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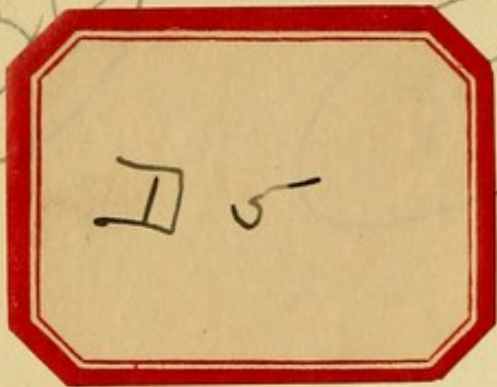
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ILLUSTRATIONS
OF
PALEY'S NATURAL THEOLOGY.

BOSTON—MDCCCXXVII.

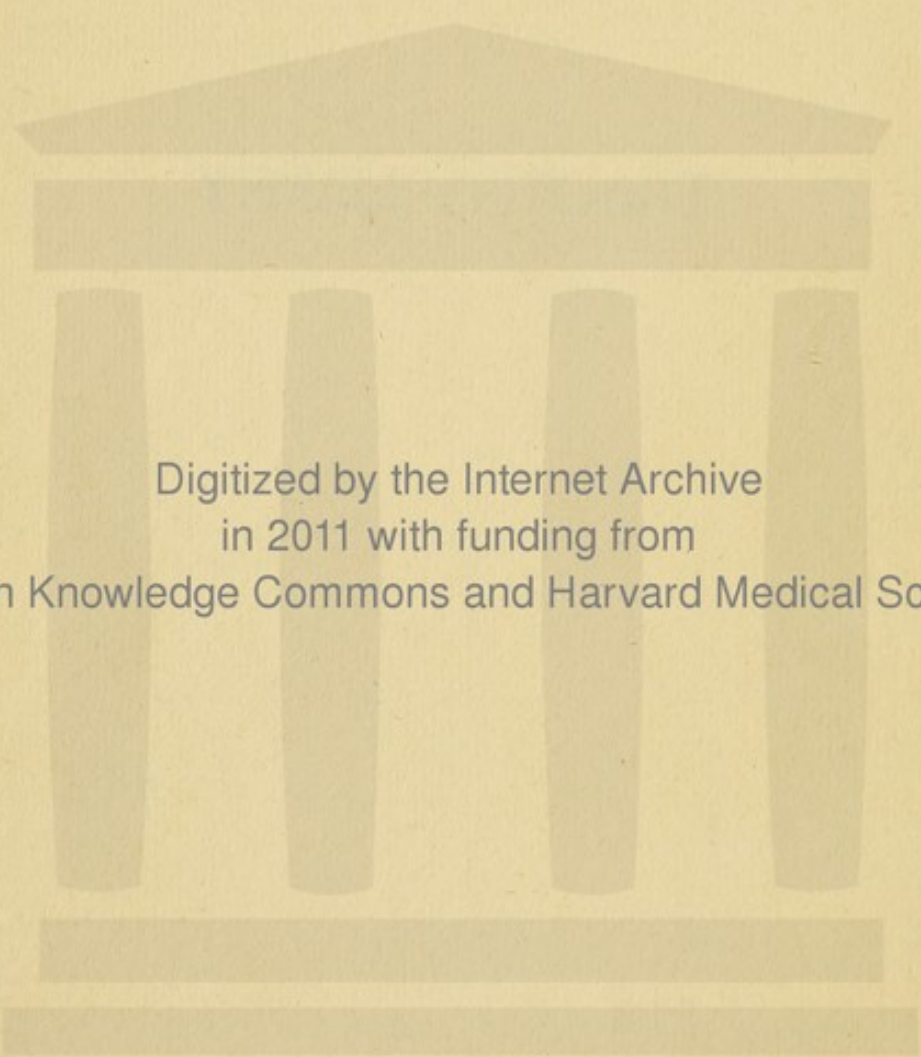
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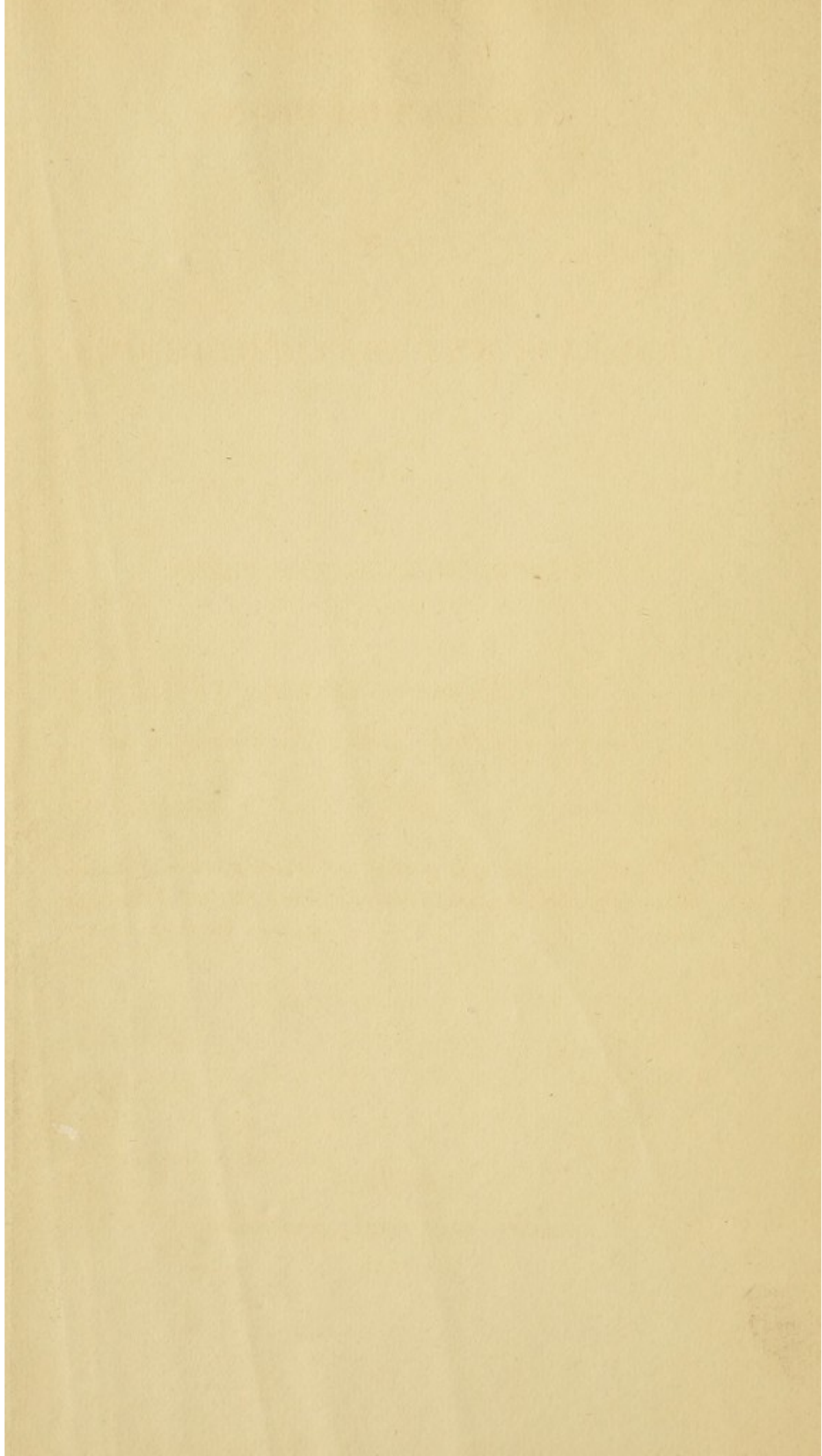
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TIMOTHY LEARY



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ILLUSTRATIONS

OF

PALEY'S NATURAL THEOLOGY.

WITH

DESCRIPTIVE LETTER PRESS.

BY JAMES PAXTON,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, LONDON.

“Of muscular actions, even of those well understood, some of the most curious are incapable of popular explanation, without the aid of Plates and Figures.”

PALEY'S THEOLOGY, Ch. ix.

BOSTON :

HILLIARD, GRAY, LITTLE, AND WILKINS.

1827.

ILLUSTRATIONS

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PAPER'S NATURAL THEOLOGY
OR THE HARRINGTON

THE NATIVE LETTER PRESS

BY PAPER'S

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CAMBRIDGE.

University Press.—Hilliard, Metcalf, and Co.

HILLIARD, METCALF, AND CO.

1857

TO THE

HONOURABLE AND RIGHT REVEREND

SHUTE BARRINGTON, LL. D.

LORD BISHOP OF DURHAM.

MY LORD,

To your suggestion the world is indebted for the existence of Dr. Paley's valuable work on Natural Theology. The universal and permanent esteem in which it has been held in this country, and its favourable reception in France, even after the desolating influence of the Revolution, have abundantly approved your Lordship's selection both of the subject and of the person to whom you intrusted it.

