

THIRD ANNUAL REPORT OF THE COMMITTEE OF COLLECTIVE INVESTIGATION OF THE ANATOMICAL SOCIETY OF GREAT BRITAIN AND IRELAND FOR THE YEAR 1891-92.<sup>1</sup> Reported by ARTHUR THOMSON, M.A., M.B., *Lecturer on Anatomy University of Oxford.*

THE following questions were issued by the Committee of Collective Investigation early in October 1891 :—

1. Mode and place of origin of the middle sacral artery.
2. Frequency of the psoas parvus, and, if possible, to note the nerve-supply.
3. Arrangement of the branches arising from the arch of the aorta, with special reference to—
  - (1) Origin of the brachio-cephalic and left common carotid arteries by a common trunk.
  - (2) Dorsal origin of the right subclavian artery.
  - (3) Origin of the left vertebral from the arch.
  - (4) Other branches arising from the arch.
4. Frequency and arrangement of communication between the median (or anterior interosseous) and ulnar nerves in the forearm.

The Report compares favourably with that issued last year. Notices were sent to thirty-nine institutions, and replies have been received from nineteen. Through some mischance the notices forwarded to Charing Cross Hospital Medical School, the School of Medicine for Women, and the Middlesex Hospital Medical School were not received, and the secretary has letters from Messrs Stanley-Boyd and Gordon-Brodie, expressing regret that they have been unable to contribute to this year's report.

These facts prove that the interest in the work is still maintained, and the Committee look forward to a continuance of the support they have already received.

Subjoined is a list of the schools to which notices were sent. An asterisk is placed opposite those from which returns have been received :—

<sup>1</sup> The Second Annual Report appeared in the *Journal of Anatomy and Physiology*, vol. xxvi., October 1891.

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| <p>*St Bartholomew's Hospital, London.<br/>         Charing Cross Hospital, London.<br/>         *St George's Hospital, London.<br/>         Guy's Hospital, London.<br/>         King's College, London.<br/>         London Hospital, London.<br/>         *St Mary's Hospital, London.<br/>         Middlesex Hospital, London.<br/>         *St Thomas' Hospital, London.<br/>         *University College, London.<br/>         *Westminster Hospital, London.<br/>         London School of Medicine for Women.<br/>         Cook's School of Anatomy.<br/>         *University of Oxford.<br/>         *University of Cambridge.<br/>         *Queen's College, Birmingham.<br/>         Bristol Medical School.<br/>         *School of Medicine, Yorkshire College, Leeds.<br/>         *School of Medicine, University College, Liverpool.<br/>         *The Owens College, Manchester.<br/>         Medical School, Firth College, Sheffield.</p> | <p>*University of Durham School of Medicine, Newcastle-on-Tyne.<br/>         *University of Edinburgh.<br/>         School of Medicine, Royal College of Surgeons, Edinburgh.<br/>         School of Medicine, Minto House, Edinburgh.<br/>         University College, Dundee.<br/>         School of Medicine for Women, Edinburgh.<br/>         *University of Aberdeen.<br/>         *University of Glasgow.<br/>         Anderson College, Glasgow.<br/>         St Mungo's College, Glasgow.<br/>         Western Medical School, Glasgow.<br/>         *School of Physic, Trinity College, Dublin.<br/>         Carmichael School of Medicine, Dublin.<br/>         *Catholic University School of Medicine, Dublin.<br/>         Royal College of Surgeons, Ireland.<br/>         *Queen's College, Belfast.<br/>         Queen's College, Cork.<br/>         Queen's College, Galway.</p> |
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## R E P O R T.

### QUESTION I.

Mode and place of origin of the middle sacral artery.

To this question replies have been received from the following gentlemen, representing different schools :—

Messrs E. Knight, The Owens College, Manchester ; G. Jamison, Trinity College, Dublin ; J. Yule Mackay, University of Glasgow ; J. M. Martin, University of Cambridge ; W. Thelwall Thomas, University College, Liverpool ; Lockhart Lowe, Queen's College, Birmingham ; C. G. B. Kemp, University of Durham Medical School, Newcastle-on-Tyne ; W. P. Herringham, St Bartholomew's Hospital, London ; J. W. Crerar, University of Edinburgh ; John Campbell, Queen's College, Belfast ; H. G. Lawrence, St Mary's Hospital, London ; Edward Fawcett, Yorkshire College, Leeds ; F. Kenneth Wilson, Westminster Hospital, London ; F. G. Parsons, St Thomas' Hospital, London ; and the University of Oxford.

