Records and Descriptions of North American Crane-Flies (Diptera).

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CHARLES P. ALEXANDER

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Records and Descriptions of North American Crane-Flies (Diptera)[1]

Part VIII. The Tipuloidea of Washington, 1

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General Account

Washington, the extreme northwestern state of the union, is roughly rectangular in outline, its extreme east-west length being 360 miles, the greatest breadth 240 miles. The total area is 66,836 square miles, of which 2,291 are water. The extreme northern boundary is the 49th parallel of north latitude while much of its southern boundary is the Columbia River, extending to slightly below the 46th parallel. The western boundary is the Pacific Ocean; in the northwest, Juan de Fuca and other straits separate the state from Vancouver Island in British Columbia. The following account by Fisher (in *Climate and Man,* 1941) provides data of value in this survey.

"The Cascade Range, 50 miles or more wide, extends in a north-south direction from British Columbia to the Columbia River and divides the state into a western and an eastern part, whose areas are to each other as 2 is to 3. Several peaks are from 10,000 to 12,000 feet high, while Mount Rainier exceeds 14,000 feet. The Olympic Mountains are the highest in the Coast Range, reaching nearly 8,000 feet. In the northeast is a series of north-south ranges, while in the extreme east are the beginnings of the Rocky Mountains, including the Blue Mountains in the extreme southeast.

"The Columbia River enters the state in the northeast and drains all of eastern and part of southwestern Washington. The Chehalis, flowing westward through the Coast Range, drains a part of the west, south of Puget Sound. Other streams in the western part of the state drain into Puget Sound, the inland waters north to the Strait of Georgia, the Strait of Juan de Fuca, and the Pacific Ocean.

"The climate of Washington is modified greatly by the influence of the Pacific Ocean and the mountain ranges, which trend north and south and hence lie athwart the prevailing westerly air currents from the ocean as well as the easterly currents from the interior of the continent. Air reaching the

1 The preceding part under this general title was published in The American Midland Naturalist 39: 1-82, 1948.

References in the text refer to the bibliography at the conclusion of the general account.

In the report the author's name has been abbreviated to the initial "A" following records of specimens. M. M. Alexander—Mrs. Charles P. Alexander.

state from the west has acquired much water vapor in passing over the ocean and has a cooling effect in summer and is a warming influence in winter. The marine influence is most pronounced on the coast and decreases inland, especially on crossing the Cascade Range, yet even eastern Washington has milder temperatures than the northern Plains. The climate of the western part of the state is much milder than that of any other section of the continent in the same latitude.

"Precipitation is heaviest near the ocean and on the windward, or southwesterly, slopes of the mountains, and lightest on the leeward slopes. * * * The lowest mean annual temperature for any station is 38° F. at Paradise Inn, elevation 5,500 feet, on the south slope of Mount Rainier, and the highest is 55° at Mottinger, Benton County, on the Columbia River. Along the coast, temperatures are moderate and equable. * * * The average annual precipitation ranges from 6 inches at Hanford, in south-central Washington on the Columbia River, to 146 at Wynoochee Oxbow in the foothills south of the Olympic Mountains. Thus Washington has by far a greater range in precipitation than is found in any other state. The average annual snowfall ranges from 5 inches on the ocean coast to 600 at Paradise Inn, where the maximum depth on the ground has exceeded 27 feet."

Tipulidae have been collected in virtually all sections of the state but certain of the seven physiographic regions into which Washington is commonly divided are much more productive of these flies than are others. These more important regions may be discussed briefly.

The Pacific Coastal Plain.—This includes the narrow strip of land immediately adjoining the Pacific and the Juan de Fuca Strait. Many of the streams flowing from the Olympic Mountains and also streams from the Coast Range in Chehalis and Pacific counties cross the plain. Precipitation is unusually heavy, ranging from about 80 to 120 inches per year. Records from Harbor and Pacific counties pertain to this region. Particular attention is called to Ilwaco, in the extreme southwestern corner of the state, where Melander secured several Tipulidae of unusual interest.

The Olympic Mountains.—An almost circular group of mountains occupying much of the Olympic Peninsula, chiefly in Clallam, Jefferson, Mason, and Chehalis counties. These isolated mountains of the Coast Range are separated from the Cascades to the east by the Puget Sound Basin. Because of their special interest, stations in the Olympic National Park will be discussed in more detail later (under "Collecting Stations").

The Puget Sound Basin.—The broad depression lying between the Coast and Cascade Ranges, averaging about 50 miles in width, dissected for more than one-half its extent by the many branching arms of Puget Sound. Much of the land around the Sound is low, scarcely attaining 100 feet. Piper (1906) delimits the basin by the 2,300 foot contour line on the surrounding mountains. Most of the streams that cross the Basin rise in the Cascades where they commonly originate in glaciers high on the various major peaks and flow into Puget Sound. The Cowlitz River, originating on Rainier, to-

gether with a few smaller streams in the southern part of the state flow into the Columbia River. Many Tipulidae have been taken at localities in the Basin, particularly in the vicinity of major cities such as Seattle, Tacoma and Olympia.

The Cascade Mountains.—The magnificent range of mid-Tertiary mountains, studded with younger near-recent volcanic peaks of imposing appearance, has long held a peculiar attraction to the botanist and zoologist. Within the state of Washington the mountains completely traverse it in a course that is slightly easterly of true north. The main uplift has altitudes ranging from about 6,000 to 7,000 feet. The peaks where collections of Tipulidae have been made, from north to south, include Mount Baker (10,750 feet), close to the Canadian border; Mount Rainier (14,408 feet), giant of the Cascade system and fourth highest mountain in the United States; and Mount St. Helens (9,671 feet), in the southwestern part of the state. No collections of Tipulidae from Mount Adams (12,307 feet) some 35 miles due east of St. Helens, are available to me at this time. The Cascades form the most important single topographic feature of the state and because of their height and the direction of the prevailing winds from off the Pacific, have a profound effect on the distribution of plant and animal life. These mountains function as a barrier between the west and east not so much from their altitude but primarily because of the difference in humidity on the two sides of the range. The low passes of the Cascades would permit a ready transfer of many species of plants and animals, including Tipulidae. Because of their great interest and importance, particular attention has been devoted to Mounts Baker, Rainier and St. Helens, and these are discussed more in detail later in this introductory account (under "Collecting Stations").

The Columbia Plains.—The great basaltic plains that cover much of eastern Washington, as well as adjoining states, include numerous stations where collections of Tipulidae have been made by Melander and others. The plains are traversed by the Snake and Yakima Rivers, tributaries of the Columbia. Stations where relatively numerous Tipulidae have been taken include the Yakima Valley (Brookman), Pullman, Spokane, Walla Walla, Wawawai, and other localities discussed throughout the report (Doane, Melander and others).

From the Okanogan Highlands, chiefly in Ferry and Stevens counties, and the Blue Mountains, in Columbia county, relatively few records of Tipulidae are now available and a fuller knowledge of these evidently interesting regions must depend on future collecting.

Biotic and Physical Provinces.—Van Dyke (1919, 1926, 1929, 1939) proposed the term "Vancouveran" for a faunal area that includes the northwestern coastal belt of North America, extending from southeastern Alaska southward through British Columbia and its coastal islands, the Puget Sound Basin of Washington, the Willamette Valley of Oregon, into coastal California, on the mountain slopes extending fully to the 5,000 foot level. Van Dyke describes this area as including one of the most peculiar of all northern

faunas and indicates that its closest relationships are with the Alleghenian in eastern North America and the Japano-Manchurian fauna in eastern Asia. The very wet region lying to the west of the Olympic and Coast Ranges is called by Van Dyke the Pacific Maritime subfauna. On the higher Cascades the life zones of the Boreal Region, the Arctic-Alpine, Hudsonian and Canadian, are found, as discussed later. Washington east of the Cascades is occupied chiefly by the semiarid Great Basin section of the Sonoran zone, with a fauna that Van Dyke considers to be a direct northward extension of the Neotropical.

Dice (1943) recognizes three of his biotic provinces within the state. He replaces the term "Vancouveran" by the earlier name Oregonian and indicates that it includes the coast ranges of the state, being delimited on the east by a line lying just beyond the crests of the Cascades. Dice arbitrarily places the alpine and subalpine zones of the latter in the Oregonian province while referring the still lower montane belt on the eastern slopes of the Cascades to his Palusian province which further embraces much of eastern Washington. The northeastern part of the state includes a part of the Montanian province which elsewhere covers much of northern Idaho, western Montana and thence extends northward into Alberta and British Columbia. The occurrence of various species of plants and animals characteristic of the Vancouveran biotic province far to the east, in cases reaching the continental divide in western Montana, has been noted by various students.

Fenneman (1931) classifies the state into its physical divisions, these agreeing closely with the other distributions above described. The Olympic Peninsula and Pacific Coastal Plain fall in his Pacific Border Province of the Pacific Mountain System while the Puget Sound Basin is his Puget Trough section. The Cascade Mountains within the state embrace the Northern Cascades Mountains section only. Southeastern Washington includes the Walla Walla Plateau section of the Columbia Plateaus Province. The Okanogan Highlands, previously mentioned, are a northern extension of the Rocky Mountain System.

In similar manner, Mulford, in Van Dersal (1938) classifies our country on the basis of plant-growth and soil regions and climatic provinces. In Washington, from west to east, his regions are the North Pacific Coast; Willamette Valley-Puget Sound; Cascade-Sierra Nevada; Columbia River Valley; Palouse-Bitterroot Valley, and in the northeast, the Northern Rocky Mountains.

Life Zones.—Several accounts of the life zones of Washington are available. For the entire state, Piper (1906: 33-65, colored map) provides the most complete account. Five zones are recognized in Washington, including those of the Boreal Region (Arctic-Alpine, Hudsonian and Canadian) on the higher mountains as discussed later for the Olympic Mountains and Mount Rainier. Western Washington from sea-level to the beginning of the Canadian zone at about 3,000 feet is Humid Transition. Northeastern Washington is chiefly timbered arid Transition, the southeastern part of the state timberless arid Transition. South-central Washington and the valleys of the Columbia River and its major tributaries are Upper Sonoran (Upper Austral).

Olympic Mountains.—Jones (1947) presents a detailed account of the Merriam life-zone concept, with particular reference to the Olympic Peninsula, basing his zonal limits on the distribution of indicator plants for the various zones. On the Olympic Peninsula he finds the following altitudinal ranges for the various zones.

Arctic-Alpine.....5,000-7,000 feet and over.
Hudsonian.....3,500-5,000 feet (with tongues as low as 2,500).
Canadian.....1,500-3,000 feet.
Transition.....Sealevel-1,500 feet.

Attention is called to the occurrence of Hudsonian elements at such low altitudes, in contrast with these in the Rocky Mountains (as Colorado, where the lower limits are at about 10,000 feet). This is correlated with the numerous low altitude glaciers in the mountains, two of which (Hoh and Jeffries Glaciers) extend down to the 3,400 foot level. I would call attention to the converse of this, that is, the occurrence of Canadian elements at higher altitudes in secluded positions (as at Deer Park, 5,400 feet).

Mount Rainier.—Several accounts of the life zones of the mountain are available (Flett, 1922; Jones, 1938; Taylor and Shaw, 1927). The following altitudinal ranges for the various zones are as given by Jones.

Arctic-Alpine.....6,000-14,408 feet.
Hudsonian.....4,500-6,000 feet.
Canadian.....3,000-4,500 feet
Transition.....2,000-3,000 feet.

Taylor and Shaw (1927) indicate that on the west side of the mountain Transition elements occasionally occur to 3,500 feet or even to 4,000 feet and further extend the altitudinal range of the Canadian zone to 4,500 or even to 5,000 feet (in the White River region northeast of the main summit). The upper limit of the Hudsonian zone is placed at or close to 6,500 feet.

Jones (1938: 9) states that the climax vegetation of the Hudsonian zone on Mount Rainier is the *Abies-Tsuga-Chamaecyparis* complex (Subalpine fir-Mountain hemlock-Alaskan cedar); the Canadian zone *Tsuga-Abies-Pinus* (Western hemlock-Amabilis fir-Western white pine). That of the Humid Transition area of the Transition zone a *Tsuga-Thuja* (Western hemlock-Western red cedar) climax with its *Pseudotsuga* (Douglas fir) subclimax.

General Survey of the Tipuloidean Fauna of Washington

Although much further work remains to be done before our knowledge of the crane-fly fauna of Washington may be considered as being fairly complete, sufficient progress has been made to warrant the preparation of the basic list presented at this time. The early collections made by Doane, Kincaid, Melander and others have been supplemented in recent years by extensive series of these flies taken chiefly by Fender, Townes and the writer, with the able assistance of their wives. The present list includes 254 species, to which numerous additions may be expected. The total for the state can scarcely be fewer than 350 or perhaps 400 species.

To date no species of Tanyderidae has been taken in Washington but the other smaller families commonly placed in the Tipuloidea, the Ptychopteridae and Trichoceridae, are unusually well represented. In the major family Tipulidae the genus *Tipula,* with 62 species, includes one of the most conspicuous elements in the fauna. Particular attention should be called to the abundance of forms in the tribe Pediciini, where no fewer than 32 species are included. This may be compared with the basic list for Utah where 10 species were reported or with the even poorer representation in the Mexican border states, as Arizona with 1 species and New Mexico with 2. The Pediciine crane-flies are essentially northern types and are unusually well represented in the Vancouveran region. The Hexatomini include relatively few forms (37) when compared with the greatly developed tribe Eriopterini, with 73 species.

The pioneer worker on the Tipulidae of western North America was Professor Rennie Wilbur Doane (1871-1942) who published a total of 50 entomological papers, of which 12 related to the Tipulidae. In these Doane described approximately 150 new species of which more than 90 fall in the great genus *Tipula.* Virtually all of the Doane species are from the West and a considerable number from the state of Washington. The most important of the Doane papers have been cited in the list of References (Doane, 1900, 1901, 1912). It may be indicated that the types of the species described in the 1900 paper, stated therein to be in the collection of the Washington State College, Pullman, are actually in the United States National Museum. I have examined these at various times since 1912, thanks to the early interest of the late Frederick Knab and John Merton Aldrich. I am further greatly indebted to Dr. Alan Stone and Dr. Henry K. Townes for making genitalic mounts and subsequent figures and comparisons of several of the more obscure and doubtful forms. The types of the species described in the 1901 paper, all belonging to the genus *Tipula* (with the exception of *Tipula rostellata* Doane which is a *Prionocera*) are preserved chiefly in the collection of the Washington State College, Pullman. The types of certain of the doubtful species in this series have been loaned to me for study in past years through the appreciated kindness of Professors Robert L. Webster and Maurice T. James. The remaining Doane types, including the further extensive series of Western *Tipula* described in 1912, remained in the Doane collection and, after his death, were presented to the California Academy of Sciences, San Francisco. In July 1946 I was privileged to study certain of the doubtful species in this series through the kindness of Dr. Edward S. Ross and Professor Edwin C. Van Dyke. As a result of all the above the identity of virtually all of the Doane species now seems settled but during the long period (1912-1946) between the first and last examinations of these types, a certain number of synonyms of his species have been created. It may be noted that Doane, himself, particularly in 1908, created synonyms of some of the species that he had described in 1900, also chiefly because the latter types were at that time unavailable for comparison.

Following his graduation from Stanford University in 1896, Doane went to the Washington State College, Pullman, where he taught Entomology and

Zoology from 1896 to 1901. He then became superintendent of the Fisheries Experiment Station, at Keyport, Washington, where he remained until 1905, when he returned to Stanford. The ten years spent in Washington enabled Doane to collect not only in the eastern part, including Pullman and Wawawai, but later in the quite different western section at and near Keyport. Fully as important as his own collections were the rich materials submitted to him for study by Professors C. V. Piper, Trevor Kincaid, and others (Doane, 1900, 1901).

As indicated elsewhere, undoubtedly the most distinguished Dipterologist to have lived in Washington was Dr. Axel Leonard Melander, who was on the staff of the Washington State College from 1904 to 1926. Dr. Melander took full advantage of his opportunity to collect in a region that at that time and as regards the Diptera was virtually unworked and unknown. Dr. John Merton Aldrich had an almost equally long period at the nearby University of Idaho, Moscow, (1893-1913) and undoubtedly collected in various places in Washington but very few of his records of Tipulidae are available to us.

Collecting Stations.—As has been done in the earlier parts under this general title, certain of the localities of particular interest where Mrs. Alexander and the writer have been able to collect in person are described below in some detail. Such collecting in Washington was done in 1946 and 1947, particularly the latter, when we were in the state between July 19th and August 15th, as discussed below.

1. Mount Rainier National Park. The magnificent Cascade peak, Rainier, located just to the west of the crest line reaches a height of 14,408 feet, being the highest peak in the entire northwestern United States. The Mount Rainier National Park includes 241,220 acres, of which approximately one-quarter is occupied by the mountain itself. At present there are 26 active glaciers on the mountain, covering a total of about 40 square miles.

The lowest altitude within the park proper is near the Ohanapecosh Hot Springs, in the southeastern corner, where it is about 1,600 feet. The lowland forests follow up the rivers to an altitude of approximately 3,500 feet. These dense stands of gigantic trees are comprised chiefly of Western hemlock, *Tsuga heterophylla* (Raf.) Sargent; Douglas fir, *Pseudotsuga taxifolia* (Poir.) Britt., and Western red cedar, *Thuja plicata* Lamb., with fewer individuals of white or grand fir, *Abies grandis* Lindl. At about 2,500 feet, the Amabilis or silver fir, *Abies amabilis* (Loud) Forbes; Noble fir, *Abies nobilis* Lindl., and the Western white pine, *Pinus monticola* Lamb., appear, becoming more characteristic of the intermediate forest zone extending up the mountain slopes to the subalpine meadows. Other conifers in this higher forest zone include the Alaskan cedar, *Chamaecyparis nootkatensis* (Lamb.) Spach., and the Mountain hemlock, *Tsuga Mertensiana* (Bong.) Carr.

In the open parklands of the subalpine country are found a great variety of dwarf shrubs and perennial herbs that have been discussed in detail by Jones (1938) and others. Many of the Hudsonian zone Tipulidae were

taken by sweeping this subalpine vegetation. The following plants are particularly characteristic of this zone. Avalanch lily, *Erythronium montanum* Wats.; Bistort, *Polygonium bistortoides* Pursh; Western pasque flower, *Anemone occidentalis* Wats.; Marsh marigold, *Caltha leptosepala* DC; Alaskan spirea, *Lutkea pectinata* (Pursh) Kuntze; Mountain cinquefoil, *Potentilla flabellifolia* Hook.; Pink heather, *Phyllodoce empetriformis* (Smith) D. Don.; White heather, *Cassiope Mertensiana* (Bong.) G. Don.; louseworts, *Pedicularis,* of several species; monkey-flowers, *Mimulus,* various species, but especially *M. Lewisii* Pursh; Sitka valerian, *Valeriana sitchensis* Bong.; together with various others, including *Claytonia* spp.; *Saxifraga* spp.; *Lupinus* spp.; shooting star, *Dodecatheon viviparum* Greene; Cusick's speedwell, *Veronica Cusickii* Gray, and various Compositae.

Crane-fly collecting on Rainier.—For more than half a century the mountain has attracted entomologists and insect collectors, some of whom have brought back specimens of the Tipulidae. Apparently the earliest of these was the distinguished botanist, Charles Vancouver Piper, who was on the mountain in August 1895 (Piper, 1906: 20) and there secured three noteworthy species of the genus *Tipula* that were later described by Doane (1901) as *Tipula calcarata, T. cervicula* and *T. helvocincta,* all being well-known and characteristic inhabitants of the Hudsonian zone. Dr. J. Chester Bradley was on Rainier in 1915 and thereafter. Dr. Harrison G. Dyar collected at Longmire Springs in June 1917.

The most distinguished Dipterologist to visit Rainier was Axel Leonard Melander, who, with Mrs. Melander, camped and tramped on virtually every accessible part of the great mountain over a period of many years (Melander, 1923). To Melander more than to any other person we owe our present satisfactory knowledge of the Diptera of Mount Rainier and, indeed, the state of Washington. Dr. C. L. Fox visited the mountain in 1919. Beginning in the 1940's there was a resumption of crane-fly collecting, begun by Dr. and Mrs. Henry K. Townes in 1940 and ending with the recent visit by Dr. and Mrs. Charles L. Remington, in late August 1947.

Mrs. Alexander and I have collected on Rainier in 1946 and 1947. The chief places investigated include Elbe, Longmire Springs, Paradise Valley, Ohanapecosh Hot Springs, Chinook Pass and Tipsoo Lake, Cayuse Pass, Yakima Park, and along the Wonderland Trail, starting at White River and following the trail to Yakima Park, a beautiful mountain walk that provided unusually rich crane-fly collecting. No collecting by the writer has been done at the other park campgrounds in the southwest and northwest sections of the Park. Since the park boundaries, as now constituted, are artificial and by no means delimit the actual mountain, a few stations in the orbit of Rainier but outside the park limits have been included as being from Rainier. These include Ashford and Elbe, along the Nisqually River to the southwest, as low as 1,200 feet; La Wis Wis, in the Columbia National Forest, due south of Ohanapecosh, altitude 1,300 feet; and the Naches River, on the Yakima road, due east of the park, at an altitude of 1,900 feet.

More specific data on the more important stations are given.

Elbe; Dutch's Creek and vicinity, on either side of the lower Nisqually River, altitude 1,200 feet; July 1947, August 1946. The station is Humid Transition and produced several interesting Tipulidae typical of this zone, including *Ptychoptera sculleni,* P. townesi,* Bittacomorphella fenderiana, Bittacomorpha occidentalis, Tipula (Trichotipula) repulsa, Dicranota (Dicranota) argentea, Gonomyia (Gonomyia) aciculifera, Erioptera (Psiloconopa) carbonipes, E. (P.) irata,* E. (P.) megarhabda, E. (P.) polycantha, E. (P.) recurva,* Ormosia (Ormosia) subcornuta,* and others. The species marked with an asterisk * were new to science when first discovered at this station. Labelled "Elbe."

Longmire Springs, southwestern section of park; altitude 2,800 feet; July 22-24, 1947, August 10-12, 1946; station highest Humid Transition or low Canadian. Particular attention should be called to the small stream flowing between the road into the campground and the Nisqually River. This brook rises on the hilly slopes across the road, crosses the latter through a culvert, and then flows parallel to the main stream for the hundred yards or so remaining. It is along this latter stretch that unusually fine crane-fly collecting was found, particularly in August 1946. Most of the Pediciine species recorded below were taken here. In July 1947 we again collected along this stream and were surprised at the great difference in the composition of the crane-fly fauna in exactly the same habitat. Virtually all of the Pediciini so common and conspicuous the preceding year were quite lacking and by far the commonest were two species of *Limonia, bistigma* and *sciophila,* particularly the former. Tipulidae from Longmire include *Tipula (Schummelia) subtenuicornis, T. (Vestiplex) tacomicola,* T. (Oreomyza) shoshone, Elliptera astigmatica, Pedicia (Pedicia) parvicellula, P. (Tricyphona) townesiana, Dicranota (Rhaphidolabis) stigma,* D. (R.) xanthosoma, D. (Plectromyia) cascadica,* D. (P.) reducta, Paradelphomyia (Oxyrhiza) pacifica, Dactylolabis nitidithorax, Limnophila (Prionolabis) paramunda,* L. indistincta, Rhabdomastix (Sacandaga) subfasciger, R. (S.) trichophora, Erioptera (Gonomyodes) tacoma,* E. (Psiloconopa) irata,* Ormosia (Rhypholophus) fumata, O. (O.) decussata, Molophilus (Molophilus) distilobatus,* and others. Labelled "Longmire."

Paradise Valley (Paradise Park), southwestern section of park, above Longmire; altitude 5,500-5,600 feet; July 23, 1947, August 11, 1946. The subalpine meadows where many Hudsonian zone Tipulidae were taken here and under comparable conditions elsewhere on the mountain (as at Tipsoo Lake and Yakima Park, discussed later) have been described earlier. Conditions definitely Hudsonian or, in secluded places, highest Canadian. The Tipulidae include *Tipula (Yamatotipula) cervicula,* T. (Y.) spernax lanei, T (Arctotipula) plutonis absaroka, T. (Oreomyza) helvocincta,* T. (O.) pseudotruncorum,* T. (Lunatipula) calcarata,* Limonia (Dicranomyia) acerba,* Elliptera astigmatica, Pedicia (Tricyphona) smithae,* P. (T.) tacoma,* Limnophila (Phylidorea) bigladia, L. (P.) claggi, Gonomyia (Gono-*

myia) *bihamata, E.* (*Mesocyphona*) *melanderiana,* E.* (*Psiloconopa*) *rainieria,* Ormosia* (*Rhypholophus*) *bifidaria, O.* (*R.*) *paradisea,* O.* (*O.*) *absaroka, O.* (*O.*) *onerosa, Molophilus* (*Molophilus*) *kulshanicus,* M.* (*M.*) *spiculatus, M.* (*M.*) *rainierensis,** and others. Labelled "Paradise Valley."

Chinook Pass and Tipsoo Lake, 5,350-5,450 feet, and Yakima Park, 6,400 feet, on east side of park; July 28-August 3, 1947; conditions Hudsonian; Tipulidae much as listed under Paradise Valley.

White River Camp, on the White River, about one mile below the snout of Emmons' Glacier; east side of park, altitude 4,400 feet; July 29, 1947; conditions Canadian. Collections made by sweeping beds and scattered clumps of mountain alder (*Alnus sinuata* Regel) on the river bars, these clumps interspersed with scattered willow, pearly everlasting, *Anaphalis margaritacea* (L.) Benth. & Hook., *Mimulus Lewisii,* and stunted *Lutkea pectinata.* Some of the more interesting Tipulidae taken here included *Rhabdomastix* (*Sacandaga*) *trichophora, Gonomyia* (*Gonomyia*) *aciculifera, G.* (*G.*) *percomplexa, Erioptera* (*Hesperoconopa*) *dolichophallus, E.* (*Gonomyodes*) *tacoma,* E.* (*Psiloconopa*) *margarita,* and others. Labelled "White River."

Naches River, outside the Park limits, to the east; altitude 1,900 feet, July 28 and 31, 1947; station arid Transition. Tipulidae, all swept from low vegetion along the river bank, included *Nephrotoma occipitalis, Tipula* (*Yamatotipula*) *nuntia, T.* (*Oreomyza*) *yellowstonensis, Limonia* (*Dicranomyia*) *brevivena, Rhabdomastix* (*Sacandaga*) *leonardi, Cryptolabis* (*Cryptolabis*) *bisinuata, Erioptera* (*Psiloconopa*) *shoshone, Molophilus* (*Molophilus*) *harrisoni,* and others. A distinctive Rocky Mountain element present. Labelled "Naches River."

2. Mount Baker. This peak, most northerly of the Cascades, was visited in 1947. We collected at Galena Camp, in Heather Meadows, between August 8th and 15th. Due to very rainy weather no adequate collections could be secured and the record provided at this time must be considered as being partial only. Conditions at the camp, located on Galena Creek, altitude 4,000 feet, were definitely Hudsonian, most of the plants being of the same species as those recorded earlier under comparable conditions on Mount Rainier (Muenscher, 1938; St. John & Hardin, 1929). Tipulidae secured at or near the camp include *Tipula* (*Yamatotipula*) *cervicula, T.* (*Y.*) *continentalis, T.* (*Oreomyza*) *helvocincta, Limonia* (*Limonia*) *sciophila, L.* (*Dicranomyia*) *halterata, Elliptera astigmatica, Pedicia* (*Pedicia*) *parvicellula, P.* (*Tricyphona*) *aperta, P.* (*T.*) *degenerata, P.* (*T.*) *diaphana, P.* (*T.*) *protea, Dicranota* (*Rhaphidolabis*) *cayuga, D.* (*R.*) *subsessilis, D.* (*Plectromyia*) *kulshanensis,* D.* (*P.*) *reducta, Phyllolabis fenderiana,* P. lagganensis, Limnophila* (*Elaeophila*) *aldrichi, L.* (*Phylidorea*) *claggi, L.* (*P.*) *aequiatra,* Neolimnophila ultima, Rhabdomastix* (*Sacandaga*) *subcaudata, E.* (*Mesocyphona*) *melanderiana, E.* (*Psiloconopa*) *rainieria, Ormosia* (*Rhypholophus*) *bifidaria, O.* (*R.*) *suffumata, O.* (*O.*) *onerosa, Molophilus* (*Molophilus*) *kulshanicus,* and others. Labelled "Galena Camp."

Further collections were made nearer the foot of the mountain at Silver Fir Camp, altitude 1,990 feet, August 13 and 15, 1947. This camp is on the North Fork of the Nooksack River, a fiercely flowing mountain torrent that rises from a glacier high up on the eastern slopes of Mount Shuksan, the gigantic mate peak of Mount Baker. Several species of Tipulidae not found elsewhere in the state were taken here, including *Diazosma subsinuata, Tipula (Oreomyza) fallax, T. (Lunatipula) unicincta, Limonia infuscata, Dicranota (Rhaphidolabis) nooksackensis,* D. (Plectromyia) nooksackiae,* Crypteria americana, Rhabdomastix (Sacandaga) trichophora, Erioptera (Empeda) alicia, E. (Psiloconopa) carbonipes, E. (P.) crassivena,* E. (P.) irata,* E. (P.) megarhabda, E. (Hesperoconopa) dolichophallus, Molophilus (Molophilus) perflaveolus,* and others. Conditions here are Humid Transition. Labelled "Silver Fir Camp."

3. Olympic National Park. The great primitive area on the Olympic Peninsula embraces 835,411 acres. We camped at the Olympic Hot Springs, altitude 2,200 feet, August 4th to 8th, 1947. Due to almost constant rain only a preliminary survey of the Tipulidae of this evidently rich area could be made. Two stations deserve special consideration.

Trail from Olympic Hot Springs to Boulder Lake. We collected along this attractive mountain trail on August 5th. Near the start, immediately above the camp, altitude 2,200 feet, is an extensive swampy area shaded with Western Hemlock and Western Red Cedar, with abundant skunk cabbage, *Lysichitum americanum* Hulten & St. John. Associated plants include the deer fern, abundant giant horsetail, *Equisetum Telmateia* Ehrh., a species of *Veratrum,* and others. Around the swamp margin grow sparse alder and devils club. Tipuloidea were numerous in and about this area but owing to the heavy rains, probably only a fraction of the species actually occurring were secured. These included *Ptychoptera lenis, P. sculleni, Diazosma subsinuata, Tipula (Bellardina) aspersa, Limonia (Limonia) bistigma, L. infuscata, L. (Dicranomyia) gracilis, L. (D.) halterata, L. (Discobola) elegans, Ula (Ula) paupera, Pedicia (Tricyphona) constans, Dicranota (Rhaphidolabis) xanthosoma, Paradelphomyia (Oxyrhiza) pacifica, Limnophila indistincta, Ulomorpha nigrodorsalis,* U. sierricola,* and others. Conditions here are Humid Transition. Higher up the trail at about 3,500 feet, a small mountain stream crosses the path. Some further interesting Tipulidae were taken here, including *Pedicia (Tricyphona) protea, P. (T.) unigera,* Dicranota (Plectromyia) kulshanensis,*Dactylolabis nitidithorax,* and others. Conditions here are definitely Canadian. Despite the low altitude of Boulder Lake, 4,000 feet, conditions are definitely Hudsonian, as shown by the presence of numerous indicator plant species and certain Tipulidae, as *Pedicia (Tricyphona) smithae.*

Deer Park; altitude 5,400 feet; August 6, 1947. Despite the higher altitude, conditions here were Canadian and definitely less boreal than at Boulder Lake. Several interesting crane-flies were secured, including *Diazosma subsinuata, Limonia (Limonia) sciophila, L. (Dicranomyia) athabascae, L. (D.)*

vulgata, Pedicia (*Tricyphona*) *degenerata, Dicranota* (*Rhaphidolabis*) *cayuga, D.* (*R.*) *neomexicana,* D.* (*Plectromyia*) *reducta, Dactylolabis sparsimacula, Limnophila* (*Phylidorea*) *olympica,* Gonomyia* (*Gonomyia*) *bihamata, G.* (*G.*) *isolata,* Ormosia* (*Ormosia*) *albertensis, O.* (*O.*) *pugetensis, Molophilus* (*Molophilus*) *distilobatus, M.* (*M.*) *rainierensis,* and others. Labelled "Deer Park."

