

as the internal pterygoid process of the sphenoid, because later it fuses with that bone, and in the process squeezes the vidian nerve between it and the basi-sphenoid.

(b) The middle piece remains throughout life as the cartilaginous portion of the Eustachian tube.

(c) The third portion, that connected with the malleus, degenerates into fibrous tissue, and becomes the anterior ligament of the malleus, and may be seen in the adult passing from the Eustachian cartilage to the head of the malleus.

The diagrams exhibited (figs. 2 and 3, pp. 571, 572) show at a glance this transformation; and to make the picture complete the metamorphosis of the two associated cartilages has been added also.

With regard to the morphological value of this bar, it requires very little perception to see at once that it is in man the representative of the palato-quadrate of Elasmobranchs, Amphibians, &c.

In concluding let me remark that Nature fashions the most complex skull on precisely the same ground-plan as she does the simplest, and it must be evident to every thinking mind that the nearer we approach truth in these matters—"how simple do her ways appear."

#### EXPLANATION OF THE PLATES.

##### PLATE LIII.

- Fig. 1. A longitudinal section of a Pike's skull, to show the situation of the pre-maxilla, pre-palatine, and vomer (after Huxley). The terminology is altered in accordance with the views of this paper.
2. The so-called parasphenoid of the Pike disarticulated.
3. The vomer of a human foetus at birth.
4. Longitudinal section of the skull of a human foetus at term, to show the situation of the vomer.
5. An under view of the anterior part of the skull of *Lepidosteus*, to show the two so-called vomers (pre-palatines). The pre-maxillæ have been removed (modified from Parker). In the figures 5, 6, 7, 8, the lettering is the same. Pre.m. premaxilla. Pre.p. Prepalatine. P. Palate bone.

##### PLATE LIV.

6. The skull of *Lacerta agilis*, showing the relation of the pre-maxilla, pre-palatines, palatines, and vomer.
7. Skull of Wombat, showing the relation of the bones on hard palate as in last figure.
8. Hard palate of man (foetus at term) to show pre-maxilla, and the pre-palatine portion of the superior maxilla, and palate bone, for comparison with figures 5, 6, & 7.

### 3. Notes on the Edible Frog in England.

By G. A. BOULENGER, F.Z.S.

[Received November 10, 1884.]

(Plate LV.)

In a communication in the July number of the 'Zoologist,' I reviewed the information collected up to that time respecting the occurrence of the Edible Frog, *Rana esculenta*, in England, and showed that the Frog hitherto found at various places (Foulmire fen in



Cambridgeshire, and Stow Bedon and between Thetford and Scoulton in Norfolk), and generally regarded as introduced from France and Belgium, belongs to the Italian form, *R. esculenta lessonæ*; and concluded by expressing the hope that descendants of the typical *R. esculenta*, which was introduced in great numbers into Norfolk by Mr. G. Berney forty years ago, would be discovered. Through the kindness of Lord Walsingham, W. Amburst Amherst, Esq., M.P., and Geo. E. Mason, Esq., who took an interest in the question, I have received much information and additional material this summer; and, what is more important, the typical *R. esculenta* has been found in or near some of the places where specimens were turned out by Mr. Berney, but where they remained unnoticed, or were confounded with the form *lessonæ*, the introduction of which is clearly of a much older date. The result is the addition to the British fauna of a new form of Frog. If I say "form," and not "species," it is because the limits of these forms are difficult to establish when the whole Palæarctic range is taken into consideration; but so far as England is concerned, the two forms are as distinct as many generally accepted "species." I may even add that, according to the definition of the genera *Rana* and *Pyxicephalus* (*Hoplobatrachus*) admitted by many authors, *Rana esculenta lessonæ* would fall into the latter; but I have elsewhere expressed my objections to the validity of the genus *Pyxicephalus*.

Soon after the publication of my note in the 'Zoologist,' I received from Lord Walsingham seven specimens from Stow Bedon; and on July 29 I had the pleasure of accompanying his Lordship on an excursion to that place, on which occasion twelve more specimens were captured. The Frogs were very abundant at Stow Bedon, in small pools and pits, which, owing to the excessive drought, contained but little water. They did not indulge in their sonorous croaking on the occasion of our visit, and no tadpoles or spawn were to be seen. However, one full-grown tadpole was dredged from the bottom of a pit, but was so much injured that I could not preserve it. I was rather surprised to find that none of the specimens presented that beautiful green colour which is usual in *R. esculenta*; all were olive-brown, spotted and marbled with black, and provided with a pale yellow or pale green vertebral line; all had the enormous metatarsal tubercle. This accounts for the fact for which I always was at a loss to find an explanation, viz. the silence of the first discoverers of the Edible Frog in Cambridgeshire as to the green colour which, among other characters, so well distinguishes that species from the Common Frog. *R. esculenta lessonæ*, as occurring in England, is never green. Lord Walsingham informed me that he was making inquiries among the people of that neighbourhood as to how long the Frogs had lived there, and that he had been assured that their existence could be traced as far as sixty years back. Lord Walsingham also inquired of Mr. G. Berney whether the Edible Frog had maintained its existence in Hockering, and was informed that for years past not one had been seen anywhere in that neighbourhood.