Records in all of 400 cases have been received, and after analysis have been arranged in nine classes, as figured A, B, C, D, E, F, G, H, I in the accompanying diagram. Appended to each figure is the number of cases noted, with, in most instances, the percentage of occurrence.

Little requires to be added in explanation of the figures, except to note particularly that it is the posterior surface of the aorta that is represented: this view of the vessels was adopted as being more convenient for the representation of the various modes of origin of the middle sacral artery.

Fig. A includes all those cases where the middle sacral artery took origin at a point  $\frac{1}{2}$  of an inch and upwards from the bifurcation of the aorta. From the data furnished by the various observers,

20 per cent. of the instances recorded in fig. A arose at a point about  $\frac{1}{2}$  of an inch or 3 mm. distant from the bifurcation.

44 per cent. at a point about  $\frac{1}{4}$  of an inch or 6 mm. from the bifurcation.

30 per cent. at a point  $\frac{1}{2}$  an inch or 12·5 mm. from the bifurcation; and

6 per cent. at a point  $\frac{3}{4}$  of an inch or 19 mm. from the bifurcation.

Instances were also recorded where the artery arose from the parent stem as high as 1 inch or 25 mm. above the bifurcation.

Fig. B includes all those examples in which the artery arose within an  $\frac{1}{2}$  of an inch or 3 mm. of the bifurcation. It has been very rare indeed to find the artery arising just at the point of division of the aorta, and only one case is recorded of this condition.

Fig. C includes those cases in which the middle sacral arises in common with the fourth lumbar arteries. The point of origin of this common trunk averaged about 10 mm. from the bifurcation of the aorta. As a rule, the fourth lumbar arteries are the vessels associated with the origin of the sacra media; but Mr Lockhart Lowe, of Queen's College, Birmingham, records a case in which it arose in common with the third lumbar branches. No mention is made as to whether a fourth pair was present.

In fig. D, of which we have eighteen examples, it may be noted that the origin of the sacra media is much more common from the right fourth lumbar than from the left. Compare fig. G, of which there are only 2 cases, with fig. D. On the other hand, it is interesting to note that the middle sacral artery arises more frequently from the left common iliac (fig. E) than from the right common iliac artery (fig. F).

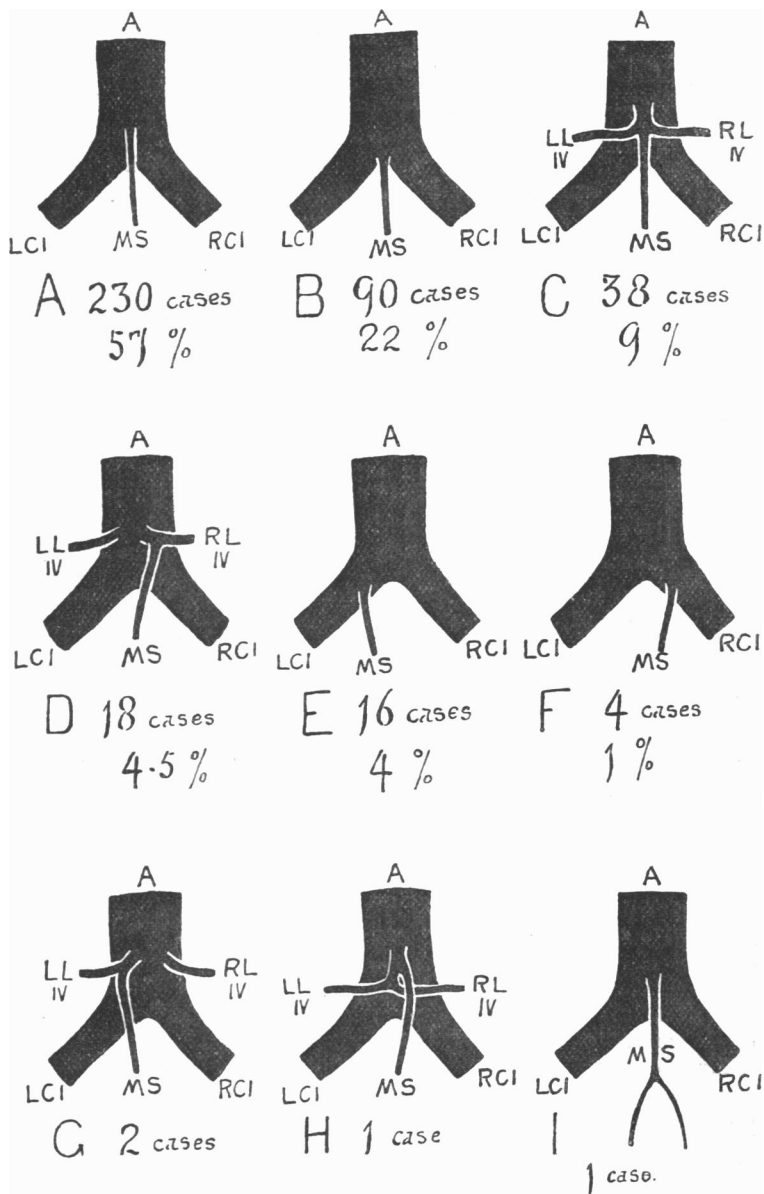
The case represented in fig. H is recorded by Mr E. Knight, of the Owens College, Manchester; and Mr H. G. Lawrence, of St Mary's Hospital, London, gives the following details in regard to fig. I:—  
"The middle sacral arose  $\frac{1}{2}$  an inch above the bifurcation, divided into two about  $1\frac{1}{2}$  from its origin, each branch coursing laterally on either side of the sacrum."