4. Mount Saint Helens. This peak is reached from Spirit Lake, western entrance to the Columbia National Forest. We camped at the latter between July 19th and 22nd, 1947. Besides collecting at Spirit Lake, altitude 3,200 feet, further materials were taken at various places along the Toutle River, outlet of the lake, to as low as 2,000 feet near Elk Creek in Cowlitz county. Conditions ranged from lowest Canadian at the lake down into Humid Transition. Special attention was devoted to timberline, altitude 4,300 feet, on Saint Helens, July 21, 1947, where conditions are Hudsonian, passing above into Arctic-Alpine. The Tipulidae at timberline included *Tipula* (*Oreomyza*) *pseudotruncorum, Pedicia* (*Tricyphona*) *aperta, P.* (*T.*) *smithae, Dicranota* (*Rhaphidolabis*) *integriloba, Rhabdomastix* (*Sacandaga*) *subfasciger, R.* (*S.*) *trichophora, Ormosia* (*Rhypholophus*) *bifidaria, O.* (*O.*) *onerosa, Molophilus* (*Molophilus*) *perflaveolus,* and others. Labelled "St. Helens, timberline."

It may be noted that in the treatment of species under the "Systematic Account," records for Mount Baker, Olympic National Park, Mount Rainier and Mount Saint Helens are arranged in that order under the individual species and precede any further miscellaneous records for the remainder of the state.

The Walla Walla Problem. Under this caption I wish to discuss a puzzling situation as regards the distribution of Washington Tipulidae. Walla Walla lies in Walla Walla County, in southeastern Washington, just west of the Blue Mountains, at an altitude of between 950 and 1,000 feet. In the later list of species the following records of Tipulidae from Walla Walla will be found.

Tipula (*Trichotipula*) *oropezoides*—August 18, 1923 (*Melander*).
Tipula (*Vestiplex*) *longiventris*—August 18, 1923 (*Melander*).
Pseudolimnophila contempta—May 28, 1938 (*M. C. Lane*).
Gnophomyia tristissima—July 2-6, 1922 (*Melander*).

All four of these flies are characteristic eastern Nearctic species that have never been taken within hundreds of miles of Washington. While the chances for mislabelling of materials might have occurred in a single case, it should be noted that two distinct collectors and three different years are involved in the above records. Somewhat comparable puzzling records of occurrences of other eastern insects in the western states have been recorded in recent years (as the Mecopterous genus *Panorpa* in Utah and Oregon) and it seems apparent that more evidence in the matter should be forthcoming before such records are finally accepted or discarded. The most dubious of the above records are the two species of *Tipula* since not only is the locality in question but the date of occurrence likewise suggests a mistake in labelling.

Collectors and Localities.—A summary of the known collectors of Tipuloidea in Washington is given herewith. Throughout the text, specimens taken by Melander are indicated by the letter "M"; those collected by Mrs. Alexander and the writer by the letter "A." The asterisk indicates the more important collectors.

Aldrich, John M.
*Alexander, Charles P.
*Alexander, Mabel M.
Argo, V.
Arnaud, Paul H.
Bradley, J. Chester
*Brookman, B.
Campbell, M. L.
*Doane, Rennie W.
Dolley, J. S.
*Dyar, Harrison G.
Dybas, Henry
*Fender, Dorothy M.
*Fender, Kenneth M.
Fox, C. L.
Giles, William
Gurney, Ashley B.
James, Maurice T.
*Kincaid, Trevor
Knowlton, George F.
Lane, Merton C.
Macnab, James A.
Mason, J. I.
*Melander, Axel L.
Melander, Ivar
Morrison, Herbert K.
Piper, Charles V.
Remington, Charles L., and J.
Shackleford, Martha W.
Shannon, Raymond C.
Shelford, Victor E.
Smith, E. I.
Smith, Marion E.
*Townes, Henry K., and M.
Van Duzee, Edward P.

In order to avoid constant repetition throughout the text, the various stations where Tipuloidea have been taken, together with their county and approximate altitude, are listed herewith. Most of the altitudes have been taken from the American Guide Series volume on "Washington," cited in the References. For stations where we have collected in person, altitudes have been taken or confirmed by altimeter.

Adams, Mount, Yakima Co.
Adna, Lewis Co.
Alder Lake, Elbe, Lewis Co., 1,200 ft.
Alta Vista, Mt. Rainier
Almota, Whitman Co.
Ararat, Mt., Mt. Rainier, 5,300 ft.
Ashford, Pierce Co., 1,770 ft.
Asotin, Asotin Co., 760 ft.

Bagley Creek Camp, Mt. Baker, 2,500 ft.
Baker, Mount, Whatcom Co.
Barnes State Reservation, Cowlitz Co.
Bellingham, Whatcom Co.
Berkeley Park, Mt. Rainier
Big-4 Mountain, Snohomish Co.
Bird Creek Meadows, Mt. Adams
Blaine, Whatcom Co., 40 ft.
Blewett, Chelan Co., 2,325 ft.
Blyn, Clallam Co., 300 ft.
Boulder Lake Trail, Olympic National Park
Brinnon, Jefferson Co.
Burroughs Mt., Mt. Rainier

Canyon Creek
Carson, Skamania Co., 100 ft.
Cascade Lake, Orcas Island
Castle Rock, Cowlitz Co., 50 ft.
Cayuse Pass, Mt. Rainier, 4,300 ft.
Chelan, Lake, Chelan Co., 1,080 ft.
Chinook Pass, Mt. Rainier, 5,440 ft.
Christine Falls, Mt. Rainier, 3,665 ft.
Clarkston, Asotin Co., 825 ft.
Colville, Lake, Lincoln Co.
Crescent, Lake, Clallam Co., 580 ft.
Cushman, Lake, Mason Co., 735 ft.

Deer Park, Olympic National Park, 5,400 ft.
Diamond Lake, Pend Oreille Co.
Dutch's Creek, near Elbe, Lewis Co., 1,200 ft.

Eagle Peak, Mt. Rainier
East Port Orchard, Kitsap Co.
Elbe, Pierce Co., 1,210 ft.
Ellensburg, Kittitas Co., 1,520 ft.
Entiat, Chelan Co., 690 ft.
Everett, Snohomish Co., 30 ft.

Five-mile Lake
Forks, Clallam Co., 375 ft.
Fort Lewis, Pierce Co.

Galena Camp, Mt. Baker, 4,000 ft.
Glacier, Whatcom Co.
Grand Coulee, Grant Co., 1,585 ft.
Grotto, King Co., 820 ft.

Hansen Camp, Mt. Rainier
Heather Meadows, Mt. Baker (Galena Camp), 4,000 ft.
Holland
Hoodsport, Mason Co., sea-level
Hoquiam, Grays Harbor Co., 300 ft.

Ilwaco, Pacific Co., sea-level
Index, Snohomish Co., 530 ft.
Indian Henry, Mt. Rainier

Kachess Lake, Kittitas Co.
Keechelus Lake, Kittitas Co., 2,475 ft.
Kelso, Cowlitz Co., 22 ft.
Kennewick, Benton Co., 355 ft.
Keyport, Kitsap Co., 25 ft.
Knightmore

La Center, Clark Co., 250 ft.
Lake Union, Seattle, King Co.
Lewis and Clark State Park, Lewis Co.
Lilliwaup, Mason Co., 15 ft.
Lind, Adams Co., 1,365 ft.
Longmire Springs, Mt. Rainier, 2,800 ft.
Longview, Cowlitz Co., 15 ft.
Loon Lake, Stevens Co.
Lowden, Walla Walla Co., 490 ft.
Lucerne, Lake Chelan, Chelan Co.
Lyle Grove, Pullman, 100 ft.

Manchester
Mazama Ridge, Mt. Rainier
McCleary, Grays Harbor Co., 285 ft.
Merritt, Chelan Co., 2,185 ft.
Mica, Spokane Co.
Mill Creek, Walla Walla Co., 955 ft.
Montesano, Grays Harbor, 65 ft.
Moxee, Yakima Co., 1,000 ft.
Mt. Vernon, Skagit Co., 25 ft.

Naches, Yakima Co., 1,815 ft.
Narada Falls, Mt. Rainier
Nasel River
Nooksack River, Mt. Baker, Whatcom Co.
North Bend, King Co., 455 ft.

Ohanapecosh Hot Springs, Mt. Rai 1,900 ft.
Olympia, Thurston Co., 70 ft.
Olympic Hot Springs, Olympic National Park, 2,200 ft.

Paradise Park (Valley), Mt. Rainier,
Pluvius, Lewis Co., 745 ft.
Pine Canyon, Douglas Co., 2,800 ft.
Port Angeles, Clallam Co., 50 ft.
Potlatch, Hood Canal, Mason Co., sea-level
Puget, Thurston Co.
Pullman, Whitman Co., 2,345 ft.

Quilcene, Jefferson Co., 30 ft.
Quinault, Lake, Grays Harbor, 200 ft.

Rainier, Mount, Pierce-Lewis Cos.
Ramparts, Mt. Rainier
Rose Springs, Blue Mts.

Saint Helens, Mt., Skamania Co.
Saints Rest, Pullman, Whitman Co., 2,345 ft.
Seattle, King Co., 12-515 ft.
Selah, Yakima Co., 1,110 ft.
Shelton, Mason Co., 20 ft.
Shine, Jefferson Co., sea-level
Silver Fir Camp, Mt. Baker, 1,990 ft.
Sluiskin, Mt. Rainier
Snoqualmie Pass, King Co., 3,000 ft.
Spirit Lake, Mt. St. Helens, Skamania Co., 3,200 ft.
Sprague, Lincoln Co., 1,890 ft.
Squaw Lake, Mt. Rainier, 5,000 ft.
Stanwood, Snohomish Co., 5 ft.
Stehekin, Lake Chelan, Chelan Co., 1,080 ft.
Stillaguamish River, Snohomish Co.
Sultan, Snohomish Co., 115 ft.
Summerland, Mt. Rainier, 5,900 ft.
Swauk Creek, Chelan Co.
Tacoma, Pierce Co., 20 ft.
Texaco Pond, Mt. Rainier, east, 2,000 ft.
Tipsoo Lake, Mt. Rainier, 5,350 ft.
Tokeland, Pacific Co., sea-level
Toledo, Lewis Co., 140 ft.
Toutle River, Spirit Lake, Skamania-Cowlitz Cos.
Tulalip, Snohomish Co., 20 ft.
Twanoh State Park, Hood Canal, Mason Co.

Union Flat, Kitsap Co., 10 ft.
Union Gap, Yakima Co., 930 ft.
Valleyford, Spokane Co.
Vancouver, Clark Co., 115 ft.
Van Trump, Mt. Rai ier

Walker's Park, Shelton, Mason Co., 20 ft.
Walla Walla, Walla Walla Co., 955 ft.
Wawawai, Whitman Co., 2,400 ft.
Wenatchee, Chelan Co., 640 ft.
White River Camp, Mt. Rai 4,400 ft.

Wind River Experimental Forest, Skamania, 100 ft.
Wis Wis, La, Columbia National Forest, 1,300 ft.
Yakima, Yakima Co., 1,075 ft.
Yakima Park, Mt. Rainier, 6,400 ft.
Yukon Camp, Grotto, King Co., 820 ft.
Zillah, Yakima Co., 820 ft.

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Besides the thousands of specimens of Tipulidae taken by the writer and Mrs. Alexander, the chief source of records for the state results from the study of the very extensive Melander collections. I am most grateful to Dr. Melander for the privilege of examining this outstanding series and particularly for his generosity in permitting me to retain in my collection the types of certain species described from unique specimens. Further acknowledgements are made to Messrs. Paul H. Arnaud, B. Brookman, Kenneth M. Fender, Merton C. Lane, the late Raymond C. Shannon, and Henry K. Townes, and to Mrs. Dorothy M. Fender and Dr. Marion E. Smith, for their generous permission to retain materials collected in the state. Acknowledgements of cooperation in the study of the Doane types have been made earlier in this report. Very appreciated help was given by Professor Trevor Kincaid, of the University of Washington, Dean of all collectors of these flies within the state, and to Professors Maurice T. James and Robert L. Webster, of the Washington State College. And as before and always, very special thanks are extended to Mrs. Alexander, loyal helpmate and co-worker on the crane-flies.

REFERENCES

ANON. No date—Alpine flora and life zones of Washington. The Mountaineers Climbers Notebook (The Mountaineers, Inc., Seattle).

———1935—Mount Rainier National Park, Washington. National Park Service, pp. 1-41, maps; trails and mileages.

———1941—A bibliography of National Parks and Monuments west of the Mississippi River, 2: Mount Rainier National Park, pp. 1-42; Olympic National Park, pp. 1-9.

———1941—Washington, a guide to the evergreen state. Amer. Guide Series, pp. 687, ills., maps.

———1941—Trail guide to Mount Rainier National Park, Washington, pp. 1-16, maps.

———1942—Olympic National Park, Washington. National Park Service, pp. 1-16, map.

(VARIOUS AUTHORS) 1941—Climate and Man. 1941 Yearbook of Agriculture. U.S.-D.A., pp. 1-1248; Washington, pp. 1170-1181, 7 maps, by Lawrence C. Fisher.

ALLEN, G. F. 1922—The forests of Mount Rainier National Park, U.S.D.I., pp. 1-33, 25 figs.

ATWOOD, WALLACE W. 1940—The physiographic provinces of North America, pp. 536, 5 col. maps, 1 insert map, 281 figs.

BROCKMAN, C. FRANK 1940 (revised 1946)—The story of Mount Rainier National Park. Mount Rainier National Park Natural History Association Publ., 64 pp., pls., map.

DAUBENMIRE, REXFORD F. 1938—Merriam's life zones of North America. Quart. Rev. Biology, 13: 327-332.

———1942—An ecological study of the vegetation of southeastern Washington and adjacent Idaho. Ecol. Mon., 12: 53-79.

———1946—The life zone problem in the northern intermountain region. Northwest Science, 20: 28-38, 1 fig. (table comparing the various classifications of life zones of eight different workers).

———1947—Plants and environment: a textbook of plant autoecology, 424 pp., ill.

DICE, LEE R. 1943—The biotic provinces of North America, pp. 78, map.

DOANE, R. W. 1900—New North American Tipulidae. Journ. N. Y. Ent. Soc., 8: 182-198, 2 pls.

———1901—Descriptions of new Tipulidae. Ibid., 9: 97-127.

———1912—New Western Tipula. Ann. Ent. Soc. America, 5: 41-61.

FENNEMAN, NEVIN M. 1931—Physiography of western United States, pp. 1-534, 173 figs., 1 pocket map.

FLETT, J. B. 1922—Features of the flora of Mount Rainier National Park, U.S.D.I., pp. 1-50, 39 figs. (discussion of the five life zones).

HANSEN, H. P. 1941—Palaeoecology of a bog in the spruce-hemlock climax of the Olympic Peninsula. Amer. Midl. Nat., 25: 290-297, 1 fig.

JONES, GEORGE NEVILLE 1938—The flowering plants and ferns of Mount Rainier, pp. 1-192, 9 pls. (discussion of life zones, with table; recognizes 729 species); University of Washington.

———1947—A botanical survey of the Olympic Peninsula, Washington, pp. 1-286, 9 pls., map showing life zones (discussion of life zones, pp. 15-45; recognizes 1,015 species and varieties); Ibid., 1st edition, June, 1936.

MATTHES, FRANCOIS E. 1922—Mount Rainier and its glaciers, U.S.D.I., pp. 1-48, 26 figs.

———1943—The Mount Rainier National Park (on reverse of topographic map of park).

MEANY, EDMOND S. 1916—Mount Rainier, a record of exploration, 325 pp. (Macmillan).

MELANDER, A. L. 1923—Collecting insects on Mount Rainier. Smithsonian Rept. for 1921: 415-422, 9 pls.

MUENSCHER, W. C. 1938—Additions to our knowledge of the flora of Mount Baker. Madroño, 4: 263-270 (adds 228 species to the basic St. John and Hardin list; total 562 species).

PIPER, CHARLES V. 1906—Flora of the State of Washington. Contr. U. S. Nat. Herb., 11: 1-637, 22 pls., col. map showing floral areas (detailed consideration of life zones, pp. 33-65).

RIGG, GEORGE B., AND CARL T. RICHARDSON 1938—Profiles of some sphagnum bogs of the Pacific coast of North America. Ecology, 19: 408-434, 20 figs.

ST. JOHN, HAROLD 1937—Flora of southeastern Washington and of adjacent Idaho, pp. 531, 11 figs., map; discussion of life zones (Students Book Corp., Pullman).

———, AND EDITH HARDIN 1929—Flora of Mt. Baker. Mazama, 11: 52-102, 6 pls., 3 figs. (brief account of life zones; recognize 334 species and varieties).

———, AND FRED A. WARREN 1937—The plants of Mount Rai ier National Park, Washington. Amer. Midl. Nat., 18: 952-985 (695 species).

———1938—The same: Additions to the flora of Mt. Rainier National Park, Washington. Ibid., 20: 243-244.

SCHMOE, FLOYD W. 1925—Our greatest mountain, 366 pp., ill., map (Mount Rainier).

SHELFORD, VICTOR E., AND COLLABORATORS 1926—Naturalist's Guide to the Americas, 1-761, 16 figs. (maps). Washington by George B. Rigg and collaborators, pp. 168-180.

STAGNER, HOWARD R. 1947—Behind the scenery of Mount Rainier National Park. Mount Rainier National Park Natural History Association Publ., 64 pp., pls.

SUKSDORF, W. N., AND THOMAS HOWELL 1896—The flora of Mount Adams. Mazama, 1: 68-97 (480 species).

TAYLOR, WALTER P. 1922—A distributional and ecological study of Mount Rai Washington. Ecology, 3: 214-236, 4 figs.

———, AND WILLIAM T. SHAW 1927—Mammals and birds of Mount Rainier National Park, U.S.D.I., pp. 1-249, 109 figs.; pocket map in color showing life zones (discussion of life zones and habitats, pp. 8-25).

VAN DERSAL, WILLIAM R. 1938—Native woody plants of the United States, their erosion-control and wildlife values. U.S.D.A. Misc. Publ. 303: 1-362, 44 pls., 2 pocket maps.

VAN DYKE, EDWIN C. 1919—The distribution of insects in western North America. Ann. Ent. Soc. America 12: 1-12, map (naming of the Vancouveran faunal region).
———1926—Certain peculiarities of the Coleopterous fauna of the Pacific Northwest. Ibid., 19: 1-12.
———1929—The influence which geographical distribution has had in the production of the insect fauna of North America. Fourth Internat. Cong. Ent. 2: 555-566.
———1939—The origin and distribution of the Coleopterous insect fauna of North America. Sixth Pacific Science Congress, Proc. 4: 255-268, map (map shows the faunal zones of North America, including the Vancouveran).

Systematic Account

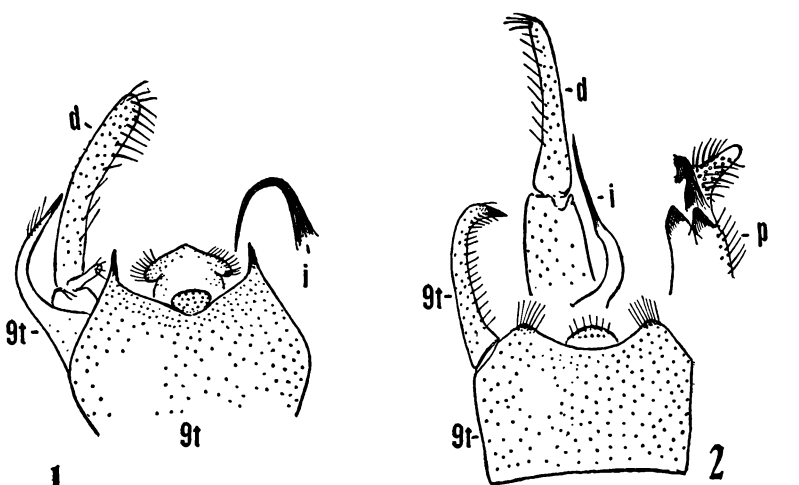
PTYCHOPTERIDAE

Ptychoptera lenis Osten Sacken, 1877.—Olympic National Park: Olympic Hot Springs, 2,200 ft., August 7, 1947 (*A*). Mt. Rainier: Longmire Springs, June 1917 (*Dyar*), July 30, 1922 (*M*). Olympia, July 27, 1924 (*M*); Valleyford, May 17, 1924, June 19, 1919 (*M*).

Ptychoptera sculleni Alexander, 1943.—Olympic National Park: Olympic Hot Springs, 2,200 ft., August 7, 1947 (*A*). Mt. Rainier: Elbe, July 15-18, 1940 (*Townes*); types.

Ptychoptera townesi Alexander, 1943.—Mt. Rainier: Elbe, July 13, 1940 (*Townes*); type. Everett, July 6, 1924 (*M*); Pluvius, July 16, 1922 (*M*); Puget, July 4, 1925 (*M*); Swauk Creek, June 28, 1924 (*M*); Toledo, June 27, 1935 (*M*).

Bittacomorphella fenderiana Alexander, 1947.—Mt. Rainier: Ashford, August 18, 1940 (*Townes*); type material; Dutch's Creek, Elbe, 1,200 ft.,



Figs. 1-2.—1. *Bittacomorphella fenderiana* Alexander, male hypopygium; 2. *Bittacomorphella sackeni* Röder, male hypopygium. (Symbols: *d*, dististyle; *i*, interbase; *p*, phallosome; *t*, tergite).

July 24, 1947 (*A*). Keyport, July 1905 (*Doane*); Lake Union, Seattle, August-September 1894 (*Aldrich*); Lewis & Clark State Park, September 28, 1946 (*Fender*), type material. The male hypopygium is figured (Fig. 1).

Bittacomorphella sackeni (Röder, 1890).—Mt. Rainier: Summerland, July 24, 1924 (*M*); July 21, 1940 (*Townes*). Everett, July 4, 1924 (*M*); Lewis & Clark State Park, September 28, 1946 (*Fender*). The male hypopygium (Fig. 2) is illustrated.

Bittacomorpha occidentalis Aldrich, 1895.—Mt. Rainier; July 8, 1940 (*Townes*); below Paradise Valley, 4,000 ft., August 11, 1946, common in a bog of *Pedicularis surrecta* Bentham (*A*); Dutch's Creek, Elbe, 1,200 ft., July 24, 1947 (*A*); Ashford, August 18, 1940 (*Townes*). Seattle (*Kincaid*).

TRICHOCERIDAE

Diazosma subsinuata (Alexander, 1915).—Washington State (Morrison); in Bigot Collection. Mt. Baker: Silver Fir Camp, August 13, 1947 (*A*). Olympic National Park: Olympic Hot Springs, August 7, 1947 (*A*), Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Longmire Springs, August 24, 1925 (*M*). Lewis & Clark State Park, August 20, 1944 (*Knowlton*).

Paracladura trichoptera (Osten Sacken, 1877).—Barnes State Reservation, September 27, 1946 (*Fender*); East Port Orchard, September 23-26, 1946 (*Fender*); Ilwaco, May 5, 1918 (*M*).

Trichocera colei Alexander, 1919.—Vancouver, December 12,1918 (*William Giles*), reared from turnips.

Trichocera columbiana Alexander, 1927.—Mt. Baker: Galena Camp, 4,000 ft., August 11, 1947 (*A*). Mt. Rainier: Longmire Springs, June 14, 1917 (*Dyar*). Twanoh State Park, September 22, 1946 (*Fender*).

Trichocera garretti, 1927.—Mt. Rainier: Paradise Park, August 1917 (*M*).

Trichocera hyaloptera sp. nov.—Allied to *tetonensis;* general coloration of thorax and abdomen dark brown; knobs of halteres dark brown; wings whitish, entirely unpatterned, veins relatively pale and inconspicuous; male hypopygium with the dististyle long and slender, approximately one-half longer than the basistyle, on mesal face at near one-third the length with a pale compressed blade.

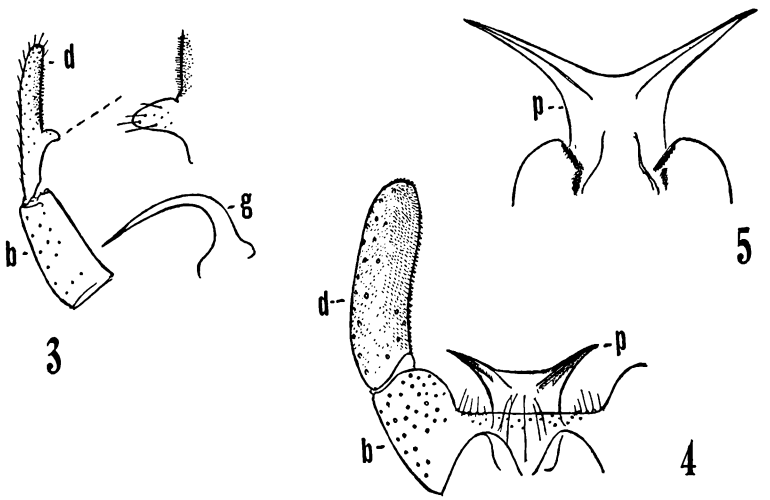
♂ Length, about 4-4.3 mm.; wing, 5.2-5.5 mm.; antenna, about 3 mm.

Rostrum and palpi black. Antennae relatively long, exceeding half the length of body, dark brown throughout. Head brownish gray.

Thorax almost uniformly dark brown, the center of the pronotum and the pretergites more brightened; scutellum with posterior border yellow. Halteres with stem pale, knob dark brown. Legs with the coxae and trochanters yellowish testaceous, remainder of legs brown, the femoral bases paling to yellow. Wings with a whitish tinge, even paler at base, entirely unpatterned; veins pale

brown, inconspicuous against the ground. Venation: Sc_1 ending shortly before R_2; R_{2+3+4} about one-third longer than R_{2+3}; cell M_1 from one-third to one-half longer than its petiole; cell *2nd A* broad.

Abdomen, including the hypopygium, dark brown, the pleural membrane paler. Male hypopygium (Fig. 3) with the fusion of the lobes of the basistyle, the so-called "coxal bridge," complete, produced into a small darkened lobe at point of union. Distitstyle, *d*, long and slender, approximately one-half longer than the basistyle; on mesal face at near one-third the length with a pale compressed blade that is provided with several pale setae; mesal face of style distad of the blade with abundant erect setulae. Gonapophyses appearing as unusually long yellow blades.



Figs. 3-5.—3. *Trichocera hyaloptera* sp. nov., male hypopygium; 4. *Trichocera setosivena* Alexander, male hypopygium; 5. *Trichocera longisetosa* Alexander; male hypopygium. (Symbols: *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *p*, phallosome).

Holotype, ♂, Peavine Ridge, Yamhill Co., Oregon, Station 3 A, October 12, 1946 (*Fender*). *Paratopotypes*, ♂ ♂, October 12-23, 1945, Station 3 (*Fender*); February 16-April 14, 1946 (*Fender*). *Paratypes*, 1 ♂, on slide, Longmire Springs, Mt. Rainier, Washington, 2,800 feet, August 23, 1947 (*Remington*); 1 ♂, East Port Orchard, Washington, September 25, 1946 (*Fender*).

The present fly is most similar to *Trichocera garretti* Alexander, 1927, and *T. tetonensis* Alexander, 1945, especially the latter, differing most evidently in the whitish subhyaline wings that are entirely unpatterned. The structure of the male hypopygium is somewhat more as in *tetonensis* yet differs in details of vestiture of the dististyle.

Trichocera longisetosa Alexander, 1927.—Lake Cushman, June 27, 1917 (*Dyar*); type. Still known to me only from the unique type. I am greatly indebted to Dr. Alan Stone for making re-examinations of the types of this

species and *Trichocera setosivena,* as discussed later under the latter species. The figures here provided are based on sketches made by me at the time of describing the two species, with additions concerning *setosivena* based on a camera lucida drawing by Dr. Stone.

Trichocera saltator (Moses Harris, 1782).—Above Galena Camp, 4,300 ft., August 11, 1947 (*A*). Mt. Rainier: Woodland Trail, above White River Camp, 5,700 ft., August 1, 1947 (*A*).

Trichocera setosivena Alexander, 1927.—Olympic National Park: Boulder Lake Trail, 2,300 ft., August 5, 1947 (*A*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). Fort Lewis, January 2-6, 1946 (*Arnaud*); Pluvius, July 10, 1917 (*M*); Twanoh State Park, September 22, 1946 (*Fender*).

The species was described from southern Alaska, now known to be common and widely distributed in the Vancouveran region as far south as Oregon. As indicated under *Trichocera longisetosa,* I am providing figures showing the male hypopygia of the two species. In *setosivena, Sc* is long, Sc_1 ending nearly opposite to just before vein R_2; R_{2+3+4} relatively short, approximately one-half R_{2+3}. The male hypopygium (Fig. 4) has the coxal bridge complete; dististyle unarmed; horns of the phallosome (gonapophyses) relatively short and stout, shorter than the transverse diameter of the stem of the phallosome. In *longisetosa, Sc* is shorter, Sc_1 ending about opposite midlength of R_{2+3}; R_{2+3+4} long, slightly exceeding R_{2+3}. The male hypopygium (Fig. 5) is almost as in *setosivena,* the only evident difference being in the longer horns of the phallosome which are approximately equal in length to the width of the stem of the phallosome. Despite the differences indicated, I must regard the two flies as being very closely allied.

TIPULIDAE

TIPULINAE

Holorusia (*Holorusia*) *grandis* (Bergroth, 1888) (*rubiginosa* Loew, 1863, preoccupied).—Mt. Rainier: Ohanapecosh Hot Springs, 1,900 ft., July 30, 1947 (*A*). Asotin, May 19, 1923 (*V Argo*); Diamond Lake, June 15, 1924 (*M*); Pine Canyon, June 28, 1924 (*M*); Seattle (*Kincaid*).

