Catalogue of American Amphibians and Reptiles.

WAKE, DAVID B. 1974. *Aneides.*

Aneides Baird
Climbing salamanders

Aneides Baird, 1849:257. Type-species, *Salamandra lugubris* Hallowell, 1849, by monotypy.

Anaides Baird, 1849:256. Variant spelling. Placed on Official Index of Rejected and Invalid Generic Names in Zoology by International Commission on Zoological Nomenclature (Opinion 377, 1956).

Autodax Boulenger, 1887:67. Substitute name for *Anaides*, preoccupied for a genus of Coleoptera. Placed on Official Index of Rejected and Invalid Generic Names in Zoology by International Commission on Zoological Nomenclature (Opinion 377, 1956).

• CONTENT. Five species are recognized: *Aneides aeneus*, *A. ferreus*, *A. flavipunctatus* (two subspecies), *A. hardii*, *A. lugubris*.

• DEFINITION. Medium-sized to large (40 to over 100 mm, snout-vent length) terrestrial and arboreal plethodontid salamanders which lack aquatic larvae and have five toes, a tongue attached on the anterior midline, and large, protuberant eyes. Adult males of *A. hardii* and adults of all other species have enlarged *adductor mandibulae* muscles which produce a swollen temporal region. Legs are moderately to very long, and the toes of all species have marked terminal expansion. Tails of most species taper from their base and are slightly to strongly prehensile.

Relative to other plethodontids, most species of *Aneides* have reduced numbers of enlarged maxillary and dentary teeth. Vomerine teeth tend to be few in number and small in size. The maxillary bone is unique in that the posterior part (from 20 to 70% of the bone) lacks teeth and is dorsoventrally expanded. In the large species this forms a cleaver-like structure that is diagnostic in living and preserved animals.

Aneides differs from its close relatives *Plethodon* and *Ensatina* in having a single rather than paired premaxillary bones. In addition, a reorganization of both the tarsus and carpus has occurred, so that all mesopodial elements contact the central element in *Aneides* (see Wake, 1963). Terminal phalanges are normally much expanded and in the more derived species the phalangeal tips are strongly recurved.

• DESCRIPTIONS AND ILLUSTRATIONS. See species accounts in this Catalogue (Gordon, 1967; Wake, 1965 a, b; Lynch, 1974; Lynch and Wake, 1974).

• DISTRIBUTION. The genus has a discontinuous distribution in central North America. *Aneides aeneus* occurs mainly in southern portions of the Appalachian Mountain region. *Aneides hardii* is found in three upland areas in south-central New Mexico. The remaining species range from northern Baja California to the Columbia River, west of the Cascade-Sierra Nevada system. *Aneides ferreus* has a disjunct population on Vancouver Island and neighboring islands in British Columbia, Canada. See Lowe (1950), Gordon (1952), and Wake (1966) for detailed discussions of distribution.

• FOSSIL RECORD. None.

• PERTINENT LITERATURE. Much of the published material for this genus refers to particular species. Cope (1869, 1889), Mivart (1870), Hoffmann (1873–78), Wiedersheim (1887) and Vaillant (1884, 1886) have early accounts of the osteology of *A. lugubris*, and Dunn (1926), Piatt (1935), and Hilton (1945) added some information for other species. Wake (1963) compared the skeletal morphology of the five species in a detailed fashion, and (1966) discussed the osteology of the group in the context of a general analysis of the family.

Dunn (1923) recognized that *A. aeneus* was a member of the genus, and he (1926) discussed relationships within the genus and to other genera. Lowe (1950) added *A. hardii* to the genus and presented a general discussion of biogeography of the group. Gordon (1952) expanded on Lowe's discussion, and Wake (1966) discussed biogeography of the genus in relation to the history of the family.

Ecology and life history of various members of the family have been discussed by Storer (1925) for *A. lugubris*, *A. ferreus*, and *A. flavipunctatus*, Gordon (1952) for *A. aeneus*, Johnston and Schad (1959) for *A. hardii*, Miller (1944) and Rosenthal (1957) for *A. lugubris*, and Lynch (Ms) for *A. flavipunctatus*.

General accounts of the species are found in Bishop (1943), Stebbins (1951, 1954, 1966, 1972) and Conant (1958).