Mr D. M. Martin, B.A., of Cambridge, records a case where three pairs of lumbar arteries arose from a common stem on the right side of the aorta, 4 cm. above its bifurcation.

Mr Lockhart Lowe, of Queen's College, Birmingham, describes a condition in which the sacra media, arising as shown in fig. C, was displaced along with the left lumbar artery to the right side, so that before it could reach its normal position it had to pass obliquely behind the right common iliac artery.

Dr Crerar, of the University of Edinburgh, in discussing the condi-

TABLE I.—*Variation in the Mode and Place of Origin of the Middle Sacral Artery. Total number of Cases examined 400.*



tion figured at C, writes as follows:—"In only one subject could it be said that the middle sacral artery arose by a common trunk with the lowest pair of lumbar arteries: in the majority of cases the lowest pair of lumbar arteries took origin from the middle sacral artery." Dr Crerar, however, furnishes no details as to the number of pairs of lumbar arteries in each subject.

Dr John Campbell, of the Queen's College, Belfast, in discussing the relation of the point of origin of the sacra media to the vertebral column, furnishes the following details of 21 cases examined:—

3	arose from the aorta opposite the disc between III. and IV. L.V.
6	opposite the upper border of the IV. L.V.
6	„ middle of the IV. L.V.
3	„ lower border of the IV. L.V.
1	„ disc between IV. and V. L.V.
2	„ upper border of V. L.V.

Dr Campbell furnishes notes that in 5 cases in which the sacra media gave off the 5th pair of lumbar arteries, the lumbar arteries of the fourth vertebra had an origin by a common trunk.

Mr F. G. Parsons, of St Thomas' Hospital, in one instance was unable to find the slightest trace of a middle sacral artery.

#### EXPLANATION OF TABLE I.

A., aorta.

R.C.L., right common iliac.

L.C.L., left common iliac.

M.S., middle sacral.

R.L. and L.L., right and left fourth lumbar respectively.

Some of the observers furnished details of the sex of the subjects examined; but as the information on this point is somewhat scant, it has not been thought necessary to embody it in the present report, nor do the details furnished appear to have influence on the final results.

#### QUESTION II.

Frequency of the *psaos parvus*, and, if possible, to note the nerve-supply.

The following gentlemen have contributed reports on this question:—

► Messrs F. G. Parsons, St Thomas' Hospital, London; H. G. Lawrence, St Mary's Hospital, London; A. F. Dixon, Trinity College, Dublin; H. L. Sutherland, University of Aberdeen; F. K. Wilson, Westminster Hospital, London; Edward Fawcett, Yorkshire College, Leeds; John Campbell, Queen's College, Belfast; J. W. Crerar, University of Edinburgh; W. P. Herringham, St Bartholomew's Hospital, London; C. G. B. Kemps, University of Durham Medical School, Newcastle-on-Tyne; G. J. Branson, Queen's College, Birmingham; H. C. Phillips, University of Cambridge; George Lamb, University of Glasgow; D. Drew, University College, London; M. T.