In looking round, then, for a patron for these ILLUSTRATIONS, it was natural to have recourse to him who was the original suggestor of the work which it is their object to explain. Nor was I disappointed in my wish; your Lordship not only condescending to approve of the design, but to encourage me in its prosecution by your very liberal support. For this

DEDICATION.

distinguished honour you will believe me deeply sensible; and if I may indulge the hope that my humble efforts will increase the utility of so eminent a writer, I shall consider it the highest gratification.

I am,

MY LORD,

With great veneration,

Your Lordship's most obliged

And obedient servant,

JAMES PAXTON.

Oxford,

January 1, 1826.

P R E F A C E.

THE works of Dr. Paley have acquired that popularity which renders it scarcely necessary to observe that his Natural Theology was written to establish the truth of the agency and wisdom of the Deity from the admirable contrivances and mechanism displayed in natural objects, inferring from thence that the knowledge and power requisite for the formation of created nature must be infinite.

The principal physical arguments made use of relate to organs destined to mechanical functions, as the bones of man—the muscles—the structure of animals, or comparative anatomy—prospective and compensatory contrivances—insects and plants: with most of these objects the anatomist only can be conversant; but all admit of graphic representation, and such has been attempted.

The designs of the following plates are original, obtained from the most authentic sources, and sub-

PREFACE.

mitted to the critical examination of the most competent judges. It is hoped that the illustrations will be found the more interesting from their being simple and unincumbered by parts irrelevant to the subject of the author. These are accompanied by notes, which are intended to supply defective or correct erroneous statements, and to explain the plates.

The undertaking originated in the difficulty of understanding the various descriptions introduced by Paley, not however from his want of clearness, for the subjects in general are plainly and correctly described; but it is evident that visible representations strike the mind more forcibly than mere descriptions. It is therefore presumed that the subsequent illustrations will be an acquisition, by bringing vividly to the imagination, objects of which only an imperfect idea could otherwise be formed; and that they will consequently render the work more intelligible to the general reader.

CHAPTER I

TABLE I.—THE WATERS.

1. The first spring and a series of five ponds with the
 which connects it to—

2. The first and second ponds. The first is a pond of
 the $\frac{1}{2}$ to connect the irregular coast of the spring. The ground
 which forms—

3. The third pond and the fourth which makes the
 of the first pond, and the second pond, and the
 the first. The third pond and the fourth, which connect the
 first pond.

4. The fourth pond, which connects the first pond to
 a narrow stream that flows to the sea.

5. The fifth pond, which connects the first pond to
 the sea, and makes a direct line from the first pond to
 the sea, thereby forming the distance in a straight line.

6. The sixth pond, which connects the first pond to
 which connects the first pond.

7. The seventh pond, which connects the first pond to
 the first pond, which is a pond.

8. The eighth pond, which connects the first pond to
 the first pond, which is a pond.

9. The ninth pond, which connects the first pond to
 the first pond, which is a pond.

10. The tenth pond, which connects the first pond to
 the first pond, which is a pond.

The above is a description of the several ponds which are
 by the first. Their relative situation, and the manner in which
 may be seen by the simple inspection of a plan.

CHAPTER I.

TAB. I.—THE WATCH.

FIG. 1. The *spring* and *barrel*, or first power, with the *chain* which connects it to—

FIG. 2. The *fusee* and *great* wheel. The *fusee* is tapered at the top to correct the irregular recoil of the spring. The *great* wheel turns—

FIG. 3. The *centre* wheel and pinion, which makes one revolution in an hour, carries the minute hand, and turns—

FIG. 4. The *third* wheel and pinion, which turns the *contrate* wheel.

FIG. 5. The *contrate* wheel, which makes one revolution in a minute, and turns the balance or escape wheel.

FIG. 6. The *balance* wheel, which acts upon the *pallats* of the *verge*, and escapes or drops from one *pallat* to another alternately, thereby keeping the balance in constant vibration.

FIG. 7. The *balance verge* and *balance* or *pendulum spring*, which regulates the whole machine.

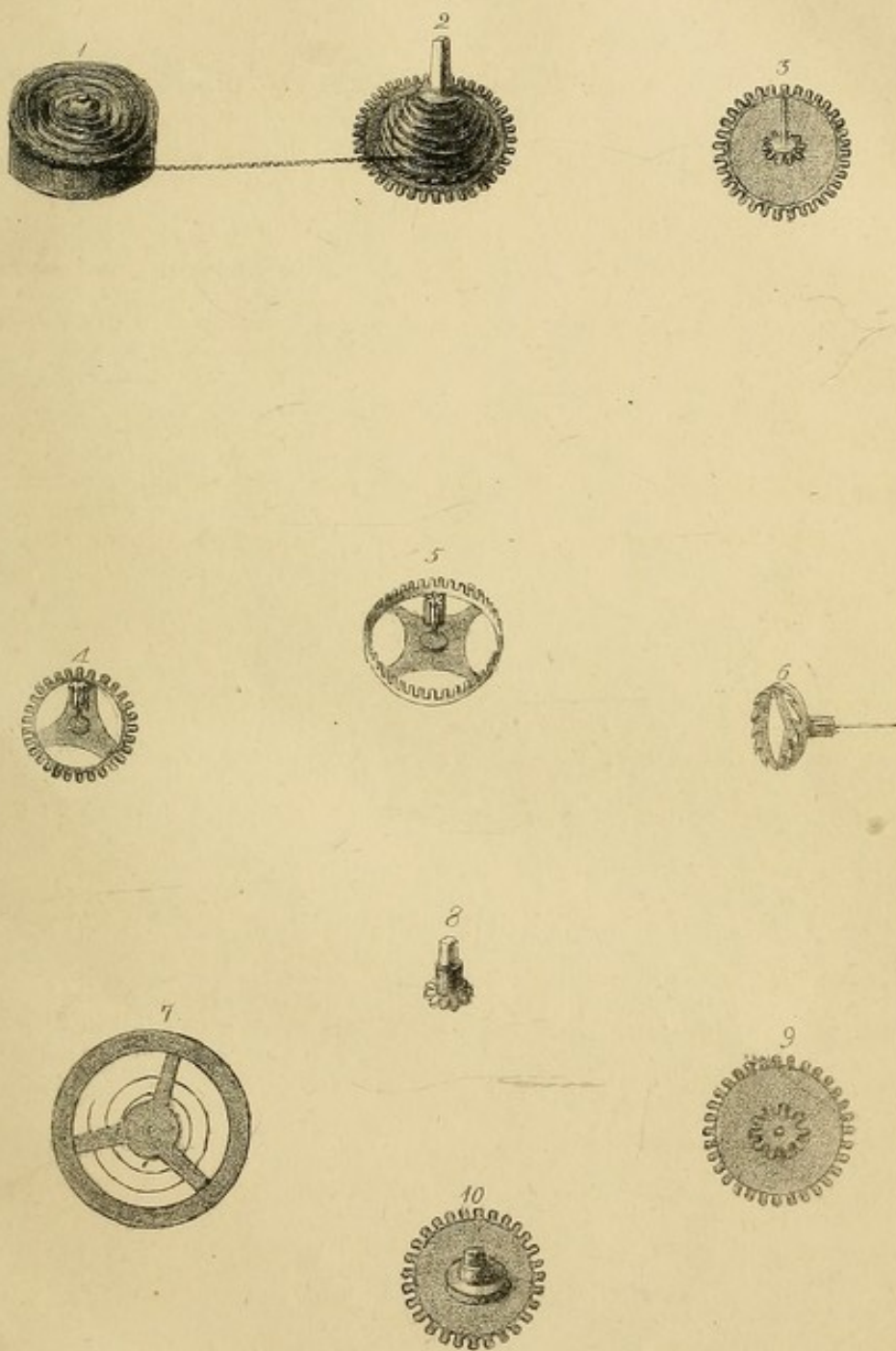
FIG. 8. The *cannon pinion*, affixed to the *centre* wheel arbour, on which the minute hand is placed.

