

2 Bändern von ovalem Querschnitt. Breite Subcuticula mit sehr zahlreichen Kernen. Flügelform eiförmig. Länge der Flügel 1,35 mm; an der Lippenbasis beginnend. Größte Höhe der Flügel über der Cuticula 0,28 mm. Verhältnis der Flügelleiste zum Flügel wie 1 : 3. Schwanzspitze des ♂ eingeknickt. Schwanzende des ♀ spitz. Länge des Schwanzes vom After bis Schwanzspitze beim ♂ 0,130 mm, beim ♀ 0,45 mm; Länge des eingeknickten Teils der Schwanzspitze 0,08 mm. Zwei Spicula. Spiculum mit einem längeren und einem kürzeren Flügel, letzterer von ersterem überdeckt. Verbindungsstück außen zugespitzt. Von den postanalischen Schwanzpapillen befinden sich in der Schwanzspitze auf jeder Seite vier, davon zwei ventral, die beiden andern in Höhe der vorderen Papille nebeneinander, mehr ventral. Zwischen Afteröffnung und Knick keine Papille.

Ascaris n. sp. 1910.

Aus *Felis pardochrous*. Glas F 117 der Berliner Sammlung.

Länge des ♂ ? mm, des ♀ 67 mm. Dicke des ♂ ? mm, des ♀ 1,005 mm. Zwei Faserschichten von ungleicher Breite, die äußere zur inneren im Verhältnis von 5 : 4, mit Lamellen von grober Struktur. Homogene Schicht von gleicher Breite wie die äußere Faserschicht, mit 2 Bändern von ovalem Querschnitt. Schmale Subcuticula mit spärlichen Kernen. Flügelform eiförmig. Länge der Flügel 2,8 mm; an der Lippenbasis beginnend. Größte Höhe der Flügel über der Cuticula 0,28 mm. Verhältnis der Flügelleiste zum Flügel wie 1 : 2,3. Länge des Schwanzes vom After bis Schwanzspitze beim ♀ 0,6 mm. Schwanzende beim ♀ spitz.

Den in der vorliegenden Mitteilung erwähnten Herren, die mich durch Material und Literaturhinweise so freundlich unterstützten, sage ich dafür meinen besten Dank.

Marburg a. L., im April 1910.

3. Instances of polymely in two Frogs. Together with notes on the absence of a right pre-caval vein in two Frogs.

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(With 5 figures.)

eingeg. 8. April 1910.

I. Instances of polymely in two Frogs.

A survey of the literature [vide Bateson (1) and below] relating to the presence of supernumary limbs in frogs shows that a large

majority of the cases recorded are those in which an extra hind limb or pair of hind limbs is present. The following is a brief resumé of those in which the extra limbs are arms or pairs of arms.

Superville in 1740 (11) described a case in which there was an extra fore limb attached to the right shoulder, but he gives non further details.

In 1864 Gervais (7) gave a description of a specimen of *Pelobates cultripes* in which there was a second left arm attached behind the normal one. It had a separate coracoid and scapula, a humerus and a radio-ulna which were fairly normal and three digits of which the two lateral were rudimentary with but one phalanx each.

The Royal College of Surgeons (4) in 1872 catalogued a specimen of a frog with a extra fore limb attached to the sternum but gave no more details.

Lunel in 1868 (9) recorded an example of *Rana viridis* in which there was a supernumary pair of anterior limbs on the left side. The pair were fairly normal and had a scapula each.

A somewhat similar example was described by Mazza in 1888 (10) in *Rana esamelica*. Here again an additional pair of arms followed the normal limb on the left side and was attached to a separate shoulder girdle formed by a single scapular and double coracoid portions.

Bland Sutton (3) in 1889 cited a case of *Rana temporaria* with an accessory fore limb on the left side. It had three digits and was attached to the left half of the shoulder girdle by means of a piece of bone resembling a supernumary coracoid.

In the same year Bergendal (2) gave a full and detailed description of a specimen of a *Rana temporaria* with a third fore limb on the left side. It has only two digits but a fairly normal humerus and radio-ulna with a fairly complete muscle supply. The humerus runs forward under the skin of the floor of the mouth from the dorsal side of the coracoid with which it does not appear to articulate and the remaining part of the limb comes through the skin and projects backwards.

