

中國古生物誌丙種第十號

卞美年著

第一冊

周口店第一第三地點之魚類，兩棲類，爬行類化石

中華民國二十三年三月

實業部地質調查所
國立北平研究院地質學研究所 印行

(學術研究與國立中央研究院國立北京大學
兩廣地質調查所湖南地質調查所合作)

THE GEOLOGICAL SURVEY OF CHINA
IN COOPERATION WITH
THE NATIONAL RESEARCH INSTITUTE OF GEOLOGY OF THE
ACADEMIA SINICA,
THE SECTION OF GEOLOGY OF THE NATIONAL ACADEMY OF PEIPING,
THE GEOLOGICAL DEPARTMENT OF THE NATIONAL
UNIVERSITY OF PEKING,
THE GEOLOGICAL SURVEY OF KWANGTUNG AND KWANGSI, AND
THE GEOLOGICAL SURVEY OF HUNAN.

Palæontologia Sinica

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Series C, Volume X,

fascicle 1.

ON THE FOSSIL PISCES, AMPHIBIA AND REPTILIA FROM CHOUKOUTIEN LOCALITIES 1 AND 3

BY

M. N. BIEN

PLATES I-III AND 9 TEXT-FIGURES

Published by the Geological Survey of China



PEIPING (PEKING) 1934

For Sale at the Following Offices:

Peiping: Geol. Surv. Library, 9 Ping Ma Sze, West City; French Bookstore, Grand Hotel de Pékin; Shanghai: Kelly & Walsh, Ltd., 12 Nanking Road; London: Edward Goldston, 25 Museum St. (W. C. 1); New York: A. G. Seiler & Co., 1224 Amsterdam Ave; G. E. Stechert & Co., 31-33 East 10th Street; Leipzig: Max Weg, Königstrasse 3; Buchhandlung Gustav Fock, Postschliessfach 100; Tokyo: Maruzen Company.

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ON THE FOSSIL PISCES, AMPHIBIA AND REPTILIA FROM CHOUKOUTIEN LOCALITIES 1 AND 3*

BY
M. N. BIEN



INTRODUCTION

The fossil remains of frogs, toads, lizards and snakes were either sorted out by the writer himself from the large amount of fossils generally labelled as "micro-fauna" of the *Sinanthropus* site (Locality 1) and from the collection of Locality 3 or collected in the field during the Spring season of 1933 from Locality 3. During the same season, the pharyngeal tooth of a carp was recovered from the mixture of smaller forms of Locality 3 by Mr. W. C. Pei. The fossil turtle is the same as that previously described by Dr. C. Ping in 1930 (16), which was recovered from Locality 3 by Dr. B. Bohlin in 1927, but the carapace with more fragments pieced together is cemented to the plastron along the sutures instead of being in separate pieces.

Descriptions of the mammalian fauna from Locality 1 have appeared in various fascicles of *Palæontologia Sinica*, Volume VIII, Series C. The fossil mammals of Locality 3 are, at present, being studied by Mr. W. C. Pei and the results of his study will be published later.

For the general geological conditions of the Choukoutien fossiliferous deposits, one has only to refer to the preliminary report by P. Teilhard de Chardin and Dr. C. C. Young (21), and recently published Memoir on Fossil Man in China (1).†

The writer wishes here to express to Dr. W. H. Wong and Dr. Davidson Black, Directors of the Geological Survey of China and of the Cenozoic Laboratory respectively, his thanks for the privilege of studying these materials. He is much indebted to P. Teilhard de Chardin, Dr. C. C. Young and Mr. W. C. Pei for their helpful suggestions and kindly criticisms; to Dr. A. M. Boring and Mr. C. T. Hsiao of the Biology Department of Yenching University, Peiping, for counsel regarding the study of the Salientia, and their kindness in loaning the writer materials for comparison; to Dr. T. L. Tchang and Mr. C. Ho of the Fan Memorial Institute

* From the Cenozoic Research Laboratory of the National Geological Survey of China. Received for publication December, 1933.

