**Contribution to the anatomy of double monsters / [Alfred Poland].**

CONTRIBUTION

TO THE

# ANATOMY OF DOUBLE MONSTERS.

BY ALFRED POLAND.

In a former Number of these Reports I gave an account of the dissection of anencephalous monsters. I now take the opportunity of occupying a few pages on the anatomy of another class of monsters, termed "double monsters." The accompanying plates, executed by our artist, Mr. Tupper, are accurate and faithful representations of the dissections, and will, I think, prove of much value to those interested in abnormal developments and fusion of organs.

I intend to confine myself to the simple detail of the two cases in question, and shall not enter into any elaborate discussion on double monsters in general; otherwise a small volume would be the result, and this not so correctly or judiciously filled as has been done by the continental writers, G. St. Hilaire,* Vrolik,† and Otto,‡ in their justly celebrated works.

### Case 1.

This monstrosity was sent to Dr. Lever by Mr. W. Pearce, of Islington, with the following particulars:—The mother was an unmarried Irishwoman of the age of 32, strong and healthy, and had given birth to a child eight years before, which was alive and in perfect health. During the pregnancy in question she was observed to be of an unusual size, and was supposed to bear twins. She went her full period, and with every evidence of living fœtation. At the time of

* Histoire des Anomalies de l'organization, tom. iii. avec Atlas.

† Ontleedkundig Onderzoek, Beschrijving en Rangschikking der Dubbelde Missgeboorten. 4to. Amsterdam, 1840.

‡ Monstrorum sexcentorum descriptio Anatomica. Imp. Fol. Berlin, 1841.

labour a midwife attended. As soon as the membranes were ruptured, an enormous quantity of liquor amnii escaped; and the midwife, finding something unusual, sent for Mr. Pearce, who arrived, and ascertained that there was a head presentation, and a peculiarity, as if the head of another child was borne close by the side of it. Mr. Pearce slightly reclined this, so as to allow the presenting head more room. The labour went on naturally, and terminated in seven hours in the birth of the present monstrosity. The fœtus with the hare-lip was dead; but it was thought that some signs of life were evinced by the other, though it was only for a few moments. The placenta was large, and did not offer any peculiarity.

This is one of the more simple forms of double monsters, there being an union of two individuals joined face to face, from the umbilicus to the upper part of the chest. G. St. Hilaire, in his table of classification, places it under the "Monstres doubles Monomphaliens," genus 3, "Sternopage;" Otto, under "Monstra abundantia," genus "Monstra partibus mediis coalitis;" Vrolik, under the head of "Verdubbeling van Voren."

*External configuration.*—This monster consisted of two well-formed nearly full-grown male fœtuses, united together by their anterior surfaces from the umbilicus to the upper part of the sternum, having one common umbilicus and one umbilical cord. The one fœtus was somewhat larger than the other, and had hare-lip and cleft palate. The remaining parts of these fœtuses were perfectly natural, and of full size and growth.

By a glance at the Plate of the outline of the chest of these fœtuses it might be supposed that the two individuals were joined together by the anterior surfaces of their sternums, and that each had its distinct thoracic cavity, and the organs therein normally placed. This, however, is not the case; for on reference to the diagram of the bony parietes of the chest, it will be observed that the sternum of each fœtus is divided in the median line, and spread out laterally, and united with the opposite halves of each other's sternum; and from this union there is resulting two lateral sternums common to the two fœtuses, and a fusion of the two thoracic cavities into one

of great dimensions, which is bounded by four parietes, viz. two costo-dorsal opposed to each other, and two costo-sternal, similarly placed; the former belonging to one and the same fœtus, the latter common to both.

INTERNAL STRUCTURE. — *Cavity of the Chest*—Here may be also observed a similar disposition to the bony parietes; for those organs which are placed near the spine and posterior part of the ribs, viz. the lungs and thoracic aorta, &c., are normal, there being a pair of lungs and one aorta for each fœtus; but in the sternal region, or median line, there has been a fusion of the central organ, viz. one large extensive pericardium, reaching from sternum to sternum, inclosing a double heart. This heart consists of the amalgamation of two distinct and perfect hearts, joined by their auricles and ventricles with imperfect septa, so as to allow free communication between the two. A reference to Plate II. will fully explain the anatomy.

The right and left auricles of each fœtus form one vast common cavity, with merely the remains of an imperfect septum at the place of union.