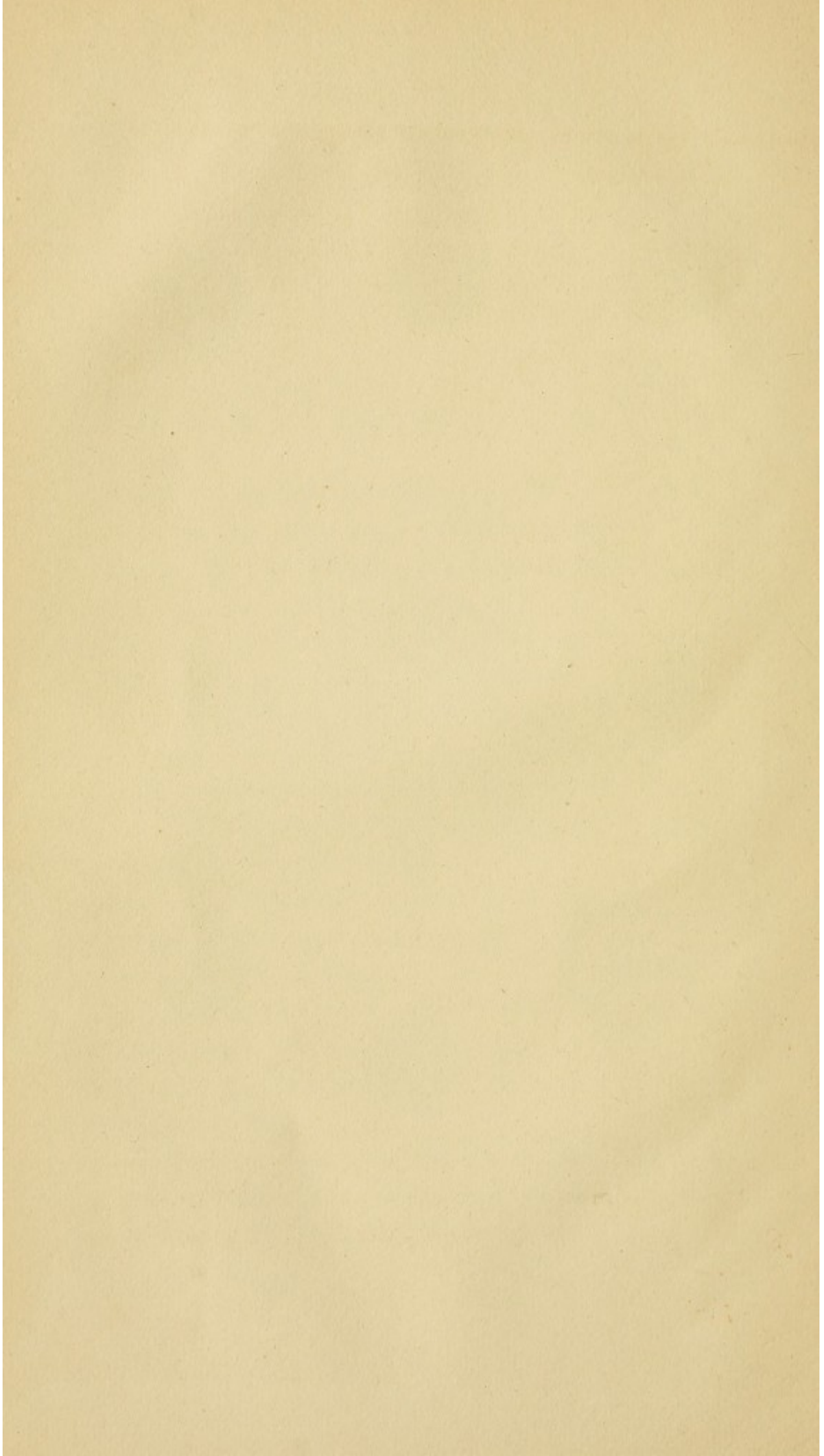
FIG. 9. The *minute* wheel.

FIG. 10. The *hour* wheel. These wheels are turned by the *cannon pinion*, and having a greater number of teeth, move much slower than the *cannon pinion*, and mark the hour by the hand on the dial.

The above is a description of the several wheels alluded to by Paley. Their relative situation, and combined movement, may be seen by the simple inspection of a watch.

TAB. II.





CHAPTER III

THE HISTORY OF THE

The first of these is the fact that the human eye is not a simple optical instrument, but a complex one, in which the light entering it is not only refracted, but also filtered and modified in various ways. The eye is a highly sensitive organ, and its function is to detect and interpret the light that enters it. The light that enters the eye is first refracted by the cornea, and then by the lens. The lens is a biconvex structure, and its curvature can be changed by the ciliary muscles, which allows it to focus light from objects at different distances on the retina. The retina is a layer of light-sensitive cells, and it is here that the light is converted into electrical signals that can be sent to the brain. The brain then interprets these signals as visual images.

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CHAPTER III.

TAB. II.—THE EYE.

FIG. 1. The crystalline lens of a fish ; it is proportionably larger than in other animals, and perfectly spherical.

FIG. 2. A section of the human eye. It is formed of various *coats*, or membranes, containing pellucid humours of different degrees of density.

The external membrane, called *sclerotic*, is strong and firm, the support of the spherical figure of the eye ; it is deficient in the centre, but that part is supplied by the *cornea*, which is transparent and projects like the segment of a small globe from one of larger size. The interior of the sclerotic is lined by the *choroid*, covered by a dark mucous secretion, termed *pigmentum nigrum*, intended to absorb the superfluous rays of light. The *choroid* is represented in the plate by the black line. The third and inner membrane, which is marked by the white line, is the *retina*, the expanded optic nerve.

Within these coats of the eye, are the *humours*. *a*, the *aqueous* humour, a thin fluid like water ; *b*, the *crystalline lens* of a dense texture ; *c*, the *vitreous* humour, in appearance like jelly. Together they make a compound lens, which refracts the rays of light issuing from an object, *d*, and delineates its figure, *e*, in the focus upon the retina, inverted.

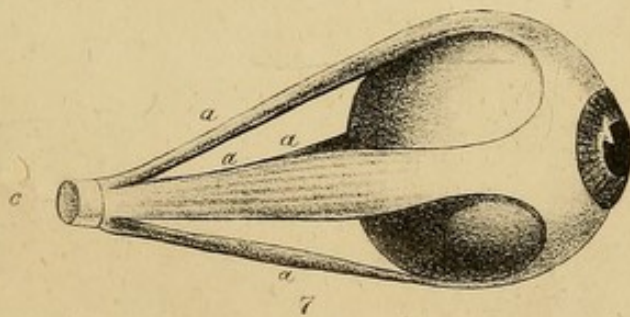
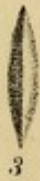
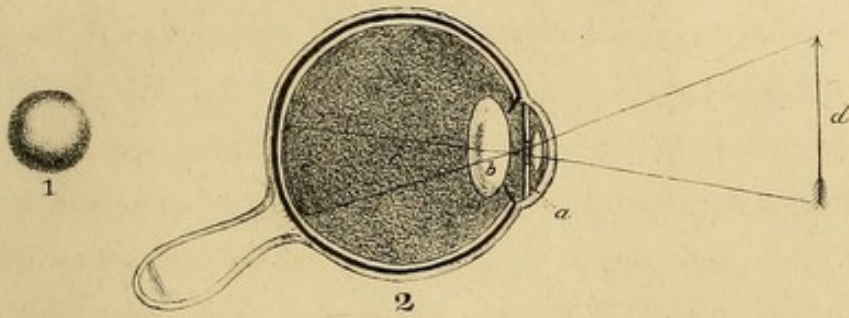
FIG. 3. The *lens of the telescope*.

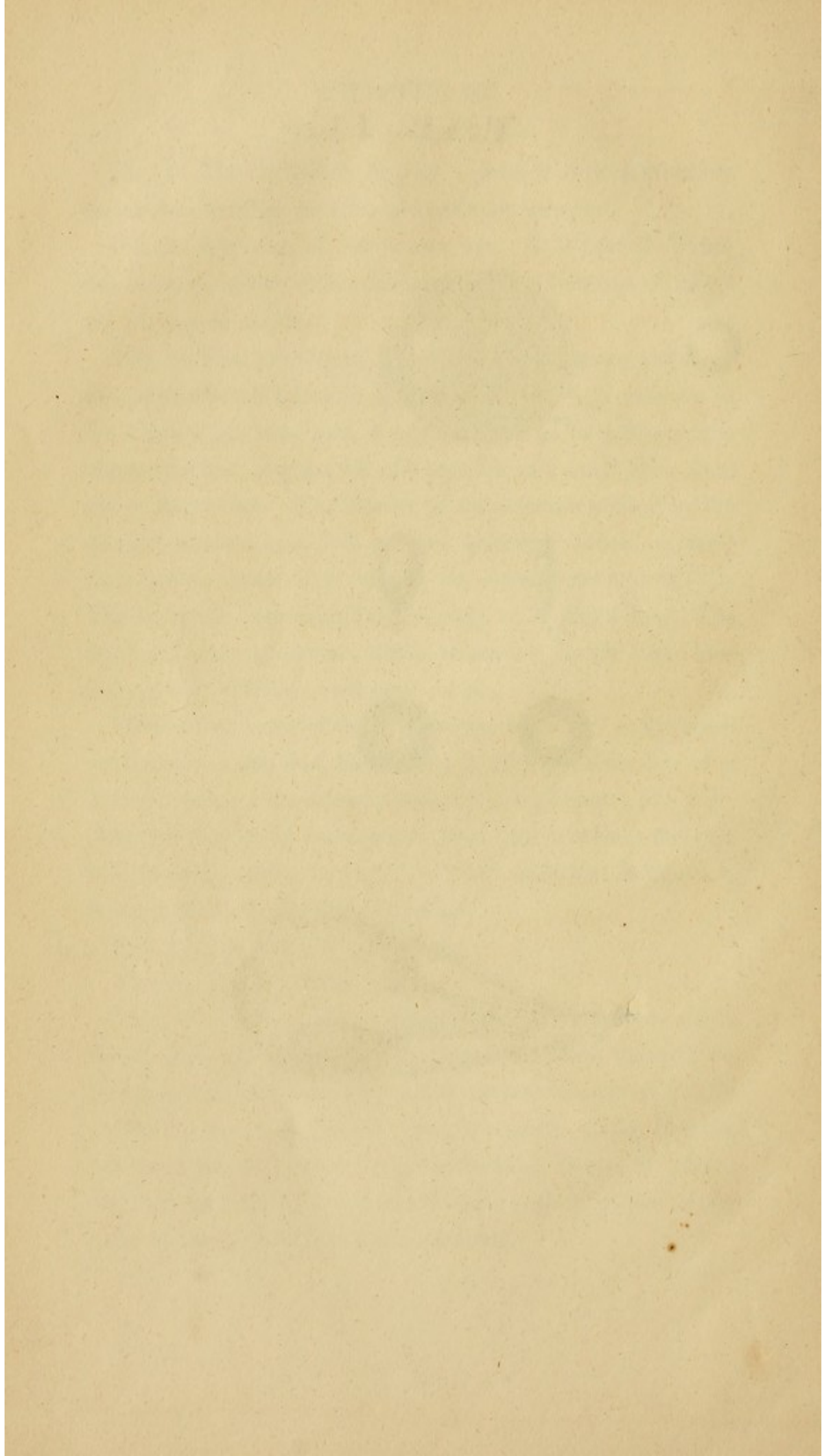
FIG. 4. The *crystalline lens*.