† It should be noted that Locality 3 is still in process of intensive study and may eventually prove to be of slightly later age than Locality 1.

of Biology, Peiping, for loaning the writer valuable books and materials for comparison; to Mr. T. H. T'ang of the Biology Department of the University of Amoy, who kindly sent the writer the museum specimen of a young *Ocadia sinensis*; to Mr. T. C. Chow for his help during the printing of this paper; to Messrs. K. H. Hsü and M. S. Lee, who are responsible for the photographs; to Mrs. O. H. Gowen for having the photographs printed by the Photographic Bureau of P.U.M.C.; and to Mr. S. Y. Wang for retouching the plates.

DESCRIPTIONS OF THE FOSSILS

Class **Pisces**

Sub-class **Teleostei**

Order **PHYSOSTOMI** Müller

Family **CYPRINIDÆ**

Genus **CTENOPHARYNGODON**

Ctenopharyngodon idellus (Cuvier and Valenciennes)

Pl. I, Fig. 34.

An isolated pharyngeal tooth indicates the presence of this form at Locality 3. Dr. T. L. Tchang of the Fan Memorial Institute of Biology has kindly compared it with the pharyngeal teeth of carps and found it to agree exactly with that of *Ctenopharyngodon idellus* to the last

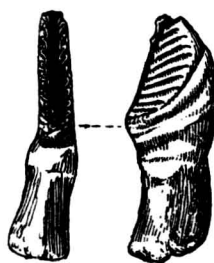


Fig. 1. Pharyngeal tooth of *Ctenopharyngodon idellus*. Medial and anterior views. 2/1 nat. size.

details. This living form is found in rivers and lakes and is widely distributed over an extensive range which stretches from Sungari River in the North down to Hongkong in the South.

HORIZON AND LOCALITY: Upper Polycene of Locality 3; Choukoutien. Cat. C.L.G.S.C. No. $\frac{C}{C 1750}$.

Class **Amphibia** Blainville

Order **SALIENTIA** Cope

Sub-order **PROCOELA** (Nicholls) Noble

Family **BUFONDÆ**

Genus **BUFO** Laurenti

Bufo bufo cf. **asiaticus** Steindachner

Pl. I, Figs. 2-23.

This form is represented by an incomplete vertebral column with vertebræ from the third to the eighth inclusive; the scapula, humerus, and radio-ulna of the left side; and the right humerus, all belonging to a single individual from Locality 1. Isolated bones as squamosals, parasphenoids, pterygoids, mandibular rami, scapulæ, coracoids, vertebræ, coccygea, tibiales, fibulares, and phalanges are few, while humeri of both male and female individuals, radio-ulnæ, ilia, femurs and tibio-fibulæ are numerous from both Localities 1 and 3.

It is referred to the eastern Asiatic sub-species *bufo asiaticus* of *Bufo bufo*, the common European toad, because its bone elements when compared with those of this sub-species are found to agree exactly. If one disregards sub-species of this species which, according to the modern herpetologists themselves, is not well defined, the fossil form of Choukoutien could be regarded as *Bufo vulgaris* itself.

This common toad is very widely distributed throughout the palearctic region and the sub-species referred is common in Eastern Siberia, Manchuria and North China.

DESCRIPTION

Vertebral column (Pl. I, Figs. 2-8a)

Judging from the incomplete vertebral column and the isolated vertebræ and coccygea, it is evident that the vertebral column is uniformly procoelous, with nine vertebræ anterior to the coccyx; the sacral vertebra with diapophyses moderately dilated, and two condyles for the articulation with the coccyx; the coccyx has no transverse processes; its dorsal bony plate does not extend far back to the posterior extremity and the dorsal furrow is quite open.

An incomplete vertebral column, 32 presacral vertebræ, 8 sacral vertebræ and 14 coccygea from Locality 1; 23 presacral vertebræ, 3 sacral vertebræ, and 10 coccygea from Locality 3.

Squamosal (Pl. I, Fig. 9)

With large, expanded, and ear-shaped supra-temporal portion; post-orbital process slightly inwardly curved.

1 complete squamosal from Locality 1; and 2 fragmentary ones from Locality 3.