The right ventricles present peculiarities; that of the one fœtus being exceedingly large, and giving off an equally large pulmonary artery; that of the other fœtus being smaller, and forming a common cavity with its own left ventricle, from which is springing a large aorta.

The left ventricles are also remarkable; that of the one fœtus small, and giving off a narrow imperfect aorta, and united with the right ventricle of the left fœtus; that of the other fœtus large, and extending behind the right ventricle of the same side, and freely communicating with the left ventricle of the right fœtus by a perforated septum, admirably delineated in the Plate by a bristle passed through them.

*Abdominal cavity.*—This is separated from the chest by a double diaphragm, united by their tendinous centres. Underneath this is placed a very large mass, the liver, which, on accurate examination, was found to consist of two livers, with their two gall-bladders united together in the general axis, and extending from one abdominal parietes to the other. There are two distinct digestive systems, each fœtus having its own œsophagus, stomach, spleen, small and large intes-

tines, without any attempt at fusion. Each had its own pair of kidneys, ureters, bladder, and urachus.

*Circulating system.*—The blood is conveyed to these fœtuses by one large umbilical vein: this passes upward between the two livers, which required exposing by separating these organs. The vein is thus found giving off a large series of trunks to the one liver, while the main trunk passes upward, and at the transverse fissure of the liver joins the venæ portæ (not shewn in the Plate), and enters to supply the other liver. After this branching the vein continues its course as the ductus venosus to the inferior vena cava: this latter vessel also here receives the hepatic and renal veins, and then passes into the auricles. The peculiarity of the one fœtus consists in that there is no direct supply of the maternal blood to its own heart, it being derived from the circulation and heart of the other fœtus.

The pulmonary veins of the right fœtus enter the auricle as usual, but the veins from each lung run separately. Those of the left fœtus are remarkable, for here they form a common trunk, which passes down, and ramifies in the structure of the liver.

With respect to the large vessels arising from the heart little need be said, beyond mentioning the peculiarities therein evinced. The pulmonary artery of the one fœtus is large, and compensates for a small aorta. The aorta of the other fœtus is very large, and has a trunk common to the right and left ventricles.

With respect to the signs of life said to have been observed in one of these fœtuses, St. Hilaire makes the following observation on the fact: he says, "It is remarkable that among the sternopages there are none which have not been born dead, or else have died very shortly after birth. Their non-viability is very naturally explained by their common heart. it being formed of two organs too intimately united to perform functions independent of each other, and at the same time too complex to act as a single heart, and propel the blood of the two fœtuses in a single, and consequently harmonious movement."

### Case 2.

This malformation is by no means rare, and has been specially observed in animals. Gurlt and St. Hilaire give remarkably good descriptions of it. The former classifies it under the head of "Octopus quadriauritus monoprosopitus;" the latter author, in his very complicated, though perfect arrangement, places it in the order "Syncephaliens," viz. an intimate fusion of two heads, and that of the two bodies; and in this order he recognises three genera, to the last of which this monstrosity accurately corresponds. He terms it "Synote," comprising those malformations where the two bodies are intimately united above a common umbilicus; with the head incompletely double, having on one side a face, and on the other one or two ears.

No history was attached to this specimen. It has been in the Guy's Museum for a long period, but requiring to be put up again in fresh spirit, it was arranged with our curator, Dr. Birkett, that I should first dissect the abdominal and thoracic viscera. Having done this, I made a dried preparation of the parts, from which the Plate No. III. has been taken. The head had been perforated, and the bones so much injured, that I did not think it advisable to macerate the head, so as to ascertain the peculiarity respecting the arrangement of its parts, especially as I wished to preserve, the specimen uninjured.

*External Configuration.*—This monster consisted of two male fœtuses, each of the size of an eight-month's fœtus, united together throughout their length above the umbilicus; the neck and head amalgamated into one mass, so that the face is thrown towards the side, which appears to be perfectly natural, and to be composed of half a face of each fœtus; the ears belonging to this face, placed on either side, each belonging to its corresponding fœtus. On the opposite side of the head is observed the more complete union of the two heads; the only parts remaining being the right and left ears of the opposite fœtuses, which are brought into close contact, and form a kind of concha to a single meatus.

*Internal Structure.*—There was one mouth, with one

pharynx and one œsophagus, passing into the abdomen, and leading to a single stomach, with one duodenum, and one set of small intestines, as far as to within a short distance of the cœcum: here the intestine bifurcated, and separated into two distinct canals, terminating each in its own cœcum and large intestines.

