References to papers in anatomy : human and comparative / by John Struthers.

REFERENCES

TO

PAPERS IN ANATOMY:

HUMAN AND COMPARATIVE.

BY

JOHN STRUTHERS, M.D.

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NOTE.—The following enumeration of published Papers in Anatomy is prepared for the use of my present Pupils and of many former Pupils to whom I have had the honour and pleasure to teach Anatomy in its various aspects since 1845, in Edinburgh and Aberdeen. The Papers are scattered in various periodicals, some of which are not now continued. The earlier of these Papers were reprinted in 1854 in a volume, "Anatomical and Physiological Observations," now out of print, and some few of them appeared in that volume only. For some parts, here and there the interpretation of the facts, of the earlier Papers I can offer only the excuse of youthfulness, and that my anatomical upbringing was entirely teleological and surgical. In my Student-days, in the Edinburgh School, Anatomy was at its lowest ebb in the University under the third Monro; there was no Comparative Anatomy in the School except the silent Museum Dr. Barclay had left behind him in the College of Surgeons; Dr. Knox was gone; John Goodsir had not then arisen with the Microscope and his Morphology; the Embryology of Allen Thomson though original was then descriptive only; there was no Anthropology; Owen's Homologies of the Vertebrate Skeleton had not yet appeared; still less had Darwin come with his interpretation of the facts. Surgical Anatomy was well taught, admirably so by Spence, my early teacher in that and afterwards respected surgical colleague of many years. I have to express my painful regret that more and better work has not been accomplished. The consumption of time in the Anatomical School, practically the whole day, winter and summer; in Aberdeen the forming of a Museum of Anatomy human and comparative, the advancement of the Medical School, and the calls of University business; the distraction of numerous projects in medical legislation threatening injury to the higher education in Scotland, requiring to be met—have all encroached seriously on my time for research. All along that has had to be relegated to the night and to holiday times. A number of researches yet unfinished may or may not be completed according as health and strength remain.

An indication of the contents of each Paper is added, which may be useful to those who desire to know what to look for.

J. S.

July, 1889.

REFERENCES TO PAPERS IN ANATOMY.

1. **On the Supra-Condyloid Process.**

(*Monthly Journal of Medical Science*, Edinburgh, 1848.)

Contents.—Woodcut, natural size, showing a well-developed process and its fibrous continuation. Notes of the variety found in four subjects. Mode of development of the arch in the cat. The variety from the surgical point of view.

[See also Nos. 13, 26, 43, and 47.]

2. **On the Oblique Muscles of the Eye in Man and Vertebrate Animals.**

(*The same*, 1849.)

Contents.—An inquiry to ascertain what light comparative anatomy throws on the question of the use of the oblique muscles. Dissections of the oblique muscles in mammals, birds, reptiles, and fishes.

Theories regarding the use of the oblique muscles. Conclusion, that the evidence from comparative anatomy is strongly in support of the view that the action of the oblique muscles is to rotate the eyeball, more or less directly, on its antero-posterior axis.

3. **Two Cases of Double Stomach in Man, with Remarks on that Condition.**

(*The same*, 1851).

Contents.—Two cases described and figured of the occurrence of the rare condition of true double stomach in man, unconnected with disease. The two sacs communicate by

an aperture admitting a finger. Historical notice. Remarks on temporary constriction of the stomach. [For further observations on the frequency of *temporary* constriction of the stomach remaining after death till forcible distention is employed, see "Anat. and Phys. Observations," 1854, p. 25. The two specimens of true double stomach are preserved in the author's collection. See also No. 27.]

4. On the Anatomy and Physiology of the Nerves of the Orbit.

(*The same*, 1852.)

Contents.—Discussion of various points connected with the origin of the Third, Fourth, and Sixth nerves. Observations on the commissure of the Fourth nerve. Distribution of these nerves in relation to the actions of the muscles and the movements of the eyeballs. [For note "On the Third Nerve and Ciliary Ganglion in the Horse," see "Anat. and Phys. Observations," 1854, p. 60. The retractor muscle not supplied in part by the third nerve. The ophthalmic ganglion found not to be absent in the horse.]

5. Case of open Foramen Ovale, and Contracted Pulmonary Orifice, with Remarks.

(*The same*, 1852.)

Contents.—Child aged 15 months. Account of the parts, foramen ovale, Eustachian valve, pulmonary orifice and valves, right ventricle. Remarks on the causes of open foramen ovale, on the formation of the foramen and development of its valve, and on the use of the foramen and result of its imperfect closure after birth.

[With the preceding case is reprinted, from the same Journal, 1852, in "Anat. and Phys. Observations," p. 75, a *Case in which the Pulmonary Artery gives off the descending Aorta and the left Subclavian Artery*, by Dr. Greig of Dundee, then Demonstrator of Anatomy in Edinburgh. It was part of a prize essay in Dr. S.'s class, 1850-51, and the specimen is preserved in his collection. *Contents.*—Fœtus, apparently about 9th month. Woodcut showing aorta ending in right subclavian, right carotid and left carotid arteries;

pulmonary artery giving left subclavian and continued as the descending aorta without any connection with the ascending aorta. Veins normal. Septum ventriculorum deficient above. Further particulars and remarks, also by Dr. Greig.]

6. Anatomical Inquiry into the mode of action of Local Bloodletting in affections of the Internal Viscera.

(*The same*, 1853.)

Contents.—Three diagrams of the longitudinal and transverse arterial anastomoses of the trunk. Reference to the anastomoses of the bloodvessels of the walls and viscera of the abdomen and thorax. Argument, that local bloodletting on the wall cannot draw blood specially from the viscera, but only from the wall, including the parietal serous membrane. But that this conclusion is not necessarily against the practice of local bloodletting.

7. Dissection of the Orbits in a Case of Paralysis of the Common Motor Oculi Nerve.

(*The same*, 1853.)

Contents.—Woodcut of the dissected and prepared paralysed nerve, the sixth nerve, the ciliary ganglion, and their connections and branches. Account of the case and its treatment. Post-mortem examination and dissection of the orbits. Third nerve wasted as seen with naked eye and under microscope. Ciliary nerves not wasted. Remarks on occasional connection between the Third and Sixth nerves, and supposed influence of the latter on the iris. This connection found in this case on the paralysed side, and a branch from the third nerve to the external rectus muscle. These connections not regarded as of functional importance. Observation made, that paralysis of the third nerve, involving the iris, does not interfere with the usual action of atropine in causing dilatation of the pupil.

8. Description of an Esquimaux Female Pelvis.

(*Anat. and Phys. Observations*, 1854.)

Contents.—From Davis Straits, 1851. True pelvis very large in all its diameters. Measurements given. Transverse

diameter of brim 6 inches. References to the alleged rapidity of parturition among the Esquimaux. This pelvis was presented by the author to the late Professor Retzius of Stockholm.

9. On Malformation of the Semilunar Valves of the Heart.

(*The same*, 1854.)

Contents.—Case of two large aortic valves and a small third valve. Symptoms of the case. Measurements of the valves. Apparently congenital, but valves diseased. Remarks on alleged non-pathological variation in the number of the semilunar valves. The natural action of the semilunar valves. Their exact adaptations. Definition of an *inferior corpus Arantii* where the valves meet below.

10. On Rudimentary Ribs, and on some points in the Anatomy of the Vertebræ.

(*Monthly Journal of Medical Science*, Edinburgh, 1854.)

Contents.—The facts contained in this Paper are included in the more comprehensive Paper on the same subject, No. 44.

11. On Branches from the Fifth Nerve to the Muscles of the Eye.

(*Anat. and Phys. Observations*, 1854.)