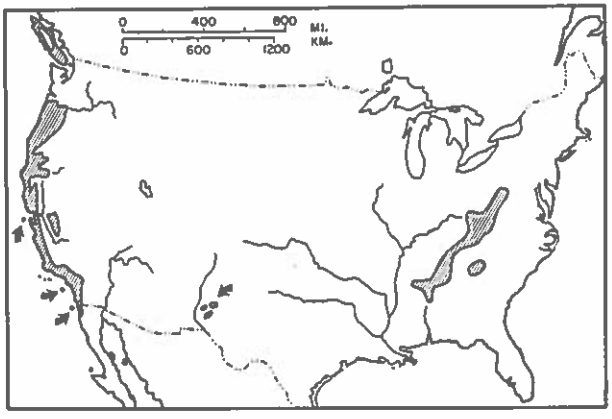
• KEY TO SPECIES (Adults)—Parenthetic numbers refer to published Catalogue accounts.

1. Legs long, overlap by 1–3 intercostal folds when adpressed; 14 or 15 costal grooves; dorsal ground color black with yellow to yellowish green lichenlike patches ..... *A. aeneus* (30)
— Legs shorter, overlap by adpressed limbs slight or absent; 14 to 17 costal grooves; color pattern variable 2
2. Legs moderately long, adpressed limbs may fail to overlap by as much as 1½ intercostal folds, or may overlap slightly 3
— Legs short, adpressed limbs fail to overlap by as much as 5 intercostal folds 4
3. 16 or 17 costal grooves; dorsal coloration complex, with clouded (ground color dark brown, mottled with splotches of lighter coloration) or dark (nearly uniformly dark brown, with small spots of white or brassy pigment) phases ..... *A. ferreus* (16)
— Usually 15 costal grooves (rarely 16); dorsal coloration gray-brown to chocolate brown, with yellowish spots of various size and number ..... *A. lugubris* (159)
4. Adults with many (more than 15 total) rather small maxillary teeth, dorsal ground color brownish, usually with light mottling; moderately small, with average adult size of about 50 mm snout-vent length ..... *A. hardii* (17)
— Adults with few (fewer than 15 total) maxillary teeth, some of which are very elongate and flattened; dorsal ground color black, which in some populations is spotted with whitish to yellowish pigment and may have a greenish appearance ..... *A. flavipunctatus* (158)

• REMARKS. *Aneides*, *Plethodon* and *Ensatina* are closely related genera which have been united in the tribe Plethodontini (Wake, 1966). All lack aquatic larvae and are terrestrial as adults. Feeding mechanisms are generally similar, and *Aneides* and *Plethodon* have nearly identical tongues. *Aneides* has stronger jaws than *Plethodon* and *Ensatina*, and possesses several dentitional specializations. *Aneides* is considered to have been derived from a stock similar to present-day *Plethodon*. Juvenile *Aneides* are very similar to juvenile *Plethodon*, and females of *Aneides hardii* bear a striking similarity to adult females of *Plethodon*.

Distribution of *Aneides* in the Pacific Northwest is puzzling. Members of the genus are unknown from Washington, but occur in both British Columbia (Vancouver Island and neighboring islands) and Oregon. This does not appear to be a collecting artifact.

• ETYMOLOGY. Unclear; possibly from the Greek prefix *a* (lacking) and the Greek word *neidos* (feebleness), in reference to the stout body form and strong limbs of the group.



MAP. Range of the genus *Aneides*.

Another possibility is *an* (lacking) and the Greek word *eidos* (form), referring to the formlessness of the external morphology of the holotype. Gender: masculine.

Literature Cited

Baird, S. F. 1849. *In* Heck, J. G., Iconographic Encyclopaedia of Science, Literature and Art. 2: 256–257.

Bishop, S. C. 1943. Handbook of Salamanders. Comstock Publishing Co., Ithaca, N. Y. xiv + 555 p.

Boulenger, G. A. 1887. Description of a new tailed batrachian from Corea. Ann. Mag. Nat. Hist. Ser. 5, 19(109):67.

Conant, R. 1958. A field guide to reptiles and amphibians of the United States and Canada east of the 100th meridian. Houghton Mifflin, Boston. xvii + 366 p.

Cope, E. D. 1869. A review of the species of the Plethodontidae and Desmognathidae. Proc. Acad. Nat. Sci., Philadelphia 21:93–118.

