deep, and equal in width to the intergastrocoelar space;

basal gastric tergite 4/5 as long as wide apically.

Lethbridge	14-viii-22	E.H.Strickland
Lethbridge	15-viii-22	E.H.Strickland

Amblyteles pomilius Provancher

(male only)

1877 Ichneumon pomilius Provancher, Nat.Can.9:9.
1877 Ichneumon pomilius;Cresson, Trans.Amer.Ent.Soc.6:164.
1878 Ichneumon pomilius;Provancher, Nat.Can.10:271,352.
1883 Ichneumon pomilius;Provancher, Faune Entom.Can.2:278.
1887 Ichneumon pomilius;Cresson, Trans.Amer.Ent.Soc.Suppl. Vol:187.

Distribution:-Massachusetts, Quebec, British Columbia.

This name appears to be applied to several species. This due, in part at least, to Cresson's use of the colour of the gastric apex which varies gradually from black to fulvous, the intermediate colours being difficult to place. In Cresson's key the Alberta specimens run either to A. inconstans Cress. (size 0.55 inches) or A. pomilius .

The type of A. pomilius has the head subtriangular; ocellocular space 1½ times the lateral ocellar width; malar space subequal; length of basal flagellar segment at least three times as long as broad apically, the sixth subquadrate, the segments rounded and entirely ferrugineous; propodeum rounded posteriorly, moderately carinate; gastrocoeli sub-obsolete; postpetiole slender and very finely striate.

The length of the basal flagellar segment, the flagellar colour, the subobsolete gastrocoeli and postpetiolar sculpture are a very strong group of uncommon characteristics occurring in this species.

The Bilby specimen has the gastric apex fusco-ferrugineous as do some specimens in the Smithsonian Institute.

Some have the gastric apex fusc0-ferrugineous (as the Bilby specimen) and the antennae entirely ferrugineous, the scutellum being yellow only posteriorly.

Bilby	21- vii-24	O.Bryant
Edmonton	19-viii-23	E.H.Strickland
Edmonton	3- vii-32	O.Peck

Amblyteles provancheri Cushman

(female only)

1877 Ichneumon bifasciatus Provancher,Nat.Can.7:75 (nec Ichneumon bifasciatus Say,Contrib.Maclur.Lyc.Phila.1: 73,1828) preoccupied.
1877 Ichneumon bifasciatus;Cresson,Trans.Amer.Ent.Soc.6:190.
1879 Amblyteles bifasciatus;Provancher Nat.Can.11:9.
1925 Amblyteles provancheri;Cushman,Jour.Wash.Acad.Sci.15:388.
1928 Amblyteles provancheri;Cushman,Ins.N.Y:925.

A. bifasciatus Prov. is a homonym of (Ichneumon) Exetastes bifasciatus Say, (Cushman, 1925).

Distribution:-New York,Quebec.

The description by Cresson (1877) differs from the original one by Provancher in the length being 0.50 inches, not 0.42, wings subhyaline, not hyaline and the gaster with two dorso-apical spots, not three.

The type has the head subquadrate, contracted ventrally, malar space 1¼ times the basal mandibular width; ocellocular space 1¼ diameter of lateral ocellus; eyes short, strongly divergent below antennae; first flagellar, segment 1½ times as long as wide apically, second subequal, basal segments swollen apically; propodeum rounded, moderately carinate, not concave posteriorly; postpetiole very finely striate, polished, smooth; first gastric tergite 4/5 as long as wide apically the second half.

The Alberta specimen agrees with a Gahan homotype and with an Alberta specimen in the U. S. National Museum; it disagrees with the type in the basal flagellar joint being twice as long as wide apically, the seventh subequal.

Edmonton	5-viii-23	E.H.Strickland
Edmonton	16- iv-24	G.Salt (in U.S. Nat.Mus.)

Amblyteles quebecensis Provancher

(male only)

1875 Ichneumon Quebecensis Provancher,Nat.Can.7:77.
1877 Amblyteles quebecensis;Cresson,Trans.Amer.Ent.Soc.6:191.
1879 Amblyteles Quebecensis;Provancher,Nat.Can.11:4.
1928 Amblyteles quebecensis;Cushman,Ins.N.Y:925.

Distribution:-New York, Colorado,Quebec.

This is an extremely variable species for gastric colouration as the rufo-ferrugineous area may cover the basal portions of the first two tergites and of the third laterally or may be almost completely absent. The species is characterised more especially by the basal flagellar segment being twice as long as wide, undilated and sericeous, the head ovately subtriangular and the extreme apices of the hind tibiae fuscous, their tarsi more or less dusky.

The type is characterised by the head being transversely subovate, strongly narrowed ventrally, the ocelloocular space 1 1/3 as great as the diameter of the lateral ocellus, eyes somewhat divergent below antennae, malar space ¾ of basal mandibular width, mandibles slender, strongly bidentate, basal flagellar segment twice as long as wide, not widened apically, the dorsal suture slanting, propodeum sharply angular and strongly carinate, postpetiole medium in width, gastrocoeli moderately deep, basal gastric tergite almost as wide as long and in the second equal, hypandrium slightly

elongate.

Edmonton	1-vii-23	E.H.Strickland
Edmonton	20-vi -26	E.H.Strickland (3)
Bilby	20-vii-24	O.Bryant
Red Deer	22-vii-26	E.H.Strickland (3)
Innisfail	5-vii-23	H.E.Gray
Edmonton	21-vi -32 to 25-vii-32	O.Peck (12)

Amblyteles radnori, n.sp.

(male only)

This species is characterised by being 12 mm. long; the head subtriangular, small, smoothly rounded; ocellocular space variable, about 1½ times as great as the diameter of the lateral ocellus; eyes weakly divergent below antennae; face rather finely punctate; malar space 2/3 of basal mandibular width; clypeus rounded ventrally; basal flagellar segment twice as long as wide apically; tyloides conspicuous on basal half of flagellum; apical flagellar segments barrel-shaped.

Thorax shining, finely punctate; scutellum convex, non-carinate laterally metapleuron and propodeum finely scabrous, propodeum more or less angular, flat posteriorly; carination not strong, areola small, quadrate, transverse; wings hyaline to subhyaline.

Postpetiole weakly arcuate, slender, finely striate medially; gastrocoeli small, foveiform, moderately deep; two basal gastric tergites closely, finely punctate; hypandrium not especially conspicuous.

Black; face (except sometimes medially) clypeus (except sometimes apically), mandibles medially, palpi, scape below, scutellum sometimes all yellow; wings strongly irridescent, slightly violaceous, stigma fulvous or ferr-

ugineous, nervures brown; tegulae and legs; ~~legs ferrugineous;~~ all coxae and trochanters black, occasionally marked with ferrugineous yellow, two anterior pairs of tibiae and tarsi yellowish; gastric sternites more or less ferrugineous; apical tergite always ferrugineous, third to fifth rarely with apical ferrugineous maculae, basal tergites laterally ferrugineous and sometimes the whole gaster.

One specimen has the apical gastric tergite subobsoletely fuscous.

In Cresson's key to males (1877) this species runs to A. apicalis Cress., if the gaster is subapically black, and to A. discus Cress., if subapically black and ferrugineous. From A. discus this species differs in the gaster being mainly black with the basal tergites lateral, not transverse, ferrugineous vittae. A. humphreyi Vier. is in this group but has the basal gastric colours reversed and the face black.

It is more difficult to separate A. radnori from A. apicalis and it is possible that this is a geographical race. The type is from Colorado and agrees morphologically with the Alberta specimens. Unfortunately only the type was inspected but the original and other descriptions give no hint of color inconstancy.

A. radnori is distinguished from A. apicalis by the tegulae and tegular lines not being yellow, the ferrugineous colouration of the gaster and the size 12 mm., not 15.

Radnor	27- vi-32	O.Peck
Radnor	29- vi-32	O.Peck

Waterton	11-vii-23	E.H.Strickland (2)
Waterton	12-vii-23	E.H.Strickland
Bilby	14-vii-24	O.Bryant
Nordegg	21-vii-26	E.H.Strickland (2)
Innisfail	5-vii-23	H.E.Gray
Beaverlodge	21--vi-31	E.H.Strickland
Beaverlodge	25--vi-31	O.Peck (3)
Beaverlodge	6-vii-31	O.Peck (2)

Amblyteles robustus Cresson

(female only)

1867 Ichneumon robustus Cresson,Trans.Amer.Ent.Soc.1:298.
1877 Amblyteles robustus;Cresson,Trans.Amer.Ent.Soc.6:191.
1879 Amblyteles robustus;Provancher,Nat.Can.11:4.
1927 Amblyteles robustus;Criddle,Ann.Rept.Ont.Ent.Soc.8:101.

Distribution:-Canada.

Edmonton	May	G.Salt (Criddle, 1927)

Amblyteles rufiventris Brullé

1846 Ichneumon rufiventris Brullé,Hym:301.
1864 Ichneumon semicoccineus Cresson,Proc.Ent.Soc.Phila. 3:179;male only.
1864 Ichneumon Californicus Cresson,Proc.Ent.Soc.Phila. 3:180;male only.
1864 Ichneumon incertus Cresson,Proc.Ent.Soc.Phila.3:180; female only.
1877 Ichneumon rufiventris;Cresson,Trans.Amer.Ent.Soc.6:173.
1878 Ichneumon rufiventris;Provancher,Nat.Can.10:359.
1881 Ichneumon Hunterae Packard,Proc.Boston Soc.Nat.Hist. 21:22.
1881 Ichneumon rufiventris;Packard,Proc.Boston Soc.Nat.Hist. 21:23,male only.
1881 Ichneumon rufiventris;Heustis,Can.Ent.13:143-144.
1884 Ichneumon rufiventris;Provancher,Faune Ent.Can.Hym:285.
1887 Ichneumon rufiventris var. Californicus;Cresson.Synopsis Hym.N.Amer. :184.
1887 Ichneumon rufiventris var.incertus;Cresson,Synopsis Hym.N.Amer:186.
1916 Ichneumon rufiventris;Viereck,Hym.Conn:358.
1922 Amblyteles rufiventris;Champlain,Psyche 29:100.
1927 Amblyteles rufiventris;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.
1928 Amblyteles rufiventris;Cushman,Ins.N.Y:925.

Distribution:-Eastern United States,Illinois,California,

Quebec,Alberta.

Hosts:-Vanessa cardui L. (Alberta).
Vanessa virginiensis Dru. (Alberta)

The female Alberta specimens have the variations shown by A. rufiventris and A. incertus by the antennal annulus being absent sometimes, the head being black, the anteorbitals sometimes rufous, this being occasionally with a dull rufous face and scutellum; the posterior pair of tibiae and tarsi may be black, piceous or rufous.

The females of this species are easily identified by the characters used in the keys.

The Brullé type, if in existance, was not seen but the Alberta specimens agreed morphologically with the Cresson series at Philadelphia.

Nordegg	21- vii-21	E.H.Strickland
Edmonton	21-viii-30	O.Peck
Fawcett	20- vi-32	E.H.Strickland (2)
Lethbridge	14-viii-32	E.H.Strickland

Amblyteles scitulus Cresson

1864 Ischnus scitulus Cresson,Proc.Ent.Soc.Phila.3:193,male only.
1867 Ichneumon scitulus;Cresson,Trans.Hmer.Ent.Soc.1:310.
1877 Ichneumon scitulus;Cresson,Trans.Amer.Ent.Soc.6:180.
1878 Ichneumon scitulus;Provancher,Nat.Can.10:363.
1883 Ichneumon scitulus;Provancher,Faune Ent.Can.Hym:289.
1916 Amblyteles (? Pterocormus) scitulus;Viereck,Hym.Conn:354.
1927 Amblyteles scitulus;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.
Distribution:-Eastern United States,Illinois,Quebec,Alberta.