Contents.—Account of branches from the ganglionic or sensory portion of the Fifth nerve to the muscles of the eye in some mammals, in addition to the ordinary supply from the motor nerves; found in dissections made by the author in 1844 for his graduation Thesis. May be readily found in the sheep. Superior rectus receives two such filaments, internal rectus two, external rectus one or two. Superior oblique either directly, or more usually by filaments joining fourth nerve near muscle. From second division of fifth nerve one or two filaments to inferior rectus, one to join motor nerve to inferior oblique muscle, another to form long root of ciliary ganglion. Retractor muscle receives supply from fifth nerve, in addition to usual supply from sixth nerve.

The preparations of these dissections, showing the branches passing direct from the Gasserian ganglion to the muscles of the eye, are preserved in the author's collection.

12. On Diverticula from the Small Intestine, Anatomically and Pathologically considered.

(*Edin. Medical and Surgical Journal*, 1854.)

Contents.—Figures of twenty preparations of the diverticulum verum ilei (Meckel's diverticulum) proceeding from the lower part of the ileum. In two of the cases the diverticulum had, by adhesion, formed a ring, as figured, through which a loop of bowel passed and became strangulated. In one it caused death without having formed a ring. Also figure of two false diverticula on the jejunum, and figure of a thimble-like pouch on œsophagus at the bifurcation of the trachea. Descriptive notes of these specimens. Historical notice, and remarks on true and false diverticula. [See also No. 34.]

13. On the Abnormal Anatomy of the Arm.

(*British and Foreign Medico-Chirurgical Review*, 1854.)

Contents.—(A) *Varieties of the Muscles in relation to the Axillary and Brachial Arteries.*

Notes of the dissection of the following varieties, with remarks. 1. The axillary artery crossed by a muscular band; eight cases. Comparative anatomy of. 2. Expansion of coraco-brachialis muscle concealing the brachial artery in the upper third of the arm. 3. Brachial artery concealed in the lower half of the arm by a broad and thick third head to the biceps muscle. 4. Slip from biceps across brachial artery. 5. Muscular and tendinous slip crossing over brachial artery. 6. Tendinous slip from pectoralis major to internal condyle, crossing over brachial artery. 7. Brachial or third head to biceps muscle; notes of four cases. 8. Brachial artery overlapped or covered by a portion of the brachialis anticus muscle. 9. High origin to pronator teres muscle.

(B) *On the occurrence of a Supra-Condyloid Process in Man.*

Contents.—Figs. 1 and 2, supra-condyloid process in man,

and ligament completing the arch. Fig. 3, anterior extremity of cat, showing median nerve and brachial artery passing under the arch. Figs. 4 and 5, humerus of kitten at birth; fig. 6, same at fifth week after birth, showing the development of the supra-condyloid arch.

Notes of the occurrence of the supra-condyloid process in man in nine subjects. Notes of the same in four subjects in Dr. Barclay's collection, Museum R.C.S., Edin.

Notes on the Process as regards situation, length, and form; symmetry; sex and age. Its relation to the arteries. Relation to the median nerve. Relation to muscles and the region. Note on the Internal Intermuscular Septum. Internal brachial band. Relation of the process to the humerus. Rudimentary ridge usually present in position in which supra-condyloid process occurs, concealed by brachialis anticus muscle, and giving origin to tendinous fibres.

Comparative Anatomy. Examination of the parts in the Cat; nerve and bloodvessels, muscles, bone and development of the arch. Variety in a cat, the bony arch mostly represented by a fibrous band. Dissection of the parts in a Lion. Dissection of the parts in an Ichneumon, the median nerve alone passing through the foramen.

(C) *On the Varieties of the Arteries of the Arm.*

1. Varieties in the muscular relations. 2. Deviation of the artery from its usual course, with and without the presence of a supra-condyloid process. Supra-condyloid fibrous arch without a bony process, the nerve and artery deviating and passing under the arch. 3. High division of the brachial artery. Relative position of the two trunks, as noted in twenty arms, with surgical appreciation.

14. On the Fascia of Scarpa.

(*Monthly Journal of Medical Science*, Edinburgh, 1854.)

Contents.—Description of the true connection of this fascia, and of the method of dissection by which these can be demonstrated. Notice of common error in describing its connections at the groin. True origin from fascia lata at Poupart's ligament. Relation to the true superficial fascia of

the perineum (fascia of Colles). Scarpa's fascia viewed surgically; influence on the course of the urine in infiltration; relations to inguinal and femoral herniæ.

15. Memoir on the Clavicle.

(*Published separately*, Edinburgh, 1855.)

Contents.—A study of the Clavicle, and its relation to the soft parts, pp. 90.

16. On Jugular Venesection in Asphyxia, anatomically and experimentally considered, including the Demonstration of Valves in the Veins of the Neck.

(*Edinburgh Medical Journal*, 1856.)

Contents.—(A) *Valves.*—Error of usual statement that valves not present in veins of head and neck except in external jugular. Valve of two flaps found always at or near termination of internal jugular vein, and in subclavian vein just external to entrance of external jugular. Arrangement of these valves. Varieties in size and number of the flaps of the subclavian valve. Valve at termination of vertebral vein. Examination of upper and lower and occasional third pair of valves in external jugular vein. Valves in its transverse tributaries. Valve found once in anterior jugular vein. Valve not usual at mouth of thoracic duct, but some way down. Woodcut showing the valves in these veins, with occasional third flap of subclavian valve.

(B) *Experiments.*—Account of series of experiments made to ascertain whether, in human body, distended right heart and great veins, as in asphyxia, could be relieved by opening external jugular vein. Water injected upwards from femoral vein. Veins of neck become distended, the fluid having overcome the first valve of each. Water regurgitates freely from heart by lancet opening between upper and lower valves of external jugular. Very freely when flap of lower valve held aside by probe, but this not required. Conclusion, that, for recovery of the apparently drowned, jugular venesection may be useful in man, as found by experiments of John Reid and others to be in animals. If employed to be done early, and care to prevent entrance of air into the vein during artificial respiration.

17. Demonstration of the Use of the Round Ligament of the Hip Joint.

(*British Association for the Advancement of Science*, Glasgow, 1855; *Edinburgh Medical Journal*, April, 1857; more fully in latter, Nov., 1858.)

Contents.—(A) *Author's method of exposing the round ligament,*—by removing the floor of the acetabulum, leaving capsular ligament and other soft parts untouched. This method renders demonstration of use of round ligament possible. First employed by author in 1847, and taught in his class; first published in 1855, as above. Exposure should be free and best done with gouge and mallet. Wood-cut, fig. 8, showing ligament thus exposed.

(B) *Special parts of the Capsular ligament.*—Besides Ilio-femoral band and Pubo-femoral band, a third special band, the "Ischio-femoral," described; passing from ischium, at behind cotyloid notch, semispirally behind neck of femur, outwards and upwards to outer part of great trochanter. Is a strong band, checking rotation inwards, especially in flexed position.

(C) *Condition of the Ligamentum Teres in the various movements of the hip joint.*—Fig. 1, Typical form of cushioned recess in acetabulum. Fig. 2, Position, form, and direction of pit and groove on head of femur. Exact adaptations of these to the sweep of the round ligament and to the position in which it is tight. Figs. 3 and 4, Position of ligament in rotation inwards and outwards. Figs. 5 and 7, Position in adduction, ligament seen not to be tight and not in its groove. Figs. 6 and 8, Position of ligament in combined movement of rotation outwards and flexion, ligament tight and flat and occupying its groove. Remarks. Round ligament does not check adduction in erect posture, as formerly supposed, though nearly tight when adduction combined with flexion. In erect position adduction, over-extension, and rotation outwards are all checked by ilio-femoral band. That great band relaxed by flexion. Rotation outwards, the chief danger to the hip joint, is now checked by the round ligament together with the outer part (ilio-trochanteric part)

of ilio-femoral band. Position of rotation outwards in flexed position (may be called Tailor-position), a natural and frequent one, renders ball of femur liable to start forwards from socket, and this prevented by round ligament below and ilio-trochanteric band above. Question of function of round ligament in various animals referred to. May be modified in adaptation to movements in each, but can be determined only by demonstration in each case by the above method of exposing the ligament.