Phoroctenia vittata angustipennis (Loew, 1872) (*similis* Williston, 1894). —Mt. Rainier: Paradise Valley, 5,000-6,000 ft., July 28, 1919 (*C. L. Fox*). Montesano, April 19, 1941 (*M. L. Campbell*); Seattle, April 10, 1901, April 17, 1898, May 11, 1937, May 24, 1933, June 25, 1909 (all *Kincaid*). Williston (1894) described from "Washington" a species *Ctenophora similis,* indicated as differing from *angustipennis* in its shining black mesonotum, more extensive darkened pattern of the abdomen, and increased amount of dark color on the legs. All such characters come within the normal color range of the subspecies and the name *similis* must be considered as being a synonym. The generic name *Phoroctenia* Coquillett, 1910, with the present subspecies as type, antedates *Malpighia* Enderlein, 1912.

Nephrotoma occidentalis (Doane, 1908).—Longview, August 10, 1947 (*Macnab*); Naches, July 30, 1941 (*Brookman*); Seattle, May 9, 1932, May 31, 1934 (*Kincaid*).

Nephrotoma occipitalis (Loew, 1864), var.—2♂♂, Naches River, Mt. Rainier, 1,900 ft., July 31, 1947 (*A*). I am considering these specimens to represent a race or subspecies of the above despite the fact that the praescutal stripes are polished black, instead of reddish brown as in the typical form. The structure of the male hypopygium, especially the somewhat peculiar gonapophyses, confirms this association. It seems probable, moreover, that *snowi* (Doane, 1908) falls in this same group although I do not know the male sex of this latter fly.

Tipula (*Bellardina*) *aspersa* Doane, 1912.—Olympic National Park: Olympic Hot Springs, in skunk cabbage association, August 8, 1947 (*A*). Mt. Rainier: Ashford, August 18, 1940 (*Townes*); Olympia, August 6, 1921.

Tipula (*Bellardina*) *pacifica* Doane, 1912.—Everett, July 6, 1924 (*M*); Keyport, July 1905 (*Doane*); part of type material.

Tipula (*Bellardina*) *rastristyla* Alexander, 1945.—Snoqualmie Pass, June 29, 1924 (*M*); types. Male hypopygium (Fig. 6) generally similar to that of *T.* (*B.*) *sacajawea* Alexander, 1945, but with all details distinct. Ninth tergite, *9t*, with the median region between the sublateral lobes more evidently emarginate; median tubercle conspicuous, low and broad, with abundant setae. Basistyle, *b*, with the most proximal point of the outer lobe a long fingerlike tubercle. Outer dististyle, *od*, narrow, its width across midlength approximately one-fifth the length; setae at apex unusually short and inconspicuous for a member of this group, continued down the inner face of style. Inner dististyle, *id*, narrowed just beyond the base, widely expanded outwardly, the spines large, black and very conspicuous, forming a compact group on the margin at the most expanded portion of the blade, about three of these spines larger and more powerful.

Tipula (*Schummelia*) *subtenuicornis* Doane, 1901.—Mt. Rainier: Longmire Springs, July 20, 1922 (*M*), July 22-24, 1947 (*A*), August 10-13, 1946 (*A*); White River Camp, July 20, 1924 (*M*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). Seattle (*Kincaid*); type, June 16, 1920 (*M*); Valleyford, May 17, 1924 (*M*), May 29, 1921 (*M*).

Tipula (*Tipula*) *carinata* Doane, 1901.—Pullman (*Doane*); types.

Tipula (*Yamatotipula*) *albocaudata* Doane, 1901.—Asotin, May 1, 1923 (*M*); Pullman (*Doane*), Wawawai (*Doane*); types.

Tipula (*Yamatotipula*) *cervicula* Doane, 1901.—Mt. Baker: Heather Meadows, 4,000-4,300 ft., August 10-14, 1947, flying low over beds of *Saxifraga, Phyllodoce* and other plants in wet areas (*A*); Kulshan Ridge, 4,500 ft., August 12, 1947 (*A*). Mt. Rainier: Alta Vista, July 29, 1922 (*M*); Eagle Peak, August 25, 1921 (*M*); Mazama Ridge, July 23, 1923 (*M*); Paradise

Park, August 17, 1921 (*M*); Sluiskin, July 28, 1922 (*M*). The types were taken on Rainier in August 1895 by C. V. Piper. A characteristic species of the Hudsonian zone.

Tipula (*Yamatotipula*) *continentalis* Alexander, 1941.—Mt. Baker: Galena Camp, 4,000 ft., August 14, 1947 (*A*). Mt. Rainier: Base of North side, July 26, 1924 (*M*); Longmire Springs, August 23, 1947 (*Remington*).

Tipula (*Yamatotipula*) *cognata* Doane, 1901.—Olympia (*Kincaid*); Seattle (*Doane*); types.

Tipula (*Yamatotipula*) *nuntia* Alexander, 1945.—Lowden, June 22, 1921 (*M*); Naches River, 1,900 ft., July 31, 1947 (*A*); Pullman, July 4, 1922 (*M*); type.

Tipula (*Yamatotipula*) *spernax* Osten Sacken, 1877.—Mt. Rainier: Longmire Springs, June 19, 1917 (*Dyar*). Olympia, April 20, 1894 (*Kincaid*); Manchester, April 14, 1934 (ex *Kincaid*); Moxee, May 24-July 11, 1941 (*Brookman*); Seattle, University of Washington Campus, April 24, 1935 (*Mason*).

Tipula (*Yamatotipula*) *spernax lanei* Alexander, 1940.—Mt. Rainier: University of Washington Collection, without further data; Tipsoo Lake, Chinook Pass, 5,350 ft., July 30, 1947 (*A.*)

Tipula (*Trichotipula*) *dorsolineata* Doane, 1901.—Keyport (*Doane*); Pullman (*Doane*); types.

Tipula (*Trichotipula*) *macrophallus* (Dietz, 1918).—Mt. Rainier: Alder Lake, Elbe, 1,200 ft., August 10, 1946 (*A*), July 24, 1947 (*A*); Texaco Pond, 2,000 ft., July 31, 1947 (*A*). McCleary, August 8, 1921 (*M*); Port Angeles, August 9, 1921 (*M*); Pullman, July 20, 1918, mating pair (*M*); Selah, July 15, 1941 (*Brookman*); Mill Creek, Walla Walla, June 24, 1921 (*M*); Yakima, July 18, 1920 (*M*).

Tipula (*Trichotipula*) *oropezoides* Johnson, 1909.—Walla Walla, August 18, 1923 (*M*). Doubtful record; see discussion earlier under Walla Walla.

Tipula (*Trichotipula*) *repulsa* Alexander, 1943.—Mt. Rainier: Alder Lake, Elbe, 1,200 ft., August 10, 1946 (*A*).

Tipula (*Trichotipula*) *rusticola* Doane, 1912.—Keyport (*Doane*); type; Kelso, June 20, 1935 (*M*); Shelton, Walker's Park, July 21, 1917 (*M*).

Tipula (*Arctotipula*) *illustris* Doane, 1901 (*Prionocera fuscipennis* Loew, 1865).—Ellensburg, August 13, 1944 (*Knowlton*); Moxee, July 11, 1941 (*Brookman*); Seattle, April 14, 1922, April 20, 1931 (*Kincaid*); Yakima, August 13, 1944 (*Knowlton*).

Tipula (Arctotipula) kincaidi sp. nov.—General coloration of head and thorax gray, the praescutum with three more blue-gray stripes; nasus lacking; antennae black throughout; head and much of thorax with very long conspicu-

ous setae, those of the dorsum black, on the coxae white; wings grayish subhyaline, stigma brown, preceded and followed by yellowish areas; veins glabrous; abdominal tergites buffy brown, with a clearer brown central stripe.

♀. Length, about 16 mm.; wing, 19 mm.; antenna, about 3.2 mm.

Frontal prolongation of head light gray, relatively short, about one-half the remainder of head; nasus lacking but with abundant very long black setae at this point; palpi black. Antennae moderately long, black throughout, more or less pruinose, especially the scape; flagellar segments subcylindrical, shorter than the verticils. Head gray, the posterior vertex with a smooth more brownish central area, the remainder of head with long black setae; eyes small, the anterior vertex without tubercle, broad, approximately five times the diameter of scape.

Pronotal scutum light gray, the scutellum clearer blue-gray; scutum with a narrow brown median line and with three groups of long black setae. Mesonotal praescutum light gray, with three more blue-gray stripes, the interspaces with conspicuous black setae; scutum light gray, each lobe with two smooth blue-gray areas; median region and outer part of lobes with conspicuous setae; scutellum gray, with a central brown vitta, the surface with long erect setae; mediotergite gray, clearer behind, both base and apex glabrous, the central part with a patch of erect setae on either side of the midline. Pleura and pleurotergite restrictedly variegated with darker; dorsopleural membrane buffy yellow. Halteres pale. Legs with the coxae light gray, with abundant long pale setae; trochanters gray; femora, tibiae and basitarsi obscure yellow, the tips rather narrowly infuscated; outer tarsal segments more uniformly brownish black. Wings grayish subhyaline; stigma oval, brown, preceded and followed by more yellowed areas; prearcular field broadly pale yellow; veins brown, paler in the brightened areas. Veins glabrous, there being no trichia behind the main stem of *R*. Venation: *Rs* long, approximately three times *m-cu; R_{1+2}* entire, with trichia on the proximal fifth; petiole of cell M_1 about two-thirds *m; m-cu* on M_4, the basal section of the latter vertical; cell *2nd A* broad.

Abdominal tergites buffy brown, sparsely pruinose, with a broad clearer brown central stripe that is narrowly interrupted at the posterior border of each segment; sternites pale gray, each with pale brown markings, the central series most distinct; vestiture of basal segments and lateral portions elongate, pale, of the remaining tergites chiefly short and inconspicuous. Ovipositor with the cerci pale, smooth, moderately long, widest on the proximal two-thirds, the tips more narrowed; hypovalvae much shorter, their tips obtuse.

Holotype, ♀, Stillaguamish River, July 15, 1928 (ex *Kincaid*).

I take unusual pleasure in dedicating this fly to Professor Trevor Kincaid, distinguished entomologist, who discovered many novelties in the Tipulidae in the Pacific Northwest described by Coquillett and Doane. In its wing pattern and venation this conspicuous fly suggests species such as *Tipula* (*Arctotipula*) *semidea* Alexander, 1944, and the smaller *T.* (*A.*) *sacra* Alexander, 1944,

both of which have the vestiture of the body short and inconspicuous; *T.* (*A.*) *twogwoteeana* Alexander, 1945, is further distinguished by the patterned wings. All other regional members of the subgenus are more distantly related.

Tipula (*Arctotipula*) *plutonis absaroka* Alexander, 1943.—Mt. Rainier: Without further data, University of Washington; Paradise Valley, 5,600 ft., July 23, 1947 (*A*), swept from beds of *Caltha leptosepala, Dodecatheon viviparum, Potentilla flabellifolia, Phyllodoce empetriformis, Valeriana sitchensis,* and others; Tipsoo Lake, 5,450 ft., July 28-30, 1947 (*A*). Snoqualmie Pass, June 29, 1924 (*M*).

Tipula (*Vestiplex*) *longiventris* Loew, 1863.—Walla Walla, August 18, 1923 (*M*). Doubtful record; see discussion earlier under Walla Walla.

Tipula (Vestiplex) tacomicola sp. nov.—Allied to *longiventris;* antennae (male) relatively long, basal four segments yellow, the outer ones passing into brown; praescutum buffy gray with four stripes that are bordered by dark brown, the intermediate pair almost solidly so; femora yellow, the tips narrowly infuscated; wings relatively long and narrow, patterned with pale yellow, dark brown spots and more extensive paler brown clouds; abdominal tergites obscure yellow, trivittate with brown; male hypopygium with the posterior border of tergite emarginate, the anterior border elevated into a transversely rectangular plate, its posterior border truncated; basistyle small, produced caudad into a strong blackened rod, its tip abruptly narrowed into a spine; inner dististyle a broad flattened plate, the outer apical angle produced into a small black spine.

♂ Length, about 21 mm.; wing, 22.5 mm.; antenna, about 4.4 mm.

Frontal prolongation of head yellow, restrictedly more darkened on sides; nasus distinct; palpi brownish black. Antennae (male) relatively long, as shown by the measurements; scape, pedicel and proximal two flagellar segments yellow, succeeding segments passing into black, the terminal segment pale at tip; flagellar segments rather strongly incised, a little longer than the verticils. Head above pale brown, darker medially, passing into a capillary dark brown vitta on the low vertical tubercle; front, anterior vertex and orbits more yellowed.

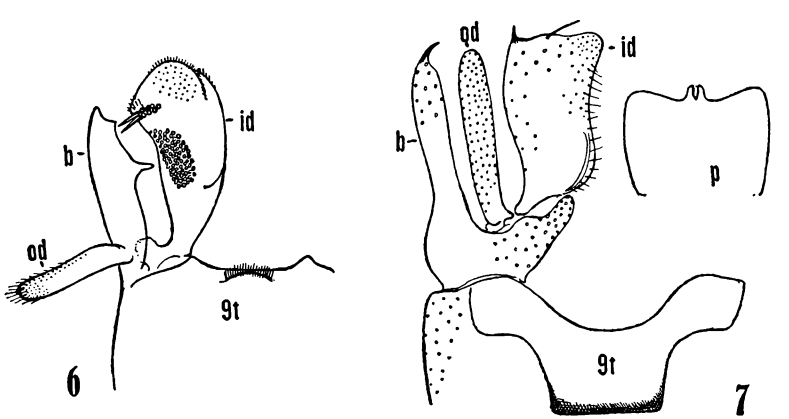
Pronotum brownish gray. Mesonotal praescutum buffy gray, with four stripes, the narrower intermediate pair more uniformly dark brown; lateral stripes dark gray, broadly ringed with dark brown; scutum gray, each lobe with two confluent dark brown rings; scutellum testaceous brown, restrictedly more darkened medially; mediotergite light ashy gray, with a capillary brown central vitta; pleurotergite pale brown, gray pruinose. Pleura chiefly dark gray, especially on the mesepisternum, the dorsal sternopleurite paler; very small to scarcely indicated brown spots on the ventral pteropleurite and beneath the halter. Halteres with stem yellow, knob infuscated. Legs with the coxae gray pruinose; trochanters yellow; femora yellow, the tips narrowly and weakly infuscated; tibiae obscure yellow, the tips even more narrowly darkened; tarsi brown, passing into black; claws unusually small, simple. Wings

relatively long and narrow, pale yellow, variegated with light brown clouds and sparser dark brown spots; the darkest areas include a postarcular mark in the bases of cells *R* and *M;* origin of *Rs;* fork of *Sc;* stigma; anterior cord and in cell *M* at near midlength of vein *Cu;* prearcular and costal fields more uniformly light yellow; outer ends of cells R_5 to *2nd A* paling to yellow at margins; veins brown, more yellowed in the ground areas. Venation: *Rs* nearly twice *m-cu;* R_{1+2} entire; petiole of cell M_1 subequal to *m;* M_{3+4} and basal section of veins M_3 subequal in length.

Abdominal tergites obscure, trivittate with brown, the lateral borders of the segments broadly light buffy gray; outer segments, including hypopygium, more uniformly darkened. Male hypopygium (Fig. 7) with the posterior border of the ninth tergite, *9t,* emarginate, the anterior border elevated into a transversely rectangular plate, its posterior border truncated. Basistyle, *b,* small, produced caudad into a strong blackened rod, its tip abruptly narrowed into a spine. Outer dististyle, *od,* relatively narrow, especially outwardly. Inner dististyle, *id,* a broad flattened plate, the outer apical angle produced into a small black spine, the inner apical region obtusely rounded. Phallosome, *p,* a depressed-flattened yellow plate, the aedeagus jutting only slightly beyond the level of the plate which is presumably composed of the fused gonapophyses.

Holotype, ♂, Longmire Springs, Mt. Rainier, 2,800 ft., found dead in spider's web in building, July 24, 1947, presumably on wing in early July (*C. P. Alexander*).

Among the rather numerous members of the subgenus in the Nearctic fauna, this fly is closest to *Tipula* (*Vestiplex*) *longiventris* Loew, 1863, yet entirely distinct in the hypopygial characters. There are likewise allied species in eastern Asia that are readily separated by genitalic and other characters.



Figs. 6-7.—6. *Tipula* (*Bellardina*) *rastristyla* Alexander, male hypopygium; 7. *Tipula* (*Vestiplex*) *tacomicola* sp. nov., male hypopygium. (Symbols: *b,* basistyle; *id,* inner dististyle; *od,* outer dististyle; *p,* phallosome; *t,* tergite).

Tipula (*Oreomyza*) *alia* Doane, 1911 (*olia* erroneously).—Keyport, July 1905 (*Doane*), Olympia (*Doane*); types. McCleary, August 8, 1921 (*M*); Olympia, August 6, 1921 (*M*); Quilcene, June 24, 1921, July 24, 1917 (*M*); Walla Walla, Mill Creek, June 24, 1921, July 2-6, 1922 (*M*); Yakima, July 18, 1921 (*M*).

Tipula (*Oreomyza*) *appendiculata* Loew, 1863 (*derelicta* Dietz, 1914; *gaspensis* Alexander, 1929; *stalactoides* Doane, 1901).—Valleyford, June 25, 1924 (*M*).

Tipula (*Oreomyza*) *fallax* Loew, 1863.—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13, 1947 (*A*). Mt. Rainier: Longmire Springs, August 23, 1947 (*Remington*). Keyport, August 1905 (*Doane*).

Tipula (*Oreomyza*) *rohweri* Doane, 1911.—Selah, Yakima Valley, July 15, 1941 (*Brookman*).

Tipula (*Oreomyza*) *yellowstonensis* Alexander, 1946.—Mt. Rainier: Naches River, 1,900 ft., July 31, 1947 (*A*).

Tipula (*Oreomyza*) *helvocincta* Doane, 1901.—Mt. Baker: Galena Camp, 4,000 ft., August 10-14, 1947 (*A*), some swept from mountain hemlock; other females found crawling about over the ground, evidently seeking oviposition places; still other specimens found while flying low over dense beds of low chamaephytes, as *Lutkea* and *Phyllodoce*. Mt. Rainier: August 1895 (*C. V. Piper*); types; Alta Vista, July 27, 1922 (*M*); Paradise Park, August 1921 (*M*); Sluiskin, July 28, 1932 (*M*); Tipsoo Lake, July 28-30, 1947 (*A*); Yakima Park, 6,200 ft., August 3, 1947 (*A*). A characteristic species of the Hudsonian zone.

Tipula (*Oreomyza*) *imbellis* Alexander, 1927.—Moxee, Yakima Valley, May 24, 1941 (*Brookman*).

Tipula (*Oreomyza*) *pseudotruncorum* Alexander, 1920.—Mt. Rainier: Longmire Springs, 2,500 ft., July 18, 1919 (*C. L. Fox*), Paradise Valley, 6,000-8,000 ft., August 5, 1919 (*C. L. Fox*); types. Alta Vista, July 22, 1922 (*M*); Nisqually Glacier Trail, 4,200 ft., July 23, 1947 (*A*); Paradise Park, August 1917, 1921 (*M*); Van Trump, July 21, 1922 (*M*); Wonderland Trail, above White River, 5,800 ft., August 1, 1947 (*A*); Yakima Park, July 22, 1924, August 19, 1934 (*M*), altitude 6,500 ft., August 3, 1947 (*M. M. Alexander*). Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*). Loon Lake, May 16, 1924 (*M*).

Tipula (*Oreomyza*) *shoshone* Alexander, 1946.—Mt. Rainier: Longmire Springs, June 27, 1935 (*M*); Van Trump, July 21, 1922 (*M*). Fort Lewis, May 11, 1946 (*Arnaud*).

Tipula (*Lunatipula*) *aequalis* Doane, 1901.—Mt. Rainier: Longmire Springs, 2,800 ft., July 24, 1947 (*A*). Keyport (*Doane*), Olympia (*Kincaid*), Pullman (*Doane*), Seattle (*Kincaid*), Tokeland (*Doane*); type material.

Tipula (*Lunatipula*) *aitkeniana* Alexander, 1944.—Wawawai, May 20, 1911 (*M*).

Tipula (*Lunatipula*) *albofascia* Doane, 1901.—Almota, without further data (*M*). Very close to *biarmata* Doane, 1912.

Tipula (*Lunatipula*) *armata* Doane, 1901 (*varia* Doane, 1901).—Seattle (*Kincaid*), types of *armata;* Olympia (*Kincaid*), types of *varia.* Canyon Creek, July 26, 1925 (*M*); Pullman, Saints Rest, June 11, 1921 (*M*).

Tipula (*Lunatipula*) *biarmata* Doane, 1912.—Keyport (*Doane*); type.

Tipula (*Lunatipula*) *bisetosa* Doane, 1901.—Pullman (*Doane*), types; July 3, 1921 (*M*); Olympia, August 6, 1921 (*M*); South Tacoma, July 27, 1921 (*M*).

Tipula (*Lunatipula*) *calcarata* Doane, 1901.—Mt. Rainier: August 1895 (*C. V Piper*), type; Ararat Mt., August 5, 1922 (*M*); Indian Henry, August 2-6, 1922 (*M*); Paradise Park, August 1917, 1922 (*M*); Wonderland Trail, above White River Camp, 5,800 ft., August 1, 1947 (*A*); Yakima Park, 6,400 ft., July 22, 1924 (*M*), July 29, 1947 (*A*); 1 ♂, probably from Paradise Valley, 6,500 ft., July 22, 1940 (*Townes*). A characteristic species of the Hudsonian zone.

Tipula (*Lunatipula*) *californica* (Doane, 1908).—Vancouver, May 11-27, 1911; University of Utah Collection.

Tipula (*Lunatipula*) *dorsimacula* Walker, 1848 (*angustipennis* Loew, 1863).—Almota, May 20, 1923 (*M*); Asotin Creek, April 22, 1923 (*M*), May 11, 1924 (*M*); Clarkston, April 8, 1923 (*Ivar Melander*); Lind, April 5, 1919 (*M*); Pullman, June 4, 1922 (*M*); Wenatchee, May 4, 1919 (*M*).

Tipula (*Lunatipula*) *fulvinoda* Doane, 1912.—Grand Coulee, Foster Coulee, June 24, 1902 (*Doane*); type. To my knowledge no further specimens have been discovered. The following supplementary notes on the type are supplied. No squamal setae, hence its position in the subgenus *Lunatipula* Edwards may be questioned. Male hypopygium (Fig. 8), as seen from the dry type. Ninth tergite, *9t,* large, the two lobes yellow, separated by a deep and narrow median notch; lobes glabrous, truncated at apex, the extreme tip a trifle decurved. Ninth sternite, with the appendage, *9s,* pale and bulbous, at apex with a dense grouping of golden setae. Outer dististyle, *od,* long and slender, subcylindrical; outer surface with a few strong black setae, these becoming smaller outwardly. Inner dististyle, *id,* excluding its outer basal lobe, appearing as a broadly rounded blade. Eighth sternite, *8s,* sheathing, the lateral lobes a trifle produced, bearing a long brush of yellow roughened setae that are decussate across the midline.

Tipula (*Lunatipula*) *impudica* Doane, 1901.—Asotin, May 16, 1923 (*M*); Asotin Creek, April 27, 1922, May 11, 1924 (*M*); Almota (*Doane*), type material; Lind, April 5, 1919 (*M*); Pullman (*Doane*), type material;

Snake River, opposite Clarkston, May 3, 1925 (*M*); Wawawai, May 7, 1898 (*Doane*), type material; May 15, 1921 (*M*), May 28, 1922 (*M*).

Tipula (*Lunatipula*) *incisa incisa* Doane, 1901 (*flavicoma* Doane, 1912). —Pullman (*Doane*); Wawawai (*Doane*); types. Kennewick, May 20, 1921 (*M*); Snake River, at Grand Ronde River, May 9, 1925 (*M*), opposite Clarkston, May 20, 1921 (*M*).

Tipula (*Lunatipula*) *lamellata* Doane, 1901 (*rangiferina* Alexander, 1915).—Pullman (*Doane*), types; July 3, 1921 (*M*); Holland, July 3, 1919 (*M*); Mica, July 14, 1918 (*M*); Wawawai, July 7, 1921 (*M*).

Tipula (*Lunatipula*) *lucida* Doane, 1901.—Lake Chelan, Lucerne, July 29, 1919 (*M*).

Tipula (*Lunatipula*) *macnabi* Alexander, 1929.—Mt. Rainier: La Wis Wis, Columbia National Forest, 1,300 ft., August 2, 1947 (*A*).

Tipula (*Lunatipula*) *macrolabis* Loew, 1864 (*spectabilis* Doane, 1901).— Diamond Lake, June 15, 1924 (*M*).

Tipula (*Lunatipula*) *megalabiata* Alexander, 1915.—Mt. Rainier: Longmire Springs, July 24, 1947 (*A*); Dutch's Creek, Elbe, July 24, 1947 (*A*).

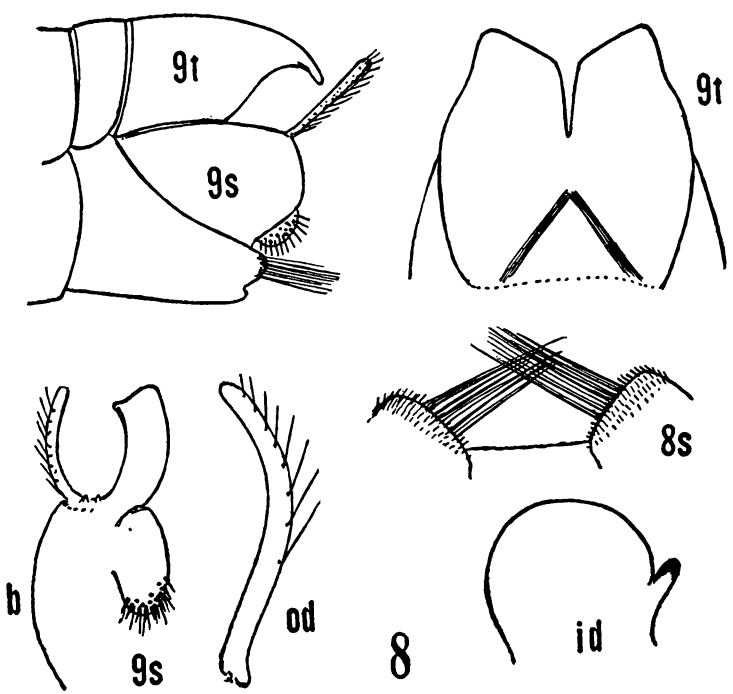


Fig. 8.—*Tipula* (*Lunatipula*) *fulvinoda* Doane, male hypopygium. (Symbols: *b*, basistyle; *id*, inner dististyle; *od*, outer dististyle; *s*, sternite; *t*, tergite).

Big-4 Mountain, July 5, 1924 (*M*); Lake Chelan, Stehekin, July 30, 1919 (*M*); Merritt, July 1942 (*J. S. Dolley*).

Tipula (*Lunatipula*) *olympia* Doane, 1912 (*concinna* Doane, 1901; *flavomarginata* Doane, 1912).—Olympia, May 22, 1894 (*Kincaid*); type.

Tipula (*Lunatipula*) *pellucida* Doane, 1912 (*clara* Doane, 1901; *pyramis* Doane, 1912).—Pullman (*Doane*); Wawawai (*Doane*), types. Almota, May 20, 1923 (*M*); Columbia River, May 1, 1919 (*M*); Wenatchee, April 1918, May 4, 1919 (*M*).

Tipula (*Lunatipula*) *praecisa* Loew, 1872.—Fort Lewis, May 11, 1946 (*Arnaud*).

Tipula (*Lunatipula*) *pubera* Loew, 1864.—Keyport, July 1905 (*Doane*); Seattle, June 1-3 (*Kincaid*).

Tipula (*Lunatipula*) *rainiericola* Alexander, 1946.—Mt. Rainier: Berkeley Park, August 23-27, 1934 (*M*), types.

Tipula (*Lunatipula*) *retusa* Doane, 1901.—Olympia (*Doane*), Pullman (*Doane*), Seattle (*Kincaid*), Wawawai (*Doane*), types. Almota, May 20, 1923 (*M*); Pullman, Lyle Grove, May 20, 1922, June 4, 1922 (*M*); Saints Rest, June 3-4, 1922 (*M*); Valleyford, May 17, 1924 (*M*); Vancouver, May 11, 1911, University of Utah Collection; Walla Walla, Mill Creek, June 24, 1921 (*M*); Wawawai, May 28, 1922 (*M*).

Tipula (*Lunatipula*) *snoqualmiensis* Alexander, 1945.—Lake Keechelus, near Snoqualmie Pass, June 29, 1924 (*M*), types. The male hypopygium (Fig. 9) had not been figured. Suture between ninth tergite, *9t*, and ninth sternite, *9s*, complete; basistyle, *b*, broadly suboval in outline, separated from the sternite by a pale ventral suture that is about one-third complete. Ninth tergite, *9t*, large, deeply notched medially, the lateral lobes produced into long, somewhat flattened arms, broad basally, the outer half more narrowed, the tip subacute; outer surface of lobes with coarse black setae, these much shorter and pale yellow at tips and likewise becoming very small nearer the midline; at base of notch a conspicuous compressed median tooth that is directed caudad and slightly dorsad. Ninth sternite, *9s*, wth the appendage small but extensive, each further produced at its lower mesal angle into a smaller globular lobule, both lobes provided with conspicuous setae. Basistyle, *b*, truncate at apex. Outer dististyle small, placed at base of the inner style; longest setae a little more than one-half the total length of the style. Inner dististyle, *id*, with both the beak and the subapical beak very heavily blackened; dorsal crest undeveloped; outer basal lobe attached to main body of style by a narrow basal union only, appearing as a broadly flattened yellow blade, narrowed at apex into a flattened obtuse beak; surface corrugated longitudinally and provided with abundant pale setae. Phallosome, *p*, forming a common sclerotized base, with the gonapophyses, *g*, appearing as divergent paddle-shaped blades near the apex, these arms much longer than the small capitate apical projection that includes the minute aedeagus. Eighth sternite, *8s*, only moderately sheath-

ing, its base telescoped beneath the seventh sternite, the apex terminating about one-fourth the length of the subcylindrical ninth sternite; apex of sternite shallowly notched, the median area with numerous long straight setae; outer portion of the very low oblique lobes with about four more powerful flattened bristles that bend inward, their tips decussate at the midline.

Tipula (*Lunatipula*) *splendens* Doane, 1901.—Olympia, May 23, 1897 (*Kincaid*); type.

Tipula (*Lunatipula*) *sylvicola* Doane, 1912.—Keyport, July 1905 (*Doane*); type.

Tipula (*Lunatipula*) *unicincta* Doane, 1901.—Mt. Baker: Silver Fir Camp, 1,990 ft., August 14, 1947 (*A*). Mt. Rainier: Longmire Springs, August 10-13, 1946 (*A*); Summerland Trail, July 24, 1924 (*M*). Keyport (*Doane*), Pullman (*Doane*), types; Mt. Adams, July 24, 1921 (*M*); Orcas Island, Cascade Lake, August 17, 1925 (*M*).

Tipula (*Lunatipula*) *usitata* Doane, 1901.—Quinault Lake, in cedar-hemlock association, July 12, 1945 (*Shelford*); Tokeland (*Doane*); type ♀.