Parasphenoid (Pl. I, Fig. 10)

Very convex at the cross; lateral arms slightly expanded laterally.

1 from Locality 1; and 2 from Locality 3.all fragmentary.

Pterygoid (Pl. I, Fig. 11)

Anterior arm strongly curved; medial arm long.

3 from Locality 3.

Mandibular ramus (Pl. I, Fig. 12)

3 from Locality 3.

Clavicle (Pl. I, Fig. 13)

1 from Locality 3.

Coracoid (Pl. I, Fig. 14)

Anterior margin, very concave; posterior margin, slightly concave; lateral extremity wider than medial extremity and nearly circular in cross-section.

4 from Locality 1; and 5 from Locality 3.

Scapula (Pl. I, Fig. 15 and Fig. 18, part)

Glenoid process, though dorsal to acromion process, does not overshadow the latter process.

17 from Locality 1; and 19 from Locality 3.

Humerus (Pl. I, Figs. 16-20; text fig. 2)

Humerus of male individual with strongly developed medial crest, the wing-like structure above the ulnar condyle; none in female individual (true in all forms). Medial tubercle not strongly developed. Shaft curved and portion just above cubital fossa is small compared to proximal and distal ends, hence distal end appears to be greatly expanded [a character attributed to *Bufo* by Lydekker (11, part iv, p. 128).]

56 and 73 humeri of male and female individuals respectively, from Locality 1; 11 of males and 42 of females from Locality 3.

Radio-ulna (Pl. I, Figs. 21-24)

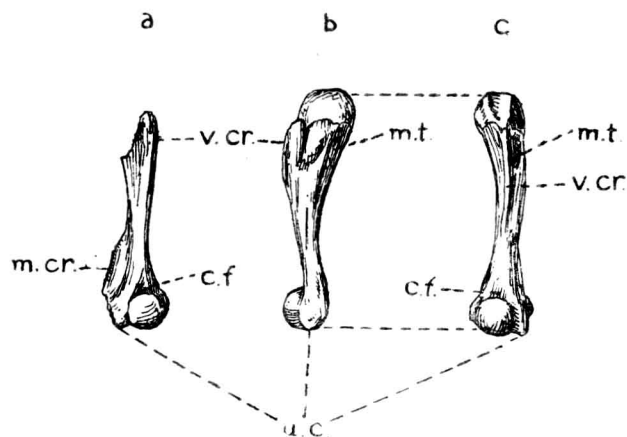


Fig. 2. Humeri of male and female individuals of *Bufo bufo* cf. *asiaticus*.

a, humerus of male from below; b, humerus of female from medial side; c, from below, 1/1. Abbr. c.f., cubital fossa; m. cr., medial crest; m.t., medial tubercle; u.c., ulnar condyle; v. cr., ventral crest.

Distal expansion varies; some with bony encrustations on medial and lateral surfaces (occur in recent specimens of *B. bufo asiaticus* also).

103 from Locality 1; and 24 from Locality 3.

Ilium* (Pl. I, Figs. 25 and 26; text fig. 3)

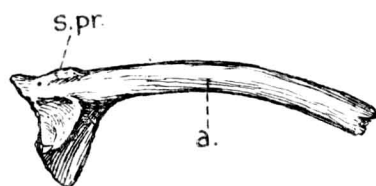


Fig. 3. Ilium of *Bufo bufo* cf. *asiaticus* from lateral side. 1/1. Abbr. a, ala; s. pr., superior process.

With no vexillum; ala not dorso-ventrally flattened anteriorly, but stout when viewed from the side; superior process, small and slightly projected laterally and dorsally.

109 from Locality 1; and 34 from Locality 3.

* Terms denoting the structures on the ilium adopted from Schæfer's work (19) on The Classification of German Anura by the Skeleton.

Femur (Pl. I, Figs. 27-29)

With well developed ventral ridge, but does not extend far below the middle portion of the shaft.

95 from Locality 1; and 25 from Locality 3.

Tibio-fibula (Pl. I, Figs. 30-32)

Stout, with proximal and distal extremities expanded; lateral surface more concave than medial surface which is almost straight in some individuals.