18. Description of a Case of Double Uterus.

(*Edinburgh Medical Journal*, 1860.)

Contents.—Case met with in dissecting-room. Bodies separate and divergent, nearly symmetrical, necks united externally, separate internally; common os externum, within which separate orifice of each neck seen. Remains of vaginal septum. Measurements and further particulars. Woodcuts, natural size; fig. 1, external form of entire organ; fig. 2, view of orifices from below; fig. 3, view of cavities laid open. The specimen is in the author's collection.

19. On the Solid-Hoofed Pig.

(*Edinburgh New Philosophical Journal*, 1863.)

Contents.—Historical notice of the solid-hoofed hog. Notes and figures from skeleton in Museum R.C.S., Edin. 1839, obtained from herd at Rannoch, Scotland; brough there, now extinct there. Woodcuts, natural size. Figure A, right fore foot; fig. B, hind foot. Epiphyses not yet united. On fore foot, the two great toes united by their distal and middle phalanges, on hind foot by distal phalanges only.

20. Case in which one fore-foot of a Horse presented two Toes, like the foot of the Ox.

(*The same*, 1863.)

Contents.—In living animal, female, two years old. Each toe three movable phalanges, division externally to same

extent as in ox, hoofs quite separate. Great metacarpal felt as if bifid at lower end, further up as if normal. The lesser metacarpal bones felt as in normal horse. Specimen not obtained after death.

21. On the Relative Weight of the Viscera on the Two Sides of the Body; and on the consequent position of the Centre of Gravity to the Right Side.

(*Edinburgh Medical Journal*, 1863.)

Contents.—The object of this inquiry was to determine whether the viscera are of equal or unequal weight on the right and left sides of the middle line of the body. The observations, extending over several years, were made by introducing needles in the exact middle line, or by slicing with a long knife, and then weighing the parts.

Liver; relative weight of right and left lobes; extent to which left lobe lies to right of middle line; correspondence of falciform ligament to longitudinal fissure; position of falciform ligament in relation to middle line; movements of the liver, and functions of the falciform and other ligaments of the liver; relative weight of the parts of the liver which lie in the internal and external subdivisions of the right side; effect of posture on the position of the liver. Spleen, pancreas, stomach, kidneys, lungs, heart, great bloodvessels, intestines. Influence of weight of contents of stomach.

Symmetry and equipoise of the right and left sides of the body zoologically and developmentally considered. Asymmetry in various mammals, birds, reptiles, and fishes. Equipoise a different question. The right side the "lying" side of the ox. Greater influence of want of equipoise in man than in quadruped owing to erect posture and greater lateral development of trunk.

Conclusion as to relative weight of the viscera on the right and left sides of man. Tabular view of the weights on the two sides. Preponderance on right side $22\frac{3}{4}$ ounces. Deduct for contents of stomach $7\frac{3}{4}$ ounces; leaving total preponderance on right side 15 ounces. This not an overestimate. Centre of gravity therefore to right side of middle line.

Reference to hypothesis of Professor Andrew Buchanan, that equipoise of viscera disturbed by acts of inspiration sending liver further to right side, and that this leads to preferential use of right hand. Result of present inquiry shows that viscera are naturally heavier on right side and gives anatomical basis for the hypothesis. Greater weight on right side leads to preference of right lower limb, and that to preference of right upper limb.

22. **On Variation in the Number of Fingers and Toes, and in the Number of Phalanges in Man.**

(*Edinburgh New Philosophical Journal*, 1863.)

Contents.—Account of numerous cases, with family history and remarks.

Part I.—*Variation in the Number of Digits.*

(1) Cases of increase in the number which could not be traced to hereditary origin. Including:—(*a*) Case of six digits in three members of family of seven children, in one on each foot, in two on each foot and each hand (figures given of hands and feet from photographs, figs. 1, 2, and 3). (*b*) Case of four members of family of eleven chilnren, one with sixth digit on one hand, two with sixth digit on one foot, one with sixth digit on each foot and each hand. (*c*) Six cases of additional thumb on one hand. (*d*) Three cases, two of them brothers, of additional little finger on one hand. (*e*) Three cases of additional toe on one foot. (*f*) Case of one hand with seven or eight digits, approaching condition of double hand (fig. 5, from a sketch).

(2) Cases of increase in the number of digits with hereditary origin. (*g*) Case in which increase in number of digits was transmitted through at least four generations; full family history, the condition variously transmitted or not transmitted, in one line re-appearing after two generations; in another line a digit added in each generation, first on one hand, then other hand, then one foot, then on other foot. (*h*) Case of additional thumb re-appearing after at least two generations. (*i*) Case of additional digit on one hand, with three phalanges and metacarpal bone, and additional digit

on each foot; direct hereditary origin. (*j*) Case of two thumbs, one of them with three phalanges in each hand; two great toes on each foot, with additional metatarsal bone in one foot; direct hereditary origin; brother to last case, another brother with the great toes double. (*k*) Case of double distal phalanx of thumb; distant hereditary origin. (*l*) Case of additional thumb on each hand, with additional metacarpal bone, and double great toe on one foot; distant hereditary origin; this and three preceding cases (*i*, *j*, and *k*) distantly related to each other. (*m*) Case of additional thumb on one hand; distant hereditary origin. (*n*) Case of additional thumb on one hand, with additional metacarpal bone; distant hereditary origin. (*o*) Case of six fingers and toes; brother has the same; interrupted hereditary origin.

(3) Dissection of three limbs of a child presenting diminution in the number of digits.

Part II.— *Variation in the number of Phalanges.*

(*p*) Case in which all the fingers and toes want a phalanx, in several members of a family. Ten children; the variety occurs in the fifth (a boy), eighth or ninth (twin boys), and tenth (a daughter); ancestors unknown, condition not present in any near relative. (*q*) Case in which four fingers of one hand have but one phalanx each, the thumb has its two phalanges, and same length as thumb on normal hand; nails present; father's aunt had two thumbs on one hand. (*r*) Case in which the fingers of one hand are formed so as to give hand appearance of a foot (fig. 4, from a cast); thumb two phalanges, index and middle fingers one phalanx (doubtful), fourth and fifth fingers no phalanges; nail on thumb only; no heredity. (*s*) Case of five very rudimentary digits on one hand; no heredity. In the last two cases there are stories of impressions made on mother's mind during pregnancy. (*t*) Case of additional phalanx in both thumbs; probably hereditary (fig. 6, from a photograph; age 21; middle phalanx the shortest and triangular; aunt had same kind of thumb on one hand.

Remarks on the normal occurrence of a bone less in the internal digit, as compared with the four outer digits, in man

and other mammals, and on the position of the epiphysis on phalanges and on metacarpal and metatarsal bones. Reference to the occurrence of the epiphysis on the functionless end of the lesser metacarpal and metatarsal bones of the horse. Note on the occurrence of an epiphysis at both ends of the metacarpal bones and phalanges in cetacea.

