

## A LATE PLEISTOCENE INTERGLACIAL HERPETOFAUNA NEAR SHROPHAM, NORFOLK

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Sunnyholme, Lower Common, East Runton/Cromer, Norfolk NR27 9PG

### INTRODUCTION

This report details a fossil herpetofauna from a recently discovered locality near Shropham, Norfolk. The site was found by J.D. Clayden in 1983, and he has been collecting there since that date. The stratigraphic relationships of the sediments and the vertebrate taxa indicate an Ipswichian interglacial age for the fossiliferous stratum reported here. Although the herpetofauna is small, two frogs, a pond tortoise, and possibly a snake are continental forms that do not occur naturally in Britain today.

### THE SHROPHAM LATE PLEISTOCENE INTERGLACIAL SITE

The fossiliferous beds occur in the Minn's Aggregates Company Pit near Shropham, Norfolk (TM 005938). The stratigraphy is from bottom to top (1) an undertermined thickness of Cretaceous chalk; (2) a chalky, pebbly gravel 1m thick; (3) a fossiliferous detritus mud containing the herpetofauna discussed here (as well as other fossils) in a layer ranging from about 1 to 5 m thick; and (4) Devensian gravels and muds at the top of the site, containing some large vertebrate bones, and forming a layer about 8 m thick.

The Devensian gravels and muds have yielded fossil bear, wolf, lion, woolly rhino, bison, red deer, reindeer, and mammoth. The detritus mud below the Devensian deposits not only yielded the herpetofauna reported below, but also produced water chestnut fruits and chewed hazel nuts, a rich molluscan and beetle fauna, bird bones and bird egg fragments, as well as the following mammalian species: *Arvicola cantiana*, *Clethrionomys glareolus*, *Microtus arvalis/agrestis*, *Microtus oeconomus*, *Castor fibre*, *Sorex minutus*, *Neomys sp.*, *Bison sp.*, and *Hippopotamus amphibius*. These mammalian remains are consistent with those in other Ipswichian faunas in Britain.

The Shropham interglacial fossils were collected from two sites within the detritus mud stratum. These sites were designated "NP" and "JC". NP was worked from 1983 through 1989, JC was opened and worked in 1989 only. Specimen numbers in the present paper are those of the J. D. Clayden Collection, Sunnyholme, East Runton/Cromer, Norfolk NR27 9PG. These numbers reflect whether the specimens were collected from the NP or the JC sites.

Fossiliferous matrix was screen-washed in a 500 micron sieve, and was dried and sorted through for fossils at the facility at the J. D. Clayden Collection. Collecting at the site will continue to be directed and coordinated by J. D. Clayden who will arrange for the additional fossil specimens to be studied by experts in each group.

### SYSTEMATIC PALAEOLOGY

This section details the fossil amphibians and reptiles of the detritus mud stratum of the Shropham site.

Class Amphibia  
Order Caudata  
Family Salamandridae  
*Triturus vulgaris* (Linnaeus)

Material - Trunk vertebra JCSHR (NP 89-60).

**Remarks** – The trunk vertebrae of *T. vulgaris* have much higher neural spines than those of *T. cristatus* and *T. marmoratus*. The trunk vertebrae of *T. vulgaris* may be distinguished from those of *T. helveticus* in that the postzygapophyseal notch is narrower and more deeply indented in the former species. *T. vulgaris* occurs in the area today (Frazer, 1983).

Order Anura  
Family Bufonidae  
*Bufo bufo* (Linnaeus)

**Material** – A left and right ilium (NP 89-61-62).

**Remarks** – *Bufo bufo* has a lower dorsal prominence and lacks the distinct ridge (“*calamita*” ridge) on the anteroventral portion of the ilial shaft that occurs in *B. calamita*. *B. bufo* occurs in the area today (Frazer, 1983).

Family Ranidae  
*Rana arvalis* Nilsson

**Material** – One left and three right ilia JCSHR (NP 89A-39-32), and one left ilium (NP 89B-54).

**Remarks** – Holman (1987a) gave characters that distinguish the ilia of *R. arvalis* from other European *Rana*. This species does not occur naturally in Britain today, but has been reported from the Cromerian (Holman, 1987b; Holman et al., 1988; Holman, 1989), Ipswichian (Holman, 1987a), and possibly the Hoxnian (Holman and Clayden, 1988) interglacial sites.