Provancher (1882) placed Cryptus flavipectus Prov. as a variety of A. scitulus restoring the original name. Only the female sex is recorded under this name. Cushman (1928) omits both names from his New York list, although he determined the Alberta specimen, and the species is common(?) in Eastern America.

Bilby	June	G.Salt (Criddle, 1927)

Amblyteles sexvittatus, n.sp.

(male only)

In this species the median ridge of the third gastric sternite may be present or absent. In Cresson's key the oxypygi form runs unsatisfactorily to I. flavizonatus Cress. (Proc.Ent.Soc.Phila.3:156), while the amblypygi form runs to A. concinnus Say, although this species has not been identified from the description (Cushman and Rohwer, 1921) and differs at least in the antennae being annulate and the head large. No similar specimens were seen at the Smithsonian Institute or the Philadelphia Academy of Natural Sciences.

A. sexvittatus is characterised by being 14 mm. long; head quadrate, weakly narrowed below; ocellocular space scarcely wider than width of lateral ocellus; eyes strongly divergent below antennae; ~~malar space~~ ½ ~~basal mandibular width~~; face evenly, moderately punctate; malar space ½ of basal mandibular width; clypeus rounded ventro-laterally; mandibles slender, ventral tooth subobsolete; basal flagellar segment ½ as long as wide apically; flagellar segments scarcely dilated, eighth subquadrate, apically a few segments subserrate.

Thorax shining, closely punctate, mesopleuron sometimes substriate ventro-posteriorly; scutellum convex, finely, evenly punctate; propodeum sharply declivous posteriorly, not laterally concave, areola variable in shape but subquadrate; legs slender.

Pedicel slender; postpetiole dorso-anteriorly smoothly rounded, moderately dilated apically, medial striae moderate, gastrocoeli small, shallow; intergastrocoelar space more than three times as wide gastrocoelar width; second

gastric tergite antero-medially or anteriorly indistinctly, coarsely striate, remainder finely, closely punctate; hypandrium broadly rounded apically.

Black; face, clypeus, labrum, mandibles except extreme apices, palpi, scape ventrally, orbits except vertices, prothorax dorsally, scutellum, metanotum sometimes, tegulae with line before and line below, propodeum sometimes laterally; postpetiolar apex narrowly banded or with two lateral spots, first gastric tergite with narrow, apical band, second entirely except narrow basal strip, three posterior tergites with band diminishing progressively, four anterior legs except coxae dorsally and both trochanters and femora laterally in part, posterior trochantelli entirely and tibiae basally, all yellow; posterior tarsi dusky.

Bilby	14-vii-24	O.Bryant (2)
Chin	29- vi-23	H.E.Gray
Edmonton	4- vi-27	E.H.Strickland

Amblyteles stricklandi, n.sp.

(male only)

The male only of this species is known. It is 12 mm. long with head subtriangular, eyes prominent; ocelloocular space 1 1/3 times as great as width of lateral ocellus; malar space scarcely half of basal mandibular width; eyes moderately divergent below antennae; clypeus not truncate, slightly emarginate in one specimen; mandibles slender; basal flagellar segment twice as long as wide, flagellar segments quadrate, apical ones subserrate.

Thorax shining, finely punctate, all pleura indistinctly rugulose; scutellum slightly convex, moderately

shallowly and evenly punctate; propodeum moderately rounded, not concave, carinae prominent, areola horse-shoe-shaped to subquadrate; wings subhyaline.

Postpetiole weakly angulate, in one specimen rather weakly dilated, strongly bicarinate and moderately striate; gaster slender, basal gastric tergite a third greater than the apical width and twice or almost twice the basal width; gastrocoeli longitudinally foveiform, their width 1/3 of intergastrocoelar width; first gastric tergite striate basally remainder closely, finely punctate; median sternal fold sometimes reduced on third gastric segment.

Black; anterior orbits; face; clypeus; labrum; mandibles except apices; palpi; scape ventrally; prothorax dorsally; tegulae; line in front and another below; scutellum; four anterior legs with their coxae entirely ventrally , their trochanters, trochantelli, tibiae and tarsi entirely and femora in part, yellow; posterior legs with trochanters apically, trochantelli entirely, femora narrowly basally and tibiae broadly basally; base of two basal gastric tergites and three basal gastric sternites entirely or partially; all yellow; stigma fulvous to dark brown, nervures dark brown; apical tarsi tinged with ferrugineous; one specimen has the posterior orbits basally and the metanotum yellowish.

In Cresson's key (1877) this species runs to the A. wilsoni-comes couplet. This species is too small for the latter and does not have transverse gastrocoeli, yellow posterior orbits, yellowly annulate antennae or black tarsi.

Gull Lake	29-vii-1932	E.H.Strickland (7)
Gull Lake	27-vii-1932	E.H.Strickland (2)

Amblyteles suturalis Say group

(female group)

Amblyteles brevipennis Cresson

(female only)

1864 Ichneumon brevipennis Cresson,Proc.Ent.Soc.Phila.3:174.
1865 Ichneumon brevipennis;Cresson,Proc.Ent.Soc.Phila.4:250.
1877 Ichneumon brevipennis;Cresson,Trans.Amer.Ent.Soc.6:182.
1877 Ichneumon brevipennis;var. obsoletus;Cresson,Trans.Amer. Ent.Soc.6:182.
1916 Amblyteles (Pterocormus?) brevipennis;Viereck,Hym.Conn:: 359.
1928 Amblyteles brevipennis;Cushman,Ins.N.Y:922.

Distribution:-Eastern United States,Colorado.

Host:-Leucania albilinea Guer. (Neleucania albilinea Hbn. (?),Alberta).

Amblyteles koebelei Swezey

(female only)

1909 Ichneumon koebelei Swezey,Hawaii Sugar Planters Ent. bul.3:30.
1912 Ichneumon koebelei;Fullaway,Hawaii Sta.Bul.27:20.
1915 Ichneumon koebelei;Fullaway,Proc.Ent.Soc.Hawaii 3:104.
1919 Amblyteles koebelei;Bridwell,Proc.Ent.Soc.Hawaii 4: 109-165.

Amblyteles obsoletus Riley

(female only)

1881 Ichneumon obsoletus Riley (nec Linn.) Mo.Rept.9:55.

Distribution:-Missouri.

Amblyteles propinquus Cresson

(female only)

1864 Ichneumon propinquus Cresson,Proc.Ent.Soc.Phila.3:172.
1865 Ichneumon propinquus;Cresson,Proc.Ent.Soc.Phila.4:257.
1877 Ichneumon suturalis;Cresson,Trans.Amer.Ent.Soc.6:193.
1921 Amblyteles propinquus;Cushman and Gahan,Proc.Ent.Soc. Wash.23:167.
1927 Amblyteles suturalis var.propinquus;Criddle,Rept.Ont. Ent.Soc.58:101.

Distribution:-Rocky Mountains,Colorado,Alberta.

Amblyteles subfuscus Cresson

(female only)

1864 Ichneumon subfuscus Cresson,Proc.Ent.Soc.Phila.3:173.
1864 Ichneumon subfuscus;Cresson,Proc.Ent.Soc.Phila.4:258.
1877 Amblyteles subfuscus;Cresson,Trans.Amer.Ent.Soc.6:193.
1917 Amblyteles subfuscus;Gibson,Can.Ent.49:401-403.
1923 Amblyteles subfuscus;Strickland,Can.Ent.butl.26.
1926 Amblyteles subfuscus;Essig,Ins.West.NorthAmer:800.
1927 Amblyteles subfuscus;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.

Distribution:-Colorado,Rocky Mountains,Nevada,British Columbia, Alberta.

Amblyteles superbus Prov.

(female only)

1885 Amblyteles superbus Provancher,Ad.Faun.Can.Hym:35.
1887 Amblyteles superbus;Cresson,Trans.Amer.Ent.Soc.Suppl:190.
1895 Amblyteles suturalis;Davis,Can.Ent.49:287.
1921 Amblyteles superbus;Cushman and Gahan,Proc.Ent.Soc.Wash. 23:167.
1927 Amblyteles superbus;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.

Distribution:-Quebec,Alberta,Vancouver Island.

Amblyteles subrufus Cresson

(female only)

1864 Ichneumon subrufus Cresson,Proc.Ent.Soc.Phila.3:168.
1877 Amblyteles subrufus;Cresson,Trans.Amer.Ent.Soc.6:193.
1879 Amblyteles subrufus;Provancher,Nat.Can.11:4.
1883 Amblyteles subrufus;Provancher,Faune Ent.Can.Hym:301.
1905 Amblyteles subrufus;Johnson,Colo.Bul.98:21.
1925-25 Amblyteles subrufus;Petch and Armstrong,Que.Soc.Prot.Pl. 18:95.
1927 Amblyteles subrufus;Criddle,Ann.Rept.Ont.Ent.Soc.58:101.
1928 Amblyteles subrufus;Cushman,Ins.N.Y:926.

Distribution:-Eastern United States,Colorado,Quebec,Alberta.

Host:-Coleophora pruniella Clemens.

Amblyteles suturalis Say

(female only)

1836 Ichneumon suturalis Say,Bost.Jour.Nat.Hist.1:227.
1877 Amblyteles suturalis;Cresson,Trans.Amer.Ent.Soc.6:193.
1879 Amblyteles suturalis;Provancher,Nat.Can.11:13.
1883 Amblyteles suturalis;Provancher,Faune Ent.Can.Hym:301.
1895 Amblyteles sutrualis;Davis,Can.Ent.27:287.
1915 Amblyteles suturalis;Britton,Ann.Rept.Conn.Agric.Expt. Sta:157-173.
1916 Amblyteles suturalis;Viereck,Hym.Conn:349.
1921 Amblyteles suturalis;Whitehouse,Ann.Rept.Alta.Dept.Agric: 191-193.
1921 Amblyteles suturalis;Cushman and Gahan,Proc.Ent.Soc.Wash. 23:167.
1927 Amblyteles suturalis;Criddle.Ann.Rept.Ont.Ent.Soc.58:101.
1927 Amblyteles suturalis propinquus;Criddle,Ann.Rept.Ont. Ent.Soc.58:102.
1928 Amblyteles suturalis;Say,Cushman,Ins.N.Y:926.
1930 Amblyteles suturalis;Brown,Ann.Rept.Ont.Ent.Soc.61:92.

Distribution:-Eastern United States,Colorado,New Mexico, Utah,Dakota,Quebec,Alberta.

Hosts:-Cirphis unipuncta Haw. (Alberta)
Euxoa ochrogaster Cn. (Alberta)

This group is believed to consist of a large number of species in which the males have black and yellow gasters. An adequate classification of the complex is outside the scope of this paper. The specific names applied to members of this group are A. subfuscus Cress., A. suturalis Say, A. subrufus Cress. and A. superbus Prov., A. propinquus Cress. and A. koebelei Swezey, while A. brevipennis Cress. and A. obsoletus Riley are closely related to these species.