116 from Locality 1, and 47 from Locality 3.

Tibiale and fibulare (Pl. I, Fig. 33)

1 specimen of tibiale and fibulare with epiphyses and few isolated ones from Locality 1; and few from Locality 3.

Phalanx

Few from Localities 1 and 3.

HORIZON AND LOCALITIES: Upper Pliocene of Localities 1 and 3, Choukoutien.

Cat. C.L.G.S.C. Nos. $\frac{C}{C 1715}$ — $\frac{C}{C 1730}$.

COMPARISONS

All the bones described or listed above agree exactly with the corresponding bones of *Bufo bufo asiaticus* Steindachner. Compared with the individual bones of the skeleton of a large recent female *B. bufo asiaticus* collected from Choukoutien which measured 120 mm. in body length, most of the bones agree even in size and some are even larger. Of course, bones of smaller size, representing those of younger individuals, also occur. This shows that the common toads which occurred as fossils in Choukoutien were mostly of giant size and comparable to those reported by A. M. Boring and C. C. Liu in their joint paper on the Giant Toads in China (3), in which the males are reported to be 100-112 mm. and females 105-140 mm. in body length, measured from tip of snout to vent.

B. raddei Strauch differs from this form in its small squamosal which does not have an expanded supra-temporal portion; its more dorsally and laterally projected superior process of the ilium; its farther distally extended ventral ridge of the femur; its very strongly developed medial tubercle of the humerus; and its smaller size.

B. melanostictus Schneider differs from this form in having the post-orbital, medial and posterior processes of the supra-temporal portion of the squamosal dorsally ridged which comprise

part of the strongly developed bony crests of the head. Two imperfect humeri from the Pleistocene cave-deposits of Karnul, Madras, were provisionally referred to this species by Lydekker (10, p. 56, 11, pt. iv, p, 128).

Bufo raddei Strauch

Pl. II, Figs. 1-9.

19 humeri of male individuals and 13 of females, 43 ilia, 37 femurs and 96 tibio-fibulæ from Locality 1; 2 humeri of males and 1 of female, 6 ilia, 6 femurs and 11 tibio-fibulæ from Locality 3 are attributed to this species.

This species is widely distributed in eastern Siberia, Manchuria and North China.

DESCRIPTION

Humerus (Pl. II, Figs. 1-4; text fig. 4)

With strongly developed medial tubercle. Other characters essentially the same as *B. bufo asiaticus*, except its smaller size.

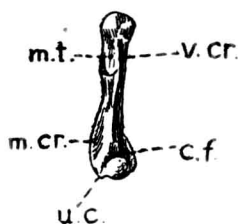


Fig. 4. Humerus of male individual of *Bufo raddei* from below, 1/1. Abbr. c.f., cubital fossa; m. cr., medial crest; m. t., medial tubercle; u.c., ulnar condyle; v. cr., ventral crest.

Ilium (Text fig. 5)

With more dorsally and laterally projected superior process than that in *B. bufo asiaticus*.

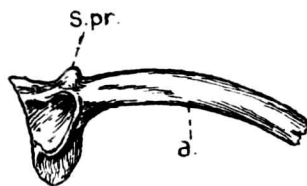


Fig. 5. Ilium of *Bufo raddei* from lateral side, 2/1. Abbr. a, ala; s. pr., superior process.

Femur (Pl. II, Figs. 5 and 6)

Ventral ridge more blade-like and extends farther below the middle portion of the shaft than in *B. bufo asiaticus*.

Tibio-fibula (Pl. II, Figs. 7-9)

The lateral surface is almost as concave as the medial surface.

HORIZON AND LOCALITIES: Upper Polycene of Localities 1 and 3, Choukoutien.

Cat. C.L.G.S.C. Nos. $\frac{C}{C\ 1731}$ — $\frac{C}{C\ 1739}$

COMPARISONS

These bones agree with the corresponding bones of *B. raddei*. Their differences from those of the other *Bufo* have already been mentioned.