Washburn (12) in 1899 noticed a toad, *Buffo columbiensis*, with an extra arm just in front of the left normal one. The hand is supplied with seven digits and it is stated that the radius and ulna are not fused but separate bones. From the diagram however it would seem that this appearance is better interpreted as a double radio-ulna and a double hand so that the limb in all probability represents parts of a fused pair.

In 1901 Johnson (8) recorded two instances of polymely: viz. a specimen of *Rana palmipes*, in which there was a pair of supernumary limbs arising one from each normal scapular region, the left was fairly normal but small while the right had previously been cut off; and a

specimen of *Rana haeccinum* with a peduncle from which two legs arise directly ventral to the right fore leg. These are each about the size of the left normal leg and distinctly larger than the normal leg of the right side.

In the same year Eigerman and Cox (5) described a case of *Rana pipiens* in which the fore limb of the right side is duplicated. The limb is fairly normal but passes forward through a band of the skin of the floor of the mouth and is held as in a sling. In the hand the second, third, and fourth digits are normal but the first is double.

I have recently obtained two further cases of polymelous frogs in both of which there is a single extra fore limb. The first of these was handed to me by Professor J. P. Hill and was in other respects a typical adult male tree frog, *Hyla aurea*. The second was obtained during class-work dissection in this college and appeared an ordinary adult female *Rana temporaria* save for the supernumary limb.

Description of the specimens.

Specimen A. *Hyla aurea* (figure 1).

The additional fore limb was attached immediately in front of and slightly dorsal to the normal arm of the left side. It was thin but had a well marked elbow joint and its distal end had the appearance of



Fig. 1. Photograph of Specimen A. *Hyla aurea*, to show supernumary limb.

having been removed by accident during the life of the animal and of afterwards being healed over. Just dorsal to the base of the limb, below the tympanic membrane, was an unusual lump on the side of the animal's head, this dissection showed to be due to the presence of a supernumary scapula.

This specimen had been preserved for a long while so that it was very difficult to make out the musculature and as the whole arrangement

is abnormal the naming is only approximate. It was observed however that no part of the pectoralis muscles was attached to it. On the other hand there were muscles corresponding to the Anconaeus, Dorsalis scapulae, and Deltoideus [named according to Gaupp (6)] but in a very reduced condition. The muscles of the fore arm were not recognisable as the amputation had occurred immediately beyond the elbow joint.

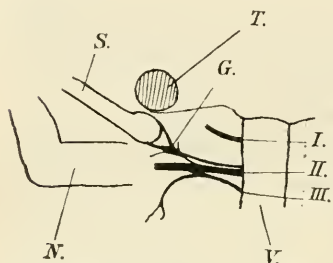


Fig. 2. Nerve supply of extra Arm. *G*, Ganglion; *N*, Normal Arm; *T*, Tympanic membrane; *V*, Vertebral Column; *I, II, III*, First three spinal nerves.

The nerve supply to the extra limb was quite unusual and connected with an abnormal ganglion (s. fig. 2). Anterior to and partially attached to the second spinal nerve, which supplied the left arm in a normal manner, was a slender nerve which after receiving a branch from the second spinal nerve formed a noticeable ganglion.

From this ganglion two nerves were given off which ran one to each side of the head of the abnormal arm and two other smaller nerves were given off to the muscles around it.

The arrangement of the blood vessels connected with this extra limb could not be made out as they were quite colourless and extremely small.