*Thoracic Cavity.*—The parietes of the chest in this monstrosity is formed exactly in the same way as that of Case 1., and will require no further mention: the contents, however, differ. There is a single trachea in the neck, which soon bifurcates into two tubes for either fœtus; each of these again bifurcating to form the bronchi, which enter the pairs of lung placed as Case 1. There is one large pericardium, enclosing two single hearts, each heart consisting of one auricle and one ventricle; each auricle receiving blood as usual from the superior and inferior venæ cavæ, as also from the pulmonary veins. Each ventricle, having an auriculo-ventricular opening with appropiate valves, give off a common large trunk, consisting of pulmonary artery and aorta, each having its own opening and proper tubes, although amalgamated so as to appear as one trunk. The two aortæ are united together by a transverse tube of larger calibre, allowing free circulation between the two. The pulmonary arteries are distributed as usual; and the aortæ give off right and left trunks, from which emanate respectively right and left carotids and subclavians.

*Abdominal Cavity.*—There are two distinct and separate livers, and two inferior cavæ; also two separate and distinct umbilical veins, running through each liver, joined by hepatic, caval, and renal veins. Each fœtus has its own pair of kidneys, ureter, bladder, and urachus; and each has its own abdominal aorta, bifurcating, as usual, into common iliac vessels, and then again into external and internal trunks; the latter forming the hypograstric arteries returning the blood to the placenta: the right hypogastric artery, however, of the one fœtus was absent.

Various explanations have been offered respecting the mode of production and causation of these malformations. Geoffrey St. Hilaire has entered very fully into the subject, as also has Vrolik. In the review on the work of Vrolik,

(British and Foreign Medical Review, Vol. XII. p. 374), the following conclusions are deduced: That there are three hypotheses at present on this question: "The *First*, that of originally double ova; *Secondly*, that of an excess or wrong distribution of formative power in a single ovum; and *Thirdly*, that of the adhesion and fusion of two single ova." The reviewer, after investigating these several theories, gives the following explanation: "That it is probable the whole class of monsters by excess (including those commonly so called, and those usually regarded as double monsters) owe their origin to different degrees of one common fault; and, consequently, that the explanation of their origin ought to be the same for all; that no kind of fusion can account for the production of supernumerary individual organs, the rest of the body being single; but that it is not impossible that excess of power in one ovum, which all admit can alone explain the lower degrees of duplicicity, may, in proportionally higher degree, produce the more completely double monsters, or even two such separate individuals as are sometimes found within a single amnion."

I cannot bring myself entirely to adopt the above reasoning; but still, as I have no satisfactory theory to advance in lieu of it, I have thought it wise to quote the above extract from the Review, as the best I have hitherto met with.

## EXPLANATION OF PLATE I.

*Fig.* 1. Outline of the external configuration of the malformation of Case 2.

*Fig.* 2. Diagram of the bony parietes of the chest of the same fœtus, seen from above.

Fig. 1.