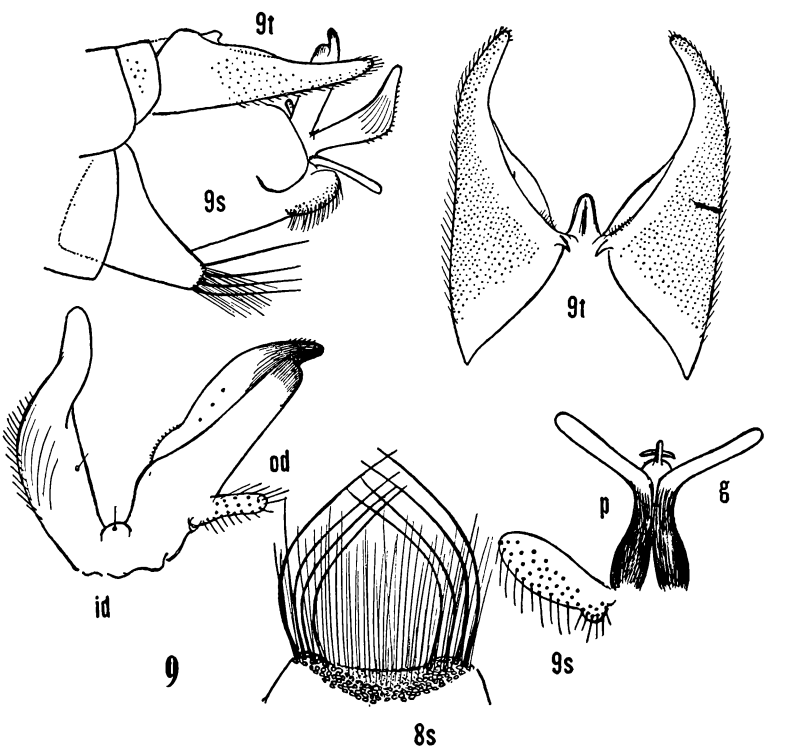


Fig. 9.—*Tipula* (*Lunatipula*) *snoqualmiensis* Alexander, male hypopygium. (Symbols: *d*, dististyle; *g*, gonapophysis; *p*, phallosome; *s*, sternite; *t*, tergite).

Tipula (*Lunatipula*) *vittatipennis* Doane, 1912 (*albovittata* Doane, 1901).—Pullman (*C. V Piper*); type.

Tipula (*Hesperotipula*) *fragmentata* Dietz, 1919.—Ilwaco, July 12, 1922 (*M*).

Tipula (*Hesperotipula*) *streptocera* Doane, 1901.—Olympia (*Doane*), Tokeland (*Doane*); types. Carson, Wind River Experimental Forest, in 30-year broadleaf forest, July 10, 1945 (*Shelford*); Keyport, July 1905 (*Doane*).

Tipula (*Hesperotipula*) *streptocera pallidocera* Dietz, 1919.—Keyport, July 1905 (*Doane*); type. Presumed to be a teneral *streptocera*.

Tipula optiva Alexander, 1921 (subgenus uncertain).—North Bend, July 9, 1920 (*E. P. Van Duzee*); type. Belongs to the so-called *juncea* group; in an earlier paper (Philippine Journ. Sci., 57: 122; 1935) I had referred this group to the subgenus *Oreomyza* Pokorny but now prefer to leave the position unsettled for the time being.

CYLINDROTOMINAE

Cylindrotoma splendens Doane, 1901 (*juncta* Coquillett, 1901).— Mt. Rainier: Cayuse Pass, 4,650 ft., August 1, 1947 (*M. M. Alexander*); Nisqually Glacier Trail, 4,000 ft., July 23, 1947 (*M. M. Alexander*); Wonderland Trail, above White River, 4,900-5,000 ft., August 1, 1947 (*A*). Ilwaco, May 5, 1918 (*M*). These specimens seem to be referrable to the race *pallescens* Alexander, 1930, distinguished by the unusually pale coloration.

Phalacrocera occidentalis Alexander, 1927.—Mt. Rainier: Longmire Springs, 2,800 ft., June 10; type.

LIMONIINAE

LIMONIINI

Limonia (*Limonia*) *bistigma* (Coquillett, 1905) (as *bestigma; tributaria* Alexander, 1943).—Mt. Baker: Galena Camp, 4,000 ft., August 10-14, 1947 (*A*); Nooksack River, August 11, 1925 (*M*); Skyline Trail, August 10, 1925 (*M*). Mt. Rainier: Ashford, July 11, 1940 (*Townes*); Elbe, July 13, 1940 (*Townes*); Hansen Camp, July 31, 1922 (*M*); Longmire Springs, July 22, 1947, August 10, 1946 (*A*); Nisqually Glacier Trail, 4,000 ft., July 23, 1947 (*A*). Olympic National Park: Olympic Hot Springs, 2,200 ft., August 7, 1947 (*A*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). Brinnon, Forest Reserve, July 27, 1917 (*M*); Ilwaco, July 1917, August 23, 1917 (*M*); Lake Crescent, July 26, 1917 (*M*); Pluvius, July 16, 1922 (*M*); Puget, July 4, 1925 (*M*); Quilcene, July 24, 1917, August 11, 1921 (*M*); Tulalip, August 3, 1917 (*M*); Yukon Camp, Grotto, August 15, 1944 (*Knowlton*).

Limonia (*Limonia*) *sciophila* (Osten Sacken, 1877).—Mt. Baker: Galena Camp, 4,000 ft., August 10-12, 1947 (*A*), Silver Fir Camp, 1,990 ft., August 15, 1947 (*A*). Olympic National Park: Deer Park, 5,400 ft., August

6, 1947 (*A*). Mt. Rainier: Longmire Springs, June 27, 1935, July 20, 1922 (*M*), July 22, 1947, August 10-13, 1946 (*A*); White River, August 28, 1934 (*M*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). Barnes State Reservation, September 27, 1946 (*Fender*); Big-4 Mountain, July 5, 1924 (*M*); Blaine, August 7, 1917 (*M*); Cascade Lake, Orcas Island, August 18, 1925 (*M*); Castle Rock, August 28, 1921 (*M*); East Port Orchard, September 22-26, 1946 (*Fender*); Everett, June 19, 1920 (*M*); Ilwaco, May 5, 1918, July 12, 1922, August 27, 1917 (*M*); Kachess Lake, August 13, 1946 (*A*); Lake Crescent, Piedmont, July 26, 1917 (*M*); Lewis & Clark State Park, September 28, 1946 (*Fender*); Olympia, June 22, 1920, August 6, 1921 (*M*); Pluvius, July 10, 1917 (*M*); Potlatch, Hood Canal, July 28, 1917 (*M*); Quilcene, July 24, 1917 (*M*); Shelton, Walkers Park, July 21, 1917 (*M*); Toledo, August 28, 1921 (*M*); Tulalip, August 3, 1917 (*M*).

Limonia (*Metalimnobia*) *californica* (Osten Sacken, 1861).—Mt. Rainier: Alder Lake, Elbe, 1,200 ft., August 10, 1946 (*A*). Seattle, May 5, 1901 (*Kincaid*).

Limonia (*Metalimnobia*) *cinctipes* (Say, 1823).—Recorded by Williston, 1893, from Washington, possibly in error.

Limonia infuscata (Doane, 1900) (*adjecta* Doane, 1908; *nitidiuscula* Alexander, 1927).—Mt. Baker: Bagley Creek Camp, 2,500 ft., August 13, 1947 (*A*); Silver Fir Camp, 1,990 ft., August 13, 1947 (*A*). Olympic National Park: Olympic Hot Springs, 2,200 ft., August 4-5, 1947 (*A*). Mt. Rainier: Longmire Springs, August 26, 1921 (*M*); Ohanapecosh Hot Springs, July 25, 1947 (*A*); Wonderland Trail, above White River, 5,300 ft., August 1, 1947 (*A*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). Cascade Lake, Orcas Island, August 17, 1925 (*M*); East Port Orchard, September 22-26, 1946 (*Fender*); Lewis & Clark State Park, September 28, 1946 (*Fender*); Olympia, August 6, 1921 (*M*); Twanoh State Park, September 22, 1946 (*Fender*).

Limonia simulans concinna (Williston, 1893).—Asotin, May 16, 1923 (*M*); Lilliwaup, July 23, 1917 (*M*).

Limonia venusta (Bergroth, 1888) (*duplicata* Doane, 1900; *negligens* Alexander, 1927).—Mt. Baker: Galena Ski Club, below Heather Meadows, 3,800 ft., August 12, 1947 (*A*). Olympic National Park: Olympic Hot Springs, 2,000 ft., August 7, 1947 (*A*); Boulder Lake Trail, 3,500 ft., August 5, 1947 (*A*). Mt. Rainier: Paradise Park, July 27, 1922 (*M*). Keyport (*Doane*); Pullman, May, July 11, 1898 (*Doane*); Selah, July 26, 1941 (*Brookman*); Tokeland, 1899 (*Doane*), type of *duplicata;* Wawawai, April 9 (*Doane*).

Limonia (*Geranomyia*) *canadensis* (Westwood, 1835).—Mt. Rainier: Ohanapecosh Hot Springs, 1,900 ft., July 28-30, 1947 (*A*). Zillah, Yakima Valley, August 17, 1941 (*Brookman*).

Limonia (*Dicranomyia*) *acerba* Alexander, 1943.—Mt. Rainier: Altitude

5,700 ft., July 8, 1940 (*Townes*), type; Paradise Valley, 5,600 ft., July 23, 1947 (*A*), swept from beds of *Erythronium montanum, Phyllodoce empetriformis, Valeriana sitchense,* and others; further material from same place, August 11, 1946 (*A*); Yakima Park, 6,400 ft., July 27, 1947 (*A*). Characteristic of the Hudsonian zone.

Limonia (*Dicranomyia*) *anteapicalis* Alexander, 1946.—Moxee, Yakima Valley, May 24-July 15, 1941 (*Brookman*); types.

Limonia (*Dicranomyia*) *athabascae* (Alexander, 1927).—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13-15, 1947 (*A*). Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Elbe, 1,200 ft., August 10-13, 1946 (*A*); Longmire Springs, 2,800 ft., August 23, 1947 (*Remington*); Ohanapecosh Hot Springs, 1,900 ft., July 25, 1947 (*A*). Mt. St. Helens: Toutle River, near Spirit Lake, 3,000 ft., July 20, 1947 (*A*). Ilwaco, May 5, 1918 (*M*).

Limonia (*Dicranomyia*) *brevivena* (Osten Sacken, 1869).—Mt. Rainier: Alder Lake, near Elbe, August 12, 1946 (*A*); Naches River, 1,900 ft., July 31, 1947 (*A*). Moxee, June 11, 1941 (*Brookman*).

Limonia (*Dicranomyia*) *citrina* (Doane, 1900).—Rose Spring, Blue Mts., July 19, 1921 (*M*); Union Flat, May 14, 1922 (*M*); Wawawai, April 24, 1897 (*Doane*), type ♀.

Limonia (*Dicranomyia*) *fulva* (Doane, 1900).—Mt. Rainier: Longmire Springs, 2,800 ft., July 22, 1947 (*A*). Pullman, May 13, 1898 (*Doane*), type.

Limonia (*Dicranomyia*) *gracilis* (Doane, 1900).—Olympic National Park: Olympic Hot Springs, 2,200 ft., August 5-7, 1947, in skunk cabbage association (*A*).

Limonia (*Dicranomyia*) *halterata* (Osten Sacken, 1869) (*cinereipennis* Lundstrom, 1912).—Mt. Baker: Galena Camp, 4,000 ft., August 9-10, 1947 (*A*); Nooksack River, August 11, 1925 (*M*). Olympic National Park: Olympic Hot Springs, August 4-6, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 26, 1921 (*M*), August 10-13, 1946 (*A*), July 22, 1947 (*A*); Ohanapecosh Hot Springs, July 25, 1947 (*A*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). Adna, July 10, 1917 (*M*); East Port Orchard, September 23-26, 1946 (*Fender*); Everett, June 19, 1920 (*M*); Ilwaco, May 5, 1918, July 12, 1922 (*M*); Keyport, (*Doane*); Montesano, July 19, 1917 (*M*); Shelton, Walker's Park, July 21, 1917 (*M*).

Limonia (*Dicranomyia*) *humidicola* (Osten Sacken, 1859).—Mt. Rainier: Elbe, 1,200 ft., July 24, 1947 (*A*); Nisqually Glacier Trail, 4,000 ft., July 23, 1947 (*A*); Ohanapecosh Hot Springs, 1,900 ft., July 25, 1947 (*A*). East Port Orchard, September 23-26, 1946 (*Fender*); Tacoma, July 9, 1944 (*Arnaud*).

Limonia (*Dicranomyia*) *illustris* Alexander, 1944.—Ilwaco, May 5, 1918 (*M*).

Limonia (*Dicranomyia*) *longipennis* (Schummel, 1829) (*immemor* Osten Sacken, 1861).—Ellensburg, August 3, 1944 (*Knowlton*); Lowden, June 22, 1921 (*M*).

Limonia (*Dicranomyia*) *marmorata* (Osten Sacken, 1861) (*signipennis* Coquillett, 1905).—Keyport (*Doane*); Shelton, Walker's Park, July 21, 1917 (*M*).

Limonia (*Dicranomyia*) *particeps* (Doane, 1908).—Mt. Rainier: Ohanapecosh Hot Springs, 1,900 ft., July 25, 1947 (*A*). East Port Orchard, September 23-26, 1946 (*Fender*); Keyport, (*Doane*), types.

Limonia (*Dicranomyia*) *penicillata* (Alexander, 1927).—Lake Colville, near Sprague, 1,900 ft., August 14, 1946 (*A*).

Limonia (*Dicranomyia*) *stigmata* (Doane, 1900).—Mt. Rainier: Longmire Springs, 2,800 ft., August 10, 1946 (*A*). Keyport (*Doane*).

Limonia (*Dicranomyia*) *vulgata* (Bergroth, 1888) (*ochracea* Doane, 1900).—Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Everett, June 19, 1920, July 11, 1924 (*M*); 5-Mile Lake, July 9, 1925 (*M*); Ilwaco, June 28, 1925 (*M*); Keyport, (*Doane*); La Center, July 8, 1917 (*M*): Lake Crescent, Piedmont, July 26, 1917 (*M*); Montesano, July 19, 1917 (*M*); Pluvius, July 10, 1917 (*M*).

Limonia (*Discobola*) *elegans* (Doane, 1900).—Olympic National Park: Olympic Hot Springs, August 4-6, 1947, skunk cabbage association (*A*). Mt. Rainier: Longmire Springs, 2,500 ft., August 13, 1946 (*A*); 2,800 ft., July 22, 1947 (*A*); Ohanapecosh Hot Springs, July 25, 1947 (*A*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). Lake Chelan, Lucerne, July 29, 1919 (*M*), a female specimen lacking the supernumerary crossvein in both wings; Olympia, June 22, 1920 (*M*); Seattle, May 1942 (*E. I. Smith*, in U.S. National Museum); Shelton, Walker's Park, July 21, 1917 (*M*); Tacoma, July 9, 1944 (*Arnaud*); Tokeland, 1899 (*Doane*), type.

Antocha (*Antocha*) *monticola* Alexander, 1917.—Mt. Rainier: La Wis Wis, Columbia National Forest, 1,300 ft., August 2, 1947 (*A*). Selah, Yakima Valley, July 15, 1941 (*Brookman*); Union Gap, June 24, 1941 (*Brookman*); Walla Walla, Mill Creek, July 2-6, 1922 (*M*).

Elliptera astigmatica Alexander, 1912.—Mt. Baker: Galena Camp, 4,000 ft., August 10-14, 1947 (*A*), commonly associated with *Phyllolabis fenderiana*. Olympic National Park: Boulder Lake Trail, 2,300-4,000 ft., August 5, 1947 (*A*). Mt. Rainier: Cayuse Pass, 4,600 ft., July 30, 1947 (*A*); Christine Falls, 3,665 ft., on wet cliffs, July 23, 1947 (*A*); Hansen Camp, July 31, 1922 (*M*); Longmire Springs, July 22, 1947, August 10, 1946 (*A*); Paradise Valley, August 1917 (*M*), July 23, 1947, August 11, 1946 (*A*); Tipsoo Lake, July 28-30, 1947 (*A*). Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*). Lake Chelan, Lucerne, July 29, 1919 (*M*); Snoqualmie, July 1, 1933 (ex *Kincaid*).

Dicranoptycha stenophallus Alexander, 1949.—Mt. Rainier: Longmire Springs, 2,800 ft., July 22, 1947 (*A*). Ilwaco, July 1917 (*M*); Lewis & Clark State Park, August 20, 1944 (*Knowlton*); Olympia, July 28, 1917 (*M*); Pullman, Saints Rest, June 11, 1921 (*M*); Seattle, June 16, 1920 (*M*); Walla Walla, Mill Creek, July 26, 1922 (*M*).

Dicranoptycha nigrogenualis sp. nov.—General coloration gray, the praescutum with indications of three faintly indicated more brownish stripes; halteres whitened; legs with all coxae yellow; femora yellow, the tips conspicuously blackened, the tibial bases more narrowly darkened; wings brownish yellow, veins brown, except in the brighter costal field; male hypopygium with the outer dististyle relatively slender, its apical spine of moderate length only, the outer half with small appressed spines; inner dististyle darkened, the apex dilated, subtruncate, with about three unusually strong yellow setae.

♂. Length, about 10.5 mm.; wing, 10 mm.

♀. Length, about 11 mm.; wing, 11 mm.

Rostrum dark gray; palpi black. Antennae with the scape dark brown; pedicel obscure yellow; flagellum dark brown, the proximal two or three segments a little brightened; flagellar segments nearly cylindrical, the outer ones elongate; verticils longer than the segments. Head gray.

Thorax gray, the praescutum with indications of three faintly indicated more brownish stripes, the scutal lobes similarly darkened. Pleura uniformly clear light gray, including the dorsopleural region. Halteres whitened. Legs with all coxae yellow, the fore pair very narrowly and indistinctly more darkened at bases; trochanters yellow, the tips conspicuously blackened, the fore pair slightly more extensively so; tibiae yellow, the bases and tips narrowly blackened; basitarsi obscure brownish yellow, passing into dark brown; outer tarsal segments black. Wings brownish yellow, the prearcular and costal fields clearer yellow; veins dark brown, yellow in the brightened fields. Venation: *Rs* a little longer than cell *1st* M_2 and somewhat less than twice the basal section of R_{4+5}; cell *1st* M_2 shorter than any of the cells beyond it; *m-cu* more than one-half its length beyond the fork of *M*.

Abdomen black, sparsely pruinose; hypopygium black. Male hypopygium (Fig. 10) with the tergal arms, *9t*, relatively slender, the tip directed laterad into a slender spine, the outer margin with a low flange. Outer dististyle relatively slender, its apical spine moderately long; surface of outer two-fifths with relatively small appressed spines; basal half of outer surface with delicate setulae. Inner dististyle with basal half stout, the outer portion more narrowed, the apex a trifle dilated, subtruncate at tip and here with three or four unusually strong yellow setae.

Holotype, ♂, Boulder Lake Trail from Olympic Hot Springs, Olympic National Park, altitude 3,400 ft., August 5, 1947 (*M. M. Alexander*). Allotype, ♀, Sahale Falls, Mt. Hood, Oregon, altitude 4,575 ft., July 17, 1947 (*C. P. Alexander*).

The present fly is closest to *Dicranoptycha occidentalis* Alexander, 1927,

and *D. quadrivittata* Alexander, 1919, from which it differs in the coloration of the body and legs and in the structure of the male hypopygium.

PEDICIINI

Ula (*Ula*) *paupera* Osten Sacken, 1869.—Olympic National Park: Olympic Hot Springs, 2,200-2,500 ft., August 4-5, 1947 (*A*).

Pedicia (*Pedicia*) *parvicellula* Alexander, 1938.—Washington State, *H. K. Morrison;* Bigot Collection. Mt. Baker: Galena Camp, 4,000 ft., August 11-14, 1947 (*A*), swept from mountain hemlock. Mt. Rainier: Longmire Springs, 2,800 ft., August 10, 1946 (*A*), a single male, going through all the motions of swarming, flying in great graceful loops; 4,700 ft., August 13, 1940 (*Townes*). Twanoh State Park, September 22, 1946 (*Fender*).

Ornithodes harrimani Coquillett, 1900.—Mt. Rainier: Longmire Springs, 2,800 ft., August 23, 1947, at light (*Remington*).

Pedicia (*Tricyphona*) *ampla* (Doane, 1900).—Seattle (*Piper*), type. Orcas Island, above Mountain Lake, August 18, 1925 (*M*).

Pedicia (*Tricyphona*) *aperta* (Coquillett, 1905).—Mt. Baker: Galena Camp, 4,000 ft., August 10-14, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 10, 1946 (*A*), August 23, 1947, at light (*Remington*). Mt. St. Helens: Toutle River, near Spirit Lake, 3,000 ft., July 20, 1947 (*A*); Timberline, 4,500 ft., July 21, 1947 (*A*). East Port Orchard, September 26, 1946 (*Fender*); Glenwood Road, Klickitat River, July 23, 1921 (*M*). Venation (Fig. 11).

Pedicia (*Tricyphona*) *bicomata* Alexander, 1943.—Mt. Rainier: Longmire

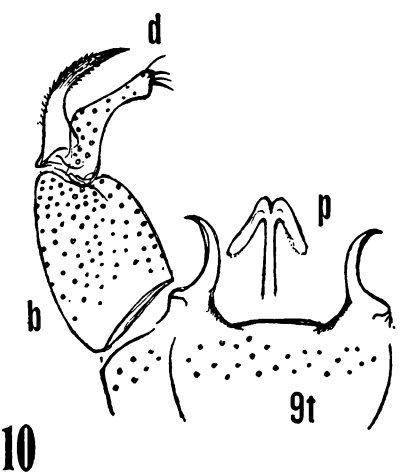


Fig. 10.—*Dicranoptycha nigrogenualis* sp. nov., male hypopygium. (Symbols: *b*, basistyle; *d*, dististyle; *p*, phallosome; *t*, tergite).

Springs, 2,800 ft., August 10, 1946 (*A*), June 27, 1935 (*M*); Texaco Pond, 2,000 ft., July 31, 1947 (*A*); Wonderland Trail, above White River, 4,800 ft., August 1, 1947 (*A*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). East Port Orchard, September 23-26, 1946 (*Fender*); Ilwaco, July 1917 (*M*); Lewis & Clark State Park, September 28, 1946 (*Fender*); Twanoh State Park, September 22, 1946 (*Fender*).

Pedicia (*Tricyphona*) *constans* (Doane, 1900).—Olympia, May 6, 1894 (*Kincaid*); Seattle, May 10, 1897 (*Kincaid*), types. Olympic National Park: Olympic Hot Springs, August 7, 1947 (*A*). Mt. Rainier: Longmire Springs, June 19, 1917 (*Dyar*), August 10, 1946 (*A*). East Port Orchard, September 23-26, 1946 (*Fender*); Everett, July 6, 1924 (*M*); Selah, Yakima Valley, July 15, 1941 (*Brookman*).

Pedicia (*Tricyphona*) *degenerata* (Alexander, 1917).—Mt. Baker: Galena Camp, 4,000 ft., August 10-14, 1947 (*A*), common, including one fully-winged male. Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Nisqually Glacier Trail, 4,000 ft., July 23, 1947 (*A*), swept from beds of *Claytonia,* sp.; Wonderland Trail, above White River, 5,700 ft., August 1, 1947 (*A*). High Canadian or low Hudsonian zone.

Pedicia (*Tricyphona*) *diaphana* (Doane, 1900).—Olympia, March 16, 1896 (*Kincaid*); Pullman, May 4, 1898 (*Doane*); Seattle (*Kincaid*), types. Mt. Baker: Galena Camp, 4,000 ft., August 13, 1947 (*A*), darker than normal, especially the wings, which approach the condition in the closely allied *exoloma.* Mt. Rainier: Longmire Springs, 2,800 ft., June 19, 1917 (*Dyar*). Venation (Fig. 12).

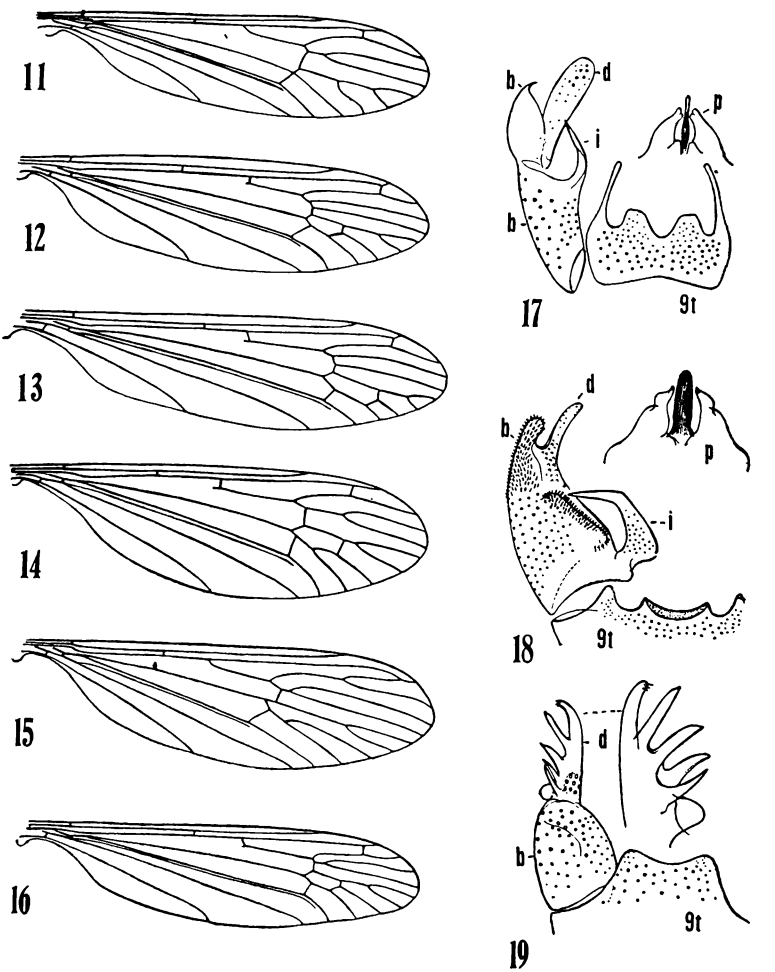
Pedicia (*Tricyphona*) *exoloma* (Doane, 1900).—Pullman, April 20, 1897 (*Doane*), types. Venation (Fig. 13).

Pedicia (*Tricyphona*) *glacialis* (Alexander, 1917).—East Port Orchard, September 23-26, 1946 (*Fender*); Hoodsport, September 22, 1946 (*Fender*); Lewis & Clark State Park, September 28, 1946 (*Fender*); Twanoh State Park, September 22, 1946 (*Fender*). Venation (Fig. 14).

Pedicia (*Tricyphona*) *protea* (Alexander, 1918).—Mt. Rainier, without exact data, type. Mt. Baker: Above Galena Camp, 4,100 ft., August 13, 1947 (*A*). Olympic National Park: Boulder Lake Trail, along mountain stream, 3,500 ft., August 5, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., June 19, 1917 (*Dyar*), August 23, 1947, at light (*Remington*); Van Trump, July 21, 1922 (*M*); Wonderland Trail, above White River, 4,600-5,500 ft., August 1, 1947 (*A*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*). Barnes State Reservation, September 27, 1946 (*Fender*); East Port Orchard, September 23-26, 1946 (*Fender*); Ilwaco, May 5, 1918 (*M*); Lewis & Clark State Park, September 28, 1946 (*Fender*).

One of the most remarkable crane-flies ever discovered. It furnished the explanation of various disputed points concerning the wing venation, particularly of the radial field, with the result of changing the interpretation of the veins not merely in the Tipulidae but, by homology and phylogeny, through-

out the entire order Diptera. I have figured the wing in various earlier papers and have added it here in order to make it more readily available (Fig. 15). The male hypopygium (Fig. 17) has the tergite, *9t*, transverse, its caudal border with a flattened lobe on either side of the broad central emargination, the apex of the lobe truncated or nearly so; lateral tergal arms produced caudad as slender rods, their outer ends a trifle more expanded. Basistyle, *b*,



Figs. 11-19.—11. *Pedicia* (*Tricyphona*) *aperta* Coquillett, venation; 12. *Pedicia* (*Tricyphona*) *diaphana* Doane, venation; 13. *Pedicia* (*Tricyphona*) *exoloma* Doane, venation; 14. *Pedicia* (*Tricyphona*) *glacialis* Alexander, venation; 15. *Pedicia* (*Tricyphona*) *protea* Alexander, venation; 16. *Pedicia* (*Tricyphona*) *rainieria* Alexander, venation; 17. *Pedicia* (*Tricyphona*) *protea* Alexander, male hypopygium; 18. *Pedicia* (*Tricyphona*) *rainieria* Alexander, male hypopygium; 19. *Pedicia* (*Tricyphona*) *smithae* Alexander, male hypopygium. (Symbols: *b*, basistyle; *d*, dististyle; *i*, interbase; *p*, phallosome; *t*, tergite).

with its apex narrowed into a flattened pale blade, the tip of which is further narrowed into a sharp spine; interbase, *i*, a broad-based rod, narrowed into a slightly twisted slender blade, its tip acute. Dististyle, *d*, single, appearing as a flattened pale blade that is slightly longer than the lobe of the basistyle, the apex obtuse; surface of dististyle with scattered pale setae, some of the outer ones stouter but pale. Phallosome, *p*, small and compact, as usual in the tribe Pediciini; aedeagus slender, weak. It should be emphasized that there are no blackened spinous pegs on either the basistyle or dististyle, a common condition elsewhere in the tribe.

Pedicia (*Tricyphona*) *rainieria* (Alexander, 1924).—Mt. Rainier: Burrough's Mt., August 21, 1934 (*M*); Longmire Springs, June 1917 (*Dyar*), type. Venation (Fig. 16): Among variations, Sc_2 in cases lies much farther distad than shown; *Rs* sometimes long-spurred at origin, in cases with the spur jutting basad to opposite Sc_2; R_{4+5} sometimes even shorter than shown; cell M_1 variable in length, from exceeding its petiole to only two-thirds as long. Male hypopygium (Fig. 18) with the tergite, *9t*, extensive, the median region more produced into a subtruncate central lobe, in cases longer or more protruded than shown. Basistyle, *b*, with apex and the low lateral lobe densely provided with short spinous setae or peglike spines; interbase, *i*, a powerful curved sabre-like blade, narrowed to the acute tip; basal portion with numerous pale setae, long but inconspicuous because of their color. Dististyle, *d*, much smaller than the interbase, appearing as a flattened blade, the tip narrowly obtuse; basal portion of style with scattered tubercles that bear long pale setae; outer half or more of style with scattered microscopic punctures. Phallosome, *p*, with the aedeagus relatively stout, blackened.

Pedicia (*Tricyphona*) *septentrionalis septentrionalis* (Bergroth, 1888) (*sparsipuncta* Alexander, 1920).—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 10, 1946 (*A*), in small swarms along stream.