[The following fourteen Notices (No. 23 to No. 36) were Communications made to the *Medico-Chirurgical Society of Edinburgh*, and were published in the Reports of the Society's Meetings, in the *Edinburgh Medical Journal*. The dates given are those when the Communications were made. The papers, Nos. 2, 6, 7, 16, 17, and 21 were also read before that Society:—]

23. Remarks on a Case in which the Abnormal Obturator Artery encircled the neck of a Femoral Hernia, but escaped division in the operation.

(16th May, 1855. *Edin. Med. Journal*, vol. i., p. 74.)

Contents.—Operation by the late Dr. Richard J. Mackenzie. Woodcut showing artery closely encircling neck of sac. Remarks on abnormal obturator artery in relation to femoral hernia.

24. Dissection of a Club-foot, with Remarks on the Surgical Anatomy of the Tendons concerned, and on the Natural Motions of the Foot.

19th Decr., 1855. *The same*, vol. i., p. 753.)

Contents.—Adult talipes varus. Relative merits of high and low operations on tibialis posticus tendon. Natural motions of the foot defined.

25. On Atrophy and Transference of the long Tendon of the Biceps Muscle.

(5th March, 1856. *The same*, vol. i., p. 953.)

Contents.—Cases in which the change had taken place. Intra-capsular part of tendon absorbed and tendon transferred to humerus external to capsule. Appearances described. Remarks on occurrence of this change in chronic rheumatic arthritis. New attachment to humerus tubular. Natural use of long tendon of the biceps at the shoulder.

26. Case of Supra-Condyloid Process readily felt in the Living Body.

(3rd March, 1858. *The same*, vol. iii., p. 951.)

Contents.—Patient exhibited to the Society. Process easily felt on both arms, most prominent on right, in usual situation. Nerve and artery can be felt to deviate. Patient, a groom aged 17. Patient not aware of the presence of the projection before it was noticed in the hospital.

27. Cases of Temporary Bi-locular Stomach.

(5th Dec., 1860. *The same*, vol. vi., p. 677.)

Contents.—Condition owing to muscular contraction; result may remain after death, but yields to distention. Condition frequent, occurred in three bodies opened at same time. May be normal condition during digestion.

28. Remarks on a Case in which the greater part of the Lower Jaw was torn away by Accident, with Recovery.

(20th Nov., 1861. *The same*, vol. vii., p. 587.)

29. Description of an Aneurysm on the Anterior Communicating Artery of the Brain.

(4th June, 1862. *The same*, vol. viii., p. 190.)

30. Description of the Alteration of the Bones in a Case of old unreduced Dislocation of the Shoulder Joint.

(2nd July, 1862. *The same*, vol. viii., p. 274.)

31. Case of Symmetrical Alteration in the Form of the Neck and Head of the Thigh Bones in rheumatic disease.

(19th Nov., 1862. *The same*, vol. viii., p. 663.)

Contents.—Description of the specimen. Remarks on the meaning of the change of form.

32. Notice of Two Cases in which a Renal Artery arose from the Arteria Sacra Media.

(7th Jan., 1863. *The same*, vol. viii., p. 759.)

33. Notice of a Case of Human "Horn".

(4th Feb., 1863. *The same*, vol. viii., p. 860.)

Contents.—From an aged female lunatic. "Horn" $3\frac{1}{2}$ inches in length. Among the hair a little behind the forehead; was easily pulled off. Several others growing, one to two inches apart.

34. Notice of Two Cases of Numerous False Diverticula of the Small and Great Intestine.

(8th April, 1863. *The same*, vol. viii., p. 1040.)

Contents.—(1) Small intestine of old female subject; small diverticula along nearly whole length of jejunum and ileum and sigmoid flexure of colon, at mesenteric attachment. (2) Adult female subject; sigmoid flexure of colon alone observed; diverticula 46 in number, from size of pea to size of end of little finger, $\frac{1}{4}$ to $\frac{1}{2}$ inch in length; most at non-peritoneal part. The diverticula in both these cases were herniæ of the mucous membrane through the muscular coat.

35. On the Error of regarding the Flexor longus Pollicis Pedis Muscle of Man as, normally, a flexor of the great toe only.

(3rd June, 1863. *The same*, vol. ix., p. 84.)

Contents.—The so-called slip from the flexor pollicis to the flexor communis in reality a tendon from the former to the second toe or also to the third, rendering flexor pollicis an internal flexor communis. Its zoological affinity. What rather is remarkable in man is the independence of the flexor pollicis of the hand.

36. Description of a New Craniometer.

(15th July, 1863. *The same*, vol. ix., p. 368.)

Contents.—Is essentially a glass box, the panes ruled and fitted into a brass frame. Side panes 9 inches square; end, top, and bottom panes 7 by 9; bottom pane plate glass; top pane lifts out. The lines one inch apart both ways; the middle squares, both ways, halved by a median line. Measurements of the cranium, sides, front, back, top, and interior of base may thus be rapidly read off, eye kept on

corresponding opposite line. Skull may be turned round and placed for measurements of exterior of base. Craniometer may be turned round and placed over a bust or over the living head. Frame must be carefully made, ruling with diamond, and fitting in of panes must be accurate.

37. On the Mediastinum Thoracis.

(*Journal of Anatomy and Physiology*, 1869.)

Contents.—Suggestion to employ the term "Superior mediastinum" in the topographical anatomy of the thorax. This term long used by the author. Defined, generally, as the space between manubrium sterni and three upper dorsal vertebræ, enclosed on the sides by the uninterrupted pleuræ, reaching above to superior aperture of thorax, below to top of aortic arch.

The mediastinal space considered developmentally and in the adult. Definition of the "middle" and "posterior" mediastina. Clinical importance of accurate definition of these regions of the mediastinum.

38. Case of Additional Bone in the Human Carpus.

(*The same*, 1869.)

Contents.—Ossicle in both hands, placed between os magnum, trapezoid, and second and third metacarpals. Seen on dorsal aspect only. The hands are preserved in the author's collection. [This variety is regarded by Wenzel Gruber as separate development of styloid process of third metacarpal.]

39. On some points in the Anatomy of a Great Fin-Whale, *Balænoptera musculus.*

(*The same*, 1871.)

Contents.—At Peterhead, 1871. Male, 64 feet long. External characters and measurements.

Figures 1 and 2.—Views of pectoral fin on flexor and extensor aspects, showing the Finger-muscles and their tendons. On flexor aspect, flexor digitorum ulnaris, flexor digitorum radialis; also flexor carpi ulnaris. On extensor aspect, extensor communis digitorum. Description of these

muscles. The figures also show the articulations of the carpal bones, or cartilages, and of the digital cartilages. Description of these joints and cartilages.

Note of Finger-muscles found in a Hyperoodon; of flexor carpi ulnaris muscle found in the common Porpoise; of dissection of paddle of Narwhal, the finger "muscles" morphologically present but entirely tendinous.

Figure 3.—Rudiment of femur found in bony condition (first found by Flower as a cartilage), attached to pelvic bone by its ligaments. Description of these parts.

Figure 4.—View of sternum and first pair of ribs, retained in position, showing two costo-sternal articulations. Shows also first rib having separate capitular process articulated to end of rib.

Figure 5.—View of vertebral end of second rib with complete capitular process. Description of these parts.

Additional pair of ribs (sixteenth) found, loose in the flesh.

The specimens figured, and some other parts of this whale, are preserved in the author's collection.

40. On the Cervical Vertebræ and their Articulations in Fin-Whales.

(*The same*, 1872.)

Contents.—1. Fin-whales examined and drawings.

(1) Balænoptera musculus, at Peterhead, 1871, male, 64 feet, soft parts dissected. Fig. 1, The cervical vertebræ, seen from below. The vertebræ are preserved in the author's collection.