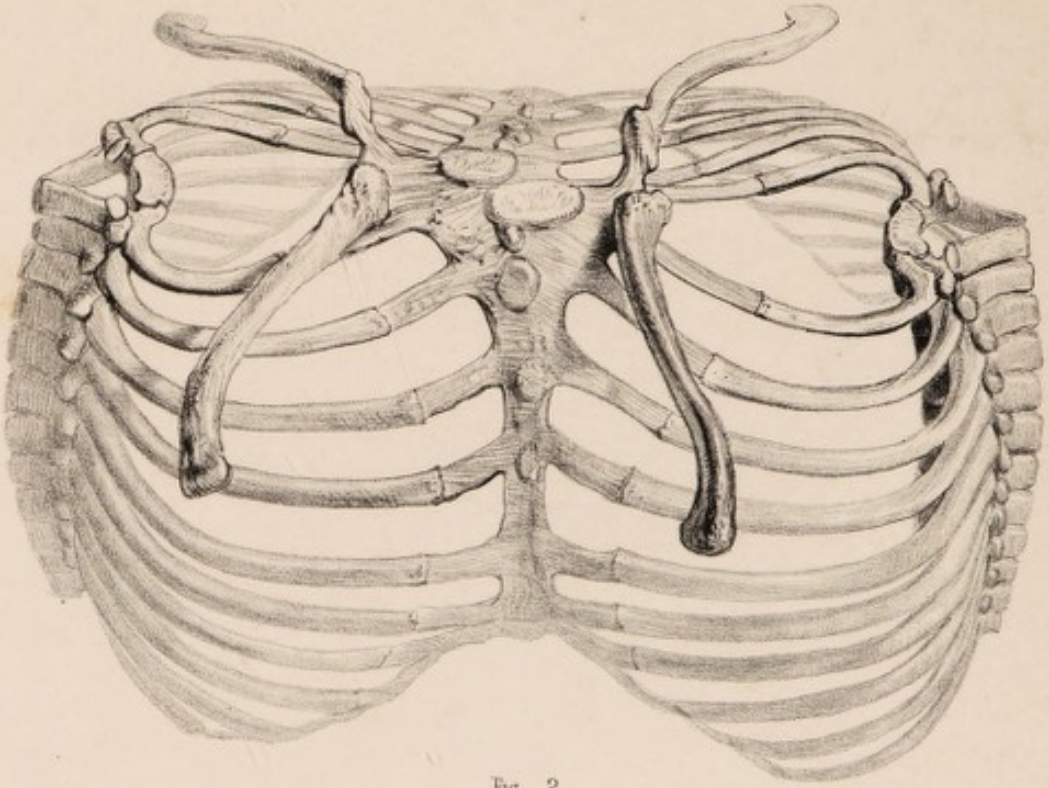


Fig. 2.

I.L.Tupper. ad nat. del. et Zinceg.

G.F.Tupper. Zinceg. Imp.

## EXPLANATION OF PLATE II.

This plate represents the dissection of the thoracic organs, the circulating system, the liver, and urinary apparatus of Case 1. It comprises the chief peculiarities; but the parts are not exactly *in situ*, being laid out in such a manner as to represent the whole. The dissection is preserved in the museum of Guy's Hospital, and may at any time be compared with the Plate, which is an accurate representation.

*A.* Trachea and bronchi.

*B.* The lungs.

*C.* Right and left auricles.

*D.* The left ventricles.

*E.* The right ventricles.

*F.* Two livers, adhering by their under surfaces, partly cut asunder and unravelled so as to expose the vessels. That of the one has its upper surface brought into view, and is somewhat bent; that of the other is laid flat with the whole of the under surface.

*G.* Gall Bladders.

*H.* Kidneys, one of each fœtus: the other two are not introduced in the plate.

*I.* Bladders.

*K.* Umbilicus and umbilical cord.

*a.* Umbilical vein, passing to the liver, and giving off a series of branches to the one liver; the main trunk then proceeding up, giving off branches to the other.

*b.* Ductus venosus.

*c.* Hepatic veins, much more numerous on the one than on the other side, and passing into the inferior cavæ.

*d.* Renal veins emptying themselves into the inferior cavæ. The lower part of the cavæ is not represented.

*e.* Inferior cavæ.

*f.* Superior cavæ.

*g.* Pulmonary veins of the one fœtus, being very remarkable; one from the right lung and two from the left passing down, forming a single trunk, and entering the liver of the other fœtus behind the hepatic veins, and there ramifying in its texture.

*h.* Pulmonary veins of the other fœtus, the veins from each lung entering the auricle separately.

*i.* Pulmonary arteries; that of the one fœtus very large, and the

chief conductor of the blood: that of the other is exceedingly slender.

*k.* Ductus arteriosus; the one side exceedingly large and short; that of the other long and tapering.

*l.* Aortæ; the one narrow, and partially developed; the other large, and springing by a trunk common to the right and left ventricles.

*m.* Arteria innominata, giving off right carotid and right subclavian vessels.

*n.* Left carotids, coming off almost in a common trunk with the innominata.

*o.* Left subclavians.

*p.* Descending aortæ.