Pedicia (*Tricyphona*) *septentrionalis vitripennis* (Doane, 1900).—Olympia, April 11, 1894 (*Kincaid*); Wawawai, April 24, 1897 (*Doane*), types. Wawawai, 2,400 ft., May 28, 1922 (*M*).

Pedicia (*Tricyphona*) *smithae* Alexander, 1941.—Olympic National Park: Boulder Lake Trail, 4,000 ft., August 5, 1947 (*A*). Mt. Rainier: Alta Vista, July 28, 1922 (*M*); Cayuse Pass, 4,300 ft., July 30, 1947 (*A*); Indian Henry, August 6, 1922 (*M*); Nisqually Glacier Trail, 4,000 ft., July 23, 1947 (*A*); Paradise Valley, August 1917 (*M*); 5,500 ft., July 23, 1940 (*Townes*), 5,560 ft., August 11, 1946 (*A*); Summerland, July 24, 1924 (*M*); Wonderland Trail, below Yakima, 5,700-6,000 ft., abundant among the spruce and fir, August 1, 1947 (*A*). Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*). Big-4 Mountain, July 5, 1924 (*M*). A characteristic species of the Hudsonian zone.

The type was from Tipsoo Lake, Chinook Pass, Rainier, taken by Dr.

Marion Estelle Smith, for whom the species was named. The altitude as given at the time of the original description is undoubtedly too low and should be approximately 5,450 ft. The venation (Figs. 20, 21), especially of the radial field, is surprisingly variable. In the three diagrams (Fig. 21), A shows vein R_{2+3+4} present as a short element; B has cell R_4 sessile, with veins R_{2+3}, R_4 and R_5 all arising from a single point at the end of the sector; C shows a short fusion of R_{4+5}. All such types of venation occur and are common in this single species. Male hypopygium (Fig. 19) of the general type of *ampla* but with the details of the tergite, *9t*, and dististyle, *d*, quite distinct from this and other members of the *ampla* group. The dististyle is unusually high and vertical in position, placed at the apex of the basistyle which is without apical lobes; the style bears six lobes or blades, the most basal one being an obtuse blade. Tergite with the apex gently emarginate, without lateral lobules.

I had suspected for some time that the female sex of this fly would prove to be short-winged and flightless, since, while the species is often very abundant, only males could be found. This sex was finally discovered on Mt. St. Helens and proved to be brachypterous, as believed.

♀. Length, about 13 mm.; wing, 5.3 x 1.4 mm.

Characters as in the male, differing in the reduced wings. General coloration, including the antennae, much paler than in the male. Antennae 15-segmented, obscure yellow. Mesonotal praescutum buffy yellow, the stripes poorly indicated, present only on the cephalic part. Legs relatively short and stout, as compared with the male, obscure yellow, the femoral tips not or scarcely darkened. Wings brachypterous, as shown by the measurements. Venation normal, not distorted, merely conforming to the reduced size of the wing.

Allotype, ♀, Mt. Saint Helens, Washington, at timberline, 4,300 ft., July 21, 1947 (*M. M. Alexander*).

Pedicia (Tricyphona) tacoma sp. nov.—Size large (wing, male, 16 mm.); mesonotum gray, the praescutum with four conspicuous brown stripes; wings with the ground grayish yellow, with a conspicuous brown pattern, including seams over the crossveins and marginal spots at ends of the longitudinal veins; petiole of cell R_4 very long, nearly two-thirds the cell; cell *1st* M_2 elongate; abdominal segments conspicuously dimidiate, the basal portion brown, the apex yellow; male hypopygium with the interbase a small darkened club; dististyle terminal in position, provided with several black spinous setae, including one of unusual size on the outer margin.

♂ Length, about 16 mm.; wing, 16 mm.; antenna, about 1.9 mm.

Rostrum brown, gray pruinose; palpi dark brown. Antennae short, 15-segmented, dark brown throughout; basal flagellar segments oval, the outer ones much narrowed, subcylindrical; verticils very long, greatly exceeding the segments. Head dark brownish gray; front paler brown.

Pronotum brownish gray, the scutellum and pretergites obscure yellow.

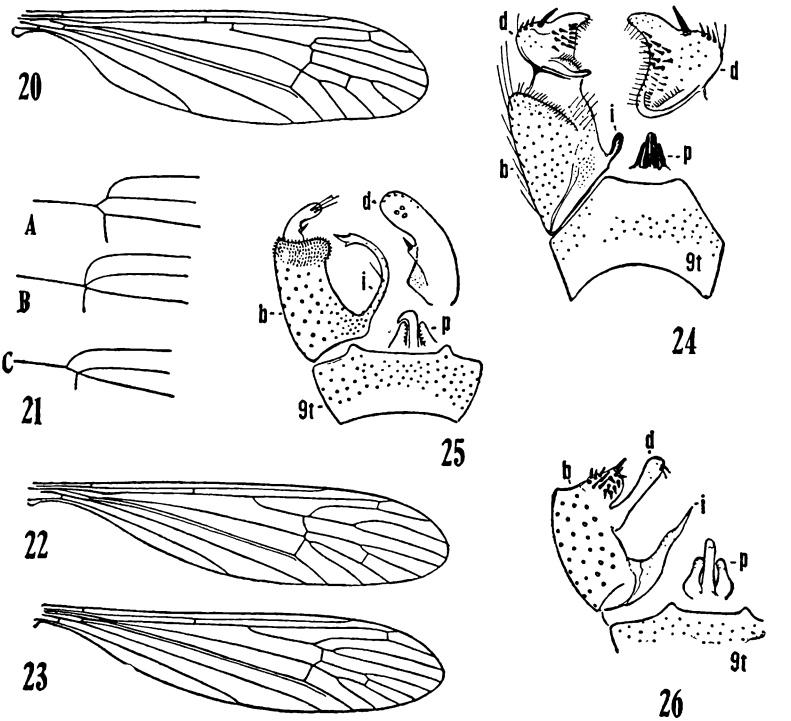
Mesonotal praescutum gray with four conspicuous brown stripes, the intermediate pair separated by a narrow ground line; vestiture of interspaces long, pale; posterior sclerites of notum light gray, the scutal lobes rather indistinctly patterned with brownish gray; posterior portion of mediotergite brown. Pleura gray, the ventral sternopleurite more brownish gray; dorsopleural membrane orange yellow. Halteres yellow. Legs with the coxae yellow, sparsely pruinose; trochanters yellow; a single partial posterior femur remains, this brownish yellow. Wings with the ground grayish yellow, handsomely patterned with brown, as follows: A common major area in bases of cells *R* and *M;* a similarly large subquadrate mark at origin of *Rs,* not reaching vein *M* behind; spots and seams along cord and *m,* fork of *Rs,* all outer forks, and at ends of all longitudinal veins; an additional brown mark near outer end of cell R_4; short supplementary marginal spots in both Anal cells, these surrounding weak vein spurs back from the margin; veins brown, the bullate areas at the cord conspicuous. Venation: Sc_2 lying far basad so Sc_1 is nearly one-half longer than the stem of *Sc* beyond *h;* R_2 transverse, a little shorter than R_{1+2}; *Rs* very long, strongly arcuated at origin which lies just before Sc_2; *r-m* a little shorter than the basal section of R_{4+5}; second section of the latter, or petiole of cell R_4, very long, nearly two-thirds the cell; cell *1st* M_2 elongate; basal section of M_3 about twice the transverse *m; m-cu* at or close to fork of *M;* cord oblique.

Abdominal tergites conspicuously dimidiate, the basal part brown, the somewhat narrower posterior portion obscure yellow; transverse impressed lines of basal rings black, conspicuous; basal tergite gray pruinose; sternites similarly dimidiate but with the basal brown rings paler; outer segments and hypopygium uniformly dark brown. Male hypopygium (Fig. 24) with the tergite, *9t,* narrowed outwardly, the caudal border nearly truncate. Basistyle, *b,* with the interbase, *i,* a small darkened club. Dististyle, *d,* terminal in position, large, armed with strong spinous setae, as shown, one of the latter on outer margin much larger.

Holotype, ♂, Paradise Valley, Mt. Rainier, altitude 5,560 ft., August 11, 1946 (*C. P. Alexander*).

This striking crane-fly is one of the most distinct members of the subgenus so far discovered. From the various species likewise having cell R_4 long-petiolate, including *Pedicia* (*Tricyphona*) *glacialis* (Alexander), the fly differs conspicuously in the heavily patterned wings and in the structure of the male hypopygium. Except for the long-petioled cell R_4 it somewhat more suggests species such as *P.* (*T.*) *auripennis* (Osten Sacken, 1859) or *P.* (*T.*) *rainieria* Alexander but the relationship is remote. The specific name, *tacoma,* is derived from Mount Tacoma, an alternative name for Mount Rainier.

Pedicia (*Tricyphona*) *townesiana* Alexander, 1942.—Mt. Baker: Nooksack River, August 11, 1925 (*M*). Mt. Rainier: Altitude 5,300 ft., August 15, 1940 (*H. K. Townes*), type; altitude 4,500 ft., August 11, 1946 (*A*), along small stream among *Mimulus, Spiraea densiflora,* and others; Longmire Springs, 2,800 ft., August 10, 1946 (*A*), an unusually active flyer for a mem-



Figs. 20-26.—20. *Pedicia* (*Tricyphona*) *smithae* Alexander, venation; 21, the same showing variations in the radial field; 22. *Pedicia* (*Tricyphona*) *townesiana* Alexander, venation; 23. *Pedicia* (*Tricyphona*) *unigera* sp. nov., venation; 24. *Pedicia* (*Tricyphona*) *tacoma* sp. nov., male hypopygium; 25. *Pedicia* (*Tricyphona*) *townesiana* Alexander, male hypopygium; 26. *Pedicia* (*Tricyphona*) *unigera* sp. nov., male hypopygium. (Symbols: *b*, basistyle; *d*, dististyle; *i*, interbase; *p*, phallosome; *t*, tergite).

ber of this tribe, occurring in small swarms of from 3 to 6 individuals, usually over a stream in small areas; Summerland Trail, July 24, 1924 (*M*); Van Trump Creek, September 1, 1917 (*M*); White River, July 20, 1924 (*M*).

Venation (Fig. 22): Among variations may be mentioned the following—R_{1+2} in cases much shorter than R_2; *r-m* variable in position, from before to beyond the fork of *Rs; r-m* at or just beyond the fork of *M*. Male hypopygium (Fig. 25) with the caudal margin of the tergite, *9t*, at either end of the extensive truncated median area with a low knob, provided with delicate setulae only; remainder of ninth segment with numerous setae, those on the sides large. Basistyle, *b*, with the interbase, *i*, a long curved rod, at apex a little dilated into a collar, the tip further produced into a strong pale conical spine; surface of interbase with several strong setae; apex of basistyle a broad low lobe set with numerous blackened spinous pegs. Dististyle, *d*, a flattened blade, its tip obtuse; before apex of blade with three or four long setae; lower

margin near base with a single strong black spine. Phallosome, *p*, small and compact, the aedeagus decurved at apex; margins of the small appressed apophyses with microscopic roughenings.

Pedicia (Tricyphona) unigera sp. nov.—Size relatively small (wing, male, about 8 mm.); mesonotum brownish gray, the praescutum with four brownish stripes; knobs of halteres infuscated; legs brown; wings weakly tinged with brown; cell R_4 deep, its petiole subequal to *r-m*, the latter at midlength of R_{4+5}; cell *1st* M_2 closed, elongate; male hypopygium with the tergite transverse, the margin with two widely separated tubercles; interbase a simple twisted rod, the surface with numerous setae, the tip a pale acute spine; dististyle bifid, the outer portion a low lobe provided with numerous blackened spinous setae, the lower arm a longer pale blade.

♂ Length, about 7 mm.; wing, 8.2 mm.

♀. Length, about 9-12 mm.; wing, 8.8-10.5 mm.

Rostrum short, brownish gray; palpi black. Antennae brownish black, scape pruinose; flagellar segments oval. Head dark grayish brown; anterior vertex broad.

Pronotum brownish gray. Mesonotal praescutum brownish gray with four slightly darker brown stripes, the lateral borders and humeral region paler; tuberculate pits black, pseudosutural foveae pale; scutal lobes dark brown, the posterior and lateral portions paler; scutellum, mediotergite and central part of scutum gray pruinose, parascutella paler; pleurotergite chiefly pale. Pleura brownish gray, the dorsal sternopleurite somewhat paler, the ventral sternopleurite darkest. Halteres with stem yellow, knob infuscated. Legs with the coxae and trochanters pale yellow, remainder of legs brown, scarcely variegated. Wings (Fig. 23) weakly tinged with brown, the oval stigma vaguely darker; wing base a little brightened; veins brown. Venation: Sc_1 ending beyond the fork of R_{4+5}, Sc_2 far before origin of *Rs;* *Rs* long, a trifle shorter than R_{2+3}; R_2 erect or bent slightly backward, longer than R_{1+2}; cell R_4 deep, its petiole subequal to *r-m*, the latter being at midlength of R_{4+5}; cell *1st* M_2 normally closed, elongate, *m* connecting with vein M_2 about its own length beyond the fork; *m-cu* at fork of *M*.

Abdomen dark brown, the caudal borders of the tergites narrowly obscure yellow, of the sternites more broadly so. Male hypopygium (Fig. 26) with the tergite, *9t*, transverse, the caudal margin with two widely separated lobules. Basistyle, *b*, truncate at apex; interbase, *i*, a simple twisted rod or blade, gradually narrowed to an acute pale spine; surface with numerous setigerous punctures that bear pale inconspicuous setae. Dististyle, *d*, large and complex, bifid, the outer portion a low lobe provided with numerous blackened spinous setae, the lower arm a longer pale blade, at its apex expanded into a rounded spatula, the lower margin with two erect setae that are larger and stronger than the other setulae. Phallosome, *p*, having the small simple aedeagus subtended by shorter apophyses, the tips of the latter obtusely rounded, with small pale punctures.

Holotype, ♂, Hazel Creek, 5 miles above Dexter, Willamette National

Forest, Oregon, altitude 990 ft., August 5, 1946 (*C. P. Alexander*); Hazel Creek flows into the Middle Fork of the Willamette River. *Allotopotype*, ♀, Big Meadow, North Santiam Highway, Oregon, August 17, 1947 (*Fender*). *Paratypes*, 1 ♀, Wonderland Trail, Mt. Rainier, Washington, above White River Camp, 5,500 ft., August 1, 1947 (*M. M. Alexander*), flying over a small mountain stream; 1 ♀, Boulder Lake Trail, Olympic National Park, Washington, 3,500 ft., August 5, 1947 (*M. M. Alexander*), swept from herbage along a small mountain torrent.

The most similar described species is *Pedicia* (*Tricyphona*) *townesiana* Alexander, 1942, which differs in the body coloration, venation, and in all details of structure of the male hypopygium.

Dicranota (*Dicranota*) *argentea* Doane, 1900 (*montana* Alexander, 1920).—Seattle, March 22, 1898 (*Kincaid*), type of *argentea*. Mt. Rainier: Dutch's Creek, Elbe, July 24, 1947, August 10-13, 1946 (*A*).

Dicranota (*Polyangaeus*) *maculata* (Doane, 1900).—Olympia (*Kincaid*); Seattle (*Kincaid*), types. East Port Orchard, September 23-26, 1946 (*Fender*); Lewis & Clark State Park, September 28, 1946 (*Fender*).

Dicranota (*Rhaphidolabis*) *cayuga* (Alexander, 1916).—Mt. Baker: Galena Camp, 4,000 ft., August 14, 1947 (*A*). Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 10, 1946 (*A*).

Dicranota (*Rhaphidolabis*) *integriloba* Alexander, 1943.—Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*).

Dicranota (Rhaphidolabis) neomexicana subtruncata subsp. nov.—

♂ Length, about 5.5-6 mm.; wing, 6.5-6.8 mm.

♀. Length, about 5-6 mm.; wing, 6-6.5 mm.

Characters as in the typical form, differing in slight details of the male hypopygium. Median region of the ninth tergite virtually truncate, the margin at this point very slightly convex and with a concentration of setae. Two or three setae near apex of dististyle long and conspicuous. In typical *neomexicana* (Alexander, 1912), the median region of the tergite is produced into a broad-based lobe with the setae concentrated at the apex of this produced portion.

Holotype, ♂, Deer Park, Olympic National Park, 5,400 ft., August 6, 1947 (*C. P. Alexander*). *Allotopotype*, ♀ *Paratopotype*, 1 ♂, 1 ♀.

Dicranota (Rhaphidolabis) nooksackensis sp. nov.—General coloration of thorax brownish gray, the praescutum with three brownish black stripes; antennae (male) relatively elongate, exceeding one-fourth the length of wings; wings subhyaline, the stigma darker brown; *Sc* short, Sc_1 ending before the fork of *Rs;* cell R_3 varying from sessile to long-petiolate; male hypopygium with the tergite large, its caudal border emarginate; basistyle on apex of mesal face bearing a long tubercle that terminates in a long straight spine; aedeagus elongate, its tip directed strongly dorsad.

♂. Length, about 5-5.2 mm.; wing, 5.8-6 mm.; antenna, about 1.6-1.7 mm.

♀. Length, about 5.5 mm.; wing, 6.2 mm.

Rostrum gray; palpi black. Antennae 13-segmented, elongate in male, as shown by the measurements; black throughout, the scape a trifle more pruinose; flagellar segments (male) long-oval, verticils about one-half as long as the segments; remainder of surface with shorter coarse setae. In female, antennae shorter but still longer than usual in the genus. Head brownish gray; vertex broad.

Thorax brownish gray, the praescutum with three brownish black stripes; scutal lobes similarly patterned with black; median region of scutum and the scutellum light gray. Pleura and pleurotergite light gray. Halteres brownish black, the base of stem yellow. Legs with the coxae gray pruinose; trochanters yellow; remainder of legs brown, the femoral bases yellow. Wings (Figs. 27, 28) subhyaline, the oval stigma very pale brown; veins dark brown. Venation: *Sc* short, Sc_1 ending about opposite one-half to two-thirds *Rs; Rs* relatively long, angulated and usually spurred beyond origin; cell R_3 sessile (Fig. 28) to petiolate (Fig. 27), in cases with R_{2+3+4} longer than R_2 or the basal section of R_5; R_2 transverse, longer than R_{1+2}; cell M_2 open; *m-cu* from one-third to one half its length beyond the fork of *M*.

Abdomen brownish black, sparsely pruinose; hypopygium dark, the apices of the appendages paling to brownish yellow. Male hypopygium (Fig. 31) with the tergite, *9t,* large, the caudal border broadly emarginate, the base of the notch with pale membrane; outer apical angles slightly produced, the margin back from this point with abundant microscopic spicules; outer lateral portions of tergite behind the apical angles more or less inflated. What appears to represent an interbase is a small slender blade that is separated from the tergite by a deep notch. Basistyle, *b,* on mesal face near apex produced into a strong tubercle that terminates in an even longer straight black spine. Two dististyles, *d,* the outer a fleshy dusky lobe that is slightly enlarged outwardly, the tip broadly obtuse, the surface of the inner face with long erect setae, those of the outer face shorter and more appressed; inner dististyle shorter, terminating in a flattened spatulate blade. Aedeagus, *a,* elongate, conspicuous, the tip directed strongly dorsad.

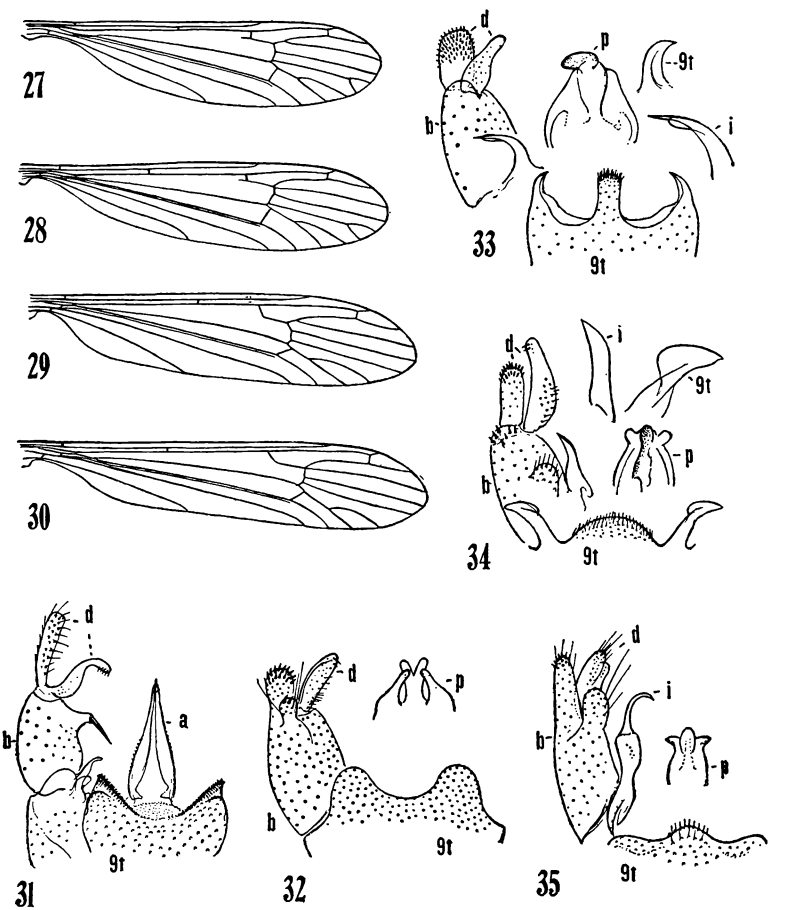
Holotype, ♂, Silver Fir Camp, Mt. Baker, along the banks of the North Fork of the Nooksack River, 1,990 ft., August 13, 1947 (*C. P. Alexander*). *Allotopotype,* ♀, pinned with type. *Paratopotype,* 5 ♂ ♀, August 13-15, 1947 (*C. P. Alexander*).

Dicranota (*Rhaphidolabis*) *nooksackensis* is very different from all other Nearctic species, being most similar in its general facies to species like *D.* (*R.*) *nuptialis* Alexander, 1947. The venation, especially the short *Sc,* structure of the male hypopygium, and the elongate antennae, all mark the species as being very distinct. The venation of the radial field is remarkably variable, lending further strong support to the writer's theory of venation as it pertains to the radial field in the Diptera.

Dicranota (*Rhaphidolabis*) *polymeroides* (Alexander, 1914).—Hoods-

port, September 22, 1946 (*Fender*); Twanoh State Park, September 22, 1946 (*Fender*).

Dicranota (*Rhaphidolabis*) *stigma* (Alexander, 1924).—Mt. Rainier: Longmire Springs, 2,800 ft., June 1917 (*Dyar*), types. No other specimens are known to me with the exception of the paratype from Colorado. This latter, while based on a female specimen, appears to be conspecific but the discovery of the male sex may prove it to be an allied new form.



Figs. 27-35.—27. *Dicranota* (*Rhaphidolabis*) *nooksackensis* sp. nov., venation; 28. the same, variation; 29. *Dicranota* (*Plectromyia*) *kulshanensis* sp. nov., venation; 30. *Dicranota* (*Plectromyia*) *nooksackiae* sp. nov., venation; 31. *Dicranota* (*Rhaphidolabis*) *nooksackensis* sp. nov., male hypopygium; 32. *Dicranota* (*Rhaphidolabis*) *stigma* Alexander, male hypopygium; 33. *Dicranota* (*Plectromyia*) *kulshanensis* sp. nov., male hypopygium; 34. *Dicranota* (*Plectromyia*) *nooksackiae* sp. nov., male hypopygium; 35. *Dicranota* (*Plectromyia*) *cascadica* sp. n., male hypopygium. (Symbols: *b*, basistyle; *d*, dististyle; *i*, interbase; *p*, phallosome; *t*, tergite).

In the structure of the male hypopygium, the species is very peculiar and isolated in the Nearctic fauna but there are more nearly allied species in Eastern Asia. The conformation of the tergite and loss of the interbasal process are especially noteworthy. Male hypopygium (Fig. 32) with the tergite, *9t*, very large, its caudal margin broadly notched, the lateral lobes thus formed narrower than the central emargination, their apices broadly rounded or feebly subtruncate; surface of tergite, including the lobes, with abundant delicate setulae and less abundant scattered pale setae (the latter indicated in the figure by setigerous punctures). Basistyle, *b*, without an interbasal process; at apex with two oval lobes, the outer one larger, provided with about a score of unusually strong spinous setae; the smaller and lower lobe provided with a few scattered very long pale setae and, in some specimens only, with two or three stout spinous setae. Dististyle, *d*, considerably longer than the outer lobe of the basistyle, appearing as an elongate foot-shaped blade, the lower margin of the basal half fringed with about a dozen long setae; face of outer half of style with scattered shorter setae; dorsal edge of style more or less thickened. Phallosome, *p*, small, the aedeagus giving evidence of being bifid or bilobed at apex (this structure visible in one slide only).

Dicranota (*Rhaphidolabis*) *subsessilis* (Alexander, 1921).—Mt. Baker: Swift Creek Trail, 4,300 ft., August 12, 1947 (*A*).

Dicranota (*Rhaphidolabis*) *xanthosoma* Alexander, 1944.—Olympic National Park: Boulder Lake Trail, 2,200-3,500 ft., August 5-7, 1947 (*A*); a few individuals from here and elsewhere have cell *1st* M_2 closed by the retention of *m*. Mt. Rainier: Longmire Springs: 2,800 ft., July 22-23, 1947 (*A*), August 10, 1946 (*A*); Nisqually Glacier Trail, 4,000 ft., July 23, 1947 (*A*); White River, July 20, 1924 (*M*). Mt. St. Helens: Toutle River below Spirit Lake, 3,000 ft., July 20, 1947 (*A*).

Dicranota (Plectromyia) cascadica sp. nov.—General coloration buffy brown, the praescutum with a broad dark brown central stripe and less evident lateral ones; antennae short; wings narrow, subhyaline; cell R_3 long-petiolate, R_{2+3+4} being approximately one half *Rs;* male hypopygium with the median region of the tergite only slightly produced; basistyle at apex produced into two lobes, the outer one more elongate, tipped with strong spinous setae; interbase large and conspicuous, the apical third abruptly narrowed into a gently curved spine.

♂. Length, about 5.5 mm.; wing, 6 mm.

Rostrum brownish black; palpi black. Antennae short, 13-segmented; flagellar segments oval to subcylindrical; verticils shorter than the segments. Head dark gray; anterior vertex narrow.

Pronotum dark brown. Mesonotum light brown or buffy brown, the praescutum with a broad conspicuous dark brown median stripe and paler, narrower lateral ones; mediotergite a trifle darkened. Pleura and pleurotergite buffy. Halteres with the stem yellow, knob infuscated. Legs with the coxae and trochanters yellow; remainder of legs pale brown, the tips of the femora and tibiae weakly more darkened; outer tarsal segments brown. Wings narrow,

subhyaline, the stigma scarcely darker; extreme wing base pale yellow; veins brown, those near base more yellowed. Venation: Sc_1 ending shortly beyond the fork of *Rs*, Sc_2 very far basad, at near mid-distance between arculus and origin of *Rs*, the latter strongly arcuated; cell R_3 long-petiolate, R_{2+3+4} being approximately one-half *Rs*; R_2 transverse; R_{1+2} very short; cell M_3 subequal to its petiole; *m-cu* shortly beyond the fork of *M*; cell *2nd A* broad.

Abdomen dark brown, the hypopygium a trifle more brightened. Male hypopygium (Fig. 35) with the median region of the ninth tergite, *9t*, only slightly produced, moderately convex, with numerous slender setae. Basistyle, *b*, at apex produced into two lobes, an outer cylindrical one that bears approximately a score of strong spinous setae on its apical fourth, and a smaller more oval lobe with fewer very elongate setae; interbase, *i*, large and conspicuous, the expanded basal portion strongly constricted at near midlength, the face of the outer part with a row of about six setae; outer third or less of the structure abruptly narrowed into a gently curved spine, the tip acute. Dististyle, *d*, a little longer than the outer lobe of the basistyle, the apex weakly notched, the upper lobe thus formed provided with several strong setae.

Holotype, ♂, Longmire Springs, Mt. Rainier, 2,800 ft., August 13, 1946 (*C. P. Alexander*).

Dicranota (*Plectromyia*) *cascadica* is entirely distinct from the other regional members of the subgenus in the structure of the male hypopygium, particularly the slightly produced tergite, basistyle, interbase and dististyle. It is most similar to *D.* (*P.*) *nooksackiae* sp. nov. and to *D.* (*P.*) *townesi* Alexander, 1940, of the southern Appalachian mountains.

Dicranota (Plectromyia) kulshanensis sp. nov.—Mesonotum brownish gray, the praescutum with three brown stripes; antennae black throughout; wings milky white, the stigma barely indicated; veins pale brown, inconspicuous; *Rs* angulated and short-spurred beyond origin; cell R_3 short-petiolate; male hypopygium with the median region of tergite produced into an elongate parallel-sided lobe, the lateral tergal arms appearing as small, slightly curved horns, the tips acute; interbase irregularly bidentate at apex; two dististyles, the outer a stout pale lobe that is provided with abundant blackened spines; inner style more or less bottle-shaped, the outer end darkened.

♂ Length, about 6 mm.; wing, 6.7-6.8 mm.

♀. Length, about 6.5 mm.; wing, 6.8 mm.

Rostrum brownish gray; palpi black. Antennae black throughout, apparently 12-segmented; flagellar segments oval. Head buffy gray.

Mesonotum brownish gray, the praescutum with three brown stripes, the median one more or less divided to produce four vittae; scutal lobes darkened; median region of scutum and the scutellum more testaceous yellow; postnotum and pleura pale gray, the ventral sternopleurite slightly more darkened. Halteres pale, the knobs darkened. Legs with the coxae and trochanters pale yellow; remainder of legs brown, the femoral bases restrictedly pale yellow. Wings (Fig. 29) milky white, the stigma barely indicated; veins pale brown,

inconspicuous, the more basal veins, especially *M*, very pale. Venation: *Sc* long, Sc_1 ending some distance beyond the fork of R_{2+3+4}; *Rs* angulated and short-spurred beyond origin; cell R_3 short-petiolate by an element R_{2+3+4}; R_2 transverse, in cases subobsolete; M_4 subequal to or longer than the second section of M_{3+4}; cell *2nd A* broad.

Abdomen dark brown, very sparsely pruinose; hypopygium yellow. Male hypopygium (Fig. 33) with the median region of the tergite, *9t*, produced into an elongate parallel-sided lobe, the apex truncated to gently convex, the surface with abundant pale setae from pale inconspicuous punctures; lateral tergal arms appearing as small, slightly curved horns, the tips acute. Basistyle, *b*, with the interbase, *i*, much larger than the tergal arms, unequally bidentate at tip, one arm a long slender spine, the other a shorter more flattened blade; apex of basistyle obtusely rounded, without spines. Two dististyles, *d*, the outer a stout pale lobe, its tip obtuse, the outer two-thirds with abundant blackened spines; this style evidently derived from the basistyle but separated therefrom by a distinct suture; inner dististyle subequal in length, appearing as a broad-based lobe that is more or less bottle-shaped, the outer half more narrowed, the tip obtuse, darkened. Phallosome, *p*, small and compact, as common in the tribe; aedeagus darkened, obtuse at tip.