(2) B. musculus, at Stornoway, 1871, male, 60½ feet. Fig. 2, The cervical vertebræ, seen from below. Fig. 4, Fifth cervical vertebra of this whale, seen from before. These vertebræ were presented by the author to the British Museum.

(3) B. musculus, at Wick, 1869, male, 65-66 feet, soft parts dissected. Fig. 3, The cervical vertebræ, seen from above. Fig. 5, Atlas of this whale, seen from behind, showing the transverse ligament, and the areæ of attachment

of the check ligaments. These vertebræ were presented by the author to the Anatomical Museum of Edinburgh University.

(4) Atlas and axis of another B. musculus, Norway, 1872.

(5) Lesser Fin-whale (B. rostrata), at Aberdeen, 1870, young female, 14½ feet, soft parts dissected. Fig. 6, Atlas of this whale, seen from before, showing the transverse ligament.

(A) Examination of the parts in the great Fin-whales. 2. Transverse processes viewed in relation to function. Great rete mirabile filling lateral rings. Rete mirabile of spinal canal and intervertebral foramina; great size in comparison with spinal cord and nerves. Function primarily in relation to muscles and ligaments. Three stages of lower processes, root stage, tubercular stage, nerve-groove stage. Three stages of upper processes, nerve-groove, tubercular, terminal. 3. Ligaments of the transverse processes; great strength of ligaments uniting the terminal expansions. 4. Ligaments of the spines, laminæ, and articular processes. Articulations between the bodies; fibro-cartilages, proportions of ligament and pulp; corresponding marks on the bones; amount of motion. 6. Articulations between atlas, axis, and occipital bone. (*a*) Transverse ligament, large, no contact with odontoid process, flattened in opposite direction to that in man; division of canal into two parts by this ligament, explaining form of canal in the finners; chief function to attach part of check ligaments. (*b*) Check ligaments, areæ of attachments to axis and atlas, are great interosseous ligaments; correspond to lower check ligaments of man. (*c*) Lig. suspensorium dentis (occipito-odontoid), size of thumb. (*d*) Superior longitudinal ligament (occipito-axoid), prolongation of superior common ligament of bodies. Soft parts which separate right and left occipito-atlantal joints.

The Cervical Vertebræ serially considered.—7. Table of measurements in the four great finners. 8. The bodies. 9. Spinal canal, laminæ, anapophyses, spinous processes. 10. Articular processes. 11. Inferior transverse processes. 12. Superior transverse processes. 13. The lateral rings. 14. Recognition of the five posterior vertebræ. 15. The

axis. 16. The atlas. Examination of the various parts of these two vertebræ.

(B) Examination of the parts in the Lesser Fin-whale. 17. Transverse processes; dissection of the soft parts, cartilages and ligaments, completing the lateral rings. 18 Bodies and their fibro-cartilages. 19. Articulations of the atlas and axis; articular surfaces, continuity across middle line; transverse ligament, prismatic form, contact with odontoid; check ligaments; ligamentum suspensorium; superficial ligaments; extent of movement very limited. 20. Occipito-atlantal surfaces. Form of the two divisions of the neural canal, separated by transverse ligament. 21. Explanation of the drawings.

41. Account of Rudimentary Finger-Muscles found in a Toothed Whale, *Hyperoodon bidens*.

(*The same*, 1873.)

Contents.—Hyperoodon, stranded alive at Fraserburgh, 1871; 19 feet 3 inches; maxillary crests 3 inches thick, 5 inches apart at middle. Account of muscles mentioned in No. 39 as found. Finger-muscles not before met with in toothed whales. In Hyperoodon are better developed than in great finner. Muscles found: Flexor carpi ulnaris; Flexor digitorum ulnaris; Flexor digitorum radialis; two extensors of the digits, ulnar and radial. Finger-joints more movable than in finner, synovial cavity reaching completely across between the cartilages, surfaces flat. But muscles feeble relatively to size of parts on which they act. Rudimentary brachial muscles present; much mixed with fibrous tissue, but have well-striped, good-sized muscular fibre.

42. Case of Subdivision of the Scaphoid Carpal Bone, probably from Fracture.

(*The same*, 1873.)

Contents.—Man aged 68. Scaphoid represented by two bones of nearly equal size; glide freely on each other by nearly flat synovial surfaces. Appearances leading to infer-

ence that this a case of fracture rather than of natural variation, for which it might readily have been mistaken. Left hand and both feet normal.

43. On Hereditary Supra-Condyloid Process in Man.

(*The Lancet*, 1873.)

Contents.—The process can be felt in the arm of the father and of four of his seven children. In father, on left arm distinctly felt, not felt in right arm. The children are five sons and two daughters. In eldest son process very distinct on left arm, no trace on right. Second son, slightly marked on left, no trace on right arm. Next three (first daughter, third son, and second daughter), no trace felt on either. Fourth son, process well developed on both arms, most on left. In youngest son (aged 15 years), process pretty well marked in left, no trace felt in right arm. Thus transmitted to four of the children, in three on same side as in father, and more developed on same side (left) in the son in whom process present in both arms. No reason to doubt that supra-condyloid process hereditary like other varieties.

This variation probably occurs in other mammals. Variation in cat already recorded (No. 13). Author has noticed process present in fossil bear in Palæontological Collection in Jardin des Plantes, Paris.

44. On Variations of the Vertebræ and Ribs in Man.

(*Journal of Anatomy and Physiology*, 1874.)

Contents.—Description of numerous specimens of variation of the vertebræ and ribs met with by the author and contained in his private collection. Variation, if looked for, found to occur more frequently than usually supposed. Conclusions as to characters of species, or differences of race, must be founded on examination of a series of specimens. Interest of a variation appears when critically examined.

(A) Variations in the Cervical Region.

(a) Deficient ossification of the Atlas; anterior arch, posterior arch, transverse processes.

(b) Bridges of bone developed on the Atlas, over the nerve and artery. 14 cases.

(c) Consolidation of the Atlas and Occipital bone.

(d) Case in which the Muscles of the spine of the Axis are transferred to epispinous bones at the third vertebra.

(e) Variation in the place of entry of the Vertebral Artery in the cervical vertebræ. 2 cases of artery entering foramen of the 7th, and 3 special cases.

(f) Additional foramen in the cervical transverse processes. Examination of numerous cases.

(g) Variation of 7th vertebra; lateral foramen, transverse processes, costal facets.

(h) Cervical Ribs. Examination of 10 cases illustrating the various degrees of development.

(i) Recognition of Cervical Ribs in the living body. 3 cases.

(B) Variations in the Thoracic Region.

(a) Imperfect development of 1st thoracic ribs. Case with remarks. Figure of the parts. Case in a three-toed Sloth.

(b) Varieties of the Sternal Ends of the ribs. 5 cases.

(c) Variation of the Costal Facets of the 9th and 10th dorsal vertebræ.

(d) Imperfect development of the 12th rib. 5 cases.

(e) Variation in the place at which change of the Articular Processes occurs. 10 cases. Note respecting position of this change in animals.

(C) Variations in the Lumbar Region.

(a) Cases 1 and 2, Lumber Rib simply. Note of 2 cases in the Ox, differently placed.

(b) More complex lumbar variations; Vertebrae and Ribs.

Case 3. Dorso-lumbar vertebra more than usual, with additional pair of ribs. Note of another case of the same in Man, and of case of the same in a Cat.

4. Case of the same, with 6th lumbar vertebra partly sacralised.

5, 6, and 7. Three cases of 6 lumbar vertebræ.

8. Dorso-lumbar vertebra less than usual; 11 pairs of ribs, and 12th rib, or movable transverse process, on one side.

9. Case of 6 cervical vertebræ, and 6 lumbar vertebræ; and a vertebra suppressed in some part of the column.

(c) Variation of the 5th lumbar vertebra.