FIG. 5, 6. A plan of the circular and radiated fibres which the *iris* is supposed to possess ; the former contracts, the latter dilates the pupil, or aperture formed by the inner margin of the iris.

FIG. 7. *a, a, a, a*, the four *straight* muscles, arising from the bottom of the orbit, where they surround, *c*, the optic nerve ; and are inserted by broad thin tendons at the fore part of the globe of the eye into the tunica sclerotica.

TAB. II.





CHAPTER III

THE EYE AND THE NERVE

The eye is a highly organized organ, the structure of which is adapted to its function of receiving and interpreting light. It consists of a series of refracting media, the cornea, aqueous humor, lens, and vitreous humor, which together form the optical system. The light rays entering the eye are focused on the retina, where they are converted into electrical impulses that are transmitted to the brain via the optic nerve. The retina is a layer of specialized cells, including rods and cones, which are responsible for the detection of light and the initiation of the visual process. The optic nerve is a bundle of nerve fibers that carries the visual information from the retina to the brain. The eye is also equipped with various muscles and structures that allow it to move and focus on different objects. The entire system is controlled by the brain, which sends signals to the eye muscles and the optic nerve to regulate vision.

CHAPTER III.

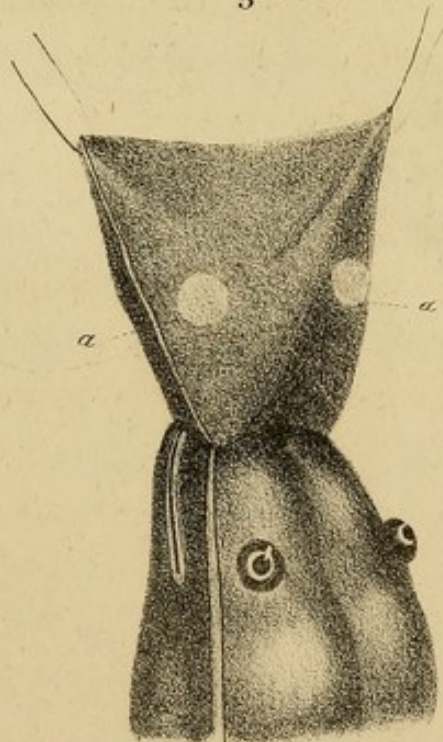
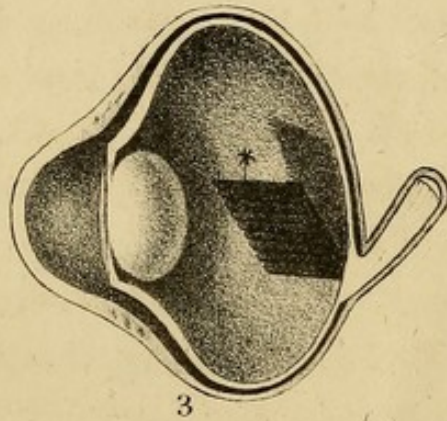
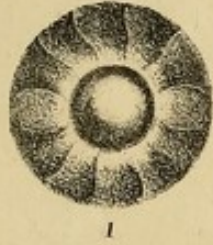
TAB. III.—THE EYE OF BIRDS AND OF THE EEL.

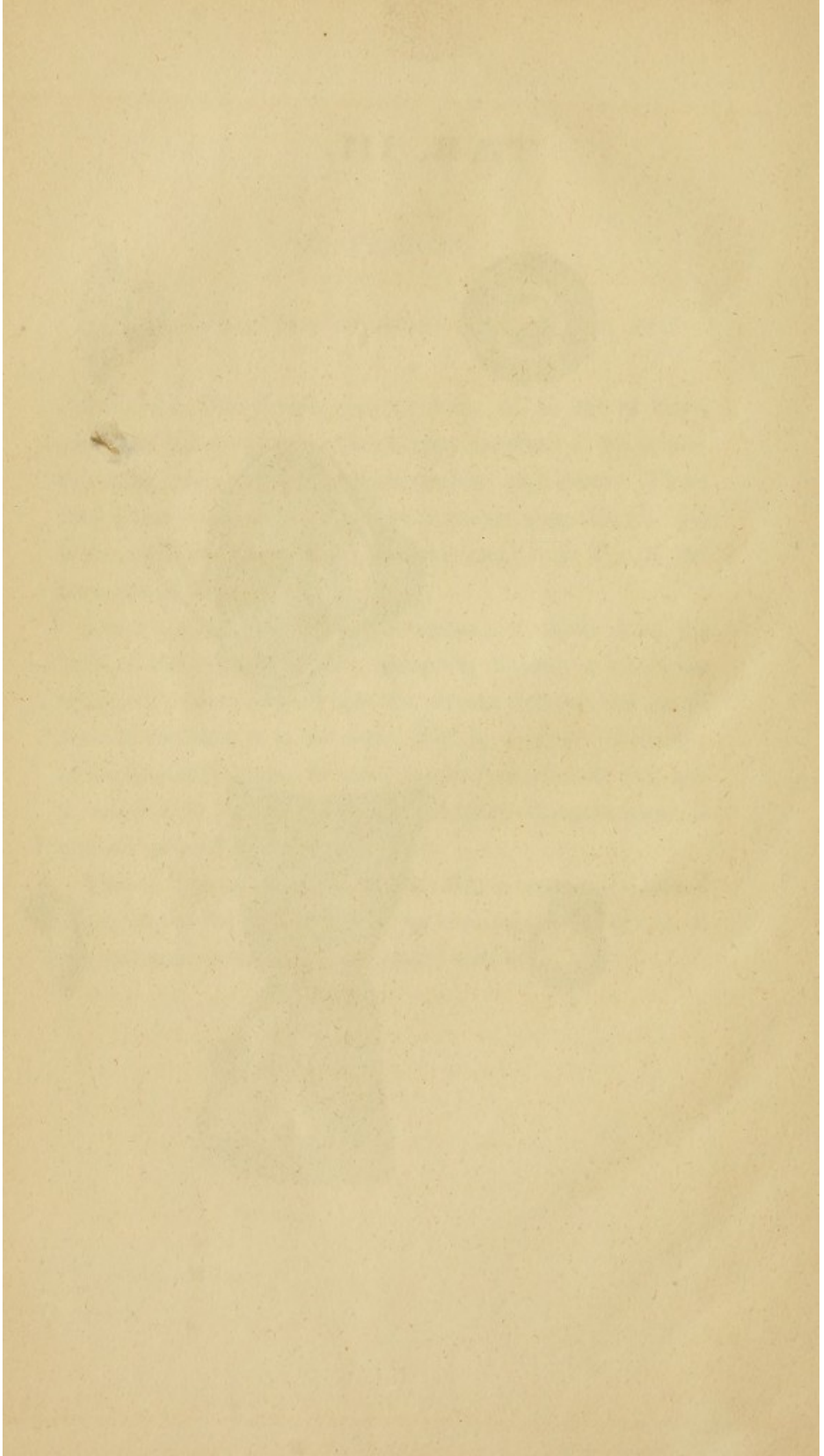
FIG. 1, 2. The *flexible rim, or hoop*, of the eye of birds, consisting of bony plates, which occupy the front of the sclerotic; lying close together and overlapping each other. These bony plates in general form a slightly convex ring, Fig. 1, but in the *accipitres* they form a concave ring, as in Fig. 2, the bony rim of a hawk.

FIG. 3, 4, 6. exhibit the *marsupium*; it arises from the back of the eye, proceeding apparently through a slit in the retina; it passes obliquely into the vitreous humour, and terminates in that part, as in the eagle, Fig. 3, a section of the eye of the *falco chrysaëtos*. In some species it reaches the lens, and is attached to it, Fig. 4, 6. In the plate the marsupium is marked with a *.