Holotype, ♂, Austin Pass, Mt. Baker, 4,300 ft., along small stream, August 14, 1947 (*C. P. Alexander*). *Allotopotype*, ♀, pinned with type. *Paratopotype*, 1 fragmentary ♂, Swift Creek Trail, Mt. Baker, 4,300 ft., August 12, 1947 (*C. P. Alexander*); *paratypes*, ♂ ♀, Boulder Lake Trail, Olympic National Park, 3,500 ft., August 5, 1947 (*C. P. Alexander*).

Most similar to species such as *Dicranota* (*Plectromyia*) *cascadica* sp. nov., and *D.* (*P.*) *nooksackiae* sp. nov., all three differing among themselves chiefly in hypopygial characters, as described and figured.

Dicranota (Plectromyia) nooksackiae sp. nov.—Mesonotum brownish yellow, the praescutum with a brownish black median stripe; antennae with scape brownish yellow, flagellum black; wings whitish subhyaline, veins pale brown; cell R_3 narrowly sessile; male hypopygium with the median region of tergite produced into a low convex lobe, the lateral arms twisted, terminating in flattened blades with subacute tips; interbase smaller, horn-like; face of basistyle, opposite the interbase, with a conspicuous setiferous lobe; apex of basistyle with a few spinous points.

♂. Length, about 4.8-5 mm.; wing, 5-5.5 mm.

Rostrum testaceous yellow; palpi black. Antennae 13-segmented; scape brownish yellow, pedicel a trifle darker, flagellum black; flagellar segments oval, the verticils subequal in length to the segments. Head brownish gray.

Pronotum brown. Mesonotal praescutum brownish yellow, with a broad brownish black median stripe and scarcely indicated lateral ones; scutal lobes weakly darkened, the remainder of mesonotum brownish yellow. Pleura brownish yellow, including the dorsopleural membrane. Halteres yellow, the knobs brownish black. Legs with the coxae and trochanters yellow; remainder of legs brown, the femoral bases restrictedly yellow; tarsi darker. Wings

(Fig. 30) whitish subhyaline, entirely unpatterned; prearcular field a little more yellowed; veins brown, those near the wing base, including the main stem of *M,* paler. Venation: *Sc* long, Sc_1 ending about opposite one-third the length of R_{2+3}, Sc_2 at near midlength of *R; Rs* relatively long, angulated at origin; R_2 slightly oblique, about three times R_{1+2}; cell R_3 narrowly sessile, vein R_4 in direct alignment with *Rs;* cell *2nd A* relatively wide.

Abdomen dark brown, with an even darker subterminal ring; hypopygium obscure yellow. Male hypopygium (Fig. 34) with the median region of tergite, *9t,* produced into a low convex lobe, the surface with abundant pale setae; lateral tergal arms appearing as long twisted rods that terminate in a flattened blade, the tip subacute. Basistyle, *b,* with the interbase, *i,* a smaller horn, its tip acute; face of style opposite the interbase with a conspicuous lobe that is provided with long coarse setae; apex of basistyle with relatively few blackened spines. Two dististyles, *d,* the outer at apex with about a score of blackened spines; inner style about one-third longer, narrowed to the obtuse tip. Phallosome compact, the aedeagus blackened.

Holotype, ♂, Silver Fir Camp, Mt. Baker, 1,990 ft., along the North Fork of the Nooksack River, August 13, 1947 (*C. P. Alexander*). *Paratypes,* 6 ♂♂, Big Meadow, North Santiam Highway, Oregon, August 17, 1947 (*Fender*).

Dicranota (*Plectromyia*) *nooksackiae* is quite different from the other regional members of the subgenus, differing particularly in the structure of the male hypopygium, as the ninth tergite and interbase. Superficially it is most like *D.* (*P.*) *kulshanensis* sp. nov., which has the male genitalia quite distinct.

Dicranota (*Plectromyia*) *reducta* (Alexander, 1921).—Mt. Baker: Galena Camp, 4,000 ft., August 10-14, 1947 (*A*). Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., July 22, 1947, August 10-13, 1946 (*A*); below Paradise Valley, 4,700 ft., July 11, 1940 (*Townes*), 5,200 ft., August 11, 1946 (*A*). Mt. St. Helens: Toutle River below Spirit Lake, 3,000 ft., July 20, 1947 (*A*).

HEXATOMINI

Paradelphomyia (*Oxyrhiza*) *pacifica* (Alexander, 1944).—Mt. Rainier: Longmire Springs, 2,800 ft., July 22-24, 1947 (*A*); Wonderland Trail, above White River, 4,700-4,800 ft., August 1, 1947 (*A*). Barnes State Reservation, September 27, 1946 (*Fender*); Everett, July 4, 1924 (*M*); Ilwaco, May 5, 1918 (*M*); La Center, July 6, 1917 (*M*); Lewis & Clark State Park, September 28, 1946 (*Fender*); Twanoh State Park, September 22, 1946 (*Fender*).

Austrolimnophila badia (Doane, 1900).—Olympia, May 1, 1894 (*Kincaid*), type. Mt. Baker: Glacier, June 4, 1917 (*Dyar*). Olympic National Park: Lake Cushman, June 27, 1917 (*Dyar*). Mt. Rainier: Ashford, June 9, 1921 (*Dyar*); Elbe, 1,200 ft., July 24, 1947 (*A*); Longmire Springs, 2,800 ft., June 27, 1935 (*M*). Everett, June 19, 1920 (*M*); Hoquiam, May 27,

1917 (*Dyar*); Ilwaco, May 5, 1918, July 12, 1922 (*M*); La Center, July 8, 1917 (*M*); Olympia, June 22, 1920 (*M*); Seattle, May 21, 1897 (*Kincaid*), larvae on May 7, 1942 (*E. I. Smith,* in U.S.N.M.); Snoqualmie Falls, May 16, 1931 (ex *Kincaid*); Valleyford, May 29, 1921 (*M*).

Pseudolimnophila contempta (Osten Sacken, 1869) (*nigripleura* Alexander & Leonard, 1914).—Walla Walla, 1,000 ft., May 28, 1938 (*M. C. Lane*). Doubtful record; see discussion earlier under Walla Walla.

Dactylolabis adventitia Alexander, 1942.—Pullman, Lyle Grove, May 1921, May 30, 1922 (*M*); Wawawai, on bluffs along the Snake River, April 7, 1918 (*M*).

Dactylolabis nitidithorax (Alexander, 1918).—Olympic National Park: Boulder Lake Trail, 3,200-3,500 ft., August 5, 1947, in small swarms near ground beneath fir and mountain hemlock (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., July 22, 1947 (*A*), August 10-13, 1946 (*A*). Mt. St. Helens: Toutle River below Spirit Lake, 3,000 ft., July 20-21, 1947 (*A*), in small swarms near decaying coniferous logs in woods; when at rest on leaves, the wings held incumbent over back; rest on leaves of alder, vanilla leaf, dwarf cornus and other low plants. It should be noted that some specimens, particularly the females, have the praescutal stripes and disk more yellowed than normal for the species.

Dactylolabis pteropoecila (Alexander, 1921).—Forks, July 1, 1920 (*E. P. Van Duzee*), type.

Dactylolabis sparsimacula Alexander, 1942.—Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Tipsoo Lake, Chinook Pass, 5,400 ft., July 31, 1947 (*A*); Wonderland Trail and Yakima Park, 5,700-6,500 ft., August 1-3, 1947 (*A*).

Phyllolabis fenderiana sp. nov.—General coloration dark brown, the mesonotum unpatterned; antennal flagellum black; wings with a strong brownish tinge, the stigmal region somewhat darker brown; *Rs* and R_{2+3+4} subequal in length, a little shorter than vein R_3; male hypopygium with the appendage of the ninth sternite unequally trilobed; outer portion of basistyle produced into two lobes; upper dististyle a slender sinuous rod, at apex expanded into a head; gonapophyses very slender.

♂ Length, about 6-7.5 mm.; wing, 6.3-7.4 mm.

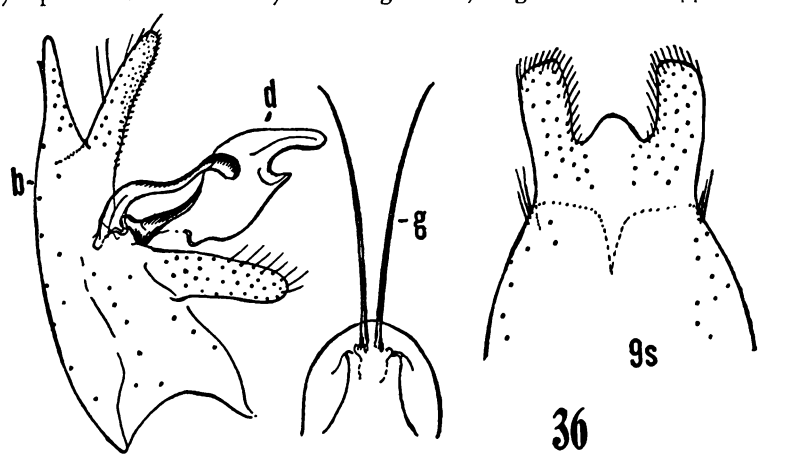
♀. Length, about 7 mm.; wing, 7.5 mm.

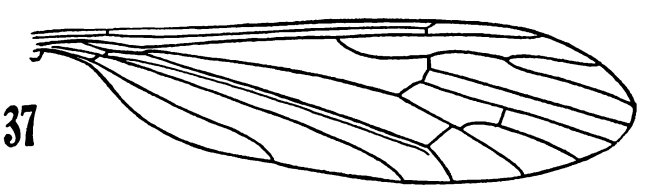
Rostrum gray; palpi dark brown. Antennae with scape gray pruinose, pedicel brown, flagellum black; flagellar segments subcylindrical to elongate-oval, the verticils exceeding the segments. Head brownish gray, the anterior vertex clearer brown.

Pronotum dark brown. Mesonotum almost uniformly dark brown, unpatterned, the pretergites restrictedly obscure yellow; parascutella and posterior portions of scutal lobes more yellowed. Pleura almost uniformly dark brown,

the dorsopleural membrane and propleura somewhat paler. Halteres with stem dirty white, the knob infuscated. Legs with the coxae obscure yellow, the fore pair somewhat more darkened; trochanters obscure yellow; remainder of legs dark brown, the bases of the femora obscure yellow. Wings (Fig. 37) with a strong brownish tinge, the stigmal region somewhat darker brown; prearcular field a trifle more yellowed; veins brown, somewhat paler at and near the wing base. Costal border above the stigma trifle dilated but not to such a degree as in *lagganensis*. Venation: *Rs* and R_{2+3+4} subequal in length, both a little shorter than vein R_3; cell *1st* M_2 long, subequal to the distal section of vein M_{1+2}; *m-cu* a short distance before the fork of M_{3+4}.

Abdomen, including the hypopygium, dark brown, the eighth segment still darker. Male hypopygium (Fig. 36) with the ninth sternite narrowed outwardly, its base darkened, the appendage, *9s*, abruptly yellow, conspicuously trilobed; lateral lobes longer, broadly obtuse at tips, provided with long setae, especially at apex and on inner margin; median lobe low and obtuse, glabrous. Basistyle, *b*, produced beyond the point of insertion of the dististyles, the apex conspicuously bilobed; outer lobe shorter and more sclerotized, acute at tip and bearing a small secondary point on outer face before tip; inner lobe obtuse at tip, the apex and lower margin with abundant short setae; mesal face of basistyle proximad of the dististyles bearing a fleshy fingerlike lobe. Upper disti-





Figs. 36-37.—36. *Phyllolabis fenderiana* sp. nov., male hypopygium; 37, *Phyllolabis fenderiana* sp. nov., venation. (Symbols: *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *s*, sternite).

style a narrow sclerotized glabrous rod, very sinuous, at apex expanded into a flattened obtuse head. Inner dististyle, *d*, longer, glabrous, shaped about as figured, the outer lobe obtuse. Gonapophyses, *g*, appearing as unusually slender spines, narrowed to the very slightly curved tips.

Holotype, ♂, Sahale Falls, East Fork of the Hood River, Mt. Hood, Oregon, altitude 4,575 ft., August 8, 1946 (*K. M. Fender*), swept from sparse vegetation at foot of falls. *Allotopotype*, ♀, July 17, 1947 (*K. M. Fender*). *Paratypes*, several ♂ ♀, Galena Camp, Mt. Baker, altitude 4,000 ft., August 10-14, 1947 (*M. M. and C. P. Alexander*). The paratypical series was found on sloping rock exposures near our camp, described earlier. They were found walking about over the rock surfaces or resting on the white heather, *Cassiope Mertensiana*, nearby. A few pairs were taken while "in copula." Although the immature stages could not be located, it seems evident that they occur in the thin sheets or mats of moss that cover parts of these rocky outcrops. The species was commonly found in association with *Elliptera astigmatica* which it superficially resembles. Adjoining the margins of the outcrops were extensive beds of a saxifrage, *Saxifraga ferruginea* Graham, on this date in full flower.

I take unusual pleasure in dedicating this interesting species to Kenneth Mark Fender, to whom we owe much of our recent knowledge of the insect fauna of the Pacific Northwest. The fly is entirely distinct from the other known species in the structure of the male hypopygium, particularly the bilobed apex of the basistyle, the conformation of the appendage of the ninth sternite, and the structure of the outer dististyle. It is most similar to species such as *Phyllolabis bryantiana* Alexander, 1931, and *P. latifolia* Alexander, 1920, yet entirely distinct.

Phyllolabis lagganensis Alexander, 1931.—Mt. Baker: Galena Camp, 4,100 ft., August 12, 1947 (*A*), swept from mountain hemlock on talus slopes above the camp; associated with the Ascaphid frog, *Ascaphus truei* Stejneger. Mt. Rainier: Cayuse Pass, 4,300 ft., July 30, 1947 (*A*).

Limnophila (*Elaeophila*) *aldrichi aldrichi* Alexander, 1927.—Mt. Baker: Galena Camp, 4,000 ft., August 11, 1947; males in small swarms at dusk (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 23, 1947 (*Remington*).

Limnophila (Elaeophila) aldrichi abrupta subsp. nov.—Thorax gray, the praescutum with four poorly-indicated more brownish gray stripes; antennal flagellum yellow; femora yellow, the tips narrowly and rather inconspicuously darkened; wings whitish subhyaline, conspicuously patterned with brown, all markings being restricted to the vicinity of the veins; abdomen bicolored, the segments obscure yellow with about the outer third brown; male hypopygium with the outer dististyle relatively narrow, the outer flange small, pointed, placed at near midlength of the outer margin.

♂ Length, about 7-8 mm.; wing, 8-9 mm.; antenna, about 1.4-1.5 mm.

Rostrum gray; palpi brownish gray. Antennae with the scape pruinose; pedicel brownish testaceous; flagellum light yellow, the outer segments a trifle

more darkened; basal flagellar segments oval, the outer ones more elongate; verticils longer than the segments. Head brownish gray.

Pronotum gray. Mesonotum gray or brownish gray, the praescutum with four poorly-indicated more brownish gray stripes, the intermediate pair separated by a line that is about one-third to one-fourth the width of either stripe; scutal lobes vaguely darkened. Pleura dark gray, the dorsopleural membrane dusky. Halteres pale yellow. Legs with the coxae pale brown to brownish yellow, the posterior pair clearer yellow; trochanters yellow; femora yellow, the tips narrowly and rather inconspicuously darkened; tibiae and proximal three tarsal segments yellow, the tips very narrowly infuscated; outer tarsal segments more uniformly darkened. Wings (Fig. 38) whitish subhyaline, conspicuously patterned with brown, as follows: An arcular darkening, extending from *h* into the base of cell *Cu;* a second area in costal cell about mid-distant between arculus and origin of *Rs,* not quite reaching *M* behind; a dark area at origin of *Rs,* in the holotype extending the full length of this vein and connecting with the central darkened areas; cord and outer end of cell *1st* M_2 seamed with brown; stigmal area relatively small; small brown marginal spots at ends of all longitudinal veins with the exception of R_5, the largest at R_4, and *2nd A;* cells R_3 and R_5 extensively suffused with brown, especially in the holotype; veins beyond cord brown, basad of cord yellow in the interspaces, brown in the clouded areas. Venation: *Rs* square and spurred at origin; R_2 close or just beyond the fork of R_{2+3+4}; cell M_1 small to very small (in holotype). In the type male there are three adventitious crossveins in cell R_1 above *Rs;* supernumerary crossvein in cell *M* lacking.

Abdomen bicolored, the segments obscure yellow with about the outer third brown; subterminal segments uniformly dark brown to form a subterminal ring; hypopygium more weakly infuscated. Male hypopygium with the outer dististyle relatively narrow, the outer flange small to very small (holotype), pointed, placed below (in type) to near midlength of outer margin of style; margin beyond this point with about 10 to 12 appressed denticles. Inner dististyle long-oval, with about a score of normal setae. In *modoc* both dististyles differ in conformation and armature.

Holotype, ♂, Hood River Meadows, Mt. Hood, Oregon, 4,480 ft., August 8, 1946 (*C. P. Alexander*). *Paratype,* ♂, Olympic Hot Springs, Olympic National Park, Washington, 2,200 ft., August 7, 1947 (*C. P. Alexander*).

The type specimen is the apparently abnormal individual discussed throughout the above description. In most regards, with the exception of the wing pattern and venation, this seems to be identical with the later discovered paratype and until more material is discovered the latter should be considered as being the normal individual. In the type the presence of three extra crossveins in the radial field and the loss of the supernumerary crossvein in cell *M* are very striking characters. From typical *Limnophila* (*Elaeophila*) *aldrichi,* it differs in slight details of coloration and in the structure of the male hypopygium.

Limnophila (*Elaeophila*) *shannoni* Alexander, 1921.—Mt. Rainier: Won-

derland Trail above White River, 5,300 ft., August 1, 1947 (*A*).

Limnophila (*Elaeophila*) *superlineata* Doane, 1900.—Olympia, April 10-19, 1894 (*Kincaid*); Wawawai, April 24, 1897 (*Doane*), types.

Limnophila (*Prionolabis*) *barberi* Alexander, 1916.—Fort Lewis, May 18-19, 1946 (*Arnaud*).

Limnophila (*Prionolabis*) *boharti* Alexander, 1943.—Mt. Rainier: Eagle Peak, July 19, 1922 (*M*); Wonderland Trail, above the White River, 5,700-5,800 ft., August 1, 1947 (*A*). The venation of the male is shown (Fig. 39); in the female, the wings are reduced, apparently more so at the higher altitudes.

Limnophila (*Prionolabis*) *oregonensis* Alexander, 1940.—Ilwaco, May 5, 1918 (*M*).

Limnophila (Prionolabis) paramunda sp. nov.—General coloration black, the praescutum and scutal lobes polished, the remainder pruinose; antennae 16-segmented, the basal flagellar segments suboval, the outer ones cylindrical; halteres yellow; femora yellow, the tips blackened; wings tinged with yellow, restrictedly patterned with brown, including seams over *Rs,* cord and the entire length of vein *Cu;* male hypopygium with the tergal lobe broad, the sternite much narrower, unequally trilobed at apex; lobe on mesal face of basistyle relatively stout; outer dististyle with distal half slender, unequally bifid at tip, without a spine at the point of narrowing.

♂ Length, about 7.5-8.5 mm.; wing, 8-9 mm.

Rostrum and palpi black. Antennae 16-segmented, dark brown, the pedicel and base of first flagellar segment paler; basal flagellar segments suboval or a trifle produced on the lower face; outer eight or nine segments cylindrical, longer than the verticils. Head dark gray.

Pronotum dark gray. Praescutum and scutum black, highly polished; posterior sclerites of notum, including the median region of the scutum, more pruinose. Pleura black, pruinose; dorsopleural membrane brownish yellow. Halteres yellow. Legs with the coxae obscure yellow, sparsely pruinose, the fore coxae darker, especially at bases; trochanters yellow; femora yellow, the tip blackened, broadly so on the fore and middle legs, narrower on the posterior femora where only about the outer eighth is included; tibiae yellow, the extreme base and broader tips infuscated; tarsi brownish black to black. Wings (Fig. 40) with a yellowish tinge, the prearcular and costal fields clearer yellow; a restricted brown pattern, including seams along *Rs,* cord, outer end of cell *1st* M_2 and fork of M_{1+2}; a very broad seam along vein *Cu,* chiefly in cell *Cu;* stigma oval, darker brown; veins brown, yellow in the brightened fields. Venation: Sc_1 ending shortly beyond the fork of *Rs,* Sc_2 at its tip; R_{2+3+4} about one-half longer than the basal section of R_5; cell M_1 shorter than its petiole; *m-cu* at or just beyond one-third the length of cell *1st* M_2.

Abdomen, including hypopygium, black. Male hypopygium (Fig. 42) with the tergite, *9t,* terminating in a broad median lobe, its caudal margin notched, the margin microscopically crenulate; sternite much narrower, the apex unequally trilobed, the median lobule much smaller. Basistyle, *b,* with

the lobe on mesal face relatively stout and conspicuous. Outer dististyle, *od,* with the outer half slender, the tip unequally bidentate, the outer spine more slender; at point of narrowing, the style weakly angulated but not produced into a spine, as in *munda.*

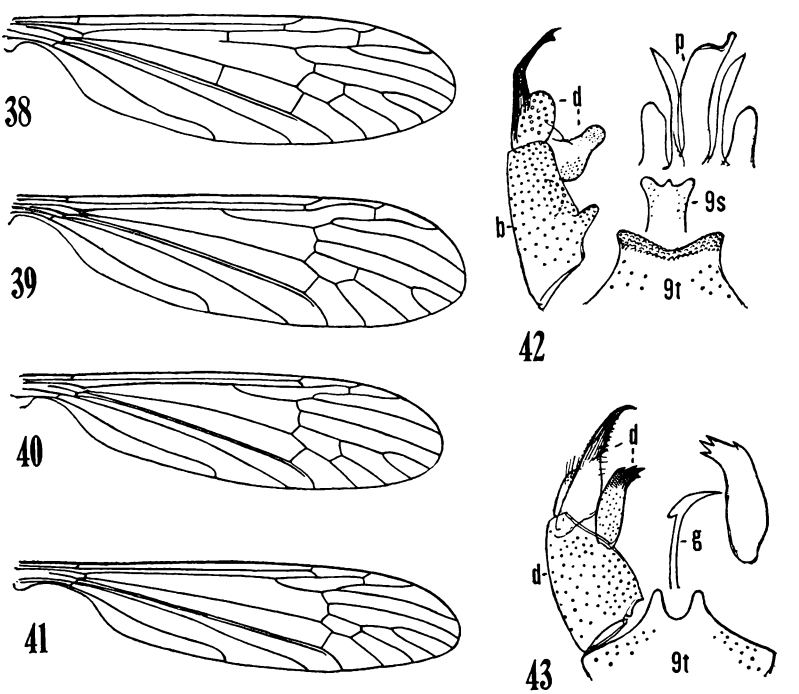
Holotype, ♂, Longmire Springs, Mt. Rainier, 2,800 ft., July 22, 1947 (*C. P. Alexander*). *Paratype,* ♂, Toutle River, below Spirit Lake, Cowlitz Co., July 20, 1947 (*C. P. Alexander*).

The present fly is very close to the eastern Nearctic *Limnophila* (*Prionolabis*) *munda* Osten Sacken, 1869, differing especially in the details of the male hypopygium, particularly of the tergite, sternite and outer dististyle.

Limnophila (*Prionolabis*) *scaria scaria* Alexander, 1945.—Index, August 2, 1917 (*M*).

Limnophila (Prionolabis) scaria trifida subsp. nov.—

♂ Length, about 8.5 mm.; wing, 9.5 mm.; antenna, about 2 mm. Characters as in the typical form, differing chiefly in the structure of the



Figs. 38-43.—38. *Limnophila* (*Elæophila*) *abrupta* sp. nov., normal venation; 39. *Limnophila* (*Prionolabis*) *boharti* Alexander, venation, male; 40. *Limnophila* (*Prionolabis*) *paramunda* sp. nov., venation; 41. *Limnophila* (*Phylidorea*) *olympica* sp. nov., venation; 42. *Limnophila* (*Prionolabis*) *paramunda* sp. nov., male hypopygium; 43. *Limnophila* (*Prionolabis*) *scaria trifida* subsp. nov., male hypopygium. (Symbols: *b,* basistyle; *d,* dististyle; *g,* gonapophysis; *id,* inner dististyle; *p,* phallosome; *s,* sternite; *t,* tergite).

male hypopygium. Antennae black throughout. Thorax gray, the praescutum and scutum less heavily pruinose. Fore femora with only the proximal fifth or sixth yellow, posterior femora with approximately the basal half brightened. Male hypopygium (Fig. 43) with the caudal margin of tergite, *9t*, produced into two slender lobes that are separated by a U-shaped notch. Outer dististyle, *d*, slender, as compared with the typical form, the inner margin with six or seven small teeth. Inner dististyle with the subapical tooth reduced, the apex with three strong teeth. In typical *scaria* the terminal teeth much more numerous. Gonapophyses, *g*, with the expanded heads elongate, produced into a beak, the outer margin at base of head produced backward into a flattened lobe or crest. In the type of *scaria* this prolongation is lacking but is indicated in further material of the race from Oregon.

Holotype, ♂, Longmire Springs, Mt. Rainier, 2,800 ft., July 22, 1947 (*C. P. Alexander*).

Limnophila (*Prionolabis*) *vancouverensis* Alexander, 1943.—Olympic National Park: Forks, July 1, 1920 (*E. P. Van Duzee*), types; Lake Cushman, June 27, 1917 (*Dyar*), types. Mt. Rainier: Ashford, June 7, 1921 (*Dyar*).

(Aldrich, *Catalogue*, p. 90, records *Limnophila* (*Prionolabis*) *rufibasis* Osten Sacken, 1859, from Wawawai, Washington, an evident lapsus for *L.* (*Elaeophila*) *superlineata* Doane, 1900).

Limnophila (*?Prionolabis*) *indistincta* Doane, 1900.—Olympic National Park: Olympic Hot Springs, 2,200 ft., August 7, 1947 (*A*); Lake Cushman, June 27, 1917 (*Dyar*). Mt. Rainier: Ashford, June 6-8, 1921 (*Dyar*); Longmire Springs, 2,800 ft., July 18, 1922 (*M*), August 14, 1917 (*M*), August 10-13, 1946 (*A*); Ohanapecosh Hot Springs, 1,900 ft., July 25, 1947 (*A*); Wonderland Trail, above White River, 5,500 ft., August 1, 1947 (*A*). Mt. St. Helens: Toutle River, below Spirit Lake, 3,000 ft., July 20-21, 1947 (*A*), associated with *Dactylolabis nitidithorax* (Alexander). Everett, June 19, 1920 (*M*); Ilwaco, July 12, 1922 (*M*); Lewis & Clark State Park, August 20, 1944 (*Knowlton*); Shelton, Walker's Park, July 21, 1917 (*M*). The reference of this fly to *Prionolabis* is provisional only.

Limnophila (*?Prionolabis*) *antennata* Coquillett, 1905.—Blewett, July 17, 1920 (*M*); Seattle, May 28 (*Kincaid*). The known range of the species extends from British Columbia, southward in the mountains to central California. The fly has not been adequately described and further notes are supplied herewith. Antennae (male) elongate, the segments long-cylindrical, much longer than the verticils; besides the latter, the segments with abundant erect setulae. Venation (Fig. 45): Sc_1 ending opposite the fork of *Rs* or virtually so, Sc_2 near its tip; *Rs* long; cell R_3 ranging from broadly sessile to very short-petiolate by the presence of a short element R_{2+3+4}, as shown; cell M_1 lacking; *m-cu* from about one-third to shortly before midlength of cell *1st* M_2; anterior arculus preserved. Male hypoygium (Fig. 48) with the caudal margin of the tergite, *9t*, with two very low, widely separated lobes. Basistyle, *b*, with a long-oval thickening or lobe on mesal face, this evidently representing the interbase. Dististyles, *d*, subterminal in position; outer style a stout heavily blackened trispinous structure, the axial or largest spine micro-

scopically scabrous. Phallosome, *p*, cordiform, the aedeagus more or less flattened.

Genus LIMNOPHILA Macquart; **Dendrolimnophila,** subgenus nov.

Antennae 16-segmented. Tibial spurs strong; claws small, simple. Venation (Fig. 44): *Sc* short, Sc_1 ending about opposite three-fifths to five-sixths the length of *Rs*, Sc_2 at or near its extreme tip; *Rs* long, subequal to its anterior branch; R_{1+2} and R_2 subequal; inner ends of cells R_4, R_5 and *1st* M_2 in approximate transverse alignment; cell M_1 lacking; cell *1st* M_2 long, in cases nearly equal to the distal section of vein M_{1+2}, in other specimens shorter; *m-cu* more than its own length beyond the fork of *M;* anterior arculus preserved. Male hypopygium (Fig. 47) with the posterior border of tergite, *9t*, produced caudad into a plate that forks into two glabrous lobes that are separated from one another by a U-shaped notch. Ninth sternite, *9s*, produced, the margin truncate. Basistyle, *b*, with a fingerlike lobe on mesal face at near midlength. Outer dististyle, *d*, a very slender sinuous glabrous rod, the tip unequally bidentate, the outer tooth low and triangular. Inner dististyle a very broad flattened blade, the outer third more narrowed, the tip obtuse. Phallosome, *p*, complex, consisting of paired divergent dusky blades that are tipped with short pale points. Outer portion of phallosome with a group of 10-12 needlelike points; besides this, a pair of pendant yellow structures that terminate in a dense cluster of more than a score of spinous points.

Type of subgenus.—Limnophila (*Dendrolimnophila*) *albomanicata* Alexander, 1945): Western Nearctic Region.

I had earlier referred this fly to the genus *Shannonomyia* Alexander, with a question. The discovery of the male sex shows that it has nothing to do with this latter genus, being more nearly allied to *Prionolabis* and *Phylidorea* in the genus *Limnophila*. The peculiar venational characters include the short subcosta and the loss of cell M_1 of the wings. The only known species is a small pale yellow fly, very conspicuous by the whitened tarsi.

Limnophila (*Dendrolimnophila*) *albomanicata* (Alexander, 1945).—Ilwaco, June 28, 1925 (*M*), type.

Limnophila (Phylidorea) aequiatra sp. nov.— Head and thorax black, heavily gray pruinose; antennae with scape black, pedicel and basal segments of flagellum yellow; femora yellow, the tips narrowly but abruptly black, the amount subequal on all legs; wings yellow, restrictedly patterned with brown; stigma oval, dark brown; *Rs* between three and four times as long as R_{2+3+4}.

♀ Length, about 11-12 mm.; wing, 10-11 mm.