Cresson (1877) recognised the first three species, but not A. propinquus or A. superbus; Cushman and Gahan (1921) believe that A. propinquus, A. superbus and A. suturalis are distinct species. In the Alberta specimens falling in A. subrufus are two types of basal flagellar segments, the one quadrate and scarcely dilated apically, the other strongly

dilated apically and the sides arcuate. The Alberta specimens vary in the shape and size of the head, the ocelloc-ular space, size of eyes, the shape of the mandible (especially of the dorsal tooth), the space between the clypeus and man-dible, the number of spines on the anterior tibiae, the shape of the gaster and the coloration.

Amblyteles trizonatus Provancher group

1875 Ichneumon trizonatus Provancher, Nat. Can. 9:8.
1877 Ichneumon trizonatus; Cresson, Trans. Amer. Ent. Soc. 6:162.
1878 Ichneumon trizonatus; Provancher, Nat. Can. 10:350.

Distribution:-Quebec.

In Cresson's and Provancher's keys the Alberta specimens in this group run directly to this species except one with shallow gastrocoeli that fits into the A. vescus Prov. couplet, although its size places it in A. trizonatus. Viereck's key (1916) places all unsatisfactor-ily in A. laetus Brullé. From this the A. trizonatus group is separated, not only upon the third gastric tergite being black but in the remaining gastric tergites being black, without a fuscous tinge. The variations in the two groups are not similar.

The Alberta specimens, however, differ from the type of A. trizonatus in the flagellar segments of the latter being sharply, annularly dilated and the malar space sub-equal to the basal mandibular width.

The head proportions vary from subrotund to quadrate and subtriangular, the first type apparently correlated with the postorbitals being yellow basally and the posterior trochanters black, not yellow, the femora basally and tro-chantelli rufous. The amount of yellow upon the legs varies.

Amblyteles uncinatus Cresson

(female only)

1877 Ichneumon uncinatus Cresson,Trans.Amer.Ent.Soc.6:159.
1927 Amblyteles uncinatus;Criddle,Ann.Rept.Ont.Ent.Soc.58:102.
1928 Amblyteles uncinatus;Cushman,Ins.N.Y:926.

Distribution:-New York,Alberta.

Criddle,(1927) reports this species but it may be A. feralis.

Edmonton	May	G.Salt (Criddle, 1927)

(?) Amblyteles utilis Cresson

(male only)

1867 Ichneumon utilis Cresson,Trans.Amer.Ent.Soc.1:311.
1877 Ichneumon utilis;Cresson,Trans.Amer.Ent.Soc.6:185.
1916 Ichneumon utilis;Viereck,Hym.Conn:355.
1928 Amblyteles utilis;Cushman,Ins.N.Y:926.

Distribution:-Eastern United States.

Host:-Alsophila pometaria Harris ("the cankerworm").

The Alberta specimen agrees entirely with the original description except in its length, which is 6 mm. instead of 7.5-9 mm. (Viereck, 1916).

The type has not been seen.

Edmonton	30-vi-23	E.H.Strickland

Amblyteles variegatus Cresson

(male only)

1864 Ichneumon variegatus Cresson,Proc.Ent.Soc.Phila.3:153.
1865 Ichneumon variegatus;Cresson,Proc.Ent.Soc.Phila.4:251.

1877 Ichneumon variegatus,Cresson,Trans.Amer.Ent.Soc.6:167.
1927 Amblyteles variegatus;Criddle,Ann.Rept.Ont.Ent.Soc.58:102.

Distribution:-Colorado,New Mexico,California,Vancouver,Alberta.

In Cresson's key (1877) A. creperus Cress. and A. variegatus Cress. are distinguished from A. grotei Cress. by the black, not fulvous, posterior femora. Many specimens, however, have both colours. The Alberta specimens form two groups which can be separated on the basal flagellar segment of the A. grotei group not being twice as long as wide or scarcely so. With the short segment is correlated the hypandrium being large, elongate and laterally emarginate, the ocellocular space subequal and the scutellum strongly convex, while the mesoscutum is partially ferrugineous and the postorbitals never immaculate.

From the original descriptions it is impossible to separate satisfactorily A. variegatus from A. creperus, the latter having been compared with A. grotei. All three species are found in the western portion of North America.

The types of A. creperus and A. variegatus differ in the basal flagellar length and the head of the former not being quadrate but transversely subovate.

The type has the head quadrate; the ocellocular space 1 1/3 the diameter of the lateral ocellus; the malar space 2/3 of basal mandibular width; clypeus rounded; basal flagellar segment more than twice as long as wide apically; scutellum convex; propodeum angulate, not concave, carinae weak and the areola fairly large and the shape of a horseshoe; postpetiole not angular, strongly bicarinate; finely striate; gastrocoeli linear and hypandrium normal in size, not emarginate nor acutely apically.

Beaverlodge	28- vii-31	E.H.Strickland	
Beaverlodge	29- vii-31	O.Peck	(2)
Beaverlodge	31- vii-31	O.Peck	(8)
Beaverlodge	9-viii-31	O.Peck	(2)
Beaverlodge	10-viii-31	O.Peck	(7)
Edmonton	12- vii-31	O.Peck	(3)
Edmonton	16- vii-32	O.Peck	
Edmonton	2-viii-30	O.Peck	

Amblyteles vescus Provancher

(male only)

1877 Ichneumon vescus Provancher, Nat.Can.9:9
1877 Ichneumon vescus; Cresson, Trans.Amer.Ent.Soc.6:163.
1878 Ichneumon vescus; Provancher, Nat.Can.10:271.
1903 Barichneumon vescus; Viereck, Trans.Amer.Ent.Soc.29:80.
1927 Amblyteles vescus; Criddle, Rept.Ont.Ent.Soc.58:101.
1928 Amblyteles vescus; Cushman, Ins.N.Y:926.

Distribution:-Eastern United States, New Mexico, Quebec, Alberta.

In Cresson's key (1877) this species may be confused with A. mimicus Cress. due to the apical gastric tergite being brown; A. mimicus, however, has all the gastric tergites yellow and black.

A. vescus is readily recognised due by its slender, smoothly rounded coriaceous postpetiole, shallow or sub-obsolete gastrocoeli and the subovate head. A. parvus Cress. has some of these characters also but is differentiated in the key. Its size is also distinctive; one Alberta specimen, however, measures 10 mm., the remainder 8mm.; Cresson (1877) gives the range of size as 7.5-10mm.

The type of A. vescus has the head subovate, narrowed ventrally, ocellocular space 1½ lateral ocellar width; in lateral view first flagellar segment three times as long as wide apically, the fifth subequal, flagellum subserrate, ferrugineous ventrally; thorax closely punctate; propodeum angulate; postpetiole slender; first gastric tergite 1 and 2/5 as long as wide apically, the second four fifths;

hypandrium pointed, small, not emarginate.

The depressed petiole may cause some specimens to be placed in the group "platyuri" of Cresson.

Gull Lake	14- vi-29	E.H.Strickland (2)
Gull Lake	26- vi-29	E.H.Strickland
Gull Lake	28- vi-29	E.H.Strickland
Wabamum	1-vii-27	E.H.Strickland
Wabamum	31-vii-29	E.H.Strickland
Edmonton	15-vii-29	E.H.Strickland
Edmonton	5- vi-24	

Amblyteles, Species I

Female:- length 11 mm.; temples broad, finely punctate; head broader than deep; eyes strongly divergent below antennae; malar space slightly less than basal width of mandible; cheeks buccate; antennae short, basal flagellar segment twice as long as wide apically; apical joints rounded.

Postpetiole slender, smooth, finely striate medially; gaster subcylindrical, finely punctate; gastrocoeli small, transverse, moderately shallow; length of second tergite ¾ its width; subgenital plate not retracted, ovipositor sub-exserted.

Black; anterior orbits broadly and face ferrugineous; genae basally, clypeus and mandibles apically fuscous; 6th to 12th flagellar segments incompletely yellow; mesothoracic dorsum with two ferrugineous vittae meeting posteriorly; tegulae with line before and line below, scutellum, metanotum, anterior pair of tibiae and all tarsi ferrugineous, mesotibiae and apex of hind tibiae fuscous; apex of gaster ferrugineous.

Gull Lake 27-vi-1929 E.H.Strickland

Amblyteles, Species II

Female;- length 12 mm; head finely, closely punctate, subquadrate; eyes strongly divergent below antennae; malar space subequal to basal width of mandible; antennae short; length of first flagellar segment three times the apical width, the third twice as long as wide, apical segments rounded.

Thorax closely, finely punctate; scutellum moderately convex, moderately sparsely punctate; propodeum finely scabrous, angular behind; carinae moderately strong; areola slightly broader than long and concave; wings almost hyaline, nervures and stigma brown, costa fuscous.

Postpetiole moderately dilated, moderately angular, very finely striate, medially elevated; gaster depressed anteriorly, cylindrical posteriorly; first and second gastric tergites closely, somewhat coarsely punctate, the anterior portion of the first striate medially, other tergites polished; subgenital plate partially retracted, ovipositor hidden.

Black; mandibles medially rufous; basal eleven or twelve flagellar segments incompletely yellow; all tibiae white except apically.

In Cresson's and Provancher's key this species runs to Amblyteles perluctuosus Prov. from which it differs in the head and prothorax being immaculate, the stigma fulvous and the gaster not especially elongate. The gastric apex of the Provancher type is quite acute, not blunt as in this species.

Wabamum	2-viii-29	E.H.Strickland (2)
Wabamum	31- vii-29	E.H.Strickland

Amblyteles, Species III

Female:- length 14-15 mm; head quadrate; temples and vertex rather closely punctate; ocellocular space slightly greater than diameter of lateral ocellus; eyes divergent below antennae; face moderately coarsely punctate; malar space 2/3 of basal mandibular width; clypeus strongly truncate; first flagellar segment 1½ as long as wide apically, the fourth subequal, those above annulus strongly flattened.

Thorax including scutellum densely punctate with few striae present; scutellum almost flat; propodeum smoothly rounded densely scabro-reticulate; propodeal carinae moderately prominent, areola varying from subconical to subquadrate.

Postpetiole very slender, arcuate, very indistinctly, finely, striate medially; gaster elongate; gastrocoeli transverse, moderately deep; intergastrocoelar space subequal and striate; two basal gastric segments depressed, median ones cylindrical and apical one conical; first gastric tergital width equal to median length; first two tergites fairly closely moderately finely punctate; subgenital plate strongly retracted.

Black; anterior orbits above scape with line above and spot below yellow, subobsolete in Beaverlodge specimen and absent in those from Slave Lake, although present in Indiana, Maine, Maryland and Pennsylvania specimens; flagellar segments 3-11, 4-12 or 5-12 incompletely yellow; short line before tegulae yellow in Maine specimen; wings hyaline to weakly fuliginous and nervures brown to piceous, the Alberta and Maine specimens being darker.

Slave Lake	17-viii-24	O.Bryant
Slave Lake	25-viii-24	O.Bryant
Beaverlodge	21- vi-31	E.H.Strickland
Inglenook,Pa.	14- vi-17	W.S.Fisher
Cabin John,Ind.	Spring -17	R.M.Fouts
Bar Harbour,Me.	15-viii-25	C.W.Johnson
Indiana	---	---

The latter four specimens were loaned by the Smithsonian Institute.

Amblyteles, Species IV

Female:- length 9 mm; head subquadrate, somewhat narrowed ventrally; ocellocular space almost twice diameter of lateral ocellus; eyes short; face somewhat coarsely, evenly punctate; clypeo-frontal suture subobsolete, malar space 1½ times the basal mandibular width; basal flagellar segment scarcely twice as long as wide apically, fourth subequal, basal segments not dilated apically, slightly tapering; apical segments moderately flattened.