FIG. 5. The head of an *eel*; the skin is represented turned back; and as the *transparent horny covering* of the eye, *a, a*, is a cuticular covering, it is separated with it.

TAB. III.





CHAPTER III

YAB. IV--THE FACIOMYAN APPARATUS AND

EXERCISING MOUTH

Fig. 1. A the body of the mouth, the lower lip is shown in the lower part of the diagram, the upper lip is shown in the upper part of the diagram, the lower lip is shown in the lower part of the diagram, the upper lip is shown in the upper part of the diagram.

Fig. 2. The body of the mouth, the lower lip is shown in the lower part of the diagram, the upper lip is shown in the upper part of the diagram, the lower lip is shown in the lower part of the diagram, the upper lip is shown in the upper part of the diagram.

Fig. 3. The body of the mouth, the lower lip is shown in the lower part of the diagram, the upper lip is shown in the upper part of the diagram, the lower lip is shown in the lower part of the diagram, the upper lip is shown in the upper part of the diagram.

CHAPTER III.

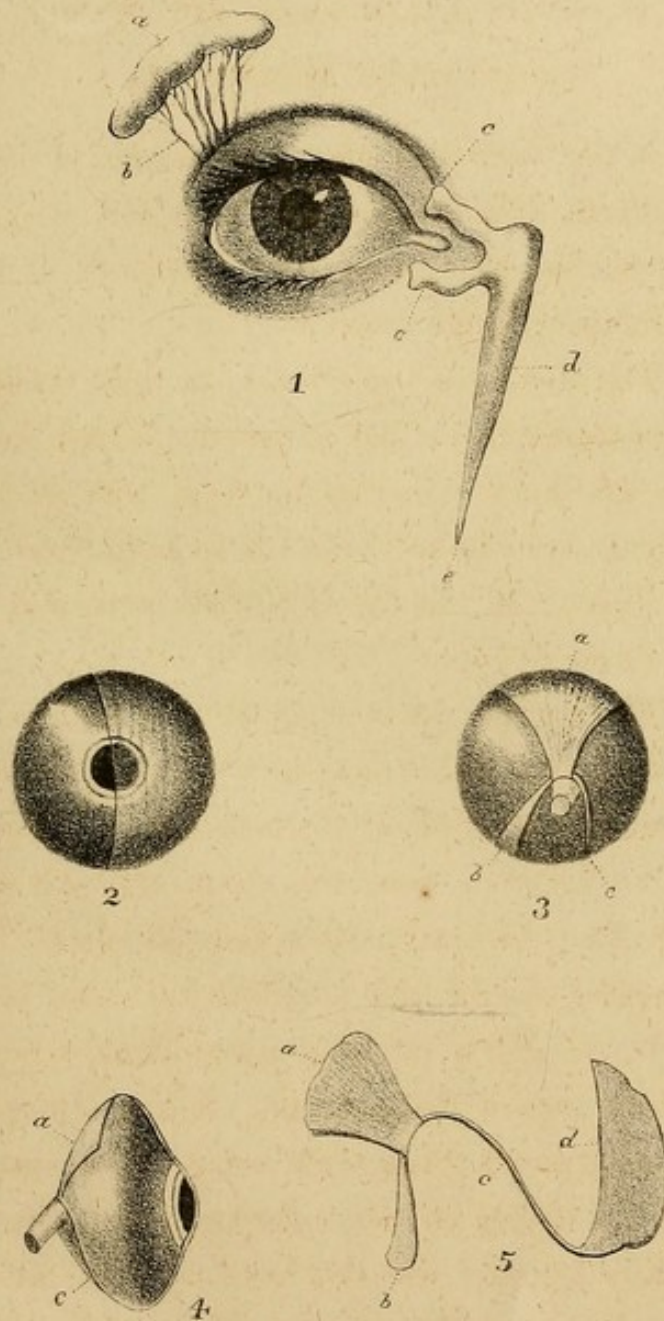
TAB. IV.—THE LACHRYMAL APPARATUS AND NICTITATING MEMBRANE.

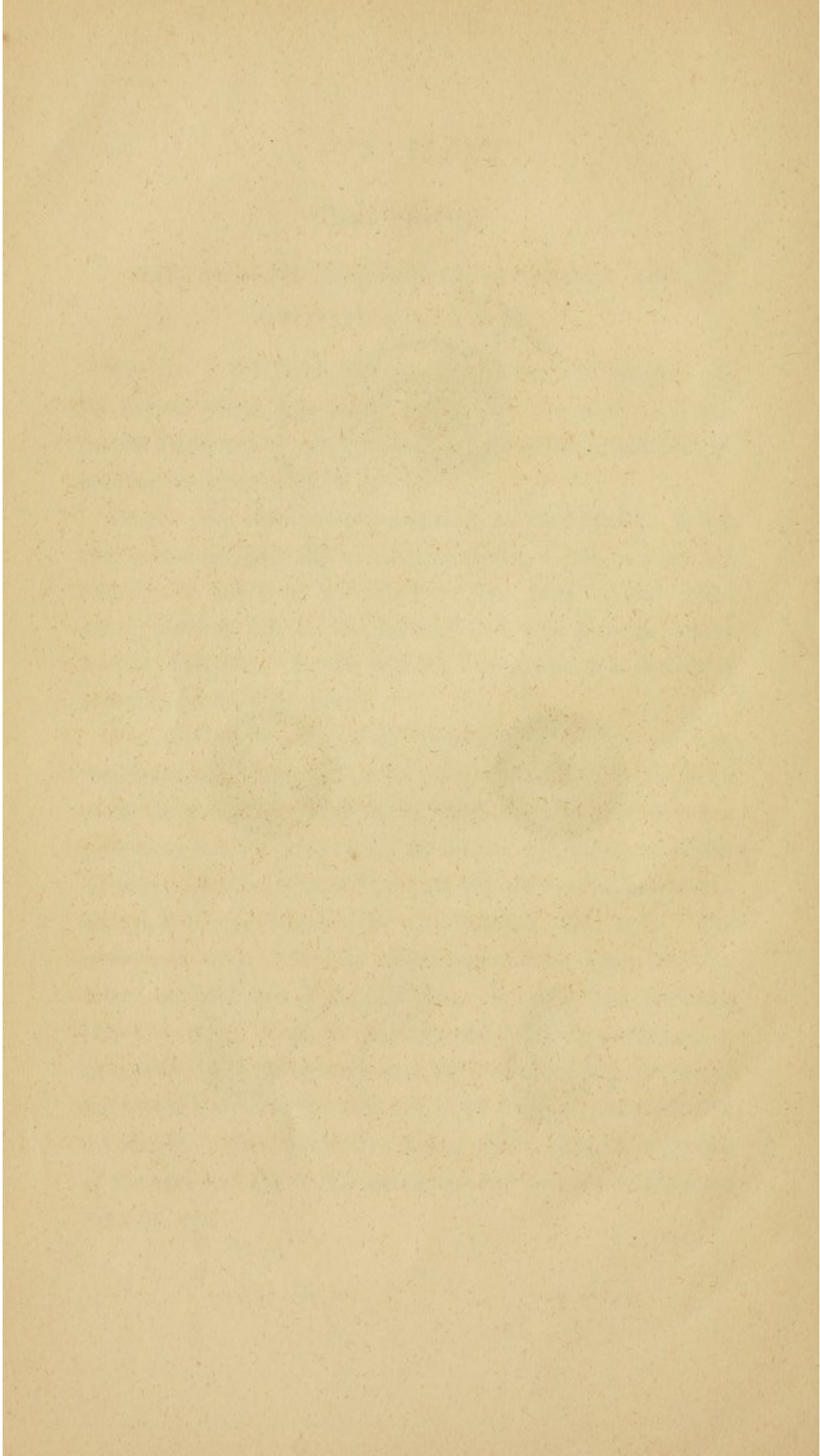
FIG. 1. *a*, the *lachrymal gland*, the source of the tears; *b*, its several *ducts*, diffusing this fluid over the eye; *c, c*, the *puncta lachrymalia*, which convey the tears into, *d*, the *lachrymal sac*, terminating in the nostril.

FIG. 2. The *nictitating membrane*, or third eyelid; it is a thin semi-transparent fold of the conjunctive, which, in a state of rest, lies in the inner corner of the eye, with its loose edge nearly vertical, but can be drawn out so as to cover the whole front of the globe. In this figure it is represented in the act of being drawn over the eye.

FIG. 3. The muscles of the nictitating membrane are very singular in their form and action; they are attached to the back of the sclerotic; one of them, *a*, which from its shape is called *quadratus*, has its origin from the upper and back part of the sclerotic; its fibres descend towards the optic nerve, and terminate in a curved margin with a cylindrical canal in it. The other muscle, *b*, which is called *pyramidalis*, arises from the lower and back part of the sclerotic. It has a long tendinous chord, *c*, which passes through the canal of the quadratus, *a*, as a pulley, and having arrived at the lower and exterior part of the eye-ball, is inserted into the loose edge of the nictitating membrane. This description refers also to Fig. 4, a profile of the eye, and Fig. 5, the membrane and its muscles detached from the eye.