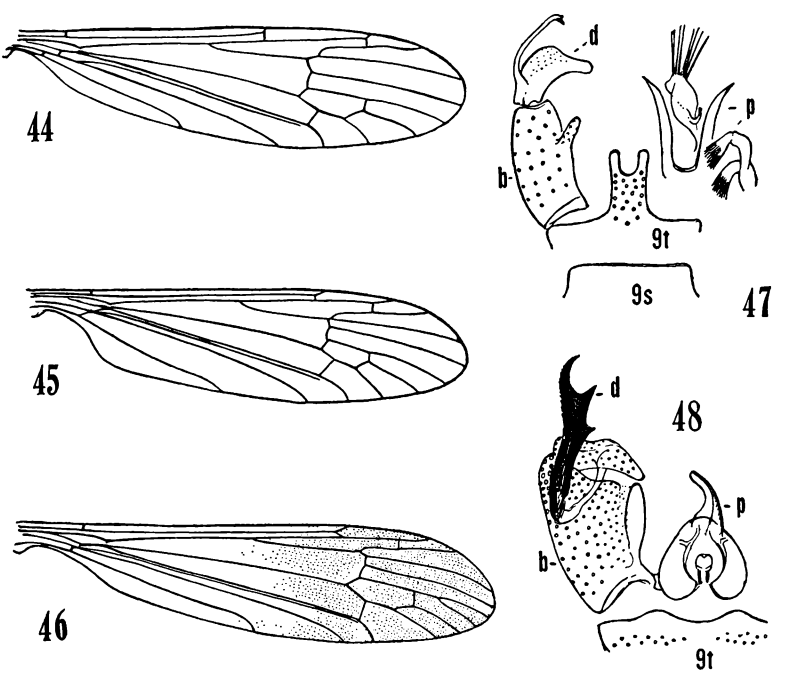
Rostrum dark gray; palpi black. Antennae with the scape black, sparsely pruinose; pedicel and basal segments of flagellum yellow, the outer segments passing into brown; basal flagellar segments oval, the outer ones elongate, with longer verticils. Head dark gray.

Pronotum and mesonotum black, rather sparsely dusted with gray, the praescutum especially so; posterior sclerites of notum and the entire pleura

dark gray. Halteres with stem yellow, knob infuscated. Legs with all coxae brownish yellow; trochanters yellow; femora yellow, the tips narrowly but abruptly black, the amount subequal on all legs, including approximately the outer eighth to tenth of the segments; in cases, a weak infuscation on proximal half of fore femora; tibiae and basitarsi yellow, the tips more narrowly blackened; outer tarsal segments black. Wings yellow, the prearcular and costal fields brighter yellow; a restricted brown pattern, including the oval dark brown stigma and very narrow seams over the cord and outer end of cell *1st* M_2; a conspicuous seam along vein *Cu* in cell *M;* vague and narrow seams over certain of the veins, including *2nd A* and those beyond cord; wing tip in cases vaguely darkened; veins brown, yellow in the brightened portions. Venation: *Rs* from three to four times as long as R_{2+3+4}; cell M_1 longer than its petiole; *m-cu* at near one-third to two-fifths the length of cell *1st* M_2.

Abdomen black, sparsely pruinose. Ovipositor with the genital shield and bases of the valves dark brown, the outer ends of the upcurved cerci horn-yellow.

Holotype, ♀, Galena Camp, Mt. Baker, 4,000 ft., August 11, 1947 (*C. P. Alexander*). *Paratopotypes,* ♀ ♀, August 11-14, 1947 (*C. P. Alexander*);



Figs. 44-48.—44. *Limnophila* (*Dendrolimnophila*) *albomanicata* Alexander, venation; 45. *Limnophila antennata* Coquillett, venation; 46. *Ulomorpha nigrodorsalis* sp. nov., venation; 47. *Limnophila* (*Dendrolimnophila*) *albomanicata* Alexander, male hypopygium; 48. *Limnophila antennata* Coquillet, male hypopygium. (Symbols: *b,* basistyle; *d,* dististyle; *p,* phallosome; *s,* sternite; *t,* tergite).

paratype, 1 ♀, Hood River Meadows, Mt. Hood, Oregon, 4,480 ft., July 17, 1947 (*C. P. Alexander*).

The only other regional member of the subgenus having the thorax entirely black, pruinose with gray, is *Limnophila* (*Phylidorea*) *olympica* sp. nov., which differs in the details of coloration, particularly of the legs. I feel that there are several allied species or well marked races in this particular section of the subgenus in the Pacific Northwest.

Limnophila (*Phylidorea*) *claggi* Alexander, 1930.—Mt. Baker: Swift Creek Trail, 4,500 ft., August 12, 1947 (*A*). Mt. Rainier: Altitude 4,700 ft., July 11, 1940 (*Townes*); Longmire Springs, 2,800 ft., July 20, 1922 (*M*), July 22, 1947 (*A*); Paradise Valley, 5,800 ft., August 11, 1946 (*A*). Ilwaco, May 5, 1918 (*M*); Snoqualmie Pass, July 3, 1940 (*Townes*).

Limnophila (*Phylidorea*) *euxesta* Alexander, 1924.—Olympic National Park: Olympic Hot Springs, 2,200 ft., August 7, 1947 (*A*). Mt. Rainier: Longmire Springs, June 1917 (*Dyar*), types; below Paradise Valley, 4,000 ft., August 11, 1946 (*A*); Narada Falls, August 16, 1917 (*M*).

Limnophila (*Phylidorea*) *flavipila* Doane, 1900.—Pullman, May 13, 1898 (*Doane*), types. Mt. Rainier: Longmire Springs, June 10-19, 1917 (*Dyar*).

Limnophila (Phylidorea) olympica sp. nov.—Thorax almost uniformly blackened, opaque by a gray pruinosity; antennal flagellum dark brown; knobs of halteres dark brown; femora obscure yellow basally, the tips blackened, very broadly so on the fore pair, very narrow on the remaining legs; wings yellow, restrictedly patterned with brown, chiefly as broad seams over the cord and along vein *Cu* in cell *M;* abdomen brownish black; cerci horn yellow.

♀. Length, about 12 mm.; wing, 11.8 mm.

Rostrum brownish black, pruinose; palpi black. Antennae with the scape black, pedicel and flagellum dark brown; flagellar segments subcylindrical, a little shorter than the verticils. Head clear light gray above, somewhat darker behind.

Thorax almost uniformly blackened, opaque by a gray pruinosity; praescutum with the central area a trifle more polished but not otherwise patterned; pseudosutural foveae black; dorsopleural region infuscated. Halteres with the stem light yellow, knob dark brown. Legs with the coxae brownish black, pruinose, the posterior pair somewhat paler apically; trochanters yellow; femora obscure yellow, the tips conspicuously blackened, very broad on the fore pair where only the proximal sixth is brightened, on the middle and hind femora the distal seventh or eighth is blackened; tibiae obscure yellow, the extreme base and tip darkened; basitarsi obscure yellow, the tip and remainder of the tarsi black. Wings (Fig. 41) yellow, the prearcular and costal fields clearer yellow; stigma oval, dark brown; narrow but conspicuous paler brown seams over the cord, outer end of cell *1st* M_2 and along vein *Cu* in cell *M;* still narrower indistinct seams over the longitudinal veins of outer two-thirds or more of wing; veins brownish black, those of the proximal third or more of wing yellowed. Venation: *Rs* moderately long, subequal to or a trifle longer

than cell *1st* M_2; petiole of cell M_1 more than one-half the cell; *m-cu* at near two-fifths the length of cell *1st* M_2.

Abdomen, including the genital shield, dark brown or brownish black; cerci horn-yellow.

Holotype, ♀, Deer Park, Olympic National Park, 5,400 ft., August 6, 1947 (*C. P. Alexander*).

The most similar regional species is *Limnophila* (*Phylidorea*) *aequiatra* sp. nov., which differs in details of coloration, as of the antennae and legs. Previously described species such as *L.* (*P.*) *flavipila* Doane and *L.* (*P.*) *snoqualmiensis* Alexander differ in the coloration of the body, legs and wings.

Limnophila (*Phylidorea*) *snoqualmiensis* Alexander, 1945.—Snoqualmie Pass, 3,000 ft., June 29, 1924 (*M*), types.

Limnophila bigladia Alexander, 1945.—Mt. Rainier: Dutch's Creek, Elbe, 1,200 ft., August 12, 1946 (*A*); Mazama Ridge, July 23, 1922 (*M*); Tipsoo Lake, Chinook Pass, 5,440 ft., July 28-30, 1947 (*A*); Hudsonian zone, swept from low herbage around margin of upper lake; Yakima Park, 6,400 ft., August 3, 1947 (*A*).

Limnophila occidens Alexander, 1924.—Olympic National Park: Boulder Lake Trail, 3,500 ft., August 5, 1947 (*A*); Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Elbe, 1,200 ft., July 24, 1947 (*A*); Longmire Springs, 2,500 ft., amongst beds of skunk cabbage, devil's club, and associates, July 22, 1947, August 13, 1946 (*A*); Wonderland Trail, above White River, 4,800-5,700 ft., August 1, 1947 (*A*).

Limnophila tetonicola Alexander, 1945.—Mt. Rainier: Fairfax Trail, August 9, 1922 (*M*); Wonderland Trail, above White River, 5,500 ft., August 1, 1947 (*A*), flying in small swarms in patches of sunlight beneath mountain hemlock and fir.

Pilaria flava (Garrett, 1925).—Knightmore, August 9, 1919 (*M*).

Ulomorpha nigrodorsalis sp. nov.—Allied to *quinque-cellula;* size large (wing over 9 mm.); general coloration of thoracic notum blackened, the pleura and pleurotergite uniformly yellow; wings yellow, the stigma barely darkened; cell R_3 broadly sessile; cell M_1 present.

♂ Length, about 8.5-9 mm.; wing, 9.5-10 mm.

♀. Length, about 10-10.5 mm.; wing, 10 mm.

Rostrum yellow; palpi brown, passing into black. Antennae with scape obscure yellow, pedicel and flagellum dark brown; flagellar segments elongate-cylindrical, with long conspicuous verticils. Head above dark brown, pruinose.

Pronotum obscure yellow. Mesonotal praescutum with the disk covered by three confluent black stripes, the broad humeral and lateral portions yellow; scutal lobes extensively black, the central part and posterior portion of lobes more yellowed; scutellum brownish black; mediotergite brownish black, heavily pruinose, the sides, pleurotergite and pleura uniformly light yellow. Halteres with stem dirty white, clearer basally, knob infuscated. Legs with the

coxae and trochanters yellow; femora obscure yellow, the tips narrowly infuscated, the amount subequal on all legs; remainder of legs yellow, the terminal tarsal segments infuscated. Wings (Fig. 46) with a strong yellow ground, the stigma barely darkened; veins brown. Macrotrichia of cells including about the distal half of wing or basad to the general level of the origin of *Rs*. Venation: Cell R_3 broadly sessile; cell M_1 preserved; *m-cu* at or just before midlength of cell *1st* M_2. In one paratype, cell M_2 is open by the atrophy of *m* in one wing only.

Abdominal tergites (male) dark brown, the borders narrowly yellow, the sides somewhat more broadly so; sternites yellow; in male, eighth and ninth segments black, the styli obscure yellow; in female, abdominal tergites more uniformly darkened.

Holotype, ♂, Olympic Hot Springs, Olympic National Park, 2,200 ft., August 5, 1947 (*C. P. Alexander*). *Allotopotype,* ♀, pinned with type.

Paratopotypes, ♂ ♀, August 5-7, 1947; *paratypes,* 1 ♂, 1 ♀, Wonderland Trail, Mt. Rainier, 4,800 ft., August 1, 1947 (*M. M. Alexander*).

This fly is readily told from *Ulomorpha quinque-cellula* Alexander, 1920, by the coloration of the thorax. These two species are the only ones in the genus that have cell M_1 preserved.

Ulomorpha sierricola Alexander, 1918.—Olympic National Park: Olympic Hot Springs, 2,200 ft., August 7, 1947 (*A*) Mt. Rainier: specimen without more exact data, type; Nisqually Glacier Trail, 4,000 ft., July 23, 1947 (*A*). Mt. St. Helens: Toutle River, 2,000 ft., July 20, 1947 (*A*).

Hexatoma (*Eriocera*) *austera* (Doane, 1900) (*obscura* Williston, 1893, preoccupied).—Olympia, April 25, 1894 (*Kincaid*), types of *austera;* Seattle (ex *Kincaid*). Washington, without further data; part of type material of *obscura.*

Hexatoma (*Eriocera*) *eriophora* (Williston, 1893).—Washington, without further data, type; Merritt, August 6, 1942 (*Dolley*).

Hexatoma (*Eriocera*) *intrita* Alexander, 1943.—Walla Walla, 1,000 ft., May 28, 1938 (*Lane*), type.

Hexatoma (*Eriocera*) *scullen* Alexander, 1943.—Rustic Inn, 7 miles west of Easton, near Kachess Lake, Wenatchee National Forest, August 13, 1946 (*A*); 1 ♂, resting on a reed at margin of stream.

ERIOPTERINI

Crypteria americana Alexander, 1917.—Mt. Baker: Silver Fir Camp, 1,990 ft., August 15, 1947 (*A*). East Port Orchard, September 23-26, 1946 (*Fender*); Fort Lewis, Northeast Camp, 300 ft., November 22, 1945 (*Gurney*); Lewis & Clark State Park, September 28, 1946 (*Fender*).

Neolimnophila ultima (Osten Sacken, 1859), var.—Mt. Baker: Galena Camp, 4,000 ft., August 12, 1947 (*A*).

Cladura (*Cladura*) *macnabi* Alexander, 1944.—Barnes State Reservation, September 27, 1946 (*Fender*).

Cladura (*Cladura*) *oregona* Alexander, 1919.—Barnes State Reservation, September 27, 1946 (*Fender*); 15 miles north of Schine, September 22, 1946 (*Fender*); Twanoh State Park, September 22, 1946 (*Fender*).

Chionea nivicola Doane, 1900.—Pullman (Doane), types.

Lipsothrix fenderi Alexander, 1945.—East Port Orchard, September 23-26, 1946 (*Fender*); Lewis & Clark State Park, September 28, 1946 (*Fender*).

Lipsothrix nigrilinea (Doane, 1900).—Olympia, May 9, 1894 (*Kincaid*), type.

Gnophomyia (*Gnophomyia*) *tristissima* Osten Sacken, 1859.—Mill Creek, Walla Walla, July 2-6, 1922 (*M*). Doubtful record; see discussion earlier under Walla Walla.

Gonomyia (*Idiocera*) *brookmani* Alexander, 1944.—Naches, Yakima Valley, June 5, 1941 (*Brookman*), types.

Gonomyia (*Idiocera*) *coloradica* Alexander, 1920.—Mt. Rainier: Ohanapecosh Hot Springs, 1,900 ft., July 28-30, 1947 (*A*).

Gonomyia (*Idiocera*) *shannoni* Alexander, 1926.—Wawawai, July 8, 1920 (*Shannon*), types.

Gonomyia (*Lipophleps*) *cinerea* (Doane, 1900).—Pullman, August 10, 1898 (*Piper*), type (♀).

Gonomyia (*Gonomyia*) *aciculifera* Alexander, 1919.—Mt. Rainier: Elbe, 1,200 ft., August 12, 1946 (*A*); White River Camp, 4,400 ft., July 29, 1947, abundant (*A*).

Gonomyia (*Gonomyia*) *bihamata* Alexander, 1943.—Mt. Baker: Galena Camp, 4,000 ft., August 11, 1947 (*A*). Mt. Rainier: Chinook Pass, 5,400 ft., July 29, 1947 (*A*); Longmire Springs, 2,800 ft., July 22, 1947 (*A*); Paradise Valley, 5,500 ft., July 23, 1947 (*A*). This material is not quite typical but does not seem to warrant a new subspecific name.

Gonomyia (Gonomyia) filicauda bidenticulata subsp. nov.—Very close to typical *filicauda* Alexander, 1916, differing chiefly in one apparently important hypopygial character. Inner dististyle with the outer spine forking into two sharp points; in the typical form, the spine longer and entirely simple.

Holotype, ♂, Texaco Pond, Mt. Rainier, 2,000 ft., July 31, 1947 (*C. P. Alexander*). *Allotopotype*, ♀. *Paratopotypes*, 9 ♂ ♀.

Gonomyia (*Gonomyia*) *flavibasis* Alexander, 1916 (*tuberculata* Alexander, 1925).—Selah, Yakima Valley, July 15, 1941 (*Brookman*).

Gonomyia (Gonomyia) isolata sp. nov.—General coloration of praescutum brown, the lateral borders broadly yellow; rostrum orange; antennae black throughout; thoracic pleura yellow, variegated with reddish brown; wings grayish subhyaline, the prearcular and costal fields pale yellow; *Sc* short, Sc_1 ending a short distance before origin of *Rs;* male hypopygium with the flange of outer dististyle conspicuous, at outer end produced into an angular point; inner dististyle with the fasciculate setae placed on individual tubercles that are

separated by a U-shaped emargination; apical blade of aedeagus relatively small.

♂ Length, about 5.5 mm.; wing, 6.3 mm.

Rostrum orange-yellow; palpi black. Antennae black throughout; basal flagellar segments oval, outer ones passing into cylindrical; verticils conspicuous. Front orange; remainder of head gray, the center of occiput orange.

Pronotum and pretergites light yellow. Mesonotum brown, the praescutum with the humeral and lateral borders broadly light yellow; praescutal interspaces indicated behind; scutal lobes dark brown, the median area obscure yellow; mediotergite with a brownish gray hourglass-shaped central mark, the remaining anterolateral portions yellow; pleurotergite uniformly pale yellow. Pleura yellow, the ventral anepisternum and ventral sternopleurite dark reddish brown. Halteres uniformly darkened. Legs with the coxae and trochanters yellow; femora and tibiae obscure yellow, darkened outwardly, the tips dark brown; tarsi brown to brownish black. Wings (Fig. 49) grayish subhyaline, the prearcular and costal fields pale yellow; stigma oval, pale brown; veins brown, more brownish yellow in the brightened fields. Venation: *Sc* short, Sc_1 ending a short distance before origin of *Rs*, Sc_2 some distance from its tip; R_{2+3+4} long, arcuated at origin; *m-cu* close to fork of *M*.

Abdomen dark brown, the lateral tergal borders yellow, the posterior margins narrowly so; sternites and hypopygium yellow. Male hypopygium (Fig. 54) generally as in *bihamata*, differing especially in the structure of the inner dististyle, where the two fasciculate setae are placed on individual tubercles, separated from one another by a broad U-shaped emargination. In *bihamata*, both setae arise from the summit of a single stout tubercle. Flange of outer dististyle broad and conspicuous, at outer end produced into a short point or angle. From the typical form of *bihamata* (Northern and Central Rockies), it differs further in the details of both dististyles and in the small apical blade of the aedeagus, *p*.

Holotype, ♂, Deer Park, Olympic National Park, 5,400 ft., August 6, 1947 (*C. P. Alexander*).

The present fly is closest to *Gonomyia* (*Gonomyia*) *bihamata* Alexander, differing in the genitalic characters, as discussed above. The wide separation of the two fasciculate setae of the inner dististyle is not found in the allied species.

Gonomyia (*Gonomyia*) *percomplexa* Alexander, 1945.—Olympic Hot Springs: Below the springs, 2,000 ft., August 7, 1947 (*A*). Mt. Rainier: Nisqually Glacier Trail, 4,000 ft., July 23, 1947, swept from beds of *Claytonia* sp. (*A*); Ohanapecosh Hot Springs, 1,900 ft., July 25, 1947 (*A*); Wonderland Trail, above White River, 4,600-4,700 ft., August 1, 1947 (*A*).

Gonomyia (*Gonomyia*) *subcinerea* (Osten Sacken, 1859) (*obscura* Doane, 1900).—Pullman, June 22, 1898 (*Doane*), type of *obscura*.

Gonomyia (*Gonomyia*) *virgata* Doane, 1900.—Tokeland (*Doane*), type.

Rhabdomastix (*Sacandaga*) *leonardi* Alexander, 1930.—Mt. Rainier: Naches River, 1,900 ft., July 31, 1947 (*A*).

Rhabdomastix (*Sacandaga*) *subcaudata* Alexander, 1927.—Mt. Baker: Galena Camp, 4,000 ft., August 14, 1947 (*A*), swept from low beds of *Phyllodoce, Cassiope* and *Lutkea.*

Rhabdomastix (*Sacandaga*) *subfasciger* Alexander, 1927.—Mt. Rainier: Longmire Springs, 2,800 ft., August 10, 1946 (*A*). Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*).

Rhabdomastix (*Sacandaga*) *trichophora* Alexander, 1943.—Mt. Baker: Galena Ski Lodge, 3,800 ft., August 12, 1947 (*A*); Silver Fir Camp, along the Nooksack River, 1,990 ft., August 13, 1947 (*A*). Olympic National Park: Olympic Hot Springs, 2,000 ft., August 7, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., July 28, 1940 (*Townes*), types; July 22, 1947, August 10-13, 1946 (*A*); White River Camp, 4,400 ft., July 29, 1947 (*A*). Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*); smaller than normal but evidently identical.

Cryptolabis (*Cryptolabis*) *bisinuata* Doane, 1900.—Spokane, August 9, 1898 (*Doane*), types. Mt. Rainier: Naches River, 1,900 ft., July 28-31, 1947 (*A*); Naches, July 30, 1941 (*Brookman*).

Erioptera (*Empeda*) *alicia* Alexander, 1914.—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13-15, 1947 (*A*).

Erioptera (Gonomyodes) tacoma sp. nov.—General coloration of mesonotum medium brown, the pleura and pleurotergite more yellowed; legs light brown; wings broad, milky subhyaline, the base more whitened; veins beyond cord with macrotrichia; vein R_3 longer than the petiole of the cell; vein R_2 atrophied or weakly preserved, in the latter case subequal to or longer than R_{3+4}; cell *1st* M_2 small, the veins beyond it straight; male hypopygium with the outer dististyle extended into a long straight spine; intermediate style nearly as long, at apex produced into a twisted dark-colored blade.

♂. Length, about 4.5 mm.; wing, 5.5 mm.

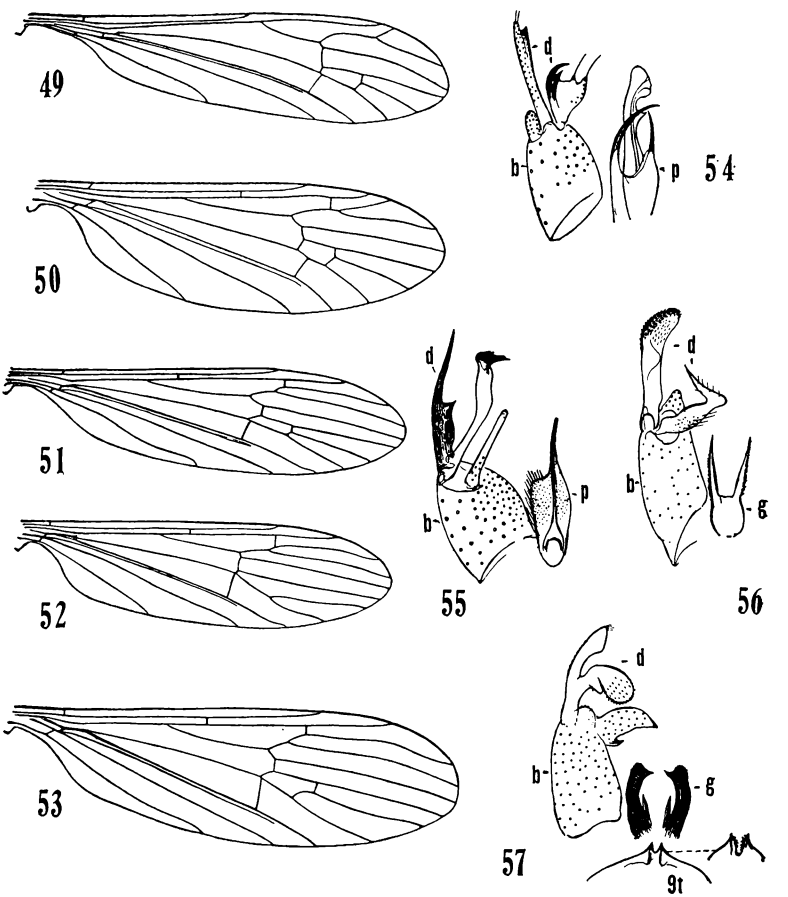
♀. Length, about 5-5.5 mm.; wing, 5.5 x 1.65 to 6 x 1.8 mm.

Rostrum and palpi brown. Antennae black. Head black, sparsely gray pruinose.

Mesonotum almost uniformly medium brown, the praescutum darker in front; pleura and pleurotergite more yellowed. Halteres short, whitish. Legs light brown. Wings (Fig. 50) broad, milky subhyaline, the base more whitened; stigmal area vaguely indicated; veins pale brown. Veins beyond cord with macrotrichia. Venation: Sc_1 ending just beyond the fork of *Rs,* Sc_2 preserved, shortly beyond midlength of *Rs;* R_2 apparently lacking in the type male, weakly preserved in the other specimens, subequal to or longer than R_{3+4}; vein R_3 extending nearly parallel to the outer end of vein R_{1+2}, longer than the petiole of cell R_3; cell *1st* M_2 small, the veins beyond it long, straight; *m-cu* about two-thirds its length beyond the fork of *M;* vein *2nd A* straight.

Abdomen, including hypopygium, dark brown. Ovipositor with the valves horn-yellow. Male hypopygium (Fig. 55) with the three dististyles, *d,* terminal, as in the subgenus. Outer dististyle a straight black rod, the basal

half stouter, the outer angle of the expanded portion produced into a long straight spine that is about as long as the base; intermediate style nearly as long, the basal half a cylindrical rod, the outer half slightly stouter, at apex produced into a flat twisted dark-colored blade, its tip acute; inner style slightly more than one-half as long as the latter, appearing as a slender pale rod, its tip obtuse. Phallosome, *p*, narrower than in allied species, the surface and lower margin of the dilated base with long dense setae or fimbriations; aedeagus slender.



Figs. 49-57.—49. *Gonomyia* (*Gonomyia*) *isolata* sp. nov., venation; 50. *Erioptera* (*Gonomyodes*) *tacoma* sp. nov., venation; 51. *Erioptera* (*Mesocyphona*) *melanderiana* Alexander, venation; 52. *Erioptera* (*Psiloconopa*) *recurva* sp. nov., venation; 53. *Erioptera* (*Psiloconopa*) *crassivena* sp. nov., venation; 54. *Gonomyia* (*Gonomyia*) *isolata* sp. nov., male hypopygium; 55. *Erioptera* (*Gonomyodes*) *tacoma* sp. nov., male hypopygium; 56. *Erioptera* (*Psiloconopa*) *recurva* sp. nov., male hypopygium; 57. *Erioptera* (*Psiloconopa*) *irata* sp. nov., male hypopygium. (Symbols: *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *p*, phallosome; *t*, tergite).

Holotype, ♂, White River Camp, Mt. Rainier, 4,400 ft., July 29, 1947 (*C. P. Alexander*). *Allotopotype,* ♀, with the type. *Paratype,* 1 ♀, found dead in spider's web, Longmire Springs, Mt. Rainier, 2,800 ft., July 24, 1947 (*C. P. Alexander*); 1 ♀, Foot of Mt. Edith Cavell, Jasper National Park, Alberta, 5,800 ft., August 21, 1947 (*C. P. Alexander*).

The only described members of the subgenus *Gonomyodes* Alexander, 1948, are *E.* (*G.*) *crickmeri* Alexander, 1948, and the subgenotype, *E.* (*G.*) *knowltonia* Alexander, 1948. The present fly is very similar to these in its general appearance, the latter differing very evidently in the structure of the male hypopygium and in slight differences in venation, especially of the radial field, where vein R_2 is shorter than vein R_{3+4}. There is a possibility that the paratype female from Alberta may prove to be nonconspecific but from present evidence the identification is correct.

Erioptera (*Mesocyphona*) *distincta* Alexander, 1912.—Pullman, June 15, 1918 (*M*).

Erioptera (*Mesocyphona*) *dulcis* Osten Sacken, 1877.—Mt. Rainier: Elbe, 1,200 ft., July 24, 1947 (*A*); Longmire Springs, 2,800 ft., July 30, 1922 (*M*); Ohanapecosh Hot Springs, 1,900 ft., July 24, 1947 (*A*); Paradise Park, 5,500 ft., August 1917 (*M*). Mica, July 14, 1918 (*M*); Montesano, July 19, 1917 (*M*); Moxee, June 11, 1941 (*Brookman*); Puget, July 4, 1925 (*M*); Union Gap, June 24, 1941 (*Brookman*).

Erioptera (*Mesocyphona*) *melanderiana* Alexander, 1944.—Mt. Baker: Galena Camp, 4,000 ft., August 10-14, 1947 (*A*); Swift Creek Trail, 4,300 ft., August 12, 1947 (*A*). Mt. Rainier: Mazama Ridge, July 23, 1922 (*M*), types; Paradise Park, August 1917 (*M*), types; 4,000-5,200 ft., August 11, 1946 (*A*), in wet boggy areas, chiefly grown with *Caltha leptosepala, Dodecatheon viviparum, Phyllodoce empetriformis,* and others; snow banks nearby and evidently the whole area had been snow covered only a few days earlier; Tipsoo Lake, 5,450 ft., July 28-30, 1947 (*A*). A characteristic species of the Hudsonian zone. Venation (Fig. 51).

Erioptera (*Erioptera*) *septemtrionis* Osten Sacken, 1859 (*subseptemtrionis* Alexander, 1920).—Naches, July 12, 1941 (*Brookman*); Pullman, Saint's Rest, June 1, 1924, June 11, 1921 (*M*).

Erioptera (*Symplecta*) *cana* (Walker, 1848) (All American records for *hybrida* Meigen, 1804, and *punctipennis* Meigen, 1818).—Mt. Rainier: Naches River, 1,900 ft., July 28, 1947 (*A*); White River Camp, 4,400 ft., July 29, 1947 (*A*); Yakima Park, 6,400 ft., July 29, 1947 (*A*), August 19, 1934 (*M*). Lake Colville, 1,900 ft., August 14, 1946 (*A*); Pullman, June 6, 1923 (*Argo*); Wawawai, May 30, 1921 (*M*).

Erioptera (*Trimicra*) *pilipes* (Fabricius, 1787), var.—Bellingham, May 31, 1917 (*Dyar*); Blynn, August 10, 1921 (*M*); Brinnon, on salt marsh, August 11, 1921 (*M*); Stanwood, June 30, 1924 (*M*).

Erioptera (*Psiloconopa*) *carbonipes* Alexander, 1929.—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13-15, 1947 (*A*). Mt. Rainier: Elbe, 1,200 ft., July 24, 1947, August 10, 1946 (*A*). Mount Vernon, July 3, 1924 (*M*).

Erioptera (Psiloconopa) crassivena sp. nov.—General coloration brownish black, the praescutal interspaces sparsely pruinose to isolate three stripes; pseudosutural foveae black; knobs of halteres yellow; antennae and legs black; wings with a dusky tinge, more suffused in the stigmal region and along vein *Cu* in cell *M;* veins stout; vein *2nd A* gently sinuous on outer portion.

♀. Length, about 4.8 mm.; wing, 5.7 mm.

Rostrum and palpi black. Antennae black; basal flagellar segments short-oval, the outer ones passing through long-oval to cylindrical; segments shorter than the verticils. Head dark gray.