Dempsey, Medical School, Catholic University, Dublin ; E. Knight, The Owens College, Manchester ; and A. Thomson, University of Oxford.

The general result is tabulated below, and requires no further explanation.

TABLE II.—*Frequency of occurrence of the Psoas parvus.*

Total Number of subjects examined.	Muscle absent.	Muscle present.		
457	270	187		
Percentage. 100	59 per cent.	Both sides. 139, or 30 per cent.	Right side. 27, or 6 per cent.	Left side. 21, or 5 per cent.
		41 per cent.		

Particulars were furnished regarding the sex in 174 instances. Of these, 105 were males and 69 females. The muscle appears to be more frequently absent in the female than in the male.

The percentages are as follows :—

	Male.	Female.
Muscle absent	54	65
„ present	46	35
	Both sides 35	Both sides 22
	Right „ 6	Right „ 4
	Left „ 5	Left „ 9
	46	35
Total,	100	100

The returns from the Irish and Scotch schools and the London hospitals were treated separately, with the result that the presence of the muscle was noted in 34 per cent. of the Irish returns, in 37 per cent. of the Scottish, and in 50 per cent. of the London subjects. It must, however, be borne in mind that any conclusions based on these facts are open to grave doubt, as the class from which subjects are obtained is very mixed both in Scotland and in England. The higher percentage in the London returns was noted, however, and it was thought that the fact was worth recording.

Mr C. G. Kemps describes one example of the muscle which he saw as “inserted into a fibrous band which extended from the IV. lumbar vertebra to the ilio-pectineal line.”

In regard to the nerve-supply of the psoas parvus muscle, there are 108 records of its being carefully examined and traced. The subjoined list is an analysis of the returns :—

*Nerve-supply of the Psoas parvus.*

From the XII. dorsal nerve, . . . . .	2 cases
„ loop between XII. dorsal and I. lumbar, . . . . .	2 „
„ I. lumbar nerve, . . . . .	36 „
„ loop between I. and II. lumbar nerves, . . . . .	28 „
„ genito-crural nerve, . . . . .	7 „
„ II. lumbar nerve . . . . .	27 „
„ loop between the II. and III. lumbar, . . . . .	6 „
	108 „

In one or two cases more than one twig passed to the muscle; these were derived from the I. and II. lumbar nerves respectively.

The nerve-supply of the muscle frequently varied on different sides of the same subject. Mr G. J. Branson, B.A., of Queen's College, Birmingham, noted the presence of a well-marked sympathetic branch joining the twig which went to the muscle from the I. lumbar nerve.

## QUESTION III.

Variation in the arrangement of the branches arising from the arch of the aorta.

In reply to this question, the Secretary has received reports from the following gentlemen:—

Messrs Montague Griffin, Trinity College, Dublin; L. S. Giles, University of Cambridge; J. Yule Mackay, University of Glasgow; Percy Fleming, University College, London; Wm. Dargan, Medical School, Catholic University, Dublin; T. T. Jeans, The Owens College, Manchester; John Campbell, Queen's College, Belfast; Edward Fawcett, Yorkshire College, Leeds; F. K. Wilson, Westminster Hospital Medical School, London; F. G. Parsons, St Thomas' Hospital Medical School, London; W. P. Herringham, St Bartholomew's Hospital Medical School, London; C. K. Bryant, University of Durham Medical School, Newcastle-on-Tyne; Lockhart Lowe, Queen's College, Birmingham; G. H. Clarkson, St George's Hospital Medical School, London; W. T. Thomas, University College, Liverpool; J. W. Crerar, University of Edinburgh; H. L. Sutherland, University of Aberdeen; A. Thomson, University of Oxford.

The arrangement of the branches of the arch of the aorta was noted in 500 cases, and, as a result of the inspection of the returns, the varieties have been grouped in 8 classes figured A, B, C, D, E, F, G, and H respectively in the accompanying diagram. The condition described as normal occurs in 82 per cent. of the cases examined, though here considerable variation is noted in the distance between the origins of the arterial trunks as they spring from the parent stem.

In Class B the length of the trunk common to the right subclavian, right common carotid, and left common carotid varied in length from zero to  $1\frac{1}{2}$  inches. The average length, however, did not exceed  $\frac{1}{2}$  an inch.