*Rana temporaria* Linnaeus

**Material** – Right ilium JCSHR (NP 89-27).

**Remarks** – The ilia of *R. temporaria* may be distinguished from those of other species of European *Rana* on the basis of its poorly developed ilial blade (Holman, 1985). This species occurs in the area today (Frazer, 1983).

*Rana* (“water frog” species)

**Material** – One left and one right ilium JCSHR (NP 89-33-34).

**Remarks** – These ilia have the steep slope of the tuber superior into the pars ascendens illi as in “water frog” species such as *R. lessonae*, *R. ridibunda*, and the hybrid form *R. “esculenta”*. We are unable to assign these somewhat fragmentary ilia to any one of these species. *Rana “esculenta”* or *ridibunda* was reported from the Cromerian interglacial stage of Britain (Holman, et al., 1988).

*Rana sp. indet.*

**Material** – Two left and four right ilia JCSHR (NP 89A-35-40), and four left and one right ilia (NP 89B-55-59).

**Remarks** – These ilia are much too fragmentary to identify either to species group or to species.

Class Reptilia  
Order Testudines  
Family Emydidae  
*Emys orbicularis* (Linnaeus)

**Material** – Two neurals: JCSHR (NP 89-9-10). Sixteen costals: second left (NP 88-4, Fig. 1), third right (NP 89-1), fourth left (NP 89-2), sixth left (NP 89-6), costal fragment (NP 88-8), incomplete costal pieces (NP 89-12-21). Five peripherals: second right (NP 88-2), fifth right (NP 88-3), sixth right (NP 89-8), tenth left (NP 88-5), eleventh left (NP 89-4). Two hyoplastra: left (NP 89-7), incomplete piece (NP 89B-9). Plastral fragment (NP 89-28). Two shell fragments (NP 88-6-7).

**Remarks** – These bones are identical to those in modern skeletons of *Emys orbicularis* and they are assigned to this species with confidence. The European pond tortoise has been identified from Cromerian, Hoxnian, Ipswichian, and Flandrian temperate stages (Stuart, 1979, 1982),

and is especially characteristic of Ipswichian deposits. Mean July temperatures greater than 18 degrees C appear to be needed for the modern species to reproduce successfully; thus Stuart (1979) suggested that temperatures in England were at least 2 degrees C warmer than now when *E. orbicularis* inhabited England in ancient times.

Order Squamata  
Family Lacertidae  
*Lacerta* cf. *Lacerta vivipara* Linnaeus

**Material** – One vertebra JCSHR (JC 89-1), and five vertebrae (NP 89-22-26).

**Remarks** – These vertebrae are very morphologically distinct from those of *Anguis fragilis* (Holman et al., 1988) and appear to be identical to those of adult *L. vivipara* in size and characters. The fossils are tentatively assigned to *L. vivipara* because skeletons of *L. agilis* were not available for study. *L. vivipara* occurs in the area today (Frazer, 1983).

Family Colubridae  
*Natrix natrix* (Linnaeus)

**Material** – One vertebra JCSHR (NP 88-1, Fig. 2), and seven vertebrae (JC 89 2-8).

**Remarks** – These vertebrae have their hypapophyses obtuse or rounded distally and have robust parapophyseal processes as in *N. natrix* (Szyndlar, 1984). This species occurs in the area today (Frazer, 1983).

*Natrix* cf. *Natrix maura* or *tessellata*

**Material** – Seven vertebrae JCSHR (JC 89 9-15).

**Remarks** – These vertebrae have their hypapophyses pointed distally and delicate, slender parapophyseal processes as described for *N. maura* and *tessellata* by Szyndlar (1984). We will tentatively assign the above fossils to this group, but J.A. Holman has noticed that this vertebral condition is very closely approached by some specimens of *N. natrix*. Additional skeletal material of species of *Natrix* is needed to ascertain the value of the hypapophyseal and parapophyseal characters. Both *N. maura* and *tessellata* do not occur in Britain today, but are found on the European continent.

*Natrix* sp. indet

**Material** – Twelve vertebrae JCSHR (NP 89 42-53), and 52 vertebrae (JC 89 16-67).

**Remarks** – We are unable to assign these specimens to species. Some of the vertebrae are missing diagnostic parts, and others come from inappropriate portions of the vertebral column.