TAB. IV.





CHAPTER III

PLATE V.—THE HUMAN EAR, AND EXPLANATION OF THE ILLUSTRATIONS

FIG. 1. The external ear, showing the auricle and external acoustic meatus. The ear is shown in its natural position, with the auricle directed forwards and slightly upwards. The external acoustic meatus is the opening into the ear canal.

FIG. 2. The middle ear, showing the ossicles and the muscles. The middle ear is situated in the temporal bone and contains three ossicles: the malleus, incus, and stapes. The malleus is attached to the handle of the malleus, the incus is attached to the body of the incus, and the stapes is attached to the base of the stapes.

FIG. 3. The internal ear, showing the cochlea and vestibular apparatus. The internal ear is situated in the temporal bone and contains the cochlea and vestibular apparatus. The cochlea is a spiral-shaped structure that contains the organ of Corti, which is responsible for hearing. The vestibular apparatus is responsible for balance and spatial orientation.

FIG. 4. The external ear, showing the auricle and external acoustic meatus. This figure is similar to FIG. 1, but shows the ear from a different perspective, highlighting the external acoustic meatus and the auricle.

FIG. 5. The middle ear, showing the ossicles and the muscles. This figure is similar to FIG. 2, but shows the middle ear from a different perspective, highlighting the ossicles and the muscles.

FIG. 6. The internal ear, showing the cochlea and vestibular apparatus. This figure is similar to FIG. 3, but shows the internal ear from a different perspective, highlighting the cochlea and vestibular apparatus.

CHAPTER VII

FIG. VII.—TROCHLEAR NODULE OF THE EYE,
AND KIDNEY.

FIG. 1. The trochlear or superior oblique muscle, which with the superior rectus forms the bottom of the orbit. Its insertion posteriorly is extended over the upper part of the eyeball, and gradually assumes the form of a smooth round tendon, which passes through the pulley of the eye and is fixed to the inner edge of the orbit. (See accompanying plates, and the legend, p. 128.)

FIG. 2. A section of the human kidney, showing the cortex which covers the outer surface of the organ, and the medulla which is divided into several pyramids by the renal columns. A capsule of the kidney is also shown, which is fixed to the outer surface of the organ, and is covered by a thin layer of fat.

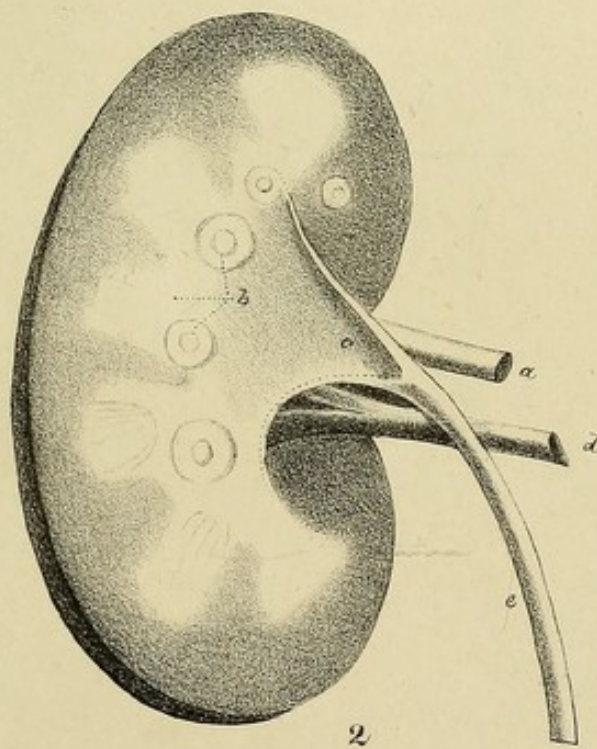
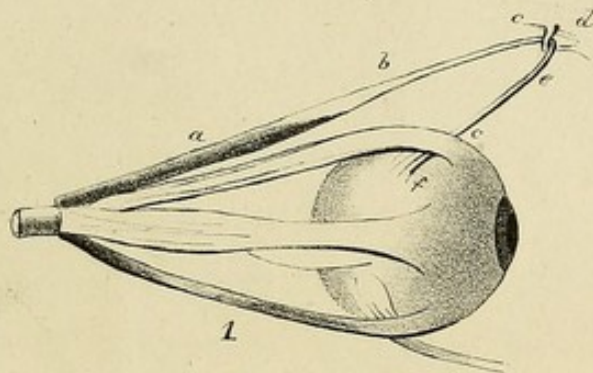
CHAPTER VII.

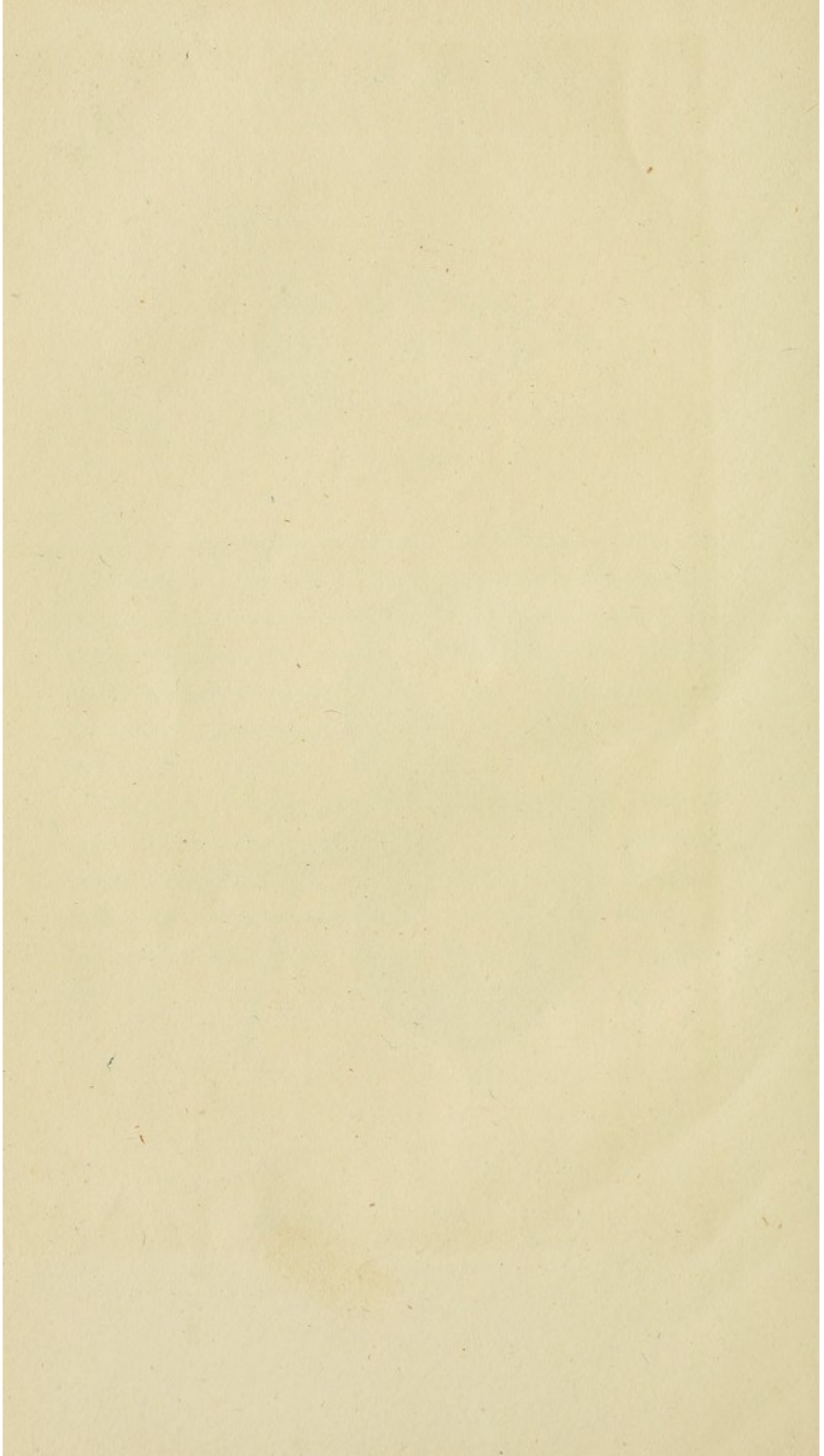
TAB. VI.—TROCHLEAR MUSCLE OF THE EYE, AND KIDNEY.

FIG. 1. The *trochlear or superior oblique* muscle, arises with the straight muscles from the bottom of the orbit. Its muscular portion, *a*, is extended over the upper part of the eye-ball, and gradually assumes the form of a smooth round tendon, *b*, which passes through the pulley, *c*, and is fixed to the inner edge of the orbit, *d*, then turning backwards and downwards, *e*, is inserted into, *f*, the sclerotic membrane.

FIG. 2. A section of the *human kidney*; *a*, the *emulgent artery* which conveys the blood to, *b*, the *papillæ*, where the peculiar fluid is secreted; from whence it passes by tubes into *c*, the *pelvis*; *d*, the *emulgent vein* which returns the blood; *e*, the *ureter*, or tube, which conducts the secretion to its receptacle.