— 1889. The Batrachia of North America. Bull. U. S. Natl. Mus. (34):5–525.

Dunn, E. R. 1923. Mutanda herpetologica. Proc. New England Zool. Club. 8:39–40.

— 1926. The salamanders of the family Plethodontidae. Smith College, Northampton, Mass., xii + 441 p.

Gordon, R. E. 1952. A contribution to the life history and ecology of the plethodontid salamander *Aneides aeneus* (Cope and Packard). Amer. Midl. Nat. 47(3):666–701.

— 1967. *Aneides aeneus*. Cat. Amer. Amphib. Rept.: 30.1–30.2.

Hallowell, E. 1849. Description of a new species of salamander from Upper California. Proc. Acad. Nat. Sci., Philadelphia 1849(4):126.

Hilton, W. A. 1945. The skeleton of *Aneides*. J. Ent. Zool. 37(2):43–47.

Hoffmann, C. K. 1873–78. Klassen und Ordnungen des Amphibien. *In* Bronn's Klassen und Ordungen des Thier-Reichs 6(pt. 2):1–726.

Johnston, R. F., and G. A. Schad. 1959. Natural history of the salamander *Aneides hardii*. Univ. Kansas Publ. Mus. Nat. Hist. 10(8):573–585.

Lowe, C. H., Jr. 1950. The systematic status of the salamander *Plethodon hardii*, with a discussion of biogeographical problems in *Aneides*. Copeia 1950(2):92–99.

Lynch, J. F. 1974. *Aneides flavipunctatus*. Cat. Amer. Amphib. Rept.:158.1–158.2.

Lynch, J. F., and D. B. Wake. 1974. *Aneides lugubris*. Cat. Amer. Amphib. Rept.:159.1–159.2.

Lynch, J. R. Ms. Intrapopulational and geographic variation in the Black Salamander, *Aneides flavipunctatus*. Completed Ph.D. dissertation, Univ. California, Berkeley (to be filed 1974).

Miller, L. 1944. Notes on the eggs and larvae of *Aneides lugubris*. Copeia 1944(4):224–230.

Mivart, St. G. 1870. On the axial skeleton of the urodela. Proc. Zool. Soc. London 1870:260–278.

Piatt, J. 1935. A comparative study of the hyobranchial apparatus and throat musculature in the Plethodontidae. J. Morphol. 57(1):213–251.

Rosenthal, G. S. 1957. The role of moisture and temperature in the local distribution of the plethodontid salamander *Aneides lugubris*. Univ. California Publ. Zool. 54(6):371–420.

Stebbins, R. C. 1951. Amphibians of western North America. Univ. California Press, Berkeley and Los Angeles, ix + 539 p.

— 1954. Amphibians and reptiles of western North America. McGraw-Hill Book Co., New York. xxii + 536 p.

— 1966. A field guide to western reptiles and amphibians. Houghton Mifflin, Boston, xiv + 279 p.

— 1972. Amphibians and reptiles of California, California Nat. Hist. Guides (31), Berkeley, Los Angeles, and London, University of California Press. 152 p.

Storer, T. I. 1925. A synopsis of the Amphibia of California. Univ. California Publ. Zool. 27:1–342.

Vaillant, L. 1884. Remarque sur la disposition des corps vertébraux chez l'*Anaides lugubris*. Bull. Soc. Philomathique, Paris ser. 7, 8:183.

— 1886. Note complémentaire sur l'anatomie de l'*Anaides lugubris* Hallowell. Bull. Soc. Philomathique ser. 7, 10: 42–44.

Wake, D. B. 1963. Comparative osteology of the plethodontid salamander genus *Aneides*. J. Morphol. 113(1):77–118.

— 1965a. *Aneides ferreus*. Cat. Amer. Amphib. Rept.: 16.1–16.2.

— 1965b. *Aneides hardii*. Cat. Amer. Amphib. Rept.:17.1–17.2.

— 1966. Comparative osteology and evolution of the lungless salamanders, family Plethodontidae. Mem. So. California Acad. Sci. 4:1–11.

Wiedersheim, R. 1877. Das Kopfskelet der Urodelen. Gegen. Morph. Jahrb. 3:352–448, 459–548.

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