COMMENT

This is only the second reported British herpetofauna from sediments assigned to the Ipswichian interglacial stage. The other fossil herpetofauna is from the Swanton Morley site, also in Norfolk (Holman, 1987a). Both of these faunas are rather small (Table 1), but both have species that do not occur naturally in Britain today, but that occur in continental Europe. These species suggest a more continental climate in Britain during Ipswichian times. In fact, Stuart (1979) suggested that the presence of *E. orbicularis* indicates that the temperatures in England were at least 2 degrees C warmer when that species occurred there.

The detritus mud sediments that yielded the fossils suggest a low energy aquatic situation such as the quiet backwaters of a meandering stream. The fossil herpetofauna from Shropham (Table 1) is consistent with this interpretation.

Additional Ipswichian herpetofaunas are being studied at present, and it will be interesting to see if a "typical" British Ipswichian herpetofauna picture emerges with the addition of new information.

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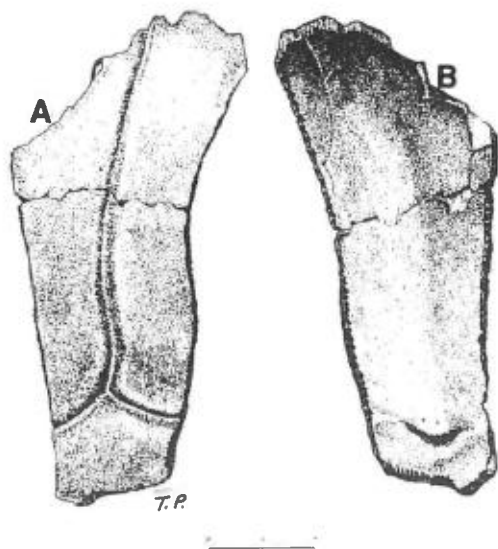


Figure 1. Second left costal bone of *Emys orbicularis* JCSHR (NP 88-4) from the Shropham, Norfolk, interglacial site. A, dorsal; B, ventral. The scale line equals 10 mm and applies to both figures.

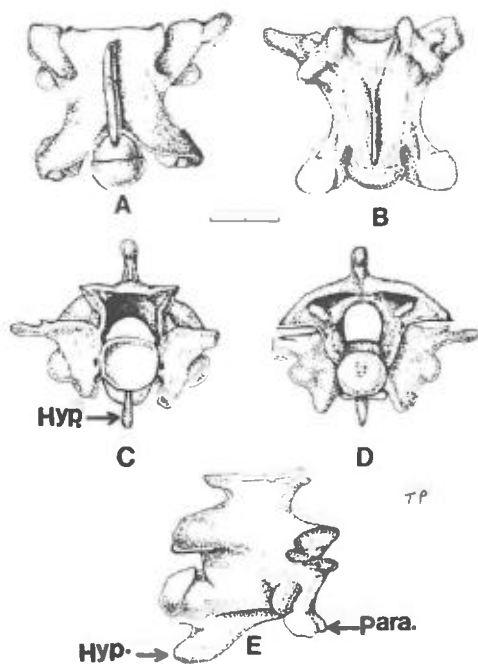


Figure 2. Vertebra of *Natrix natrix* JCSHR (NP 88-1) from the Shropham, Norfolk, interglacial site. A, dorsal; B, ventral; C, anterior; D, posterior; E, lateral. (Hyp.) refers to the hypapophyses on the vertebral drawings; (Para.) refers to the parapophyseal processes on the vertebral drawings. The scale equals 2 mm and refers to all figures.

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**TABLE 1:** Herpetological species identified from the Swanton Morley and Shropham Ipswichian sites. (E) refers to forms that do not naturally occur in Britain today, but that inhabit continental Europe.

Species	Swanton Morley	Shropham
<i>Triturus vulgaris</i>	0	+
<i>Bufo bufo</i>	+	+
<i>Rana arvalis</i> (E)	+	+
<i>Rana temporaria</i>	+	+
<i>Rana</i> ("water frog" species) (E)	0	+
<i>Emys orbicularis</i> (E)	+	+
<i>Lacerta</i> cf. <i>vivipara</i>	0	+
<i>Natrix natrix</i>	+	+
<i>Natrix</i> cf. <i>maura</i> or <i>tessellata</i> (E)	0	+

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