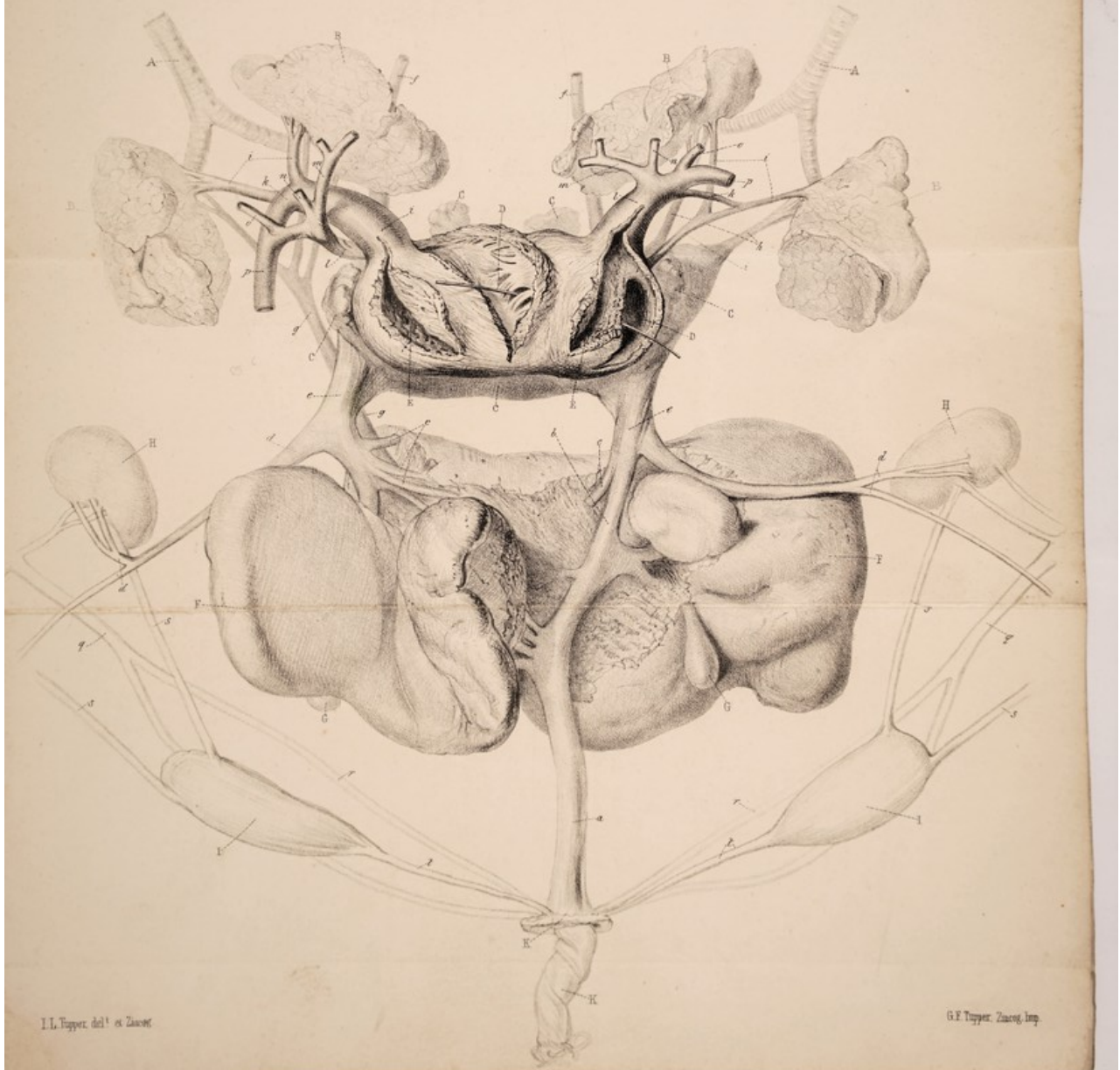
*q.* Abdominal aortæ, giving off right and left common iliacs. The division into external and internal iliacs is not shewn, but was perfectly natural; the internal iliacs only have been left.

*r.* Hypogastric arteries.

*s.* The four ureters passing to the bladders.

*t.* The urachus on either side, passing to the umbilicus.

PLATE II.



J. L. Tupper, del.t et Zincogr.

G.F. Tupper, Zincog. Imp.

## EXPLANATION OF PLATE III.

*Fig.* 1. Front view of the external configuration of Case 2.

*Fig.* 2. Posterior view of the head and chest of the same case.

PLATE III.

Fig. 1

Fig. 2.

H.L. Tupper, ad nat. del. et Zincogr.

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## EXPLANATION OF PLATE IV.

The plate represents the dissection of the thoracic viscera, and circulation of Case II.

*A.* Single trachea; two bronchi, and their bifurcation.

*B.* The lungs.

*C.* The auricle of the right heart receiving the pulmonary veins, the inferior and superior cavæ.

*D.* The ventricle of the right heart giving off aorta and pulmonary artery.

*E.* The ventricle of the left heart.

*F.* The auricle of the left heart.

*G.* The livers.

*H.* The kidneys of the one fœtus: those of the other are omitted in the drawing.

*I.* Bladder.

*K.* Umbilicus and umbilical cord.

*a.* The two umbilical veins.

*b.* The ductus venosus.

*c.* Hepatic veins.

*d.* Renal veins.