Thorax chiefly brownish black, the praescutum sparsely gray pruinose to leave the stripes of the ground; pseudosutural foveae and tuberculate pits black; postnotum and pleura more heavily pruinose. Halteres with stem weakly infuscated, the base restrictedly yellow, the knobs obscure yellow. Legs brownish black, the coxae weakly pruinose; fore trochanters brownish yellow. Wings (Fig. 53) with a weak dusky tinge, more suffused in the stigmal region and along vein *Cu* in cell *M;* veins brown, unusually stout, those comprising the anterior cord pale. Venation: Sc_2 nearly opposite one-third the length of *Rs;* cell *1st* M_2 closed, basal section of M_3 arcuated, about twice *m;* vein *2nd A* gently sinuous on its outer portion.

Abdomen black, the valves of the ovipositor light yellow.

Holotype, ♀, Silver Fir Camp, Mt. Baker, North Fork of the Nooksack River, 1,990 ft., August 13, 1947 (*C. P. Alexander*).

The most nearly allied species is *Erioptera* (*Psiloconopa*) *hygropetrica* Alexander, 1943, of the central Rocky Mountains in Colorado. This differs in details of coloration of the body and halteres and in slight venational features.

Erioptera (Psiloconopa) irata sp. nov.—Allied to *sparsa;* wings grayish yellow, with a restricted brown pattern; male hypopygium with the caudal margin of the tergite produced into two compressed-flattened plates, separated by a U-shaped notch, the lower margins of the plates toothed; outer dististyle with its inner arm a broad blade that is microscopically spiculose; inner dististyle large and pale, terminating in a spinous point, with a further point on the lower margin near base; outer gonapophyses appearing as stout gently curved blackened rods, the inner margin before apex with an upturned point or beak.

♂ Length, about 4.5-5 mm.; wing, 5-6 mm.

♀. Length, about 5.5 mm.; wing, 6.2 mm.

Rostrum and palpi black. Antennae with basal segments testaceous yellow, the flagellar segments pale brown to brown; flagellar segments suboval or with the lower face slightly produced; longest verticils unilaterally arranged on the dorsal face, about one-half longer than the segments. Head brownish gray.

Pronotum brown, the scutellar lobes and pretergites testaceous yellow. Mesonotum chiefly brownish gray, the praescutum scarcely patterned with darker; pseudosutural foveae and tuberculate pits black; posterior portions of

scutal lobes and the parascutella paler. Pleura grayish brown to gray. Halteres uniformly pale yellow. Legs with the coxae brownish gray; trochanters yellow; femora obscure yellow, the tips darkened; tibiae pale brown, narrowly darkened at both ends; tarsi passing into darker brown. Wings with the ground grayish yellow, patterned with brown, including seams over the cord and crossveins and as marginal spots at ends of the longitudinal veins, largest in the costal and outer radial fields; one to few dark spots in basal part of cell Cu_1; dusky seams over most veins beyond cord and in the Anal cells, especially *1st A;* veins obscure yellow, brown in the clouded portions. Venation: Sc_2 opposite or just beyond midlength of *Rs;* cell *1st* M_2 moderately long, basal section of M_3 about twice *m;* both the allotype and paratype show a short spur on vein *2nd A* beyond midlength, jutting outward into cell *2nd A;* the holotype does not show this character.

Abdomen, including hypopygium, dark brown. Male hypopygium (Fig. 57) with the tergite, *9t,* narrowed outwardly, extended into a compressed blade on either side of a U-shaped median notch, the lower margin of the blade serrulate. Outer dististyle, *d,* with two primary arms, the outer one glabrous, slightly expanded outwardly, the outer face with microscopic appressed serrulations; outer apical angle with a few setae; inner arm a broad blade, the margin and surface with microscopic spiculose points; near base of arm with a strong blackened lobe. Inner dististyle a large pale structure that terminates in an acute point; lower margin at base with an acute spinous projection; vestiture yellow. Outer gonapophyses, *g,* appearing as stout, gently curved rods, the outer surface near apex microscopically roughened, the inner margin near apex produced into a slightly upcurved spinous beak or point; inner apophyses appearing as strongly blackened spikes at base of the major outer ones.

Holotype, ♂, Peavine Ridge, Yamhill County, Oregon, Station 1, 210 ft., July 26, 1946 (*K. M. Fender*). *Allotopotype,* ♀, April 23, 1946 (*Fender*). *Paratypes,* 1 ♂, Happy Valley, McMinnville, Oregon, April 14, 1946 (*Fender*); ♂ ♂, Silver Fir Camp, Mt. Baker, 1,990 ft., August 13, 1947 (*C. P. Alexander*), not uncommon along the Nooksack River; ♂, Longmire Springs, Mt. Rainier, 2,800 ft., August 23, 1947 (*C. L. Remington*).

The most similar described species are *Erioptera* (*Psiloconopa*) *polycantha* Alexander and *E.* (*P.*) *sparsa* Alexander, 1919, which differ conspicuously in all details of structures of the male hypopygia.

Erioptera (*Psiloconopa*) *margarita* Alexander, 1919.—Mt. Rainier: Longmire Springs, 2,800 ft., August 10, 1946, July 1947 (*A*); White River Camp, 4,400 ft., July 29, 1947 (*A*).

Erioptera (*Psiloconopa*) *megarhabda* (Alexander, 1943).—Mt. Baker: Silver Fir Camp, 1,990 ft., August 15, 1947 (*A*). Mt. Rainier: Elbe, near Alder Lake, 1,200 ft., July 24, 1947, August 12, 1946 (*A*).

Erioptera (*Psiloconopa*) *polycantha* Alexander, 1945.—Mt. Rainier: Elbe, near Alder Lake, 1,200 ft., August 12, 1946 (*A*). Quilcene, July 24, 1917 (*M*), type.

Erioptera (*Psiloconopa*) *rainieria* Alexander, 1943.—Mt. Baker: Galena

Camp, 4,000 ft., August 9-14, 1947 (*A*). Mt. Rainier: Altitude 5,000 ft., July 14, 1940 (*Townes*), types; Alta Vista, July 29, 1922 (*M*); Indian Henry, August 2, 1922 (*M*); Paradise Valley, 5,560 ft., July 27, 1922 (*M*), August 11, 1946 (*A*); Tipsoo Lake, 5,440 ft., July 28-30, 1947 (*A*). In the northern part of its range the species is characteristic of the Hudsonian zone; at the southern end, at Sequoia National Park, California, it is Canadian.

Erioptera (Psiloconopa) recurva sp. nov.—Mesonotum brownish gray, unpatterned; antennae with scape and pedicel brownish black, the flagellum pale brown; wings subhyaline, unpatterned; cell M_2 open by the atrophy of *m;* vein *2nd A* short and straight; male hypopygium with the outer dististyle an elongate blackened structure, the outer half more enlarged, at near midlength produced into a low lobe or flange; inner dististyle a blackened rod, at apex bent strongly backward into a powerful spine; gonapophyses consisting of an oval base that forks into two long slender blackened spinous arms, the inner one with its inner margin microscopically toothed.

♂ Length, about 4.6 mm.; wing, 5 mm.

Rostrum dark brown; palpi black. Antennae with scape and pedicel brownish black, flagellum pale brown; flagellar segments subcylindrical, with long verticils. Head brownish gray.

Pronotum brownish gray; scutellum and anterior pretergites yellowed. Mesonotal praescutum brownish gray, unpatterned; pseudosutural foveae pale, tuberculate pits darker; posterior sclerites of notum more chestnut brown; lateral borders of mediotergite and much of the pleurotergite more yellowed. Pleura light brown, sparsely pruinose. Halteres pale. Legs with the coxae and trochanters pale yellow; remainder of legs yellow, with only the outer tarsal segments darker. Wings (Fig. 52) subhyaline; veins pale brown, more yellowed at the wing base. Venation: *Rs* subequal in length to Sc_1; R_2 faint, subequal to R_{2+3}; cell M_2 open by atrophy of *m; m-cu* close to fork of *M;* vein *2nd A* short and straight, the Anal vein thus strongly divergent.

Abdomen dark brown, including the hypopygium, the appendages of the latter blackened. Male hypopygium (Fig. 56) with the dististyles, *d,* slightly subapical in position; outer dististyle a long strong blackened structure, the outer half more enlarged to form an elongate head that is provided with rows of abundant close-set spines; at near midlength with a low lobe or flange on outer margin. Inner dististyle shorter, blackened, at apex bent strongly backward into a powerful spine; outer surface of stem with abundant long setae, the recurved spine with fewer shorter setae on outer face. Gonapophyses, *g,* black, the base oval, bearing two long slender spines, the outer smooth, the inner a trifle longer, its inner margin with microscopic spines, those near base larger and more separated.

Holotype, ♂, Near Alder Lake, Elbe, foot of Mt. Rainier, 1,200 ft., August 12, 1946 (*C. P. Alexander*). *Paratopotypes,* ♂ ♂.

The most similar regional species is *Erioptera* (*Psiloconopa*) *bisulca* Alexander, 1948, of the Sierra Nevadas of central California. This differs evident-

ly in the structure of the male hypopygium, including both dististyles and the gonapophyses.

Erioptera (*Psiloconopa*) *shoshone* Alexander, 1945.—Mt. Rainier: Naches River, 1,900 ft., July 28-31, 1947 (*A*); swept from low herbage along the stream.

Erioptera (*Hesperoconopa*) *dolichophallus* Alexander, 1948.—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13-15, 1947 (*A*), swept from vegetation along the Nooksack River. Mt. Rainier: Longmire Springs, 2,800 ft., August 10-14, 1946 (*A*); White River Camp, 4,400 ft., August 1, 1947 (*A*), abundant on river bar vegetation.

Ormosia (*Rhypholophus*) *bicuspidata* Alexander, 1944.—Castle Rock, August 28, 1921 (*M*), types; Twanoh State Park, September 22, 1946 (*Fender*).

Ormosia (*Rhypholophus*) *bifidaria* Alexander, 1919.—Mt. Baker: Galena Camp, 4,000 ft., August 9, 1947 (*A*). Mt. Rainier: Chinook Pass, 5,400 ft., July 29-30, 1947 (*A*). Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*). Characteristic of the Hudsonian zone.

Ormosia (*Rhypholophus*) *fumata* (Doane, 1900).—Mt. Rainier: Longmire Springs, 2,800 ft., August 10-11, 1946 (*A*).

Ormosia (*Rhypholophus*) *paradisea* Alexander, 1920 (*garretti* Alexander, 1926).—Mt. Rainier: Paradise Valley, 5,000-6,000 ft., July 29, 1919 (*C. L. Fox*), type of *paradisea;* August 1917 (*M*); 5,600 ft., July 23, 1947 (*A*); Mazama Ridge, July 23, 1922 (*M*); Sluiskin, July 28, 1922 (*M*); Tipsoo Lake, 5,440 ft., July 28-30, 1947 (*A*); Van Trump, July 21, 1922 (*M*); White River, July 20, 1924 (*M*); Yakima Park, 6,400 ft., July 29, 1947 (*A*). Characteristic of the Hudsonian zone.

Ormosia (*Rhypholophus*) *suffumata* Alexander, 1943.—Mt. Baker: Above Galena Creek, 4,300 ft., August 11, 1947 (*A*).

Ormosia (*Ormosia*) *absaroka* Alexander, 1943.—Mt. Rainier, Tipsoo Lake, 5,450 ft., July 28-30, 1947 (*A*).

Ormosia (*Ormosia*) *albertensis* Alexander, 1933.—Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Altitude 4,700 ft., August 13, 1940 (*Townes*), presumably below Paradise Valley; Wonderland Trail, above White River, 5,700 ft., August 1, 1947 (*A*). The fly is very close to the eastern *Ormosia* (*Ormosia*) *mesocera* Alexander, 1917.

Ormosia (Ormosia) cerrita sp. nov.—Allied to *unicornis;* general coloration dark brown; antenna short; wings with a brownish tinge, the stigma still darker; male hypopygium with the margin of the tergite before the median spatula broadly blackened and fimbriate; outer dististyle conspicuously three-branched, the short outer branch bispinous at apex, the two inner branches simple, forking close to base of style.

♂ Length, about 4.5 mm.; wing, 4.7 mm.; antenna, about 1 mm.

Rostrum and palpi brown. Antenna brown throughout, short, as shown by the measurements; flagellar segments oval, with very long verticils, on the

more basal segments the longest fully three times the segments; verticils of outer segments very small to lacking. Head dark brown.

Pronotum light brown, the scutellum and anterior pretergites more testaceous yellow. Mesonotal praescutum and scutum chiefly dark brown, the posterior sclerites a trifle paler. Pleura chiefly medium brown. Halteres yellow. Legs with the coxae and trochanters light yellow; remainder of legs brownish yellow, the outer tarsal segments brownish black. Wings (Fig. 58) with a brownish tinge, the stigma still darker brown; veins brown. Venation: Sc_1 ending about opposite R_2, Sc_2 nearly opposite midlength of Rs; R_{2+3+4} about one-half longer than the basal section of R_5; cell M_2 open by atrophy of basal section of M_3; *m-cu* just before the fork of *M;* vein *2nd A* nearly straight, pale and feebly sinuous on outer third.

Abdomen, including hypopygium, dark brown. Male hypopygium (Fig. 64) with the margin of the tergite, *9t,* before the median spatula broadly blackened and margined with short black setulae; spatula narrowed basally. Outer dististyle, *d,* conspicuously three-branched, the outer branch shortest and stoutest, bispinous at apex; other branches simple, subequal in length, forking close to base of style. Inner dististyle a long narrow paddle, on outer margin at near midlength bearing a slender spine. Gonapophyses, *g,* unequally bispinous, the longest or inner branch slender, sinuous.

Holotype, ♂, Silver Fir Camp, Mt. Baker, North Fork of the Nooksack River, 1,990 ft., August 13, 1947 (*C. P. Alexander*).

The closest allies are *Ormosia* (*Ormosia*) *tricornis* Alexander, 1948, and *O.* (*O.*) *unicornis* Alexander, mss., which differ among themselves in the characters of the male hypopygia, especially the structure of the outer dististyles.

Ormosia (*Ormosia*) *curvata* Alexander, 1924.—Olympia, April 16, 1894 (*Kincaid*).

Ormosia (*Ormosia*) *decussata* Alexander, 1924.—Mt. Baker: Nooksack Camp, 1,200 ft., August 13, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 10-13, 1946 (*A*). East Port Orchard, September 23, 1946 (*Fender*); Kachess Lake, August 13, 1946 (*A*).

Male hypopygium (Fig. 61) with the tergite broader than in *longicornis* (Doane), the pale median membranous area extensive. Inner dististyle, *d,* more or less bilobed, the basal portion more expanded. Gonapophyses, *g,* very strong and powerfully developed, appearing as dilated basal plates that are narrowly united at the midline, the elongate spines sinuous, very gradually narrowed to the acute tips, in slide mounts the latter decussate across the midline. See discussion under *longicornis*.

Ormosia (*Ormosia*) *fusiformis* (Doane, 1900) (*divexa* Doane, 1908).—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 10-13, 1946 (*A*). East Port Orchard, September 23-26, 1946 (*Fender*).

The type of *divexa* is a female from Keyport, Washington, July 1905 (*Doane*). I examined this type in San Francisco in 1946 and consider it to

represent the present fly. The right wing of this type is missing. Cell *1st* M_2 is closed, as in *fusiformis,* not opening into cell *2nd* M_2 as stated by Doane, *m* being present though faint, straight, the basal section of M_3 a trifle longer and more arcuated; *m-cu* at fork of *M*. The antennae are uniformly light brown.

Ormosia (*Ormosia*) *hispa* Alexander, 1945.—Puget, July 4, 1925 (*M*), type.

Ormosia (*Ormosia*) *longicornis* (Doane, 1908).—Keyport, July 1905 (*Doane*), type. Although allied to *decussata* Alexander, the two flies seem certainly to be distinct. I studied the type of the present species in San Francisco in 1946 and made notes and rough figures of genitalic structures which I am including in the present report. Male hypopygium (Fig. 63) shows differences in the ninth tergite, *9t;* dististyles, *d,* and the gonapophyses, *g,* which are more slender and more angular in the present fly. See discussion under *decussata* (Fig. 61).

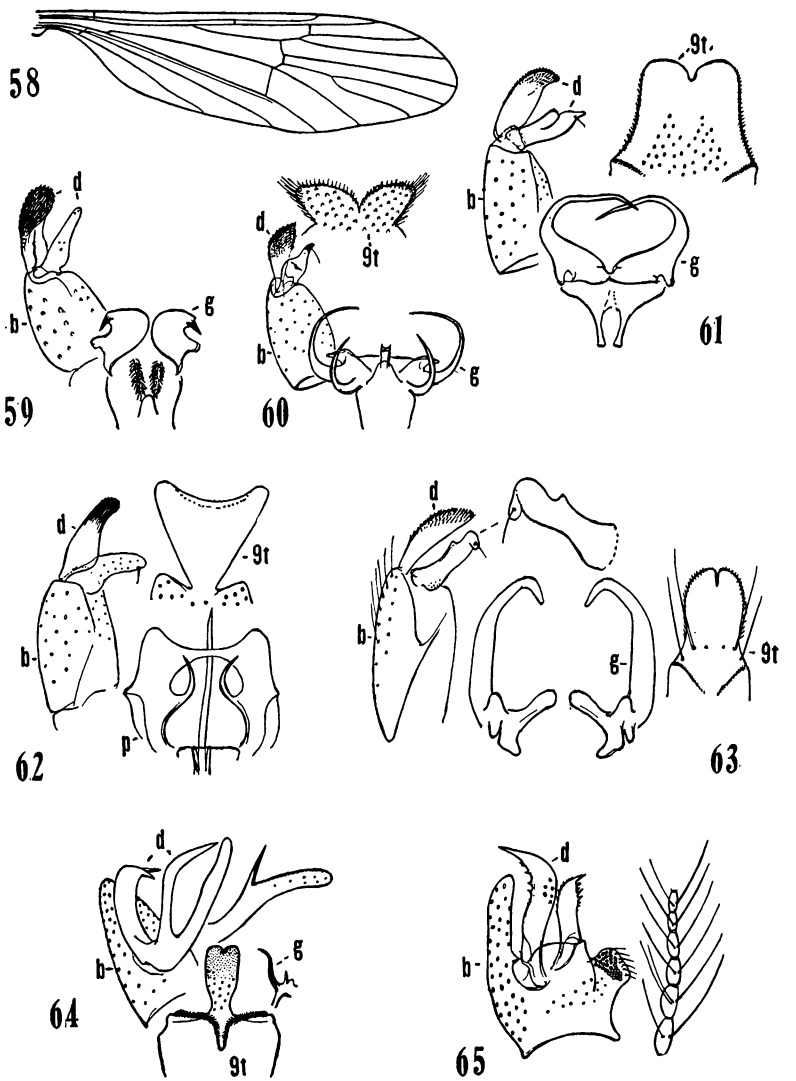
Ormosia (*Ormosia*) *manicata* (Doane, 1900) (*deviata* Dietz, 1916, *fuscopyga* Alexander, 1924).—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13, 1947 (*A*). Mt. Rainier: Ohanapecosh Hot Springs, 2,000 ft., July 30, 1947 (*A*). Everett, June 19, 1920 (*M*); Lewis & Clark State Park, September 28, 1946 (*Fender*).

Ormosia (*Ormosia*) *onerosa* Alexander, 1943.—Mt. Baker: Galena Camp, 4,000-4,300 ft., August 10-14, 1947 (*A*). Mt. Rainier: Cayuse Pass, 4,600 ft., July 30, 1947 (*A*); Nisqually Glacier Trail, 4,000 ft., July 23, 1947 (*A*); Paradise Valley, 5,600 ft., July 23, 1947, August 11, 1946 (*A*); Tipsoo Lake, 5,440 ft., July 28-30, 1947 (*A*); Wonderland Trail, below Yakima Park, 5,800-6,000 ft., August 1, 1947 (*A*). Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*). One of the commonest and most characteristic small crane-flies of the Hudsonian zone.

Ormosia (*Ormosia*) *pugetensis* Alexander, 1944.—Puget, July 4, 1925 (*M*), type. Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Ohanapecosh Hot Springs, 1,900 ft., July 25, 1947 (*A*); Wonderland Trail, above White River, 4,800 ft., August 1, 1947 (*A*).

The male hypopygium (Fig. 60) has not been adequately described. Tergal lobes, *9t,* large but low and divergent, separated by a very narrow median split; margins of lobes with fimbriations, longest and most conspicuous at the outer angles; dorsal surface of tergum with very long conspicuous setae. Outer dististyle, *d,* broad, the distal two-thirds of outer face with rows of microscopic scale-like setae. Inner dististyle darkened, broad on basal half, thence narrowed into the blackened apex, before tip with one seta of unusual length. Phallosome, *p,* with a transverse central plate that is produced at either end into two strong spines and a beak-like smaller lobe; longest spine or arm unusually long and very slender; shorter spine stouter and about two-thirds as long as the outer one.

Ormosia (*Ormosia*) *subcornuta* Alexander, 1920.—Mt. Rainier: Alder Lake, near Elbe, 1,200 ft., July 24, 1947, August 10, 1946 (*A*).



Figs. 58-65.—58. *Ormosia* (*Ormosia*) *cerrita* sp. nov., venation; 59. *Ormosia* (*Ormosia*) *albertensis* Alexander, male hypopygium; 60. *Ormosia* (*Ormosia*) *pugetensis* Alexander, male hypopygium; 61. *Ormosia* (*Ormosia*) *decussata* Alexander, male hypopygium; 62. *Ormosia* (*Ormosia*) *triangularis* sp. nov., male hypopygium; 63. *Ormosia* (*Ormosia*) *longicornis* Doane, male hypopygium; 64. *Ormosia* (*Ormosia*) *cerrita* sp. nov., male hypopygium; 65. *Molophilus* (*Molophilus*) *kulshanicus* sp. nov., male hypopygium, antenna. (Symbols: *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *p*, phallosome; *t*, tergite).

Ormosia (Ormosia) triangularis sp. nov.—Belongs to the *flaveola* group; general coloration of thorax reddish brown to brownish gray; head uniformly gray; wings with a weak brownish tinge, the stigma slightly darker; male hypopygium with the tergite produced into a large triangular plate, its caudal border gently concave; outer dististyle a stout simple lobe, the blackened apex microscopically serrulate; phallosome consisting of a plate on either side, connected with one another by a narrow bridge across the posterior border; mesal edge of either plate produced into a strong spine.

♂ Length, about 4.5 mm.; wing, 5 mm.

♀. Length, about 5.5-5.8 mm.; wing, 5.5-6 mm.

Rostrum and palpi brownish black. Antennae short; scape testaceous yellow to brown, pedicel and flagellum dark brown or brownish black; flagellar segments oval, with long verticils. Head uniformly gray.

Pronotum brown, the pretergites yellow. Mesonotal praescutum reddish brown, the broad median area more brownish gray; pseudosutural foveae black; posterior sclerites of notum brownish gray, pleurotergite more yellowed. Pleura brownish gray. Halteres obscure yellow, clearer yellow at base of stem, knob weakly infuscated. Legs with the coxae and trochanters yellow; remainder of legs pale brown to brown, the outer tarsal segments darker. Wings with a weak brown tinge, the stigma a little darker brown; prearcular and costal fields a little more yellowed; veins pale brown. Macrotrichia of cells abundant, distributed virtually over the entire wing. Venation: Cell M_2 open by the atrophy of *m*.

Abdomen dark brown, the hypopygium a trifle paler. Male hypopygium (Fig. 62) distinctive. Ninth tergite, *9t*, with the apical appendage roughly an equilateral triangle in outline, the basal connection unusually narrow, expanded outwardly, the caudal margin gently concave, with restricted pale membrane; appendage microscopically roughened, the setae abundant but small and inconspicuous. Outer dististyle, *d*, a stout simple lobe, narrowed outwardly, the distal half blackened, tip obtuse, microscopically serrulate. Inner dististyle nearly as long and not greatly dissimilar in outline, at tip with a single strong modified seta. Phallosome, *p*, very distinct, consisting of a plate on either side, united across the posterior border by a very narrow bridge, behind which is a major lacuna; mesal margin of either plate produced caudad into a long sinuous spine. Aedeagus slender, the tip acute.

Holotype, ♂, East Port Orchard, September 25, 1946 (*K. M. Fender*). *Allotopotype*, ♀. *Paratopotype*, 1 ♀

This fly is very different from all other members of the *flaveola* group so far made known. It is perhaps most similar to *Ormosia* (*Ormosia*) *absaroka* Alexander, which has the male hypopygium, particularly the tergite, outer dististyle and phallosome, all quite different. For a discussion of the various groups of *Ormosia* that have cell M_2 open by the atrophy of crossvein *m*, as they occur in North America, a paper by the writer may be consulted (Alexander, Amer. Midl. Nat., 30: 755; 1943).

Ormosia (*Ormosia*) *upsilon* Alexander, 1946.—Barnes State Park, Sep-

tember 27, 1946 (*Fender*); East Port Orchard, September 3-25, 1946 (*Fender*).

Molophilus (*Molophilus*) *colonus* Bergroth, 1888 (*comatus* Doane, 1900).—Mt. Rainier: Naches River, 1,900 ft., July 31, 1947 (*A*). Entiat, July 26, 1919 (*M*); Knightmore, August 9, 1919 (*M*); Pullman (*Doane*), Seattle (*Kincaid*), types of *comatus*.

Molophilus (*Molophilus*) *distilobatus* Alexander, 1945.—Olympic National Park: Deer Park, 5,400 ft., August 6, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., July 22, 1947 (*A*), August 10-13, 1946 (*A*). Ilwaco, May 5, 1918 (*M*).

Molophilus (*Molophilus*) *harrisoni* Alexander, 1945.—Mt. Rainier: Elbe, Alder Lake, 1,200 ft., August 12, 1946 (*A*); Naches River, 1,900 ft., July 28-31, 1947 (*A*).

Molophilus (Molophilus) kulshanicus sp. nov.—Belongs to the *gracilis* group, *pubipennis* subgroup; size large (wing, male, over 5 mm.); general coloration of body brownish black, obscured by a sparse pruinosity; antennae (male) less than one-half the length of body, black throughout; flagellar segments with very long verticils, the erect pale pubescence of the more proximal segments less than one-half the length of the segments; wings subhyaline, with a brown seam in cell *M* adjoining *Cu;* male hypopygium black; outer dististyle a broad flattened blade that is about one-fifth as wide as long, the lower margin with five or six acute points; phallosomic plate with microscopic setulae.

♂ Length, about 4.8-5 mm.; wing, 5.3-5.5 mm.; antenna, about 1.30-1.35 mm.

Rostrum and palpi black. Antennae (Fig. 65) moderately long, more than one-fourth the length of the body or wing, black throughout; basal flagellar segments subcylindrical or with the lower face a trifle produced, the outer segments more oval; longest verticils of the basal flagellar segments approximately twice the segments, these becoming progressively shorter on the outer segments; pale erect pubescence of the basal segments abundant, less than one-half the segments. Head uniform gray.

Pronotum infuscated medially, the scutellum light yellow. Mesonotum brownish black, the color dulled by a sparse pruinosity; posterior margins of scutal lobes and the parascutella obscure yellow; postnotum blackened, the suture narrowly pale. Pleura black, pruinose to produce a plumbeous appearance; dorsopleural region obscure yellow. Halteres uniformly yellow. Legs with the coxae yellowish brown to light brown; remainder of legs black. Wings broad, subhyaline; a brown seam in cell *M* adjoining vein *Cu;* veins and macrotrichia light brown, R_{4+5} and *Cu* darker brown. Venation: R_2 lying just distad of level of *r-m;* petiole of cell M_3 nearly twice *m-cu;* vein *2nd A* long and sinuous, ending about opposite one-fourth the length of the petiole of cell M_3.

Abdomen, including hypopygium, black. Male hypopygium (Fig. 65) with the ventromesal lobe of basistyle, *b*, provided with a triangular group of about 35 strong black spinous points, the marginal vestiture appearing as long setae, there being no conspicuous intermediate types of setae. Outer dististyle, *d*, a strong flattened blade, curved to the long straight apical spine, the greatest breadth about one-fifth the length; lower or concave margin with about five or six acute points; outer margin entirely smooth, the surface at midlength with about six setae. Inner dististyle smaller, with appressed spines on outer margin of distal half and coarser more erect ones on the lower face, some of the latter larger and coarser. Phallosomic plate with microscopic setulae.

Holotype, ♂, Swift Creek Trail, Mt. Baker, 4,300 ft., August 12, 1947 (*C. P. Alexander*). *Paratypes*, ♂, Chinook Pass, Mt. Rainier, 5,100 ft., July 29, 1947 (*C. P. Alexander*); Tilly Jane Creek, Mt. Hood, Oregon, 5,600 ft., July 18, 1947 (*C. P. Alexander*); ♂, Hood River Meadows, Mt. Hood, Oregon, 4,480 ft., July 17, 1947 (*C. P. Alexander*).

The closest relative of the present fly appears to be *Molophilus* (*Molophilus*) *paulus* Bergroth, 1888, which is distinguished by the smaller size, pale coloration, length and vestiture of the antennae, and in the details of structure of the male hypopygium.

Molophilus (*Molophilus*) *nitidulus* Alexander, 1944.—Almota, May 20, 1923 (*M*), types.

Molophilus (*Molophilus*) *nitidus* Coquillett, 1905.—Seattle (ex *Kincaid*); Sultan, June 9, 1919 (*M*); Vancouver, July 7, 1917 (*M*).

Molophilus (*Molophilus*) *paulus* Bergroth, 1888.—Mt. St. Helens: Spirit Lake, 3,200 ft., July 21, 1947 (*A*). Ilwaco, May 5, 1918 (*M*). In some specimens the pale pubescence of the flagellar segments is shorter and less conspicuous than in others yet seem to be conspecific. It is best distinguished from *spiculatus* by the antennal structure and vestiture.

Molophilus (*Molophilus*) *perflaveolus* Alexander, 1918.—Mt. Baker: Silver Fir Camp, 1,990 ft., August 13, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 10-13, 1946; Ohanapecosh Hot Springs, 1,900 ft., July 25, 1947 (*A*); White River Camp, 4,400 ft., July 29, 1947 (*A*). Mt. St. Helens: Timberline, 4,300 ft., July 21, 1947 (*A*). Everett, July 4-6, 1924 (*M*); Ilwaco, June 28, 1925 (*M*); Kachess Lake, August 13, 1946 (*A*); Nasel River, July 2, 1925 (*M*); Quilcene, July 24, 1917 (*M*).

Molophilus (*Molophilus*) *rainierensis* Alexander, 1943.—Olympic National Park: Boulder Lake Trail, 2,200 ft., August 6, 1947 (*A*), in skunk cabbage association; Deer Park, 5,400 ft., August 6, 1947 (*A*), very abundant. Mt. Rainier: Longmire Springs, 2,800 ft., July 20, 1922 (*M*).

Molophilus (*Molophilus*) *spiculatus* Alexander, 1918.—Mt. Baker: Galena Camp, 4,000 ft., August 12-14, 1947 (*A*); Galena Ski Lodge, 3,800 ft., August 10, 1947 (*A*). Mt. Rainier: Longmire Springs, 2,800 ft., August 23, 1947 (*Remington*); Yakima Park, 6,400 ft., July 27, 1947 (*A*).

Molophilus (*Molophilus*) *subnitens* Alexander, 1944.—Valleyford, May 29, 1921 (*M*), types.