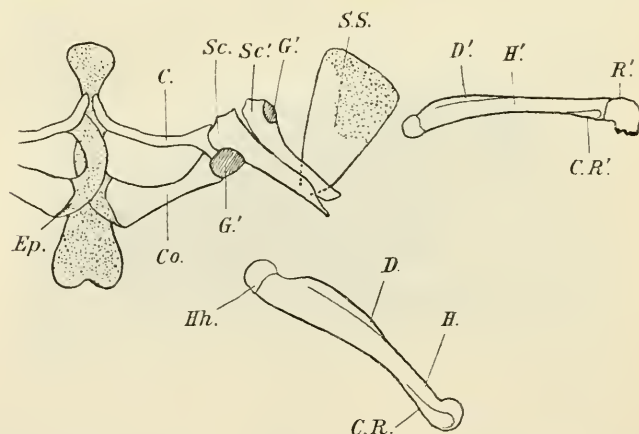


Fig. 3. Bones of Pectoral Girdle and Arms of Left Side of Specimen A. *C*, Clavicle; *Co*, Coracoid; *CR*, Condylar Ridge; *D*, Deltoid Ridge; *Ep*, Epicoracoid; *G*, Glenoid Cavity; *Hh*, Head of Humerus; *H*, Humerus; *Se*, Scapula; *S.S*, Supra Scapula; *C.R'*, *D'*, *G'*, *H'* & *Sc'*, Corresponding parts of Supernumary bones; *R*, Proximal end of Radio-ulna.

In the skeleton we meet with another abnormality in addition to the extra limb. On the right side the pectoral girdle is quite normal

and again on the left as far as the clavicle, coracoid, and epicoracoid are concerned, but not in its scapular portion (see figure 3). The scapula on this side, although fairly normal in shape and taking the usual part in the formation of the glenoid cavity, is articulated with the coracoid and clavicle in such a manner that it runs in a posterior direction at an angle of about 30° to that normally taken. Closely attached to its anterior dorsal edge is another somewhat reduced scapula belonging to the supernumary limb, for the articulation of which it offers an incomplete shallow glenoid cavity. The extra scapula is somewhat similar in shape to that of the right side but entirely different in orientation. Instead of the supra scapula being attached to the dorsal end of the scapula it is attached to its ventral side a little way from the end and runs forward beneath the extra scapula at an angle of about 110° to the normal angle between the two bones. Thus the scapula comes to lie in an antero-posterior direction at an angle of about 90° to the position it usually occupies. The humerus of the supernumary limb although small is fairly normal, showing distinct deltoid and condylar ridges, a head for articulation with the glenoid cavity and an articulating surface for the radio-ulna. The radio-ulna is bent in an unusual way and has a broken end which suggests that the distal extremity was removed while the skeleton was still cartilaginous. The bones of the left arm are quite normal.

Specimen B. *Rana temporaria*.

In this specimen the supernumary arm was on the right side and was situated slightly dorsal and posterior to the normal arm. It was thin, ending at its distal extremity in a blunt point representing a single digit and although an arm and fore arm could be recognised the joints did not appear to be capable of movement. The whole limb was covered by skin in a normal manner and was very similar in appearance to that of Specimen A.

Again as in the preceeding example no part of the pectoralis muscles was connected with the extra arm. The musculature of this arm was largely composed of much reduced muscles approximately corresponding to the Aconaeus, Dorsalis scapulae, Latissimus dorsi, Deltoideus, Flexor carpi, Extensor carpi and Palmaris longus Gaupp (6) of the normal frog.

The second spinal nerve in addition to supplying the right arm gave off a large branch to the supernumary one.

On either side of this nerve ran a blood vessel, one coming from the sub-clavian artery near the origin of the coraco-clavicularis artery, supplying the arm and the other returning the blood to the brachial vein.

The skeleton of the shoulder girdle (see figure 4) was quite normal save for the presence of a small shallow cavity just on the dorsal edge of the glenoid cavity, with which the extra limb was moveably articulated. The abnormal arm had a small humerus with a very small but distinct head, its distal end was slightly larger and appeared to be immoveably joined to the radio-ulna. At the distal extremity of the radio-ulna, which was a single bone showing no sign of double origin, was a small partly fused bone probably representing one of the carpalia.

