

where the disturbance of nomenclature would be really important. While most of these names are now correctly identified and allocated, either as valid names or as junior synonyms or homonyms, a few of them, such as *Leptophryne*, still remain without proper allocation, and should in my opinion be given attention in the near future.

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Herpetofaunas of the Courland  
Canal and Hall Ash Local Faunas  
(Pleistocene: Early Kansas)  
of Jewell Co., Kansas

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Two herpetofaunas, Courland Canal and Hall Ash, from localities in Jewell Co., northcentral Kansas, form the basis of this report. The faunas were dug by Ralph Eshelman (Calvert Marine Museum) and Michael Hager (Museum of the Rockies) and are considered by them to be of Early Kansan age, i.e. very latest Irvingtonian. The mean fission track age of an ash overlaying

the fossiliferous sediments is  $0.706 = 0.017$  m.y. and thus is correlated with the Kansas stage Hartford Ash (Boellstorff, 1978).

Courtland Canal and Hall Ash represent different ecological settings. Courtland Canal material includes abundant fish, large mammals, and the reptiles and amphibians are predominantly aquatic species. The Hall Ash materials include no fish, mainly small mammals, and the reptiles and amphibians in general are those that tend to wander a distance from water. Following is an annotated list of the faunas. All fossils are from the National Museum of Natural History (USNM).

*Ambystoma tigrinum* (Green). Hall Ash: eight vertebrae and one tibia, USNM 256635. These vertebrae were identified using characters of Tihen (1958) and Holman (1969). Vertebrae of the *A. tigrinum* group of *Ambystoma* are shorter and wider than other groups of *Ambystoma* (Tihen, 1958) and *A. tigrinum* vertebrae are larger than other *Ambystoma* and have an upswept neural arch that extends well beyond the end of the centrum (Holman, 1969). The size range of the fossil vertebrae is similar to Recent individuals. The fossils may represent a neotenic population since two of the largest vertebrae have perforate neural canals. These salamanders occur in ponds and pools when neotenic or as breeding adults, and metamorphosed adults are widely dispersed even into fairly arid regions.

*Ambystoma maculatum* (Shaw). Hall Ash: one atlas and 19 vertebrae, USNM 256636. The fossil vertebrae are elongate; the neural spine does not extend beyond the postzygapophyses and the arch of the neural spine is low resulting in a very low postzygapophyseal area. I cannot distinguish these vertebrae from Recent *Ambystoma maculatum*. Today *A. maculatum* ranges east to within 250 km of the fossil locality. This species is found beneath stones or boards in moist environments in warm weather and will make mass migrations in response to warm rains (Conant, 1975).

*Rana pipiens* complex Schreber. Courtland Canal: 6 ilia, USNM 256638; Hall Ash: 10 ilia, USNM 256637; Hall Ash: 11 ilia, USNM 256639. These ilia were separated from all other possible species of *Rana* using characters of Holman (1965a). *Rana pipiens* is a widespread frog which frequently wanders far from water (Conant, 1975). Today, frogs of the *R. pipiens* complex occur at the fossil localities.

*Rana catesbeiana* Shaw. Courtland Canal: two ilia, USNM 256640. The fossil ilia are similar to *Rana catesbeiana* in having the posteriodorsal border of the ilial prominence slope precipitously into the dorsal acetabular expansion (Holman, 1965a) so have been referred to that species. *Rana catesbeiana* is found in Jewell Co., Kansas, today and is very aquatic, preferring larger bodies of water than most other frogs (Conant, 1975).

*Bufo hemiophrys* Cope. Courtland Canal: one ilium USNM 256641; Hall Ash: two ilia, USNM 256642. The fossil ilia have lower ilial crests than all species of *Bufo* in or near Jewell Co., Kansas, except for *Bufo americanus* and *B. hemiophrys*. The anterior angle of the ilial prominence is less acute than the posterior angle in *B. americanus* (Tihen, 1962) but these angles are approximately equal in *B. hemiophrys* and the fossils. The present range of *B. hemiophrys* extends to 200 km north of the fossil localities. This species is known as a fossil from the Kansan age Cudahy fauna of Meade Co., Kansas (Tihen, 1962). The Hall Ash and Courtland Canal fossils are relatively small as are the Cudahy fossils. The largest ilium from Jewell Co., Kansas, represents a toad no larger than 60 mm in snout-vent length. *Bufo hemiophrys* is more aquatic than most toads, living along the shores of small lakes and frequently swimming well out in the water (Conant, 1975).

*Geochelone* sp. Hall Ash: one marginal, USNM 276621. This fossil is larger and thicker than marginals found in all other genera of Testudinidae and is thus assigned to the genus *Geochelone*. The material is insufficient for specific identification.