TAB. VI.





CHAPTER VIII

YAN VII.—VERTICES OF THE BOWTIE

Fig. 1. A representation of the head and its neck; the latter is composed of several bones called vertebrae.

Fig. 2. Exhibits the first and second vertebrae, with their mode of connection. The first is a large, rounded bone, which does not support the head; of the second, but an oval cartilage, called the atlas, is the only support of the head, as the first is placed on the second, and the second is only to admit of the motion of bending and raising the head.

Fig. 3. The atlas.

Fig. 4. The second vertebra, called axis, has two points, which are adapted to the hollow of the atlas, and by this manner of articulation, permits the turning of the head, as well as the other motions of the neck. The atlas is placed on the second vertebra, which allows a great deal of the freedom of the head, as is described. The atlas is a bone, which is connected with the second vertebra, and is adapted to the hollow of the atlas, and by this manner of articulation, permits the turning of the head, as well as the other motions of the neck. The atlas is placed on the second vertebra, which allows a great deal of the freedom of the head, as is described. The atlas is a bone, which is connected with the second vertebra, and is adapted to the hollow of the atlas, and by this manner of articulation, permits the turning of the head, as well as the other motions of the neck.

CHAPTER VIII.

TAB. VII.—VERTEBRÆ OF THE HUMAN NECK.

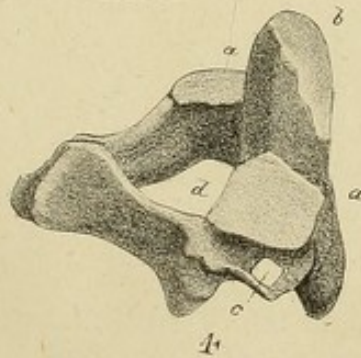
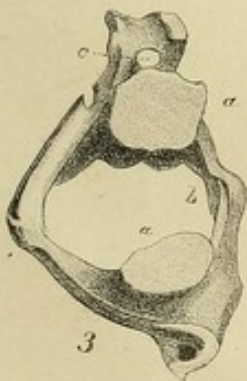
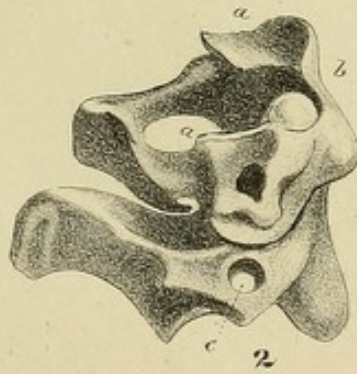
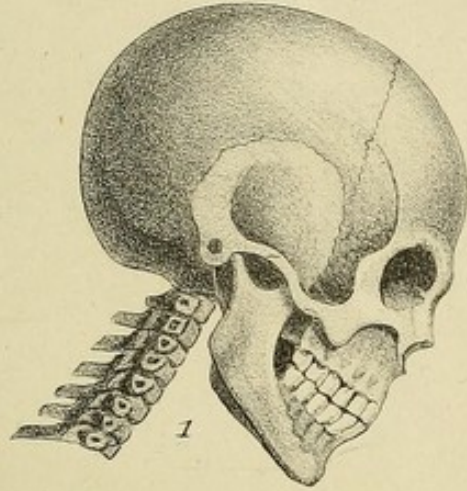
FIG. 1. A representation of the head and the neck ; the latter is composed of seven bones called *vertebræ*.

FIG. 2. exhibits the first and second vertebræ, with their mode of connexion. The uppermost vertebra, termed the *atlas*, from its supporting the globe of the head, has an oval *concave* surface on either side, *a, a*, for the reception of two corresponding *convex* surfaces placed on the lower part of the head, in such a manner as only to admit of the action of bending and raising the head.

FIG. 3. The *atlas*.

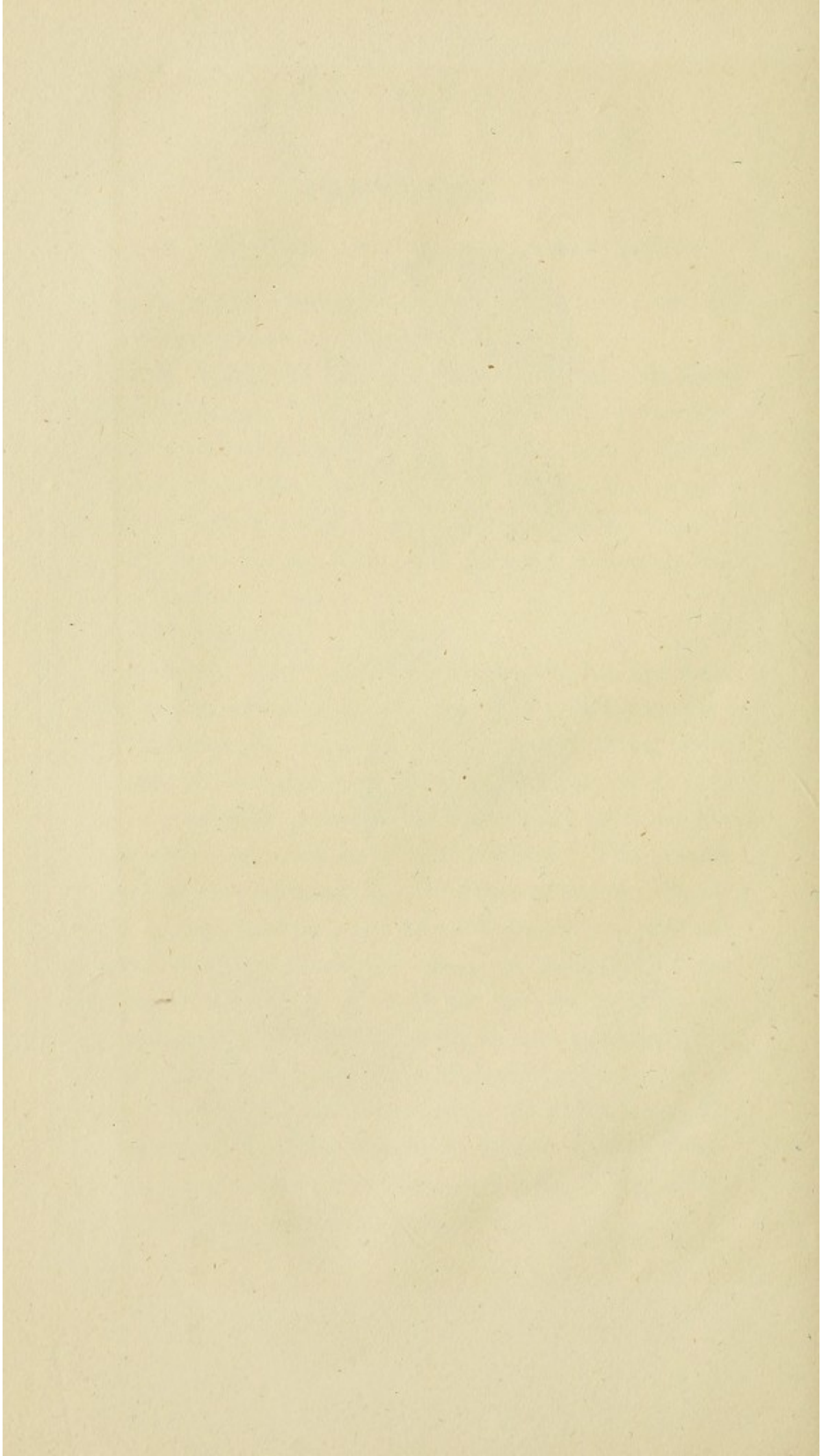
FIG. 4. The second vertebra, called *dentata*, has two plane surfaces, *a, a*, adapted to the planes, *a, a*, Fig. 3. of the atlas : and this manner of articulation provides for the turning of the head laterally in almost every direction. Fig. 2. and 4. *b, b*, show the *tooth-like process* which affords a firm pivot for the production of the lateral motion just described. This process is received into a corresponding *indentation* of the atlas, Fig. 3. *b*, and a strong ligament passes behind it, serving as an effectual security against dislocation, and consequent compression of the spinal marrow. Fig. 4. *d*, marks the situation of the spinal marrow, which passes through the ring of each vertebra. The letter, *c*, indicates a perforation in the lateral process ; and as there is a corresponding perforation in each lateral, or as it is termed *transverse process* of the seven *cervical* vertebræ, a continuous passage is thus formed for the protection of two important blood-vessels destined to supply the brain.

TAB. VII.



Swett Del.