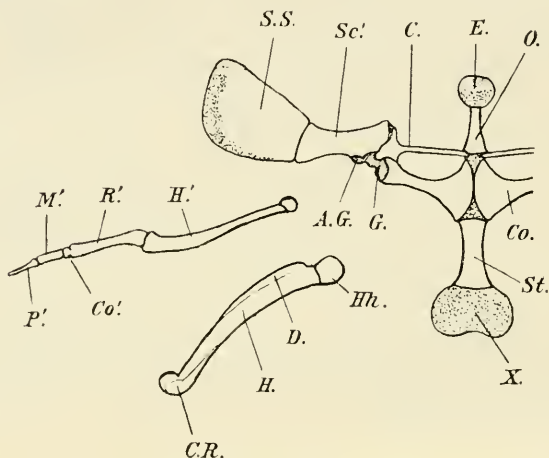


Fig. 4. Bones of Pectoral Girdle and Arms of Right Side of Specimen B. E, Episternum; O, Omesternum; St, Sternum; X, Xiphisternum; A.G, Auxillary Glenoid Cavity; R', Radio-ulna; Co', Carpal; M', Metacarpal; P', Phalanx of extra arm. Other letters as before.

The hand was greatly reduced, parts of one digit only being present. These comprised a small bone representing a metacarpal and a single phalanx.

Bateson (1) calls attention to the fact that in the "enormous majority" of polymelians the extra repetition consists of parts of a complementary pair and the preceeding two examples are of interest because in both cases the supernumary limb was single with no signs of being paired.

II. The absence of a right pre-caval vein in two Frogs.

The first of the two specimens here described, in which there is an entire absence of a precaval vein on the right side, was discovered during class-work dissection in this college and the details of the second were given me by Dr. Woodland. In all other respects, including the remainder of the venous system they appeared normal adult specimens of the common frog *Rana temporaria*.

Specimen A. *Rana temporaria* (see figure 5a).

In this specimen the sub-clavian, innominate, and external jugular veins of the right side join together in the normal way, but instead of forming a precaval vein they end blindly. There is however a dilated and somewhat varicose vein forming an anastomosis between the external jugulars of the two sides. It runs in the form of a double arch from the confluence of the lingual and mandibular veins of the right side to the similar confluence on the left and it is evident from its size and position that it conveyed the blood normally taken to the sinus venosus

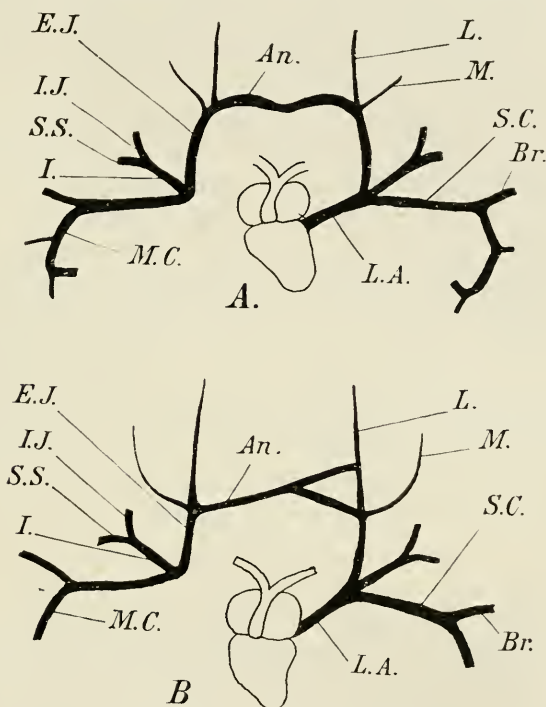


Fig. 5. Diagram of Venous Systems with Right Precaval Absent. A, Specimen A; B, Specimen B; An, Anastomosis; Br, Brachial; E.J, External Jugular; I, Innominate; I.J, Internal Jugular; L, Lingual; L.A, Left Precaval; M, Mandibular; M.C, Musculo-cutaneous; S.C, Sub Clavian; S.S, Sub Scapular.

by the right precaval, to the left external jugular. The varicose appearance of this anastomosis suggests that the blood did not find an easy passage in this direction. As a result of this absence of a precaval vein there are only two caval veins opening into the sinus venosus.

Specimen B. *Rana temporaria* (see figure 5b).