*Chrysemys picta* Schneider. Courtland Canal: one fragmentary nuchal, USNM 256622. The fossil was identified using characters described by Weaver and Rose (1967a). The element is indistinguishable from Recent *Chrysemys picta*. *Chrysemys picta belli* occurs today in Jewell Co., Kansas. These turtles live chiefly in shallow water with profuse aquatic vegetation and soft, muddy bottoms (Conant, 1975).

*Chrysemys scripta* (Schoepff). Courtland Canal: one marginal, USNM 256623. This marginal was identified using characters of Weaver and Rose (1967a, b). Today, *Chrysemys scripta elegans* ranges north to within 50 km of Jewell Co., Kansas. This turtle prefers quiet water with a muddy bottom and abundant vegetation (Conant, 1975).

*Heterodon nasicus* (Baird and Girard). Courtland Canal: three vertebrae, USNM 256630. The fossil vertebrae were identified using characters of Brattstrom (1967) and Holman (1963). This snake occurs in Jewell Co., Kansas, today and occurs most frequently in relatively dry, sandy prairie areas.

*Nerodia sipedon* (Linnaeus). Courtland Canal: six vertebrae, USNM 256625. The fossil vertebrae were identified using characters of Holman (1962). *Nerodia sipedon* occurs in Jewell Co., Kansas, today and is a snake of permanent or semi-permanent water. It follows rivers into otherwise arid country (Conant, 1975).

*Thamnophis proximus* (Say). Courtland Canal: eight vertebrae, USNM 256629. The fossil vertebrae were assigned to *T. proximus* since the neural spine is high, the prezygapophyseal processes are

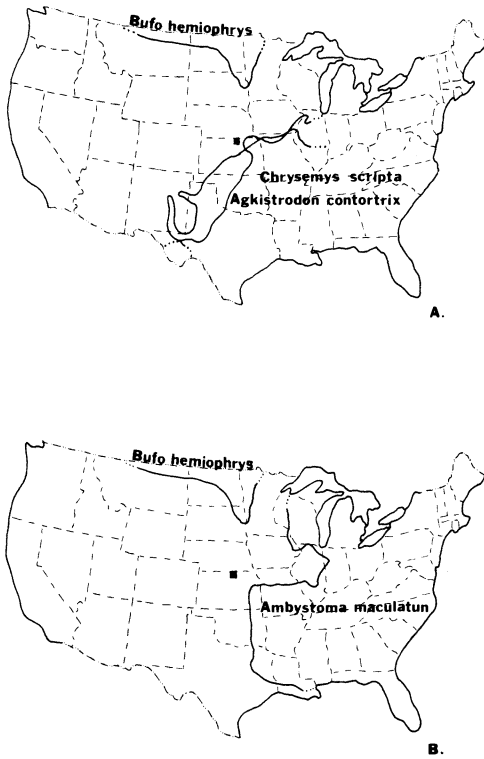


FIG. 1. Limits of ranges of ecologically incompatible herpetological species from Courtland Canal (A) and Hall Ash (B).

oblique to the centrum (Holman, 1962), and the prezygapophyses tend to be oblong. This snake occurs today in Jewell Co., Kansas. *Thamnophis proximus* is semi-aquatic and remains close to streams and other bodies of water in the more arid parts of its range (Conant, 1975).

*Thamnophis radix* (Baird and Girard). Courtland Canal: one vertebrae, USNM 256626; Hall Ash: two vertebrae, USNM 256627. These vertebrae are identifiable as *Thamnophis radix* because of their relatively low neural spines. This snake occurs in Jewell Co., Kansas, today. It is an abundant snake today, especially common in river valleys and near prairie ponds. It is also occasionally found in open park land (Conant, 1975).

*Thamnophis sirtalis* (Linnaeus). Courtland Canal: 15 vertebrae, USNM 256628. The fossil vertebrae have a neural spine as high as *Thamnophis proximus*, but the prezygapophyseal processes are at right angles to the centrum and the prezygapophyseal facets tend to be round. *Thamnophis sirtalis* occurs today in Jewell Co., Kansas. This snake is widespread and common in prairie swales, ditches, around ponds, and will follow water courses into otherwise arid country (Conant, 1975).

*Coluber constrictor* Linnaeus. Courtland Canal: two vertebrae, USNM 256631. These fossil vertebrae

are indistinguishable from Recent *Coluber constrictor* and have been separated from the very similar vertebrae of *Masticophis* on the basis of characters of Hill (1971) and on the basis of range. This snake occurs in Jewell Co., Kansas, today and generally inhabits fields, grasslands, brushy areas, woods, and will take refuge in mammal burrows or rock piles (Conant, 1975).

