ANNOTATED LIST OF FOREST INSECTS OF BRITISH COLUMBIA, PART XIV, *POLYGONIA, NYMPHALIS* AND *LIMENITIS* (NYMPHALIDAE)

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Many members of the family Nymphalidae are found in British Columbia but only a few species, regarded as economically unimportant, feed on the foliage of forest trees. Small localized outbreaks of some species have been recorded in British Columbia but all were of short duration. The caterpillars are usually spiny, pale to dark and obscurely or strikingly marked. The chrysalids are angularly tuberculate, naked, dull or marked with gold or silver, and are suspended by the cremaster in sheltered sites. The number of collections per host is shown only when fewer than five.

Polygonia faunus Edw. - *Betula* spp. (4 records), *Salis* spp. (3). Throughout British Columbia, including Vancouver Island, uncommon on forest trees. LARVA: 1⅜ inches; head bilobed, dull black marked with white, pale chalazae and setae, prominent black scoli armed with spines on vertex of each lobe; body pale brown with irregular markings of yellow, dull white and medium brown, dull white dorsal stripes; TI with a band of small tubercles extending to sides; pale addorsal and spiracular scoli with black-tipped spines on TII-III; middorsal, addorsal, supraspiracular and subspiracular scoli on A1-7 are pale yellowish white, except lower half of supraspiracular scoli which are pale brown, all with pale black-tipped spines; A8 similar but with two supraspiracular scoli, A9 with one pair of supraspiraculat scoli, black-tipped spines and dark brown anal shield; venter paler than dorsum with sparse but prominent setae; thoracic legs and prolegs marked dark brown.

Polygonia zephyrus Edw. - *Salix* sp. (1 record), *Alnus* sp. (2) and the shrubs *Menziesia ferruginea* Smith, *Ribes* spp. Throughout British Columbia, including Vancouver Island, uncommon on forest trees. LARVA: 1⅜ inches; head moderately bilobed, shiny black with white markings and white chalazae and setae, black scoli with black spines on vertex of each lobe; body with dorsum of TI-III and AI and 2 dull yellowish orange; A3-9 dull white lightly marked brown, dark brown and black; pale yellow addorsal scoli TI-III, pale middorsal scoli A1-8; all scoli with pale black-tipped spines, anal shield black; lateral dull white, heavily marked pale and dark brown, irregular dull yellow supra-and subspiracular lines, supraspiracular scoli on TII-III and A9, supra-and subspiracular scoli A1-A8, all with pale setae; thoracic legs and anal prolegs marked black; venter dull orange finely marked pale brown, darker then dorsum.

Polygonia gracillis C. & R. - *Salix* sp. (2 records). Clemina, B.C. LARVA: similar to *P. zephyrus* except that in the dark phase, pale portions are washed with pale buff and brown.

Nymphalis j-album Bdv. & LeC. - *Betula* sp., *Salix* spp. Southern interior and lower Fraser Valley of British Columbia; uncommon on forest trees. LARVA: 1⅝ inches; head dull black, moderately bilobed with prominent black spined scoli on vertex of each lobe and setae arising from white chelazae; body pale yellow profusely marked medium and dark brown; yellow middorsal line on TI, irregular pale yellow addorsal lines TII-A8; addorsal and subdorsal pale yellow chalazae with dark brown or black setae on TI, middorsal and subdorsal black spined scoli TII-A8, subdorsal black spined scoli on A9; black spined spiracular scoli TII-III, black supra- and pale yellow subspiracular scoli A1-8, pale yellow subspiracular line; venter pale, sparsely marked pale brown with white setae arising from pale chalazae; thoracic legs and prolegs dull yellow marked pale brown.

Nymphalis antiopa Linn.-*Salix* spp. *Populus* spp. Throughout British Columbia, including Vancouver Island. Common, occasionally causing severe defoliation of individual trees. LARVA: 1⅞ inches; head dull black with white setae on black chalazae; body black banded with rows of small white spots; A1-7 with one large yellowish-orange to red middorsal spot on each segment, broken middorsal line TII-A8, black setaceous middorsal scoli A4-8 and black setaceous addorsal scoli TII-A9; black setaceous spiracular scoli TII-III, black setaceous supra-and subspiracular scoli A1-8; venter flecked with small white spots, black midventral line; thoracic legs and anal prolegs black, abdominal prolegs yellowish-orange to dull red.