On a request made by Lord Walsingham to Mr. Amburst Amherst, I received from that gentleman on August 9 two fine living



specimens, which proved to belong to the typical *Rana esculenta* as occurring in the north of France and Belgium. These came from Foulton, Norfolk, one of the very spots where the Frogs had been turned out by Mr. Berney, and of which they are, without the slightest doubt, the descendants. Both specimens were grass-green and had the moderate-sized metatarsal tubercle of the animal so graphically and accurately described by Rösel.

Shortly after, Mr. G. E. Mason made an excursion to Norfolk with the special object of ascertaining the distribution of the Edible Frog in that county. He visited Stow Bedon first, and succeeded in finding a large number of recently transformed young and others in the last stage of the tadpole, some of which he has kindly presented to the Natural History Museum.

Mr. Mason has furnished me with the following notes:—"On the common (of Stow Bedon) the species is, I think, restricted to the north-west portion; it was absent in all the ponds which are distributed over the remaining tract. This portion is undoubtedly seldom disturbed, and a number of Teal and other water-fowl had made so favourable a spot their home; this is, I think, sufficient to account for the absence of Frogs. As to the range of the species beyond Stow Common, I have unfortunately gained but little trustworthy information. During my daily rides round the adjacent districts, I availed myself of every opportunity to search for specimens and gain information; but owing to the excessive heat, and extreme dryness of the land, I found the former object a most difficult occupation. Scoulton ( $3\frac{3}{4}$  miles from Stow Bedon station) was the only neighbourhood near Stow where I could learn the species had been observed, and, according to the testimony of a large land proprietor, they were readily found two or three years back in nearly all the ponds &c. on his estate, but since that time they have quite disappeared." Mr. Mason, having sent the gentleman just alluded to specimens from Stow Bedon, was assured they were positively identical with those of Scoulton.

Mr. Mason also caught a fine adult example of the true *Rana esculenta* on Wereham fen, nearly six miles from Foulton, and subsequently found other specimens on Foulton fen. He informs me that that form is distributed over all the fen-land in that part of the county, and is well known as the "French Frog." "I put a few specimens of *R. esculenta* from Foulton in the ponds &c. at Brandon; the surroundings are extremely favourable, and I fully expected I should have found one of the two forms there."

It is clear that the Frogs of Stow Bedon and Scoulton (and Foulmire fen, where they have disappeared for many years past) are quite distinct from those of Foulton and Wereham. Those from the latter places are certainly the descendants of Mr. Berney's importations from Paris, Brussels, and St. Omer in 1837-42. Of the introduction of the other form we have no authentic record; but as they belong to a race known to occur only in Italy, we must come to the conclusion that they were imported from that country and the suggestion of the late John Wolley, that they were introduced by the monks, appears the most plausible.



The typical *Rana esculenta* is too well known to require description; and it will suffice to refer the reader to Rösel's admirable illustrations, and to the figure appended to this note, taken from a living specimen from Foulden. The coloration varies immensely, and although the green is the most frequent, I have also seen olive-brown specimens (from Berlin) resembling very closely in colour the form *lessonæ* as occurring in this country. For the latter it will be useful to give a short description, which, with the coloured figures, will enable to compare that form with other varieties of *Rana esculenta*.

Snout obtuse, with very oblique loreal regions, its length slightly exceeding the diameter of the orbit; nostril equally distant from the eye and the tip of the snout; interorbital space half the width of the upper eyelid; tympanum three fourths the diameter of the eye. Hind limb short; when the limb is stretched forwards, the tibio-tarsal articulation reaches the tympanum or not quite so far in the female, the tympanum or a little beyond in the male. Inner metatarsal tubercle very large and prominent, strongly compressed, semi-lunar, closely resembling the spur of *Pelobates*; its length equals nearly two thirds that of the remaining part of the inner toe. Skin smooth or feebly warty; glandular lateral fold moderately prominent, narrower than the upper eyelid. Olive-brown or bronzy brown above, spotted with black, strongly marbled on the flanks, where a light longitudinal zone remains unspotted; glandular folds lighter; the sides of the head and the ground colour of the flanks sometimes green; canthal streak well marked, black; upper lip usually bordered with black; tympanum chestnut-brown; a pale yellow or pale green vertebral line, frequently edged with black. The dark cross bands on the limbs usually very irregular; hinder sides of thighs, axilla, and groin bright yellow or orange, marbled with black. Lower surfaces more or less profusely spotted with blackish.

Dimensions.	♂	♀
	millim.	millim.
From snout to vent .....	64	78
Length of head .....	22	29
Width of head .....	22	28
Diameter of the eye .....	6	8
Interorbital space .....	2.5	3
From the eye to the nostril .....	4.5	5
From the eye to the tip of the snout .....	10	12
Diameter of the tympanum .....	4	5.5
Fore limb .....	34	42
Hind limb .....	97	110
Tibia .....	25	30
Foot (from outer metatarsal tubercle) .....	34	39
Inner toe (from inner metatarsal tubercle) ..	7.5	9
Inner metatarsal tubercle .....	5	6

#### EXPLANATION OF PLATE IV.

Fig. 1. *Rana esculenta*, var. *lessonæ*, Camerano. From specimens from Stow Bedon.

Fig. 2. *Rana esculenta*, L. From a specimen from Foulden.



Boulenger, George Albert. 1884. "Notes on the Edible Frog in England."  
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<https://doi.org/10.1111/j.1096-3642.1884.tb02874.x>.

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