*e.* Inferior venæ cavæ.

*f.* Superior venæ cavæ.

*g.* Pulmonary veins.

*h.* Pulmonary arteries.

*i.* Aorta.

*k.* Common trunks from the aorta, for the supply of the head neck, and arms of each side.

*l.* Descending aorta.

*m.* Renal arteries.

*n.* Bifurcation of aorta.

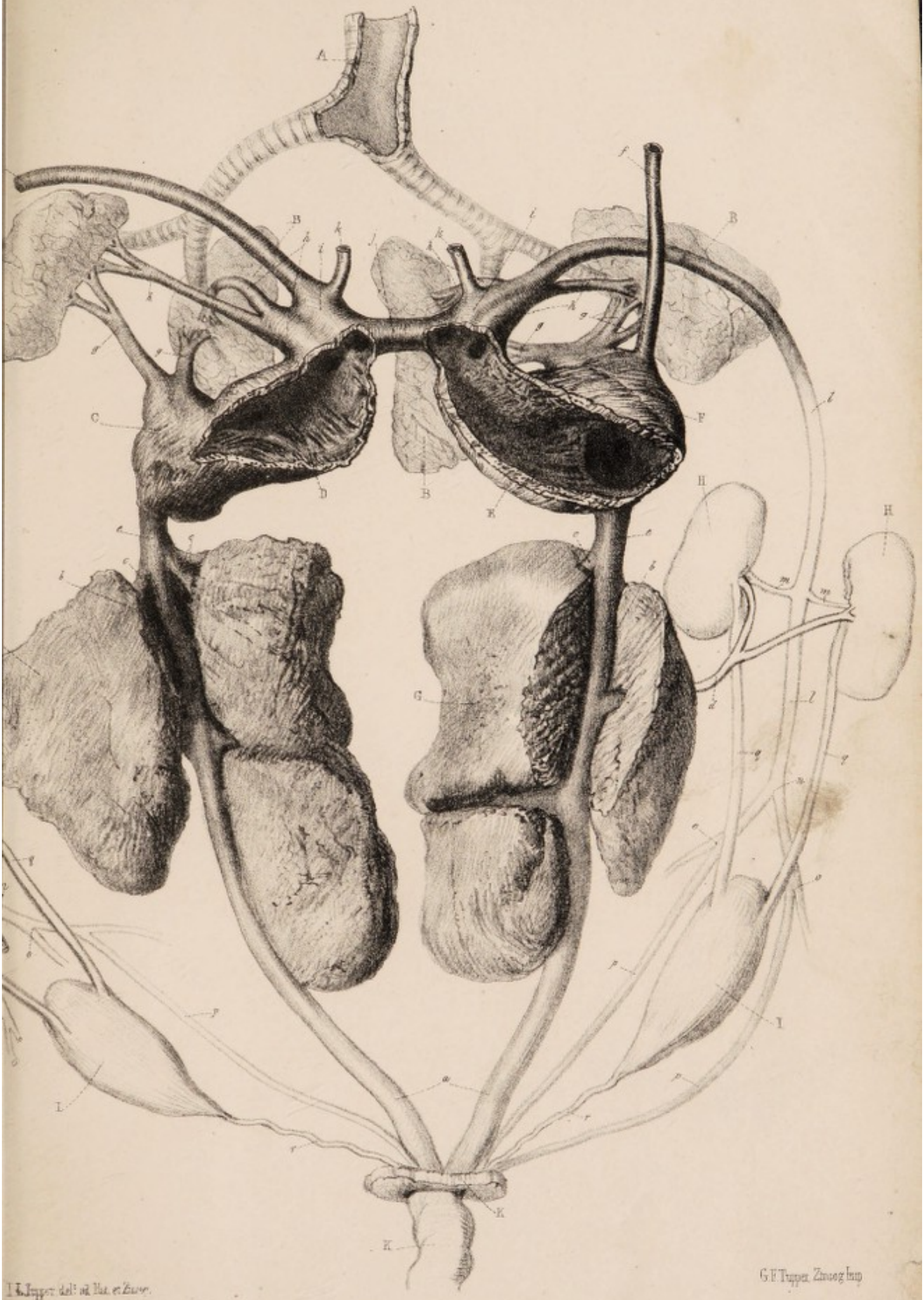
*o.* Bifurcation of iliacs.

*p.* Hypogastric arteries,

*q.* Ureters.

*r.* Urachus.

PLATE IIII.




J.H. Tupper del.et lith. et Zinco.

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