Thorax closely, confluently punctate; scutellum small, almost an equilateral triangle; propodeum arcuate; areolation moderate, sub-bispinose; areola transverse, 1½ times as broad as long.

Postpetiole moderately dilated, strongly elevated medially, indistinctly striate; gaster broad, subcylindrical, short; gastrocoeli shallow; gastrocoelar space scarcely longer than gastrocoelar length; first gastric tergite finely, closely punctate, length ¾ of apical width; subgenital plate strongly retracted.

Black; basal twelve flagellar segments ferrugineous; scutellum yellow except posteriorly; wings subhyaline, nervures brown, stigma fulvous; metatrochantellus, profemora except exter-

iorly in part, mesofemora apically and all tibiae and tarsi ferrugineous, metatibiae apically fuscous and all metatarsi apically annulated piceously, apical segments darker; basal two gastric segments ferrugineous, two apical dorsal tergites with median ferrugineous spots (originally yellow ?).

In Cresson's key this runs in section III to the I. instabilis - I. terminalis couplet if the flagellar segments are considered long; the spots on the apical gastric tergites separate it from the former species, while the entirely black thorax (except scutellum) without ferrugineous coloration separates it from the latter; both species, moreover, have a yellow annulus. There is no place for this specimen in the other half of the couplet, due to the black pedicel; moreover, the only two species included that have the apical gastric tergites spotted are 0.25 inches in size, not 0.35.

Wabamum 14-viii-29 E.H.Strickland

Amblyteles, Species V

Female:- 9 mm. long; head subtriangular, contracted ventrally; ocellocular space 1¼ times diameter of lateral ocellus; eyes small, strongly divergent below the eyes; face moderately, evenly punctate; malar space almost twice the basal mandibular width; clypeus moderately strongly punctate; basal flagellar segment 2½ times as long as wide apically, gradually dilated, seventh subquadrate, apical segments not depressed.

Thorax rather finely, confluently punctate, scutellum flat, very lightly, sparsely punctate, legs elongate.

Postpetiole moderately wide, finely aciculated, subangular; gaster broad, somewhat depressed; gastrocoeli broad, moderately deep, transverse, intergastrcoelar space subequal to gastrocoelar width; basal gastric tergal length and apical width subequal; tergite finely punctate; subgenital plate strongly retracted, ovipositor subexserted.

Black; anterior orbits, six basal flagellar segments and apex of scape ferrugineous; the orbits almost rufous; flagellar segments 7-11 with incomplete yellow annulus, varied with ferrugineous; apical segments fuscous; mesoscutum rufous, scutellum yellow-ferrugineous; apices of four anterior coxae and trochanters, trochantelli, profemora except exteriorly, meso-and meta-femora basally and apically and all tibiae and tarsi except metatibiae apically, rufo-ferrugineous; stigma and nervures brown; postpetiole, two basal gastric tergites and three basal gastric sternites rufous, two apical tergites dorsally with yellow maculae.

Edmonton 15-v-30 E.H.Strickland

<u>Amblyteles</u>, <u>Species VI</u>

Female :- 15 mm; head quadrate; ocellocular space 1½ diameter of lateral ocellus; eyes unusually short below antennae, strongly divergent; temples and cheeks broad, the latter buccate; malar space ¾ of basal mandibular space; mandibles stout; face broad, moderately punctate, basal flagellar segment 1½ times as long as wide apically, basal segments dilated gradually apical segments not depressed.

Thorax moderately punctate, mesopleuron not striated;

scutellum flat, very sparsely, lightly punctate; propodeum arcuate, scabrous, areolation moderately developed, areola subquadrate, slightly longer than wide; basal metatarsi strongly spinose.

Postpetiole arcuate, moderately dilated, evenly striated; gaster elongate, subcompressed apically; gastrocoeli shallow, large, longitudinal; length subequal to intergastrocoelar space; basal gastric tergite slightly shorter than apical width, indistinctly striate medially; subgenital plate elongate, strongly retracted, ovipositor subexserted.

Black; head rufous; basal antennal segments apically rufous, segments 8-17 yellow, apical segments piceous; pro- and mesothoracic dorsa entirely and pleurae antero-ventrally rufous; four anterior pairs of legs rufous except black coxae and trochanter; hind legs with trochantellus and tarsi entirely and femora and tibiae basally ferrugineous; wings hyaline, nervures brown, stigma fulvous; pedicel, two basal gastric tergites and three sternites, rufous; two apical tergites yellow dorsally.

Wabamum	31-vii-29	E.H.Strickland

Amblyteles, Species VII

Male; length 11 mm; head broadly, transversely subovate; ocellocular space equal to diameter of lateral ocellus; eyes large, not strongly divergent below antennae; face closely, moderately finely punctate; cheeks buccate; malar space 1/3 of basal mandibular width; clypeus coarsely sparsely punctate,not truncate, basal flagellar segment

twice as long as wide apically; flagellar segments distal to annulus dilated medially.

Thorax shining, moderately closely and finely punctate; scutellum weakly convex propodeum scabro-rugulose, arcuate, not concave posteriorly; carinae moderate in size; areola horse-shoe shaped, costula present.

Postpetiole slender, dorsally coriaceous, apically smooth; gastrocoeli oblique, moderately deep, their width scarcely equal to intergastrocoelar space; gaster strongly depressed, confluently and fairly coarsely punctate.

Black; face and clypeus laterally; posterior orbitals basally and anterior orbits, flagellar segments 13-17 in part; line before tegulae, another below, four anterior femora apically and tibiae inside, all yellow; wings subhyaline, stigma piceous, nervures dark brown.

The tarsi of the four hind legs and the antennal apices are absent in the specimen.

This species runs close to Viereck's Amblyteles (Pterocormus)pequitorum (?) male but the size - 16 mm.-is too great. It resembles A. acerbus but the stigma is not fulvous nor the thorax immaculate; the latter species is more finely punctate.

Edmonton 13-vi-32 E.H.Strickland

Amblyteles, Species VIII

Male;-length 16 mm; head transverse, narrowed ventrally; ocellocular space twice diameter of lateral ocellus; eyes moderately divergent below antennae; frons

moderately coarsely, confluently punctate, malar space ¾ of basal mandibular width; cheeks slightly buccate; clypeus; basal flagellar segment twice as long as wide apically; all flagellar segments, except a few basally, subserrate;

Thorax densely, confluently punctate, scutellum evenly, subobsoletely so; propodeum scabro-rugose ,propodeal carinae unusually strong; areola quadrate, 1½ times as broad as long.

Postpetiole moderately dilated, angular,medially striate; gastrocoeli transverse, deep, intergastrocoelar space striate, equal to gastrocoelar width; basal gastric tergite 4/5 as wide as long, tergite confluently, coarsely punctate; sutures between first three gastric tergites strongly constricted.

Black; both face and clypeus laterally; base of maxillary palpi; scape apically; tegulae, line before, another below, scutellum, profemora inside, all tibiae basally, protibiae almost entirely, all yellow; protarsi luteous; wings subhyaline, stigma rufo-ferrugineous, nervures dark brown to piceous; apices of mandibles rufous.

This species is close to A. ultus Cress. and A. stadaconensis Prov. but differs from the former in the postpetiole not being coriaceous and the head not strongly quadrate; in A. stadaconensis the ocellocular space is 1 1/3 - not twice - the diameter of the lateral ocellus,. Colour separates the three species as well.

Waterton 12-vii-23 E.H.Strickland

Amblyteles, Species IX

Male:- 15 mm. long; head quadrate; vertex, face and temples strongly, closely punctate; ocellocular space 1¼ times diameter of lateral ocellus; eyes divergent below antennae; clypeus broadly truncate; malar space 2/3 of basal mandibular width; basal flagellar segment 1½ times long as wide, apical segments subserrate.

Thorax closely, rather coarsely punctate; scutellum flat with a few somewhat large punctations, anterior half carinate laterally; propodeum rounded, concave; areola 1½ as broad as long, carinae strongly flattened.

Postpetiole arcuate, bicarinate, punctate with indistinct striae moderately dilated; gaster strongly depressed throughout length; gastrocoeli transverse, large, deep; intergastrocoelar space slightly greater than gastrocoelar width; coarsely striate (as are two following tergites basomedially); length of second gastric tergite equal to the apical width.

Black; both face and clypeus laterally, mandibles medially, palpi; orbits basally and with an apical spot, scape, spot before tegula, tegulae partially and spots at angles of scutellum, all yellow; wings hyaline, subfuscous apically, nervures and stigmata brown; four anterior legs except coxae and trochanters, posterior trochantelli and vitta basally on femora, all ferrugineous; posterior tarsi and remainder of tibiae fuscous.

In Cresson's key to Ichneumon this species runs to the similaris - pedalis - luctus group and in the key to Amblyteles to A. luctus, A. similaris Prov. differs in the gaster being subfusiform, the malar space equal, the head

blackly pilose, the basal flagellar segment twice as long as wide apically and the stigma fulvous. A. luctus Cress.has the areola elongate, stigma fulvous, gaster minutely punctate. A. pedalis Cress. has a constant violaceous tinge to the wings and the antennae are quite different. A. pedalis pallidipennis has the vertex and temples obscurely punctate.

Nordegg 21-vii-26 E.H.Strickland

Amblyteles, Species X

Male; length 12 mm; head subquadrate, narrowed ventrally; ocellocular space 1¼ the diameter of lateral ocellus; vertex and temples weakly punctate; eyes strongly divergent below antennae; malar space ½ of basal mandibular width; cheeks moderately buccate; clypeus broadly truncate; basal flagellar segment 3 times as long as wide apically (in lateral view), the apex sloping; all but first eight flagellar segments subserrate.

Thorax moderately punctate, meso- and metapleura punctate except former postero-ventrally; notauli somewhat prominent for this genus; scutellum convex; propodeum arcuate posteriorly, not concave; areola quadrate, slightly wider than long.

Postpetiole narrow, slender, arcuate medially, coriaceous; gaster strongly depressed with median fold on three basal sternites; gastrocoeli transverse, subobsolete; basal gastric tergite 1/8 longer than wide apically; basal gastric tergite and basal half of following one shallowly, confluently punctate, following tergites indistinctly, sparsely punctate.

Black; face, orbits except vertices, clypeus, labrum, palpi, scape anteriorly, 16th - 23rd flagellar segments above; line anterior to tegula and another below, scutellum in a medial transverse band; four anterior tibiae inside and basal tarsi ventrally; posterior tibiae with small posterior vitta near base, all yellow; four anterior femora and tibiae outside fuscous or black; wings subhyaline with fuscous tinge, stigmata and nervures fuscous.

Both this species and Species XI run to either A. sagus Cress. or to A. sublatus Cress. in the keys available, according to whether the propodeal or flagellar coloration is considered more important. In the original description of A. sagus (Cresson, 1867), however, the annulus is sometimes subobsolete. A. sagus differs by having the head transversely quadrate, narrowed below, the malar space ¼ the basal mandibular width, only the dorsal half of postorbitals yellow, areola transversely subrotund and the basal half of the posterior tibiae white or whitish. The allotype has the areola twice as broad as long. In his original description Cresson confused A. sagus with A.promptus Cress. but in differentiating between the two (Cresson, 1877) he does not alter the description on this point.

A. sublatus Cress. differs from this species in the pronotum dorsally, mesothoracic disc, (propodeum laterally), four anterior coxae and trochanters, intermediate coxae partially and basal half of hind tibiae, all yellow.