In Class C the left vertebral artery was seen entering the vertebral foramen in the IV. cervical vertebra in two cases—the V.

in 4, and the VI. in 1: the fact was noted that in several instances it was joined by an accessory branch from the left subclavian.

No remarks are necessary in regard to Classes D, E, and F: the diagrams sufficiently explain themselves.

The examples represented in figures G and H were exhibited at a meeting of the Anatomical Society by Mr F. C. Abbott, of St Thomas' Hospital, and a detailed description of them will be found in the *Proceedings of Anat. Soc. of Great Britain and Ireland* for Feb. 1892.

Appended are some notes by the individual observers:—

Mr Montague Griffin, M.B., of Trinity College, Dublin, notes two cases in which the brachio-cephalic trunk arose from the ascending part of the arch and passed vertically upwards parallel to and to the right side of the trachea, whilst the left common carotid arose from the most anterior part of the transverse arch and passed obliquely upward and to the left, crossing the trachea in the middle line. In the first subject this point was  $1\frac{1}{2}$  inches, in the second  $1\frac{1}{4}$  inches above the level of the arch.

Mr L. S. Giles, B.A., University of Cambridge, notes the occurrence of a large vas vasorum to the pulmonary artery in one instance.

Dr Herringham, of St Bartholomew's Hospital, records a case where the left vertebral arose from the left common carotid  $\frac{5}{8}$  of an inch above its origin.

Mr C. H. Bryant, of the Medical School, Newcastle-on-Tyne, mentions an instance, in a female subject, of a left bronchial artery springing from the posterior part of the arch, close to the ductus arteriosus; in three other subjects, bronchial and mediastinal branches were seen arising from the descending part of the arch; and four cases are recorded of the origin of the thyroidea ima from the innominate artery.

Mr G. A. Clarkson, of St George's Hospital, London, in his account of a case of root-origin of the right subclavian classed in Group D, gives the following details:—

“The artery (right subclavian) arose from the posterior aspect of the descending part of the aortic arch  $\frac{1}{2}$  an inch below the origin of the left subclavian . . . its length from origin to the first branch (vertebral) was 3 inches . . . the ductus arteriosus was pervious, and the inferior laryngeal nerve was not recurrent.”

Mr W. Thelwall Thomas, F.R.C.S., of University College, Liverpool, describes a large mediastinal branch which arose from the front of the arch between the innominate and left common carotid arteries, and coursed downwards in the fat of the mediastinum for  $4\frac{1}{2}$  inches.

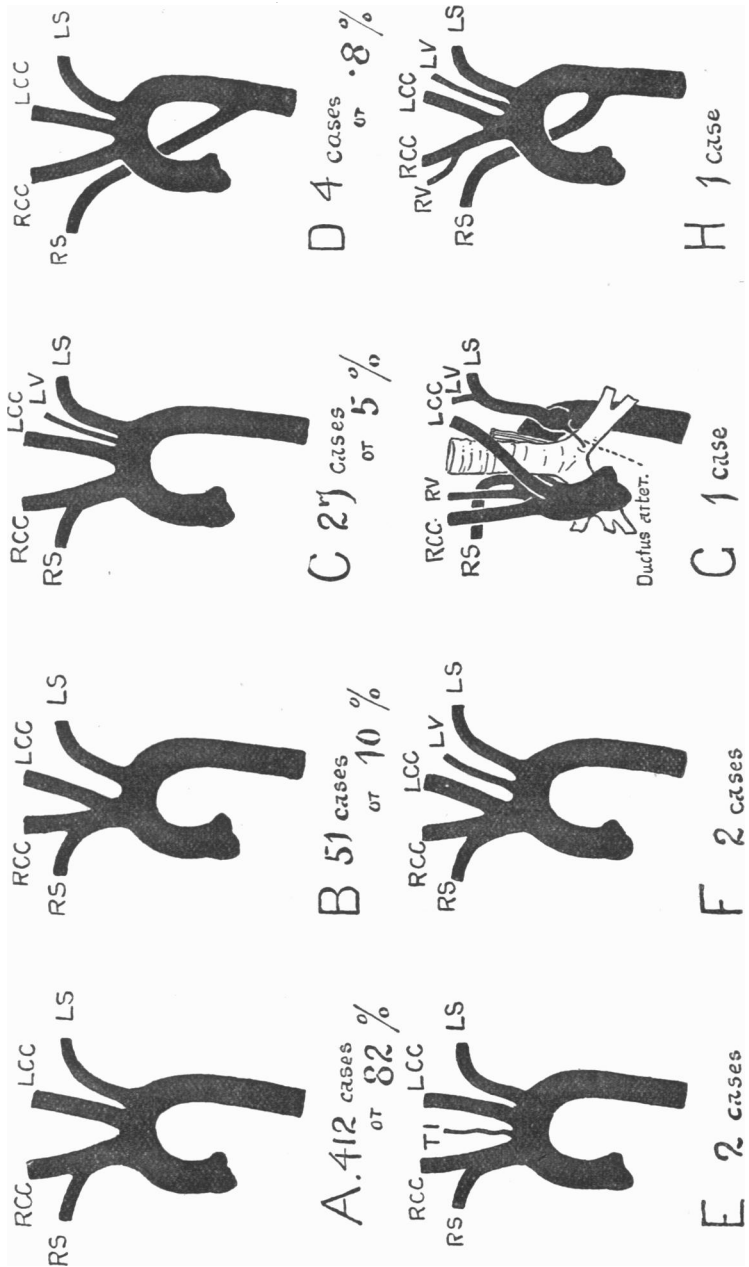
Dr Crerar, of the University of Edinburgh, also mentions a case in which a bronchial artery arose from the back of the arch, just below the origin of the left subclavian.