Sub-order **DIPLASIOCOELA** (Nicholls) Noble

Family **RANIDÆ**

Genus **RANA** Linnæus

Rana nigromaculata Hallowell

Pl. II, Figs. 10-15.

This species is represented by 1 humerus of male and 2 of females, 4 ilia and 15 tibio-fibulæ from Locality 3. This form is widely distributed, "being recorded from 'Vladivostok to Bangkok'" (3, p. 45).

DESCRIPTION

Humerus (Pl. II, Fig. 10; text fig. 6)

Shaft, very slightly curved and portion just above cubital fossa, not much smaller than proximal and distal ends.

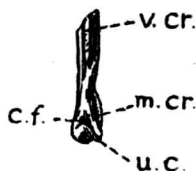


Fig. 6. Humerus of male individual of *Rana nigromaculata* from below, 1/1. Abbr. c.f., cubital fossa; m. cr., medial crest; u.c., ulnar condyle; v. cr., ventral crest.

Ilium (Pl. II, Figs. 14 and 15; text fig. 7)

With well developed vexillum; superior process, strongly projected dorsally and laterally.

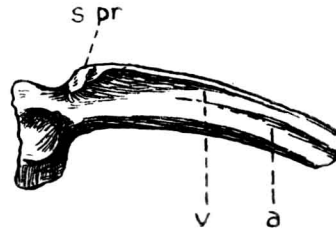


Fig. 7. Ilium of *Rana nigromaculata* from lateral side, 2/1. Abbr. a, ala; s. pr., superior process; v, vexillum.

Femur (Pl. II, Fig. 13)

With no distinct ventral ridge.

Tibio-fibula (Pl. II, Figs. 11 and 12)

Flat, with slightly convex medial surface and concave lateral surface; proximal and distal expansions, not great as compared with its length.

HORIZON AND LOCALITY: Upper Polycene of Locality 3, Choukoutien. Cat.

C.L.G.S.C. Nos. $\frac{C}{C\ 1740}$ — $\frac{C}{C\ 1745}$.

COMPARISONS

The above mentioned bones agree exactly with the corresponding bones of *R. nigromaculata*. They also resemble those of *R. plancyi*, the other common pond-frog of North China. The bones are not unlike those of *R. esculenta* of Europe and the fossil *Rana* of Ertemte, Mongolia, described by Schlosser (18, p. 96) as *R. hipparionum* (sp. nov.).

Rana asiatica Bedriaga

Pl. II, Figs. 16-20.

16 humeri of male individuals and 12 of females, and 31 tibio-fibulæ from Locality 3 are attributed to this species. This form is found in eastern Siberia, Kansu, Ordos, Shansi, Shensi and Hopei (near Mongolia).

DESCRIPTION

Humerus (Pl. II, Figs. 16 and 17; text fig. 8)

Shaft slender and almost straight; proximal and distal ends, very slightly expanded; and ventral crest with a peculiar medial projection in male individual.

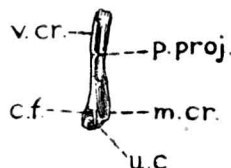


Fig. 8. Humerus of male individual of *Rana asiatica* from below, 1/1. Abbr. c.f., cubital fossa; m. cr., medial crest; p. proj., peculiar projection; u.c., ulnar condyle; v. cr., ventral crest.

Tibio-fibula (Pl. II, Figs. 18-20)

Very slender and long; proximal and distal extremities very slightly expanded.

HORIZON AND LOCALITY: Upper Polycene of Locality 3, Choukoutien. Cat. C.L.G.S.C. Nos. $\frac{C}{C\ 1746}$ — $\frac{C}{C\ 1747}$.

COMPARISONS

The humerus and tibio-fibula are very characteristic and agree exactly with those of *Rana asiatica*.

Class **Reptilia** Blainville

Order **SQUAMATA**

Sub-order **LACERTILIA** Owen

Family **LACERTIDÆ**

Gen. et sp. indet.

Pl. II, Figs. 21 and 22.

The Lacertid is represented by ten fragmentary dentaries from Locality 1 and 1 from Locality 3. It is pleurodont. The dentary is deep dorso-ventrally with a convex lower border.