Edmonton 30-vi-23 E.H.Strickland

Amblyteles, Species XI

(male only)

This species is closely allied to A. sagus Cresson and to Species X but differs from the latter in the head being small; basal flagellar segment twice as long as wide apically; thorax finely punctate, mesopleuron not striate; propodeum almost angularly, areola small, subrotund; gastrocoeli large, oblique, moderate in depth; intergastrocoelar space equal to gastrocoelar width; second gastric tergite distinctly punctate entirely; orbits black apically except at vertex; mandibles entirely yellow except dentes; flagellar segments 9-16 yellow; posterior tibiae with smally yellowish-white macula at extreme base.

Edmonton 7-vi-32 E.H.Strickland

Genus Hoplismenus Grav.

Genotype:-Hoplismenus armatorius maestus Grav.(Viereck,1914)

1829 Hoplismenus,Gravenhorst,Ichneum.Eur.2:409.
1864 Hoplismenus;Cresson,Proc.Ent.Soc.Phila.3:288-289.
1868 Hoplismenus;Trans.Amer.Ent.Soc.2:89,92.
1877 Ichneumon (Hoplismenus);Cresson,Trans.Amer.Ent.Soc.6: 130,185-186.
1878 Hoplismenus;Provancher,Nat.Can.10:265.
1879 Hoplismenus;Provancher,Nat.Can.11:2-4.
1883 Hoplismenus;Brodie and White.Ck.List.Ins.Dom.Can:7.
1887 Hoplismenus;Cresson,Trans.Amer.Ent.Soc.Suppl:41,189.
1901 Hoplismenus;Ashmead,Proc.U.S.Nat.Mus.23:16.
1903 Hoplismenus;Morley,Ichn.Brit.1:6-8.
1904 Hoplismenus;Dalla Torre,Cat.Hym.3,pt.2:1024-1028.
1914 Hoplismenus;Viereck,U.S.Nat.Mus.Bul.83:72.
1916 Hoplismenus;Cresson,Mem.Amer.Ent.Soc.1:12-64.
1916 Hoplismenus;Viereck,Hym.Conn:258,343.
1924 Hoplismenus;Ceballos,Estud.Ichn.Esp.1:30-35.
1925 Hoplismenus;Ceballos,Him Esp:65-67.
1925 Hoplismenus;Handlirsch,Handbuch Ent.3:737.
1928 Hoplismenus;Cushman,Ins.N.Y:927.
1930 Hoplismenus;Schmiedeknecht,Hym.N.and M-Eur.1,fasc.1: 201-203.

Hoplismenus morulus Cresson

1828 Ichneumon morulus Say, Contrib.Maclur.Lyc.Phila.2:73.
1836 Ichneumon morulus;Say.Boston.Jour.Nat.Hist.1:277.
1875 Ichneumon calcaratus Provancher,Nat.Can.7:49.
1876 Hoplismenus morulus;Cresson,Trans.Amer.Ent.Soc.6:186.
1879 Hoplismenus morulus;Provancher,Nat.Can.11:2.
1883 Hoplismenus morulus;Provancher,Faune Ent.Can.Hym:291.
1890 Hoplismenus morulus;Bruner,Neb.Bul.14.
1902 Hoplismenus morulus var.flavitarsis;Cresson,Trans. Amer.Ent.Soc.29:76.
1916 Hoplismenus morulus;Viereck,Hym.Conn:343.
1921 Hoplismenus morulus;Cushman and Gahan,Proc.Ent.Soc.Wash. 23:166.
1926 Hoplismenus morulus;Webber and Schaffner,U.S.D.A.Bul. 1363:16.
1927 Hoplismenus morulus;Criddle,Ann.Rept.Ont.Ent.Soc.58:102.
1928 Hoplismenus morulus;Cushman,Ins.N.Y:927.

Distribution:-Eastern United States,Nebraska,Quebec,Alberta.

Hosts:-Polygonia interrogationis Fabr.
Aglais antiopa L. (Alberta)

Cresson believed that H. flavitarsis Cresson is the western race of H. morulus (Skinner, 1902).

The neotype is at the United States National Museum but was not seen.

Red Deer	22-vii-26	E.H.Strickland
Edmonton	20- vi-26	E.H.Strickland
Bilby	June	(Criddle, 1927)

5. Tribe Joppini

1869 Trogoidea;Foerster,Verh.d.naturh.Ver.pr.Rheinl.25:144,188.
1894 Trogini;Ashmead,Proc.Ent.Soc.Wash.3:278.
1898 Joppinae;Kriechbaumer,Ent.Nachr.24:2.
1900 Joppini;Ashmead,Smith's Insects N.J.p:563.
1901 Joppini;Ashmead,Proc.U.S.Nat.Mus.23:12-16.
1903 Joppides;Morley,Ichn.Brit.1:5-39.
1904 Joppini;Berthoumieu,Gen.Ins.18:5-25.
1918 Joppinae;Viereck,Proc.Biol.Soc.Wash.31:73.
1924 Joppini;Ceballos,Estud.Ichn.Esp.1:18-25.
1925 Joppini;Handlirsch,Handbuch Ent.3:737.
1928 Joppini;Cushman,Ins.N.Y:921.
1930 Joppini;Schmiedeknecht,Hym.N.and M-Eur.1,fasc.1:10-18.

The only Alberta genus and species of this tribe is Trogus Panz. Ashmead (1901) keys out the genus by the hidden labrum, although Berthoumieu (1904) characterises it by its salient labrum. Berthoumieu (loc. cit.), however, separates Trogus by the antennae not being dilated, the antennae shorter than the body, the head of normal size, the scutellum pyramidal, the areola truncately cone-shaped and the wings sometimes maculate.

Genus Trogus Panzer

1829 Trogus Panzer,Krit.Rev:80.
1862 Trogus;Cresson,Proc.Ent.Soc.Phila.1:208.
1864 Trogus;Cresson,Proc.Ent.Soc.Phila.3:287-288.
1865 Trogus;Cresson,Proc.Ent.Soc.Phila.4:264-265.
1868 Trogus;Cresson,Trans.Amer.Ent.Soc.2:90-95.
1872 Trogus;Cresson,Trans.Amer.Ent.Soc.4:157.
1875 Trogus;Provancher,Nat.Can.7:349.
1877 Amblyteles (Trogus);Trans.Amer.Ent.Soc.6:194-199.
1878 Trogus;Provancher,Nat.Can.10:265.
1879 Trogus;Provancher,Nat.Can.11:33-35.
1882 Trogus;Provancher,Nat.Can.13:329.
1883 Trogus;Brodie and White,Ck.List Ins.Dom.Can:7.
1887 Trogus;Cresson,Trans.Amer.Ent.Soc.Suppl:41,190-191.
1901 Trogus;Ashmead,Proc.U.S.Nat.Mus.23:14.
1902 Trogus;Dalla Torre,Cat.Hym.3,pt.2:1032-1032.
1903 Trogus;Morley,Brit.Ichn.1:13-16.
1904 Trogus,Berthoumieu,Wytsman's Gen.Ins.18:21-22.
1914 Trogus;Viereck,U.S.Nat.Mus.Bul.83:150.
1916 Trogus;Cresson,Mem.Amer.Ent.Soc.1:12-64.
1916 Trogus;Viereck,Hym.Conn:258,343.
1924 Trogus;Ceballos,Estud.Ichn.Esp.1:23-25.
1925 Trogus;Ceballos,Him.Esp:77.
1925 Trogus;Handlirsch,Handbuch Ent.3:737.
1928 Trogus;Cushman,Ins.N.Y:921.
1930 Trogus;Schmiedeknecht,Hym.N.and M.-Eur.1,fasc.1:200-201.

The only species from Alberta is T. fulvipes Cress.

Trogus fulvipes Cresson

(male only)

1868 Trogus fulvipes Cresson,Trans.Amer.Ent.Soc.2:39.
1873 Trogus obsidianator Provancher,Nat.Can.6:336.
1877 Trogus fulvipes;Cresson,Trans.Amer.Ent.Soc.6:195.
1879 Trogus fulvipes;Provancher,Nat.Can.11:13.
1883 Trogus fulvipes;Provancher,Faune Ent.Can.Hym:302.

Waterton	7-vii-23	H.E.Gray
Lethbridge	28-vii-23	H.E.Gray

IV. CONCLUSIONS

The taxonomy of the American species of the subfamily Joppinae is not in a satisfactory condition at the present time.

The original descriptions were based almost entirely upon colour but the evaluation of the colour characteristics was not sufficiently accurate for modern needs. This is especially true of some species described from either a single individual or else only a few specimens.

Following the descriptions of Say, Cresson and Provancher, very little has been published, revising the excellent preliminary work of these early writers. Due to the almost total reliance of the early workers upon colour it is necessary at the present time to stress the value of structure and to correlate morphological characters with structures. This is especially to be stressed in a study of the species in Alberta where the genus has not been studied closely.

While structure has been emphasised in this paper yet it must be borne in mind that structural characters may be variable. They are necessarily more difficult to employ in keys and descriptions than colour; structure should be supplementary to colour in keys.

It is of great importance, therefore, that colour should be studied in relation to the environment of the insect, more especially the effects of temperature, humidity, food and host species. Field observations are so meagre that hosts are unknown for most of the joppines, while even the

males and females are usually known under different scientific names. It is necessary to obtain series of joppine species,, raised from known hosts and under definite environmental conditions.

Because of the neglect of the environmental viewpoint the American joppines have been classified upon dried specimens, with too little recognition of bionomics. This has caused the determination of species to be accompanied by an element of hazard; this is increased due to the lack of study of western species and the probable occurrence of many new species and geographical races in the province of Alberta.

Until the taxonomy of the prairie joppines has been improved considerably, the biological control of western cutworms cannot be carried out thoroughly. Even after the classification of the joppines is satisfactory, it may be impossible to aid the natural control of cutworms by the use of joppine species in biological control work.