The figures in Table III. are lettered as follows:—

- R.S., Right subclavian.
- R.C.C., Right common carotid.
- L.C.C., Left common carotid.
- L.S., Left subclavian.
- L.V., Left vertebral.
- R.V., Right vertebral.
- T.I., Thyroidea ima.



TABLE III.—Variations in the Mode of Origin of the Branches arising from the Arch of the Aorta.  
Total number examined 500.



In each figure the number of such cases met with is recorded, and the percentage of occurrence given.

#### QUESTION IV.

Frequency and arrangement of communication between the median (or anterior interosseous) and ulnar nerves in the forearm.

The answers to this question were not so numerous as to the others. The difficulties of observation were no doubt greater, but notwithstanding reports have been received which yield a total of 406 forearms examined.

The gentlemen to whose assistance we are indebted are—

Messrs Richard Smith, Trinity College, Dublin ; T. T. Jeans, The Owens College, Manchester ; A. K. Gordon, University of Cambridge ; P. J. Fagan, Medical School, Catholic University, Dublin ; John Campbell, Queen's College, Belfast ; J. W. Crerar, University of Edinburgh ; W. T. M. Whitling, University of Durham Medical School, Newcastle-on-Tyne ; H. L. Sutherland, University of Aberdeen ; and A. Thomson, University of Oxford.

Out of 406 forearms examined a communicating branch was noted in 63 instances, or about 15 per cent.

The results are classified into four varieties.

Class I., of which 33 examples were noted out of the 406 cases examined, yielding a percentage of occurrence of 8 cases per hundred, was as follows:—The branch of communication which arose from the *anterior interosseous* at a point varying from the commencement of that nerve to a spot  $2\frac{1}{2}$  inches down its trunk, coursed downwards with a varying degree of obliquity and lay behind the ulnar artery, resting on the flexor profundus digitorum and being crossed superficially by the muscles springing from the internal condyle, with the exception of the flexor carpi ulnaris : it usually joined the ulnar nerve at a point corresponding to the junction of the upper and middle thirds of the forearm.

Class II., of which, out of the total of 406 cases examined, there were 12 instances recorded, or an average of about 3 per cent., differed from Class I. only in the fact that the communicating branch arose directly from the *median* in place of the *anterior interosseous*, otherwise its course and relations were the same, except in one instance recorded by Mr A. K. Gordon, B.A., of Cambridge University, in which case the ulnar artery lay *behind* the nerve in place of in front, as described in Class I.

Class III. includes 16 cases out of the total of 406, or rather under 4 per cent., in which the communicating branch was formed by a junction between the filaments of nerve supplying the flexor profundus digitorum : in this way a loop was formed which underlay the ulnar artery, the convexity of which was directed downwards.