Here again we have an entire absence of a right precaval vein and consequently only two veins opening into the sinus venosus and indeed

this specimen is very similar to the preceeding one except in the conformation of the anastomosis between the two external jugular veins. This anastomosis consists of two parts. The first is a vein running from the junction of the right lingual and mandibular veins in a slightly anterior direction across to the left lingual vein. The second is another vein starting from the junction of the left lingual and mandibular veins and running forwards into the previous one just to the left of the mid-ventral line.

The only other example of a similar abnormality, so far as I have been able to find, is that described by Shore (13). In his note he terms the anastomosis an innominate vein and points out that the term innominate vein in the frog is usually applied to a vein that is not homologous with the vein so named in man and mammals and which he calls from its factors the sub-scapulo-jugular. But although in his specimen the anastomosis did run in somewhat a similar way to that of the innominate in man (except that it was from right to left instead of left to right) the conformation of the anastomoses in the foregoing specimens shows that they cannot be in any way homologised with a true innominate vein and so his term is misleading. There were in the specimens no trace of disease and it is therefore somewhat difficult to account for the loss of the right pre-caval vein. The loss of this vessel necessitated, as Shore suggests, the formation of another means of return to the sinus venosus and it appears that the blood was forced through normal small anastomoses of the tributaries of the external jugulars which in consequence became dilated.

Addendum.

Since the foregoing note was in the printer's hand another similar abnormality of the venous system has been found in a frog undergoing dissection in this college. It is almost identical with that of specimen A for again it is the right Precaval that is absent, the only difference is that the left Lingual and Mandibular veins opened separately instead of flowing together. In other respects the specimen was a normal adult, male *Rana temporaria*.

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✓ 4. Cnidosporidienstudien.

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(Mit 4 Figuren.)

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1. Die Gattung *Leptotheca* Thél.

Nach Labbé's Angaben (8) im »Tierreich« lassen sich die Arten unsrer Gattung zunächst nach der Form ihrer Sporen in zwei Gruppen trennen. Zur einen gehören die Species mit regelmäßig ovalen Sporen, während zur andern diejenigen zu rechnen sind, deren Sporen nicht oval sind. Erstere Gruppe läßt sich wieder zerlegen, je nachdem die Sporenhülle mit gewellten, zur Nahtlinie parallel laufenden Riefen versehen oder glatt ist. Eine geriefelte Schale zeigt *L. ohlmacheri* Gurley¹, während *L. agilis* Thél., *L. elongata* Thél. und *L. polymorpha* Labbé eine glatte Hülle besitzen.

Zur Gruppe mit nicht ovalen Sporen gehört *L. hepseti* Thél.¹, *L. parva* Thél. und *L. macrospora* Auerb. (1, 2, 4), und zwar sind die Sporen der ersteren Art im optischen Schnitt dreieckig, diejenigen der beiden letzteren Species hingegen bogenförmig.

Diesen ziemlich sicheren Species fügt Labbé noch zwei weitere unsichere an, und zwar *L. remicola* Thél. und *L. perlata* Gurley. Erstere Species ist von Thélolhan (14) selbst zu unserm Genus gestellt worden, allerdings mit der Bemerkung, daß die vegetativen Formen sich aus den Nierenkanälchen von *Scomber scombrus* L. nur sehr schwer isolieren ließen und keine bemerkenswerten Eigenschaften besäßen, und daß die Sporen denjenigen von *Sphaerospora* sehr glichen. Demnach ist es noch fraglich, ob sich nicht noch die Zugehörigkeit zu dieser Gattung ergeben wird.

Unzulässig erscheint es mir, die andre Form (*L. perlata* Gurley) zurzeit in unser Genus einzureihen, denn von dem Parasiten sind bisher nur die Sporen bekannt. Es läßt sich demnach gar nicht feststellen, ob die fragliche Form auch wirklich dispor ist, eine Bedingung, die nach unsern heutigen Kenntnissen von Angehörigen der Gattungen *Leptotheca*

¹ Die Zugehörigkeit dieser Species zur Gattung *Leptotheca* muß so lange als nicht ganz sicher bezeichnet werden, als die vegetativen Formen noch nicht bekannt sind.

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