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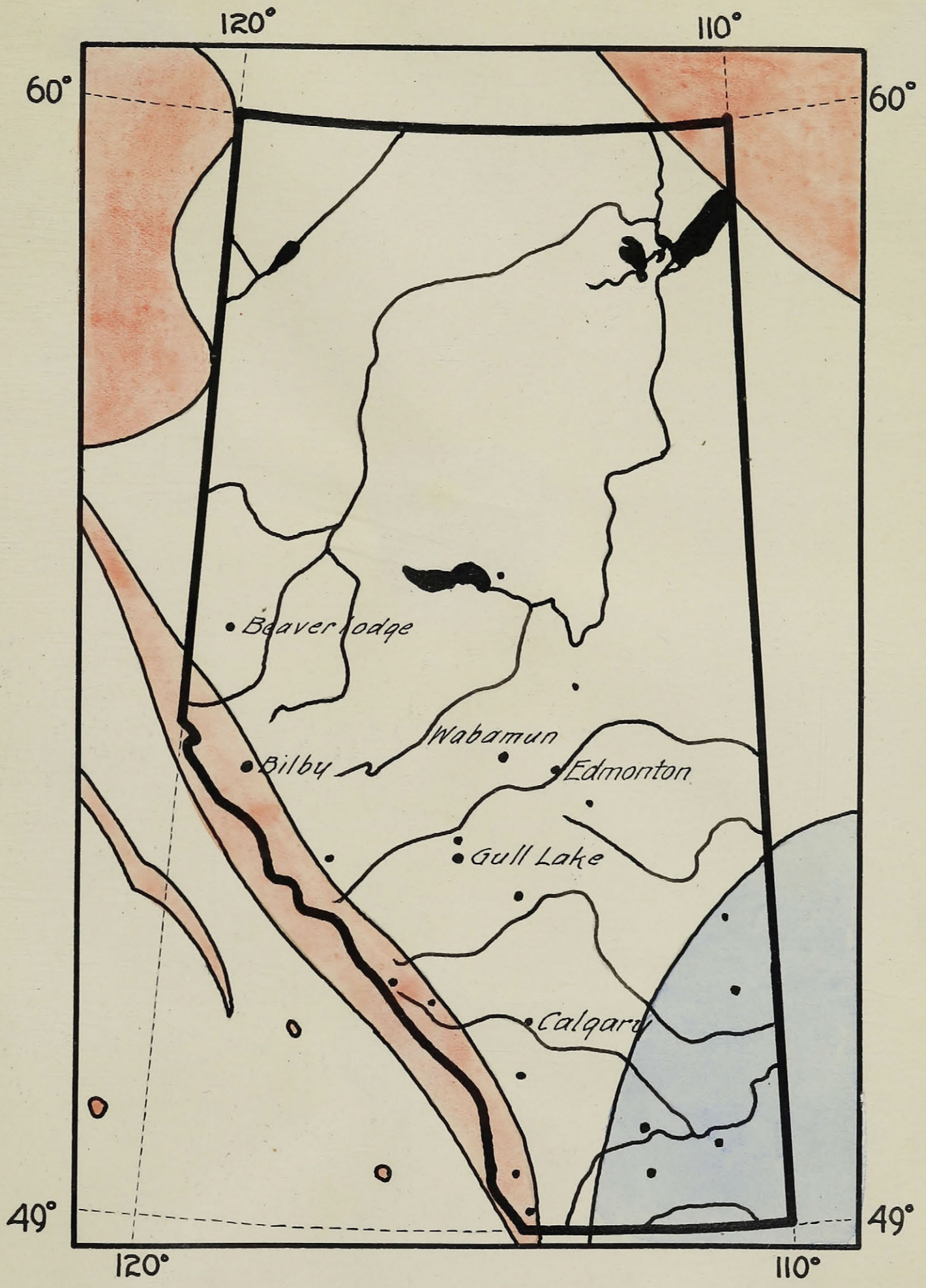
Faunal and Locality Map of Alberta

showing distribution of specimens examined

Hudsonian	zone	red
Canadian	zone	white
Transition	zone	blue



ALBERTA
and adjoining areas

Fig. 1. Amblyteles suturalis Say (female)

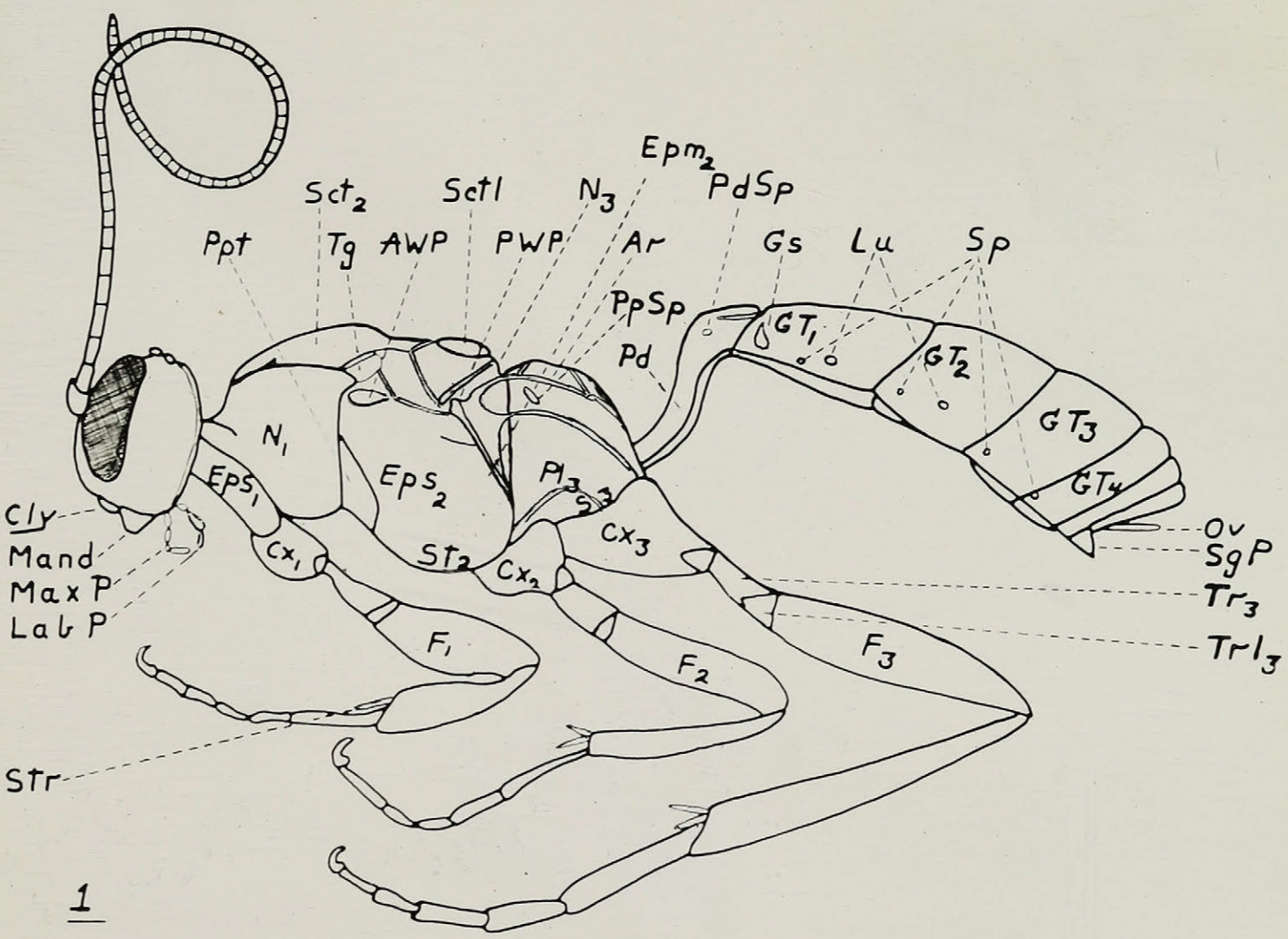
Lateral View of Body

Ar	areola	Pd	pedicel or pedicelar
AWP	anterior wing process	Pl	pleuron
Cly	clypeus	Pp	propodeum or propodeal
Cx	coxa	Ppt	prepectus
Epm	epimeron	PWP	posterior wing process
Eps	episternum	Sct	scutum
F	femur	Sctl	scutellum
G	gastric	SgP	subgenital plate
Gs	gastrocoelus	Sp	spiracle
LabP	labial palpus	St	sternum
Lu	lunula	Str	strigilis
Mand	mandible	T	tergite
MxP	maxillary palpus	Tg	tegula
N	notum	Tr	trochanter
Ov	ovipositor	Tl	trochantellus

Fig. 2. Amblyteles suturalis

Wings

Veins		Cells	
AB	costa	1	median
BC	stigma	2	submedian
CE	metacarpus	3	radial
FGHD	radius	4	discocubital
BJ	basal	5	second cubital or areolet
GM	first intercubitus	6	third cubital (incomplete)
HO	second intercubitus	7	second discoidal
IJ	medius	8	third discoidal (incomplete)
KLS	discoideus	9	first brachial
LM	discocubitus	10	second brachial (incomplete)
MNOP	cubitus	11	anal (incomplete)
KR	nervulus	12	costellan
NU	second recurrent	13	mediellan
QR	submedian	14	submediellan
RS	brachius	15	radiellan
TUV	subdiscoideus	16	cubitellan (incomplete)
WX	ramellus	17	discoidellan (incomplete)
abc	subcostella	18	brachiellan (incomplete)
cd	metacarpella	19	anellan (incomplete)
bef	radiella		
ei	intercubitella		
gh	mediella		
hj	cubitella		
hnj	nervellus		
mn	discoidella		
kl	submediella		
jo	brachiella		


Epm2
Sct2
Sctl
N3
PdSp
Ppt
Tg
AWP
PWP
Ar
Gs
Lu
Sp
PpSp
Pd
GT1
GT2
GT3
GT4
N1
EpS1
EpS2
Pl3
Cly
Mand
Max P
Lab P
Cx1
St2
Cx2
Cx3
Ov
Sg P
Tr3
Tr1 3
F1
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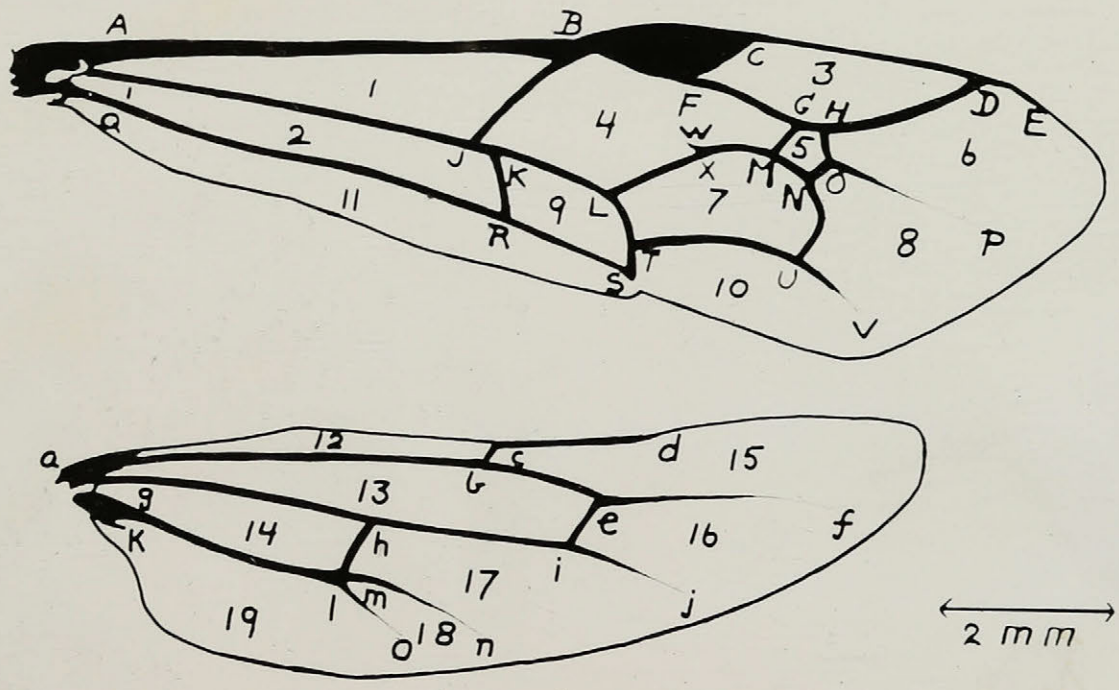
F3
Str

1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14
h
17
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m
19
l
o
18
n
j
2 mm