Appended is Mr P. J. Fagan's description of this condition as observed in the cases reported by him. Mr Fagan writes:—

“In seeking for communications between the ulnar and median

nerves, I observed the following method as far as possible. Before the forearm had been dissected, I cut the anterior head of the flexor carpi ulnaris, and traced the branches of the ulnar nerve lying on the flexor profundus digitorum. I then traced the offsets of the median to the ulnar artery; and at a later stage in the dissection, noted the lower part of the ulnar. In all, I collected 17 examples. In four instances I failed to find any communication; in the remaining thirteen, communications were established. There were few variations, the usual arrangement being, a twig from the ulnar lying on the flexor profundus digitorum ran to the posterior aspect of the ulnar artery, and, at that place, anastomosed with a twig from the median. When traced with a little care the plan of the nerves proved to be this:—As soon as the ulnar had passed between the heads of the flexor carpi ulnaris it gave off a slender branch, which ran downwards and outwards on the flexor profundus digitorum muscle, to which it furnished a small twig, and then beneath the ulnar artery, where it joined the branch from the median. The branch from the median, in some cases, emerged from the substance of the flexor sublimis digitorum; in others, it came under that muscle. It usually divided into two twigs: one entered the flexor profundus digitorum, the other joined the ulnar twig, forming an arch with its convexity downwards. From this arch a varying number of twigs arose. In two cases the number was three: two short, entering the muscle almost immediately; one long, arising by two heads, and extending as low down as midway between the elbow and wrist, where it supplied the part of the muscle for the middle and ring fingers. In one case where the usual communication did not obtain, I found a very large branch low down coming from the ulnar to the median.

“On the whole, I am inclined to think that the variations in the twigs depended rather on the condition in which I found the part than on the actual state of affairs, and that the usual arrangement is for the ulnar alone to supply that part of the flexor profundus destined for the little finger; the median, the part for the index finger; and the arch formed by the ulnar and median, the remaining two fingers.”

Class IV. includes only 2 examples out of a total of 406. These cases which came under the notice of Mr T. T. Jeans, of the Owens College, Manchester, are thus described by him:—“The communication was by a superficial branch which left the median at the bend of the elbow, passed across the muscles rising from the internal condyle (except the flexor carpi ulnaris), and joined the ulnar nerve in the lower third of the forearm.

The results may be summarised as follows:—

Total number of cases examined, 406.

Class I.

Communication between anterior interosseous  
and ulnar . . . . . 33, or 8 per cent.

Class II.

Communication between median and ulnar  
trunks . . . . . 12, or 3 „

## Class III.

Communication between muscular twigs to flexor profundus . . . . .	16, or 4 per cent.
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## Class IV.

Communication by means of a superficial branch . . . . .	2, „ „
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Total, . . . . .	63, or 15 per cent.
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Some extracts from the reports are added.

Mr T. T. Jeans, of The Owens College, reports that he only saw the communication between the anterior interosseous and ulnar nerves in both arms of the same subject in one instance, a female.

Dr John Campbell, of the Queen's College, Belfast, mentions a case in which the slender communication joined the ulnar palmar cutaneous branch, and describes, in three of the instances recorded, how the communicating twig from the median trunk arose in connection with its muscular offsets, pierced the flexor sublimis digitorum, and joined the ulnar nerve in his upper third of the foramen.

In 5 of the subjects examined by Dr Crerar, of Edinburgh University, the communication was present on both sides. In one case the communication took place in the fibres of the flexor sublimis digitorum. The communicating branch varied in size from the thickness of thread to that of small whipcord, and in length from 3 to 9 cm. In one of the subjects examined a twig was given off from the branches of the ulnar nerve to the flexor profundus, which, passing behind the ulnar artery, did not communicate with the anterior interosseous nerve, but recurved over the artery, to be distributed to the flexor sublimis digitorum near the internal condyle of the humerus. From this twig a small condylar muscular branch of the flexor profundus received a branch of supply in addition to a larger one which it received from the anterior interosseous nerve.

Dr Crerar concludes by stating that Professor Sir W. Turner has recorded a case of supply of the flexor sublimis digitorum by two twigs from the ulnar nerve (*Nat. Hist. Rev.*, 1864).

In conclusion, the Committee desire to place on record their sincere thanks to those gentlemen who have so kindly assisted them in the publication of the present report.

The Secretary will at all times be pleased to receive suggestions with regard to subjects for future inquiry. Communications may be addressed to him at the Department of Human Anatomy, Museum, Oxford.