(1) Changes by which it becomes united to the sacrum. 4 cases. Note on this change in the Gorilla.

(2) Variations of its lower Articular Processes. Cases and remarks.

(3) Variations of the upper articular processes of the sacrum.

(D) Variations of the Sacrum.

(a) Diminution in the number of its component vertebræ.

(b) Variation in form of the upper sacral vertebra, apparently from borrowed lumbar vertebra. The Ape-like sacrum. 4 cases.

(c) Examination of 6 sacra, in which the upper vertebra is of unusual form, but in which the additional vertebra appears to have been obtained from the coccyx.

(d) Examination of 7 other cases in which a 6th vertebra is obtained from the coccyx.

(e) Variation in the number of sacral vertebræ with which the Ilium articulates.

(f) Variation in the form of the Auricular Surface.

(g) Case of Sacral Canal open in its whole length.

(E) Variations of the Coccyx.

(a) Diminution in the number of its component vertebræ. Cases of, and their nature.

(b) Increase. Remarks. Two cases of 10 sacro-coccygeal vertebræ.

(c) Union of the coccygeal vertebræ. External influences.

45. Account of Rudimentary Finger-Muscles found in the Greenland Right-Whale, *Balæna mysticetus.*

(*The same*, 1878.)

Contents.—These muscles found to be present in this whale. Fully as well developed as in the great finner. The observation was made in 1873 on a 45-feet-long female, both paddles dissected, and repeated in 1874 on right paddle of a 35-feet-long male. The muscles found were—1, flexor carpi

ulnaris; 2, extensor carpi ulnaris; 3, extensor communis digitorum; 4, flexor digitorum ulnaris; 5, flexor digitorum radialis; 6, flexor carpi radialis, found in young male only. Fibrous curtain along upper edge of ulna, from olecranon to pisiform cartilage; receives tendons of flexor and extensor carpi ulnaris; not present in finner. In all these muscles the tendinous tissue continuous from end to end, giving ligamentous function; disappearance of muscular fibre would leave them as ligaments only, as in ordinary toothed cetacea. In Hyperoodon the teeth are rudimentary.

46. On the Bones, Articulations, and Muscles of the Rudimentary Hind-Limb of the Greenland Right-Whale, *Balæna mysticetus*.

(*The same*, 1881.)

Contents.—Inquiry undertaken to ascertain what light dissection of soft parts might throw on nature of rudiments discovered many years ago by Reinhardt, attached to pelvic bone in Mysticetus, and which he interpreted as thigh bone and leg. These parts dissected in ten Right-Whales, from Davis Straits, from 1873 to 1876. Life-sized drawings made from dissections. Specimens shown at meeting of British Association at Glasgow, 1876.

Table I.—Measurements of pelvic bone from eleven Right-Whales, showing variations with sex, side, individual, and age.

Table II.—Measurements of femur and tibia from ten Right-Whales, showing variations.

(A) The Bones.

I. *The Pelvic Bone*—1. Its nature. 2. Characters and adaptations. 3. Differences with sex. 4. Individual variations. 5. Symmetry. 6. Foramen. 7. Cartilages of the pelvic bone, periosteum.

II. *The Femur*—8. General characters. 9. Individual variations. 10. Weight, sex, symmetry. 11. Cartilages of the femur, periosteum.

III. *The Tibia*—12. Condition, form, variations, perichondrium.

(B) The Articulations.

I. *The Knee-Joint*—3. Synovial cavity, surfaces, ligaments, movements.

II. *The Hip-Joint*—14. Position and movements of the femur. 15. The ligaments. 16. Synovial cavity. 17. The acetabular cartilage. 18. Variations and adaptations of the hip-joint in the several specimens.

(C) The Muscles.

19. Relation of the genital organs in the male, inter-pelvic ligament, muscles. Relation in the female. 20. The posterior muscular connections. 21. The anterior muscular connections. 22. Muscles between the pelvic bone and the femur. 23. The muscular and tendinous connections of the tibia. 24. Explanation of the Drawings.

Plate I.—Ten figures, showing variations in form of the pelvic bone, femur, and cartilaginous tibia in six Right-Whales, 3 male, 3 female. In fig. 10, from adult male, the hip-joint anchylosed.

Plate II.—Figs. 11 and 12. Upper and under views, from 35-feet-long male, showing pelvic bone, femur, tibia, and their ligaments, the interpelvic ligament, and relation of penis to pelvic bone.

Plate III.—Figs. 13, 14, 15. From same male, showing upper and under views of the muscles connected with same parts, and transverse section of penis and its muscular surroundings; muscles coloured.

Plate IV.—Three views of the bones, ligaments, and muscles, from 48-feet-long female. Fig. 16. Ligaments of the hip-joint and femur. Fig. 17. Deep muscles attached to pelvic bone; small muscles attached to femur; hip-joint opened; capsular ligament of knee-joint. Fig. 18. Superficial view of muscles and aponeuroses attached to femur and tibia. Tibial band, prolonged from apex of tibia.

"Although, from the size of the masses, their fragmentary nature, and the decomposing condition of some of them, the dissections were not easy, the inquiry was a most interesting one. Nothing can be imagined more useless to the animal

than rudiments of hind legs entirely buried beneath the skin, so that one is inclined to suspect that these structures must admit of some other interpretation. Yet, approaching the inquiry with the most sceptical determination, one cannot help being convinced, as the dissection goes on, that these rudiments really are femur and tibia. The synovial capsule representing the knee-joint was too evident to be overlooked. An acetabular cartilage, synovial cavity, and head of femur, together represent the hip-joint. Attached to this femur is an apparatus of constant and strong ligaments, permitting and restraining movements in certain directions; muscles are present, some passing to the femur from distant parts, some proceeding immediately from the pelvic bone to the femur, by which movements of the thigh-bone are performed; and these ligaments and muscles present abundant instances of exact and interesting adaptation. But the movements of the femur are extremely limited, and in two of these whales the hip-joint was firmly anchylosed, in one of them on one side, in the other on both sides, without trace of disease, showing that these movements may be dispensed with. The function point of view fails to account for the presence of a femur in addition to processes from the pelvic bone. Altogether, these hind legs in this whale present for contemplation a most interesting instance of those significant parts in an animal—rudimentary structures."

[Some of the specimens described in the above Paper have been presented by the author to the British Museum and to the Anatomical Museums of the Universities of Edinburgh, Glasgow, and Aberdeen; the remainder are in the author's private collection.]

47. On the Processus Supra-Condyloideus Humeri of Man.

(*Transactions of the International Medical Congress*, London, 1881, vol. i.)

Contents.—Short notice of the facts concerning the process, illustrated by numerous specimens from the author's collection which he desired to lay before the Anatomists

attending the Congress. Specimens of the macerated humerus showing the process in various degrees of development; specimens showing the ligament completing the arch; dried preparations of the upper extremity showing the median nerve hooked aside by the process, with and without deviation of the artery; dissection of the soft parts in a case of the process; specimens of the comparative anatomy of the arch. Remarks on the surgical importance of the variety, and on the interpretation of its occurrence in man.

Discussion of the Paper by Professors Flower, Macalister, Lesshaft, Braune, and Keen.

48. On the Acetabulum of Animals in which the Ligamentum Teres is described as wanting.

(*Read before the British Association for the Advancement of Science* at York, 1881.)

Contents.—Preliminary notice of Paper not yet published in full. The form of the recess in floor of acetabulum in man adapted to receive and cushion the ligament in the various motions of the joint. A recess present in mammals in which the ligament is said to be absent. Finds the ligament not to be absent in the Greenland seal, not free but projecting from the capsule, with well-marked notch on head of femur. In birds the recess represented by a thinner part of the membrane that forms the floor of the acetabulum.