2

Fig. 3. Amblyteles suturalis

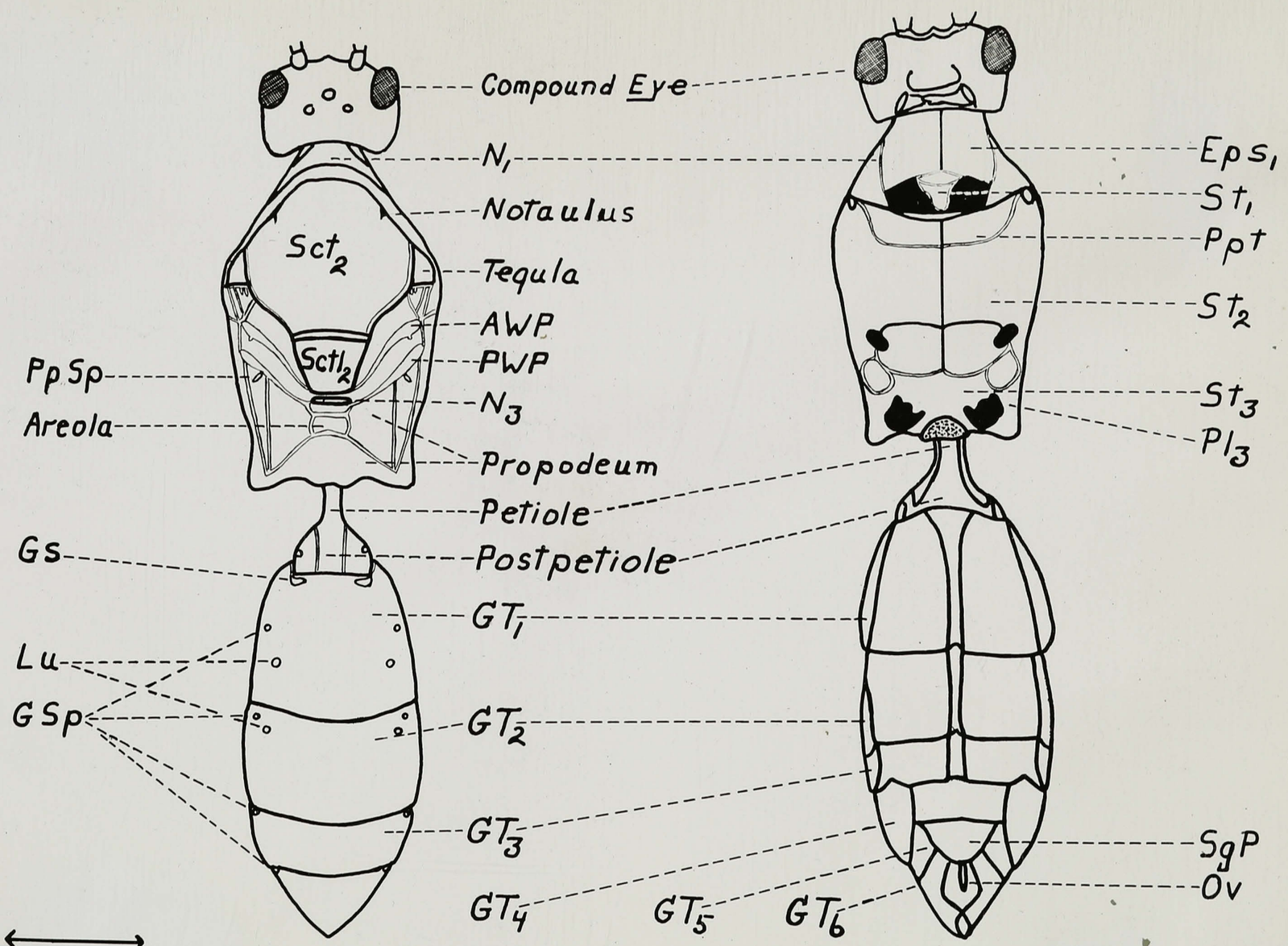
Dorsal View of Body

AWP	anterior wing process	PWP	
G	gastric	Sct	
Gs	gastrocoelus	Sctl	
Lu	lunula	SgP	
N	notum	Sp	
Ov	ovipositor	T	
Pp	propodeal		

Fig. 4. Amblyteles suturalis

Ventral View of Body

Pl	pleuron	Ppt	prepectus
Eps	episternum	SgP	subgenital plate
G	gastric	St	sternum
N	notum		
Ov	ovipositor		


Compound Eye
N1
Notaulus
Sct2
Tequla
AWP
Sctl2
PWP
Pp Sp
N3
Areola
Propodeum
Petiole
Postpetiole
Gs
GT1
Lu
GSp
GT2
GT3
GT4
2 mm
3
Eps1
St1
Ppt
St2
St3
Pl3
GT5
GT6
SgP
Ov
OP
4

Joppinae

Fig. 5. Amblyteles suturalis

Anterior View of Head

Sc scape

Cryptinae

Fig. 6. Echthrus abdominalis Cress.

Lateral View of Mesothorax (in part)

Cx coxa
Eps episternum
Ppt prepectus
St sternum

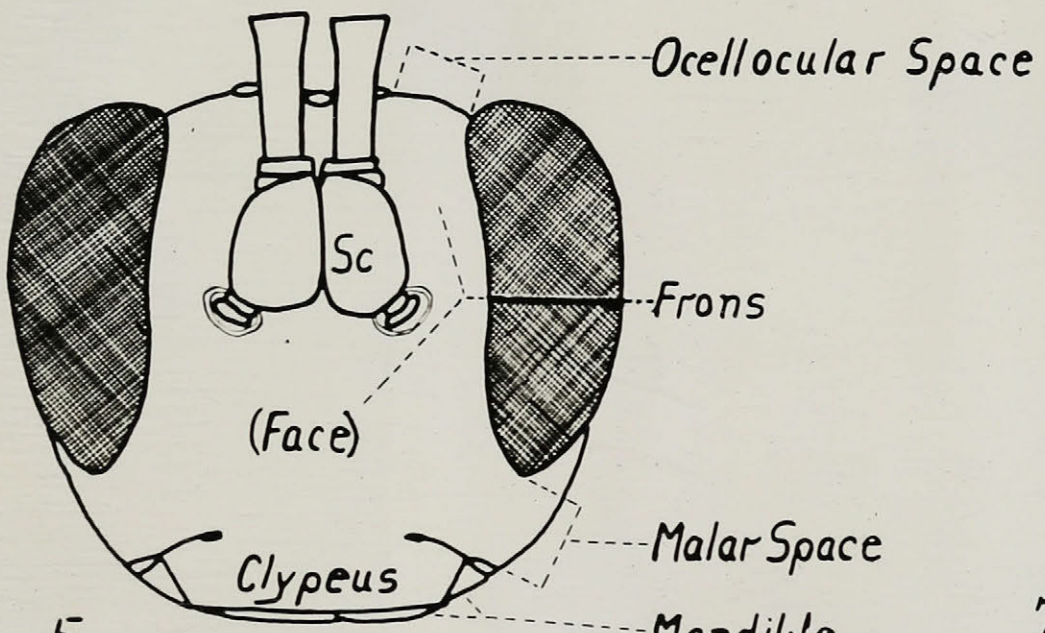
Fig. 7. Echthrus abdominalis Cress.

Dorsal View of Postpetiole

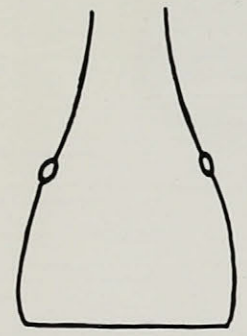
Fig. 8. Echthrus abdominalis Cress.

Dorsal View of Mesothorax

Sct scutum
Sctl scutellum
Tg tegula


Ocellocular Space
Sc
Frons
(Face)
Malar Space
Clypeus
Mandible

5



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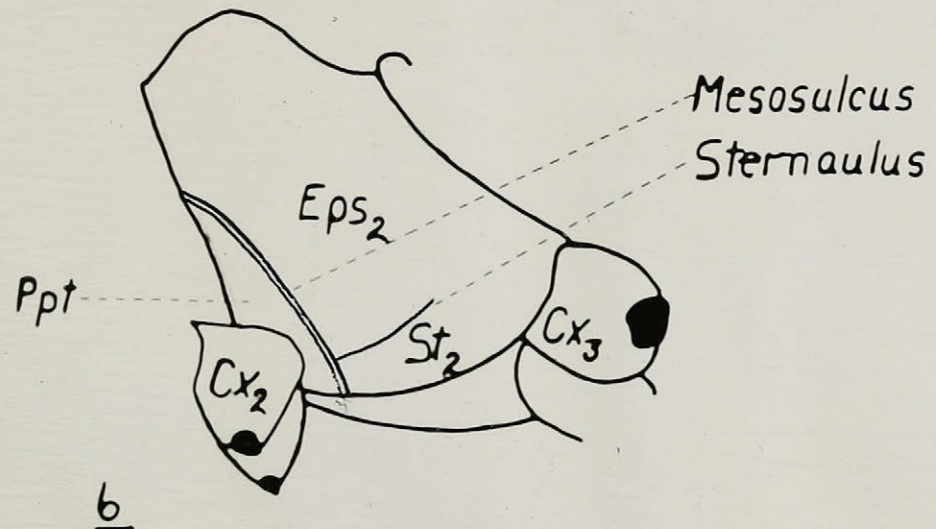
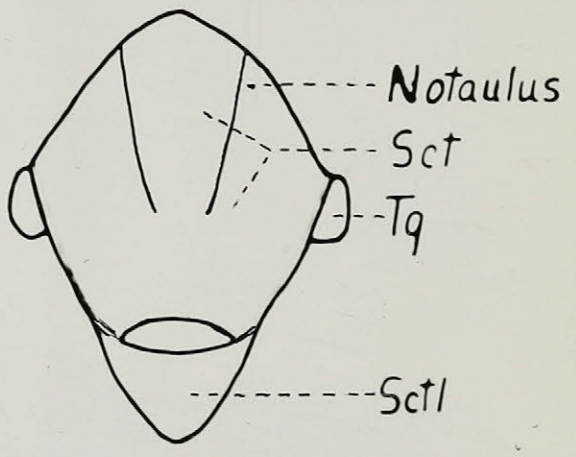

Mesosulcus
Sternaulus
Eps2
Ppt
St2
Cx3
Cx2

6


Notaulus
Sct
Tg
Sctl

8

Fig. 9. Amblyteles variegatus Cress.