Limenitis arthemis Dru. - *Populus tremuloides* Michx. *Salix* spp. Central and northern British Columbia; uncommon on forest trees. LARVA: 1⅜ inches; head pale brown, bilobed with one pair modified scoli on vertex of each lobe and short pale satae on prominent chalazae; body dark yellowish brown or olive-green; dorsum of TI-II and A4-6 pale mauve or white extending ventrad of A5, occasionally suffused with pale pink; remainder sparsely marked dark brown and black; two

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prominent subdorsal scoli on TII, small short subdorsal scoli on TI and III, A1-3 and 7-9, scoli much reduced or lacking A4-6; pale buff subspiracular line A1-9 extending down sides of anal prolegs; venter with numerous pale setae on dull white chalazae, thoracic legs black, dull white chalazae and pale setae on prolegs.

Limenitis lorquini burrisonii Mayn. - *Populus trichocarpa* Torr. and Gray, *Populus tremuloides* Michx. *Salix* spp. Southern British Columbia; may hybridize with *L. arthemis* at about 51 latitude; uncommon on forest trees. LARVA: 1⅜ inches, similar to *L. arthemis*, head pale lilac to pale mauve-tan, bilobed with one pair modified scoli on vertex of each lobe, short pale setae on prominent chalazae; body dark brown-purple to gray-mauve; dorsum of TI-II and A4-6 white, washed with pale mauve extending ventrad on A5; remainder of dorsum sparsely marked brown and black with two prominent subdorsal scoli on TII, small subdorsal scoli and TI and III, A1-3 and 7-9; scoli much reduced or lacking A4-6; mauve-white subspiracular line A1-9 extending down sides of anal prolegs; venter with numerous pale setae on dull white chalazae; thoracic legs black; dull white chalazae and pale setae on prolegs.

INSECTS AND INSECTICIDES

By *R. C. Reay*
Oliver & Boyd Ltd., Edinburgh
1969. Pp. 152. $1.50

A sharp little controversy boiled up recently in *Science* about books on scientific writing and on scientific writing itself. This is all to the good; we need to be reminded of our shortcomings. Most of us are guilty of writing that is inflated, or wordy, or complicated, or just dull, or all four. Part of the trouble is that we tend to think in special scientific terms and since we are fearful of being misinterpreted we write in the same way, playing it safe by using cliches. In papers which will be read only by people on the same wavelength as ourselves, there is little harm done, but in a book before the general public which is expected to sell, some sparkle and color are needed.

Insects and Insecticides is a case in point. The subject is topical but the book will never be a best seller. The format, the printing, the type, the price, the paper, and most of the illustrations are good. I saw only two small typesetting errors, the arrangement and coverage are excellent and the scientific content is hard to fault. Many people will buy it but fewer will read it, because the writing has too high a content of pedaguese. Or perhaps it is overscholarly. On. p. 7 is an example: "From the foregoing account it will be apparent that insects are well provided with the means to seek out and recognize a source of nourishment." In other words, insects are evidently well equipped to find and recognize food? On p. 5 the "odours of putrefaction" and the "smell of sweat" somehow got into the same sentence. The author is never obscure but he clearly is capable of much sprightlier prose than the text indicates. The introduction, written in the first person, is proof. It ends with a graceful tribute for her help to his wife, who ". . . suffered the whole process willingly, kept the children at bay, and who helped with the typing . . ."

This is carping criticism because it is such a cool and well-conceived book; students in entomology and especially those in allied disciplines will find it an excellent and comprehensive summary. Surely students rather than laymen are the audience in mind when, without apology or explanation, the author speaks of exopterygote nymphs (p. 2), cuticular sensillae, monovalent salts (p. 4), plants containing isothiocyanates, oviposition loci, the glycosides phaseolunatin and lotaustrin, beta-gamma-hexanol and alpha-beta-hexanal all within the first five pages. There is a fairly technical section (p. 27-33) on the role of inorganic ions in digestion and nutrition. The author means to sort the men from the boys early.

There are three major sections: What is an insect pest? (33p.); Which insects are pests? (33 p.); How are insect pest controlled? (79 p.). The index of 5½ pages includes 225 proper names of species or genera, and the names of the chemicals discussed. He shows 73 structural formulae in the text including some chemosterilants, botanicals, synergists, attractants, repellents, and two anti-feeding agents. A few references are made in the text to author and year only but these are not listed elsewhere.

Some of the more volatile ecologists would do very well to invest in this unemotional and factual little paperback.