49. On the Correspondence between the Articulations of the Metacarpal and Metatarsal Bones in man.

(*The same*, 1881.)

Contents.—The correspondence is exact, not merely numerical (from within outwards, 2, 5, 4, 5, 3) but homological. Articulate with the homologous carpal and tarsal bones, and in same manner by their terminal and corner facets. This correspondence has long been taught by the author. The occasional occurrence of an articular facet between the first and second metatarsal bones may be the result of civilisation.

50. On a Method of promoting Maceration for Anatomical Museums by Artificial Summer Temperature.

(*Journal of Anatomy and Physiology*, 1883.)

Contents.—Boiling, or any approach to it, objectionable. Strong wooden tanks described, with method of filling and emptying. Water in tanks heated by hot-water pipes, 1 inch bore, galvanised to prevent rust, connected with boiler in furnace-room. Fire lowered when temperature reaches 95° Fahrenheit. Arrangement of pipes described. Heating by steam pipes probably preferable. Conduction by air of room not sufficient to heat large body of water in tank. Note on maceration in jars in furnace-room. Author has found these methods of great service in facilitating formation of the Anatomical Museum.

51. On a Method of Demonstrating the great Interosseous Ligament between the Astragalus and Os Calcis.

(*The Lancet*, 1883.)

Contents.—Astragalus sawn into three parts, so that narrow middle portion shall carry entire upper attachment of ligament. Exact position and direction of the cuts. Lateral parts of astragalus left hanging on by ligaments for replacement. Entire extent of interosseous ligament now exposed. Method also gives useful view of joints on either side of the ligament. Dorsal dissection and transverse vertical sections give useful views, but above method gives complete view, length, height, and thickness, and renders function demonstrable.

Method showing interior of ankle joint may be combined with the above. Lower part of tibia and fibula sawn off transversely, and tibia then divided antero-posteriorly. The parts then admit of opening out and replacement.

52. On the Rudimentary Hind-Limb of Megaptera longimana.

(*Read before the British Association for the Advancement of Science*, at Montreal, August 29th, 1884.)

Contents.—Preliminary account of dissection of the parts.

[See No. 64. Specimens of the rudimentary hind-limb of Mysticetus were also shown at this meeting.]

53. On the presence of Finger-Muscles in Megaptera longimana.

(*Read before the American Association for the Advancement of Science*, at Philadelphia, 9th Sept., 1884. This and the preceding Paper published in *The American Naturalist*, February, 1885.

Contents.—Preliminary account of the dissection of these muscles. More rudimentary than in B. musculus, being not half so large while paddle nearly twice the size of that of B. musculus. Ulnar flexor of the digits much the smaller of the two flexors in Megaptera, the larger in B. musculus.

54. On Human Crania and other contents found in short stone Cists in Aberdeenshire.

(*Read before the British Association for the Advancement of Science*, at Aberdeen, 1885.)

Contents.—Account of skulls, other bones, and urns found in 8 short stone cists, in Aberdeenshire. The specimens are preserved in the Anatomical Museum of Aberdeen University.

55. Notice of Human Bones found in 1884 in Balta Island, Shetland.

(*The same*, 1885.)

Contents.—Notice of 13 skeletons found by Mr. D. Edmonston there; all large-sized adolescent or middle-aged males, buried near each other irregularly, in extended position, not in coffins, none more than 18 inches below surface. Bones not decayed. No reliable history.

56. On the Development of the Foot of the Horse.

(*The same*, 1885.)

Contents.—First phalanx found to have an epiphysis at distal as well as at proximal end. Distal epiphysis con-

solidates early. Sections of fore and hind feet of young horses exhibited. Attention called to situation of epiphysis of lesser metacarpal and metatarsal bones, not at upper functional end but at rudimentary distal end, as significant link in chain of evidence of descent of horse. Specimen of polydactyly in horse exhibited.

57. On the Development of the Vertebræ of the Elephant.

(*The same*, 1885.)

Contents.—Neural arches on the anterior vertebræ meet below so as to shut out the bodies from forming any part of spinal canal. Diminution of this backwards, bodies at length rising to form part of canal. The vertebræ exhibited those of elephant said to be about 30 years old.

58. Account of Whales recently obtained in the District.

(*The same*, 1885.)

Contents.—1. *Megaptera longimana ;* male 40 feet, seen at Dundee, December, 1883, beached near Aberdeen, January, 1884. Skeleton exhibited to the Association, and chief characters noticed. Skeleton ultimately to be placed in Dundee Museum.

2. *Balænoptera musculus ;* male 50 feet, stranded at Nairn, December, 1884, brought to Aberdeen and dissected there. Finger-muscles same arrangement as described in Peterhead B. musculus, 1871. Femur cartilaginous, 1 inch in length Skeleton exhibited to the Association.

3. *Balænoptera borealis ;* male 36 feet. Killed at Widewall Bay, Orkney, December, 1884. Skeleton and parts for dissection brought to Aberdeen. Soft character of whalebone fringe. Femur not present in this whale. Ribs 14 pairs, first pair double-headed. Skeleton exhibited to the Association, and characters which distinguish it from B. musculus noticed.

4. *Beluga ;* killed at Wick, 1884. Photographs showing natural form. Skeleton exhibited to the Association.

59. On the Cervical Vertebræ of Balæna Mysticetus, and of some other Cetaceans.

(*The same*, 1885.)

Contents.—Account of eight specimens of cervical vertebræ of Mysticetus exhibited, showing complete consolidation of the bodies, even in the young state. Condition of the transverse processes and pedicles. Nerve-groove stage recognisable on both upper and lower transverse processes.

Numerous specimens of cervical vertebræ of Globicephalus exhibited, showing progress of consolidation with age. Thin body-epiphyses present on the rudimentary bodies. Change of position of neuro-central suture seen between 8th and 10th dorsal vertebræ.

Dissections of Beluga and Monodon exhibited, showing the deficient bony transverse processes to be fully represented by fibrous bands and cords completing the rings.

60. On the Carpal Bones of various Cetaceans.

(*The same*, 1885.)

Contents.—Demonstration of dissections of the carpal bones and cartilages in Hyperoodon, Beluga, Globicephalus, Narwhal, Balænoptera musculus, B. borealis, B. rostrata, Megaptera longimana, and Balæna mysticetus.

61. Account of the Dissection of the Rudimentary Hind-Limb of Balænoptera musculus.

(*The same*, 1885.)

Contents.—Account of dissection of the soft parts in relation with the pelvic bone and rudimentary femur in the Nairn whale, with full-sized drawings of the several stages of the dissection.

62. On Methods of Preparing the Brain, Museum Specimens, and Dissections.

(Read before the *Anatomical Society of Great Britain and Ireland*, London, November 22nd, 1887. *Journal of Anatomy and Physiology*, January, 1888.)

63. Series of Specimens exhibited at the Anatomical Society, with Remarks.

(*The same.*)

1. Specimen of "Rider's Bone" (presented by Dr. James Allan, Leeds).

2. Series of Specimens of permanently separate Acromion Process, simulating fracture.

3. Series of preparations of the Variety in which the right Subclavian Artery arises last from the arch of the aorta and passes behind the œsophagus; the "recurrent" laryngeal nerve free.

64. On the Anatomy of the Humpback Whale. Megaptera longimana.

(*Journal of Anatomy and Physiology*, 1887, 1888, 1889. *Published separately*, 1889.)