Lateral View of Posterior Gastric Segments

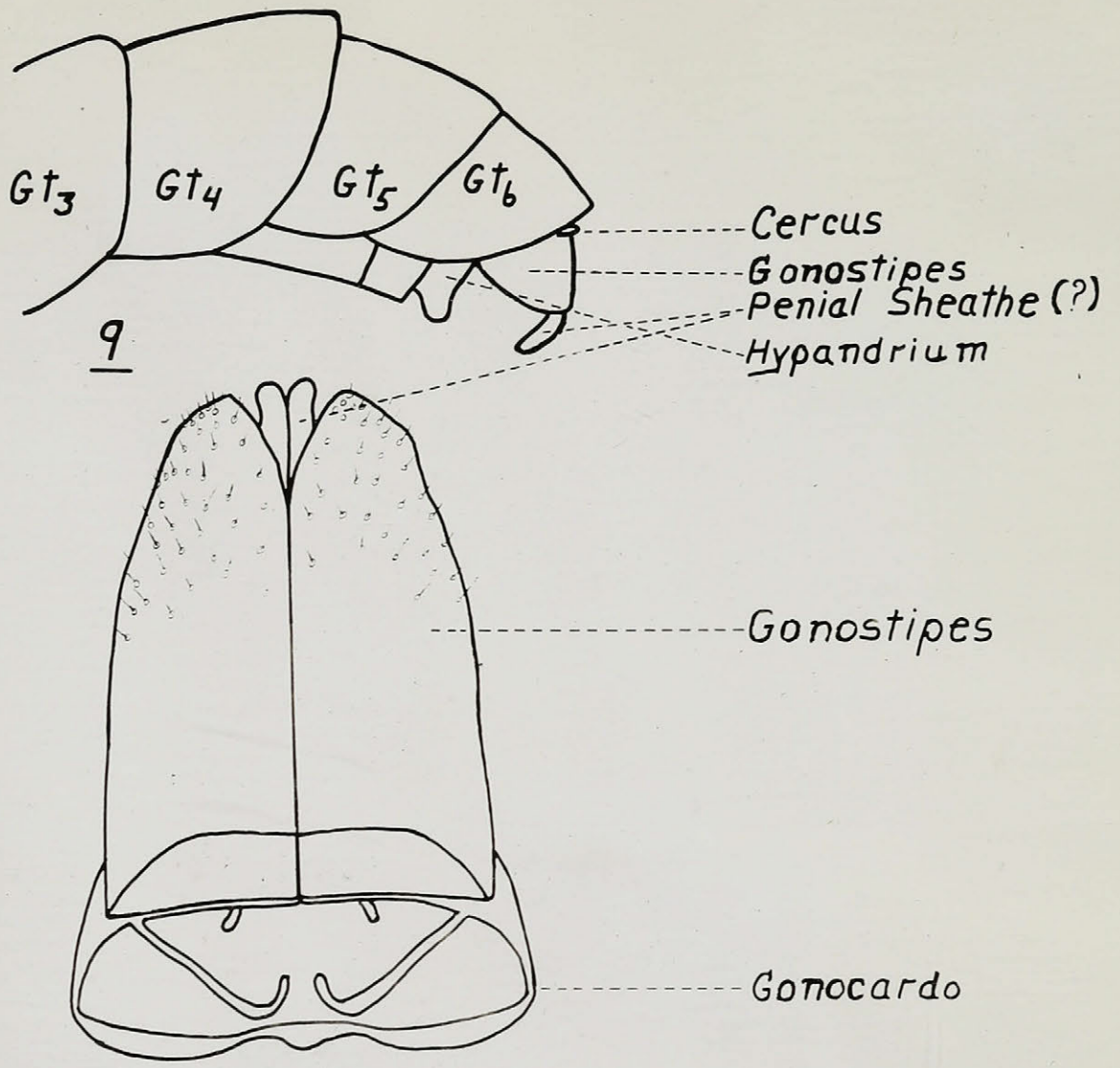
Gt gastric tergite

Fig. 10. Amblyteles variegatus Cress.

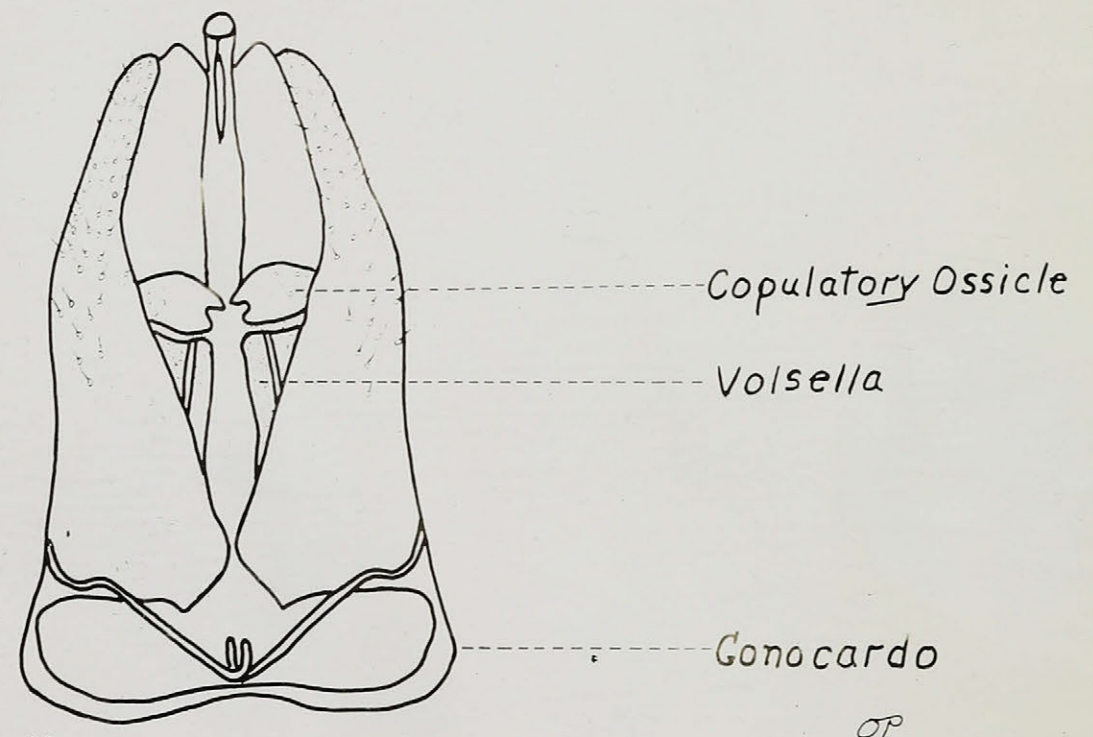
Dorsal View of Male Genitalia

Fig. 11. Amblyteles variegatus Cress.

Ventral View of Male Genitalia


Gt3
Gt4
Gt5
Gt6
Cercus
Gonostipes
Penial Sheathe (?)
Hypandrium
Gonostipes
Gonocardo

9


Copulatory Ossicle
Volsella
Gonocardo

10

11

OP

Fig. 12. Amblyteles suturalis

Lateral View of Ovipositor

Cc	cercus
GTg	gastric tergite
Prct	proctiger
V	vulvula
Vf	valvifer

Fig. 13. Amblyteles variegatus

Anterior View of Cardo

Fig. 14. Amblyteles quebecensis Prov.

Ventral View of Volsella (s.l.)

Fig. 15. Amblyteles variegatus

Ventral View of Volsella (s.l.)

Fig. 16. Amblyteles variegatus

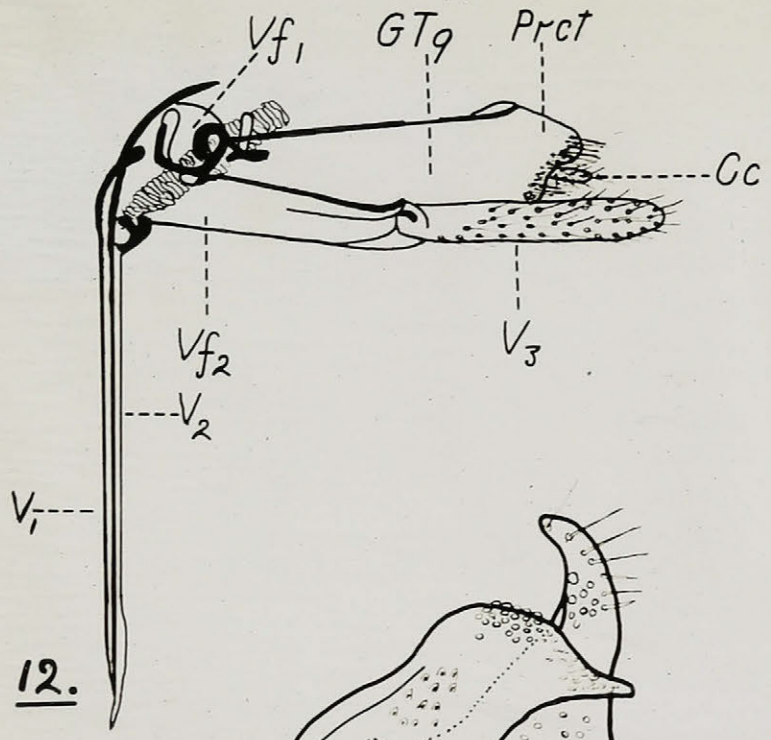
Ventral View of Penial Sheathe or Penis

Fig. 17. Amblyteles variegatus

Lateral View of Penial Sheathe or Penis

Fig. 18. Amblyteles quebecensis

Lateral View of Penial Sheathe or Penis



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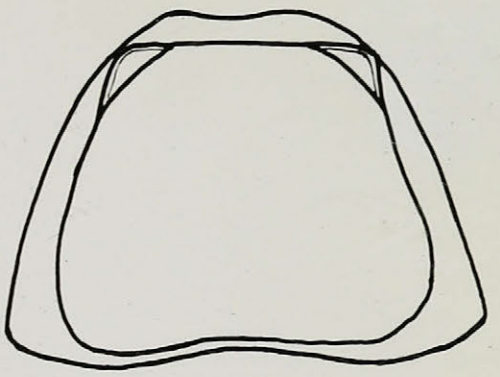

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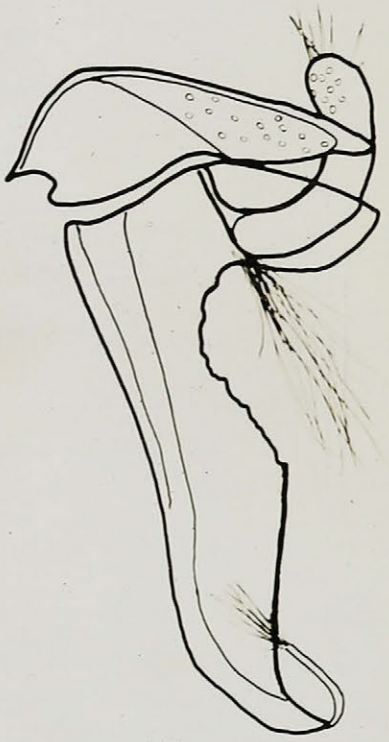

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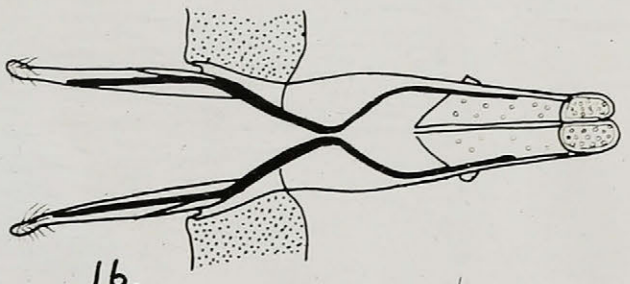

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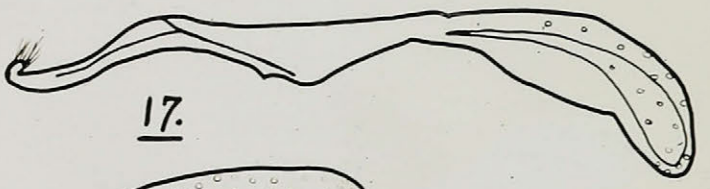

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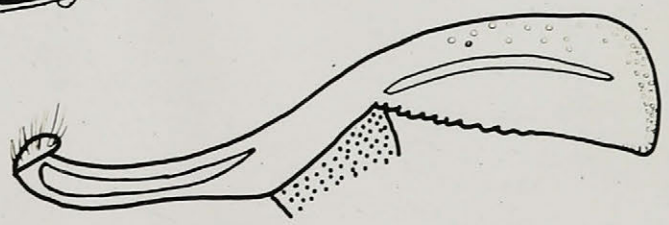

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