*Agkistrodon contortrix* (Linnaeus). Courtland Canal: six vertebrae, USNM 256632. The fossil vertebrae were identified using characters of Holman (1963, 1965b). *Agkistrodon contortrix* occurs today in Jewell Co., Kansas. It is a snake of rocky, wooded hillsides and mountainous areas. These reptiles frequently find food, shelter, and moisture around piles of rotting wood (Conant, 1975).

Both Courtland Canal and Hall Ash are faunas that are very modern. None of the Courtland Canal species identified represent extinct species and only one of the Hall Ash species, *Geochelone*, is extinct. All species reported have been identified from other Pleistocene localities.

Ecologically, Courtland Canal and Hall Ash represent slightly different settings. The Courtland Canal Fauna represents a permanent prairie pond (*Thamnophis radix*, *T. sirtalis*) with shallow, quiet water with a muddy bottom (*Chrysemys scripta*) bordered by a wooded hillside (*Agkistrodon contortrix*) and not far removed from a relatively dry, sandy prairie area (*Heterodon nasicus*). The Hall Ash Fauna represents a prairie pond (*Thamnophis radix*) bordered by an area of moist ground (*Ambystoma maculatum*). Prairie areas would have been nearby (*Geochelone*).

Admixtures of northwestern and southeastern elements are present in both faunas (see Fig. 1). Nine of the twelve Courtland Canal species occur in Jewell County today. Of the remaining species, one (*Bufo hemiophrys*) occurs to the northwest of the fossil locality, and two (*Chrysemys scripta* and *Agkistrodon contortrix*) occur to the southeast of the fossil locality. Five of the seven Hall Ash species occur at the locality today, one species is extinct (*Geochelone*), one species (*Bufo hemiophrys*) occurs to the northwest of the fossil locality and one (*Ambystoma maculatum*) occurs to the southeast of the fossil locality.

Kansas Pleistocene faunas frequently contain a mixture of forms that are "ecologically incompatible" (Lipps and Ray, 1967; Holman, 1976) today. This has been explained most frequently by hypothesizing a more equable paleoclimate than our present one (Dalquest, 1965; Hibbard and Taylor, 1960; and others). Mild winters with few frosts would account for "southern" species and cooler summers with few very hot days would account for "northern" forms. Moderating a climate, such as that seen in the Pleistocene paleoclimate of the high plains and the southeastern United States, occurs readily from the greenhouse effect. This is, heavy cloud cover results in increased moisture which in turn causes moderated winter lows and summer highs.

Species in the Courtland Canal and Hall Ash Faunas that do not occur in Jewell Co., Kansas, today support the idea of a greenhouse effect in the Kansan paleoclimate of Jewell Co., Kansas. A comparison of species ranges with isolines of average solar radiation and vegetation maps indicates that *Chrysemys scripta*, *Agkistrodon contortrix*, *Ambystoma maculatum*, and *Bufo hemiophrys* are species that occur in areas with more water or more cloud cover than is found in Jewell Co., Kansas, today. With the increased moisture and moderated temperatures that would result from the greenhouse effect, this "northern" species and these "southern" species could exist together.

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A New Subspecies of  
*Leiocephalus personatus* from  
the República Dominicana

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The status of the population of *Leiocephalus personatus* Cope in La Romana and San Pedro de Macoris provinces (Schwartz, 1967) has been uncertain. A series collected on this southeastern coast of Hispaniola in the República Dominicana can now be described as a new subspecies, which may be called *Leiocephalus personatus socoensis*, subspecies nova.

*Holotype.*—USNM 197371, an adult male from 25 km E San Pedro de Macoris, Río Cumayasa, La Romana Province, República Dominicana, one of a series collected 26 June 1975 by local collectors. Original number ASFS V41076.

*Paratypes.*—ASFS V41074-75, ASFS V41077-88, same data as holotype; CM 60543-50, AMNH 115532-39, San Pedro de Macoris Prov., 2.9 km S Boca del Soco, 16 July 1971, D. C. Fowler; MCZ 156212-20, La Romana Prov., Río Cumayasa, 25 km E San Pedro de Macoris, 25 June 1975, M. H. Strahm, native collectors; USNM 197372-82, La Romana Prov., 24.8 km E San Pedro de Macoris, 15 July 1971, D. C. Fowler, A. Schwartz; MCZ 15210-11, La Romana Prov. Río Cumayasa, 17 km W La Romana, 28 June 1963, R. Thomas.

*Definition.*—A subspecies of *L. personatus* characterized in males by a tan to brown dorsum with dorsolateral stripes buffy, throats with black smudges anteriorly, chin black but throats of large males not spotted, and chin immaculate. Subocular region with a white stripe, with or without a single black slash. Ventral ground color green to yellowish green; underside of tail bright orange and undersides of hindlimbs dull pea green; one-half midbody scales more numerous ( $\bar{x} = 24.0 \pm .65$ ).