This whale first seen in the Firth of Tay, December, 1883, wounded and died at sea, brought ashore at Stonehaven, near Aberdeen, early in January, 1884; dissected by the author at Dundee, certain parts of it at Aberdeen. Skeleton prepared at Aberdeen and studied there in comparison with those of Balænoptera musculus and Balænoptera borealis. A comparison of the bones with those of B. musculus is given throughout this Paper.

Contents.—Part I., October, 1887. History and external characters. Plates I. and II.

Part II., January, 1888. The Limbs. (*a*) Pectoral Fin; bones, cartilages, joints, finger-muscles. Tables of measurements. (*b*) Rudimentary Hind-Limb; pelvic bone, cartilaginous femur, ligaments and muscles. Table of measurements. Plates III., IV., and V.

Part III., April, 1888. The Vertebral Column. Table of measurements. Table of measurements of the vertebræ of Balænoptera musculus for comparison with those of Megaptera. Bodies of the dorsal, lumbar, and caudal vertebræ.

July, 1888. Neural arch and canal, articular processes, transverse processes, spinous processes.

October, 1888. Cervical vertebræ, the ribs, sternum, chevron bones. Tables of measurements. Plate VI.

Part IV., January, 1889. The Skull. Table of measurements of Megaptera and of B. musculus for comparison. Characters of the various regions and bones of the two skulls.

April, 1889. Ear bones, mandible, hyoid bone. Tables of measurements, characters.

Drawings. Plate I. Fig. 1, View of the whale as it lay on the back when brought ashore at Stonehaven.

Plate II. Fig. 2, Dorsal fin. Fig. 3, Tail fin. Fig. 4, Mammillary pouch and nipples. Fig. 5, View of head, mouth, eye, ear-hole, &c.

Plato III. Fig. 6, Bones, cartilages, and joints of pectoral fin, in natural relation. Fig. 7, Scapula. Fig. 8, Glenoid cavity of scapula and rudimentary coracoid. Fig. 9, Section of carpus, with neighbouring parts of bones of forearm and metacarpus and their epiphyses. Figs. 10, 11, 12, Terminal cartilages of digits II. and III. showing their form and concealed joints.

Plate IV. Figs 13, 14, Flexor and extensor aspects of pectoral fin of B. musculus, showing the finger-muscles; also the bones, cartilages, and joints; for comparison with those of Megaptera.

Plate V. Fig 15, Pelvic bone and femur and their muscular and fibrous connections in Megaptera (male), the muscles coloured; the numerous parts indicated. Fig. 16, right and left, Pelvic bone and femur and their ligaments.

Plate VI. Fig. 17, Atlas seen from behind, showing lateral articular surfaces, mesial articular surface, ligamentous area, &c. Fig. 18, Sternum and first pair of ribs, placed in relation. The figures in this Plate for comparison with figures of same parts in B. musculus given with No. 39 and No. 40.

[Reference may be made to the following as connected with Anatomy.]

65. Lessons on the Human Body.

Illustrated by Diagrams, Edinburgh, 1859.

(Written for *Constable's Advanced Reading Book*, for use in Schools.)

66. On the Value of a Knowledge of the Human Body, and on the Method of Imparting that Knowledge in Schools.

(Address delivered at the *Aberdeen Congress of the Educational Institute of Scotland*, 29th December, 1876.)

67. Comparison of British and Continental Schools of Anatomy.

(Read before the Section of Anatomy at the *International Medical Congress* in London, 1881.)

"The object of this paper is, by a comparison of British Schools of Anatomy with especially those of the Universities of Germany, to lead to the improvement of the former.

"Reference is made to the completeness of the anatomical institutes of Germany; to the devotion of the teachers of anatomy in Germany to their department; to the completeness of the teaching; and to the result, in the large contributions which the anatomists of Germany have made in modern times to the progress of anatomical science in all its branches. The system generally pursued in the anatomical schools of England is contrasted with this, as deficient except in regard to surgical anatomy. The system pursued in the anatomical schools of Scotland is referred to as corresponding closely to that pursued in Germany.

"The writer next remarks on what, according to his view, should be the constitution and aim of the anatomical school; that anatomy should be taught from the morphological as well as from the surgical point of view, microscopically as well as macroscopically, and that the teacher should be devoted to anatomy. Reference is farther made to the methods of the anatomical schools of Scotland as securing

the progress of the student. These national differences in the aims and methods of the anatomical schools of Germany, England and Scotland are attributed to the differences in the University systems of these countries." (Report, vol. i., p. 173.)

68. Address delivered at the Opening of the New Anatomical Buildings of Aberdeen University, 1881.

69. Historical Sketch of the Edinburgh Anatomical School, 1867.

Originally a *Lecture delivered before the Fellows of the Royal College of Surgeons of Edinburgh*, afterwards extended, with notes.

(*Published separately*, Edinburgh, 1867.)

Contents.—(1) The Surgeons, 1505. Provision for dissection of the human body in Edinburgh. (2) Development of the Medical School, 1694-1720. The annual nine days' public anatomical dissection. Appointment of special teachers. (3) Commencement of the Medical School proper, 1720-1726.

Account of the teaching and publications of each of the following :—(4) Alexander Monro, *primus*, professor 1720-1758. (5) Alex. Monro, *secundus*, professor 1754-1808. (6) Alex. Monro, *tertius*, professor 1798-1846. (7) John Bell, lecturer on anatomy and surgery, 1786-1800. (8) Sir Charles Bell, lecturer on anatomy and surgery, Edinburgh, 1799-1804. In London 1804-1836. Professor of Surgery, Edinburgh, 1836-1842. Bell and Wilson Museum purchased by Edinburgh College of Surgeons. (9) Dr. John Barclay, lecturer on anatomy, 1797-1824. Museum of human and comparative anatomy presented to Edinburgh College of Surgeons. (10) Dr. John Gordon, lecturer on anatomy and physiology, 1808-1818. (11) John Innes, demonstrator of anatomy in University for 20 years, died 1777. (12) Andrew Fyfe, demonstrator of anatomy in the University for 40 years, beginning 1777. (13) Alexander Walker, born 1779, died 1852. (14) Dr. David Craigie, born 1793, died 1866. (15)

Dr. William Cullen, lecturer on anatomy, 1823-1827. (16) Dr. Robert Knox, lecturer on anatomy, 1824-1842.

(17) Separation of Physiology from the courses of Anatomy; completed by College of Surgeons 1838. Separate course of Physiology then required. (18) Separation of Surgery from the courses of Anatomy; completed by College of Surgeons 1839. Regulation then made refusing to recognise any teacher for more than one branch. (19) Attendance on Anatomy. Before 1824 attendance on lectures alone required. Dissection made compulsory by College of Surgeons after 1826. Dissection made compulsory by University in following year. Number of students attending lectures on Anatomy and Practical Anatomy under the Professor and four Extra-mural Lecturers. (20) Before 1826-7 certificates of attendance on any classes not required; only production of tickets showing entry to classes. A form of roll-call enacted by College of Surgeons, 1836.

70. Notice of the Life and Work of the late Professor Allen Thomson.

(*Edinburgh Medical Journal*, 1884.)

Son of Dr. John Thomson, the eminent professor of Pathology in Edinburgh. Training as a teacher. Lecturer on Physiology and on Anatomy, Edinburgh, 1831-1836. Professor of Anatomy at Aberdeen 1839-1841; professorship founded 1839. Lecturer on Anatomy, Edinburgh, 1841-42. Professor of Physiology, Edinburgh, 1842-1848. Professor of Anatomy, Glasgow, 1848-1877. Influence in advancing the Glasgow school. Work in connection with the new University buildings. Work in regard to medical education and University improvement. Member of Medical Council for 18 years. Characteristics as a teacher. Influence of the evolution hypothesis on his later views. List of his publications. Died 1884, in 75th year.