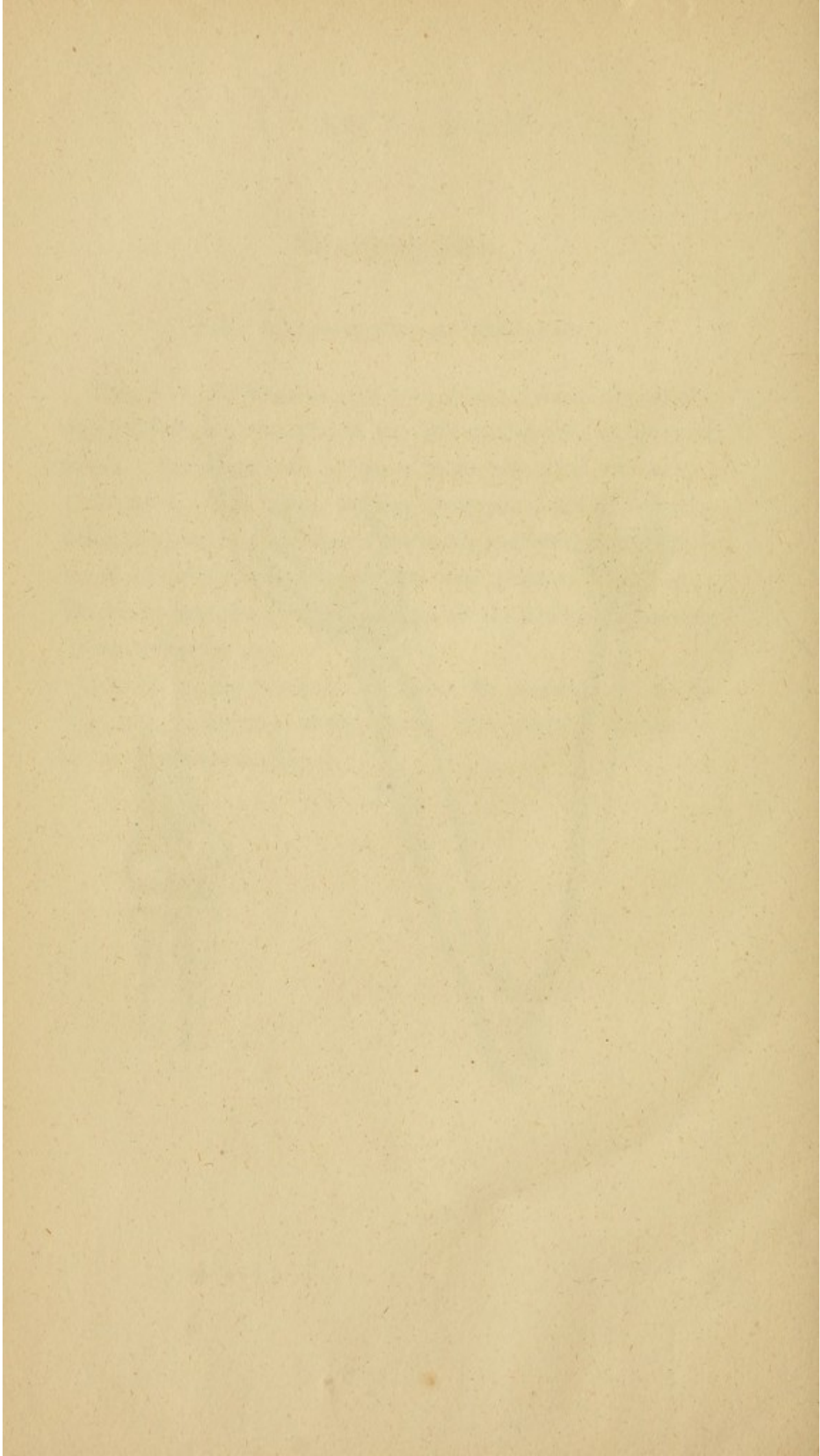
Lith. of Pendleton.



CHAPTER VIII

TABLE VIII.—BONES OF THE ARM

Fig. 1. of the humerus; the head, A, is a portion of a sphere, and is situated on the greater end of the bone, and is covered by the capsule of the joint. The tuberosity, B, is a process of the bone, which is situated on the lesser end of the bone, and is covered by the capsule of the joint. The greater tuberosity, C, is a process of the bone, which is situated on the greater end of the bone, and is covered by the capsule of the joint. The lesser tuberosity, D, is a process of the bone, which is situated on the lesser end of the bone, and is covered by the capsule of the joint. The neck of the bone, E, is the portion of the bone which is situated between the head and the tuberosities. The shaft of the bone, F, is the portion of the bone which is situated between the neck and the distal end. The distal end of the bone, G, is the portion of the bone which is situated at the end of the bone, and is covered by the capsule of the joint. The epicondyles, H and I, are two processes of the bone, which are situated on the distal end of the bone, and are covered by the capsule of the joint. The olecranon, J, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The coronoid process, K, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The radial notch, L, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The ulnar notch, M, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The styloid process, N, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The radial tuberosity, O, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The ulnar tuberosity, P, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The coronoid fossa, Q, is a depression of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The radial fossa, R, is a depression of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The ulnar fossa, S, is a depression of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The radial groove, T, is a groove of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The ulnar groove, U, is a groove of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The radial crest, V, is a crest of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The ulnar crest, W, is a crest of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The radial notch of the ulna, X, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The ulnar notch of the radius, Y, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The radial notch of the radius, Z, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint. The ulnar notch of the ulna, AA, is a process of the bone, which is situated on the distal end of the bone, and is covered by the capsule of the joint.



CHAPTER VIII

TAB. IX.—TWO STIRS.

Fig. 1. The first stir is shown from the side of the
piston, showing the two pistons part of the
the stir consists of two pistons of the same
by the pistons in the same part of the
belonging to the body and not to the
of the stir, and half of the stir is
and hence the stir is shown.

Fig. 2. A second stir is shown from the side of the
piston, showing the two pistons part of the
the stir consists of two pistons of the same
by the pistons in the same part of the
belonging to the body and not to the
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Fig. 3. The stir is shown from the side of the
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by the pistons in the same part of the
belonging to the body and not to the
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Fig. 4. The stir is shown from the side of the
piston, showing the two pistons part of the
the stir consists of two pistons of the same
by the pistons in the same part of the
belonging to the body and not to the
of the stir, and half of the stir is
and hence the stir is shown.

Fig. 5. A view of the stir is shown from the side of the
piston, showing the two pistons part of the
the stir consists of two pistons of the same
by the pistons in the same part of the
belonging to the body and not to the
of the stir, and half of the stir is
and hence the stir is shown.

CHAPTER VIII.

TAB. IX.—THE SPINE.

FIG. 1. The *human spine*, so named from the series of sharp processes projecting from the posterior part of the vertebræ. The spine consists of *seven* vertebræ of the neck, distinguished by the perforations in their transverse processes; of *twelve* belonging to the back, and marked by depressions for the heads of the ribs; and, lastly, of *five* belonging to the loins, which are larger than the other vertebræ.

FIG. 2. A separated *dorsal vertebra*: *a*, the body of the vertebra; *b*, the ring through which the spinal marrow passes: *c, c*, the articulating surfaces to which the ribs are united.

FIG. 3. The vertebra of a very large serpent, drawn from a specimen belonging to the anatomy school of Christ Church, Oxford. This figure shows the socket of the vertebra.

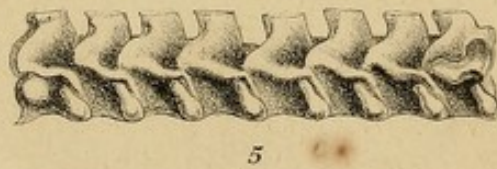
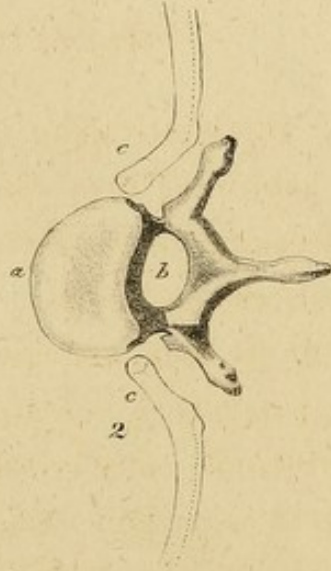
FIG. 4. The ball or rounded joint, evidently calculated for extensive motion.

FIG. 5. A part of the spine of the same reptile; it is exceedingly strong, each bone being united to the other by fifteen surfaces of articulation.

TAB. IX.



Swett Del.



Lith. of Pendleton.

CHAPTER VIII

THE GREAT VENTRAL VESSEL

Fig. 1. The great ventral vessel, showing its course from the heart to the lungs, and its division into the pulmonary arteries and veins. The vessel is shown in its course through the thoracic cavity, and its branches are seen entering the lungs. The vessel is shown in its course through the abdominal cavity, and its branches are seen entering the various organs of the body.

Fig. 2. The great ventral vessel, showing its course from the heart to the lungs, and its division into the pulmonary arteries and veins. The vessel is shown in its course through the thoracic cavity, and its branches are seen entering the lungs. The vessel is shown in its course through the abdominal cavity, and its branches are seen entering the various organs of the body.

Fig. 3. The great ventral vessel, showing its course from the heart to the lungs, and its division into the pulmonary arteries and veins. The vessel is shown in its course through the thoracic cavity, and its branches are seen entering the lungs. The vessel is shown in its course through the abdominal cavity, and its branches are seen entering the various organs of the body.

CHAPTER VIII.

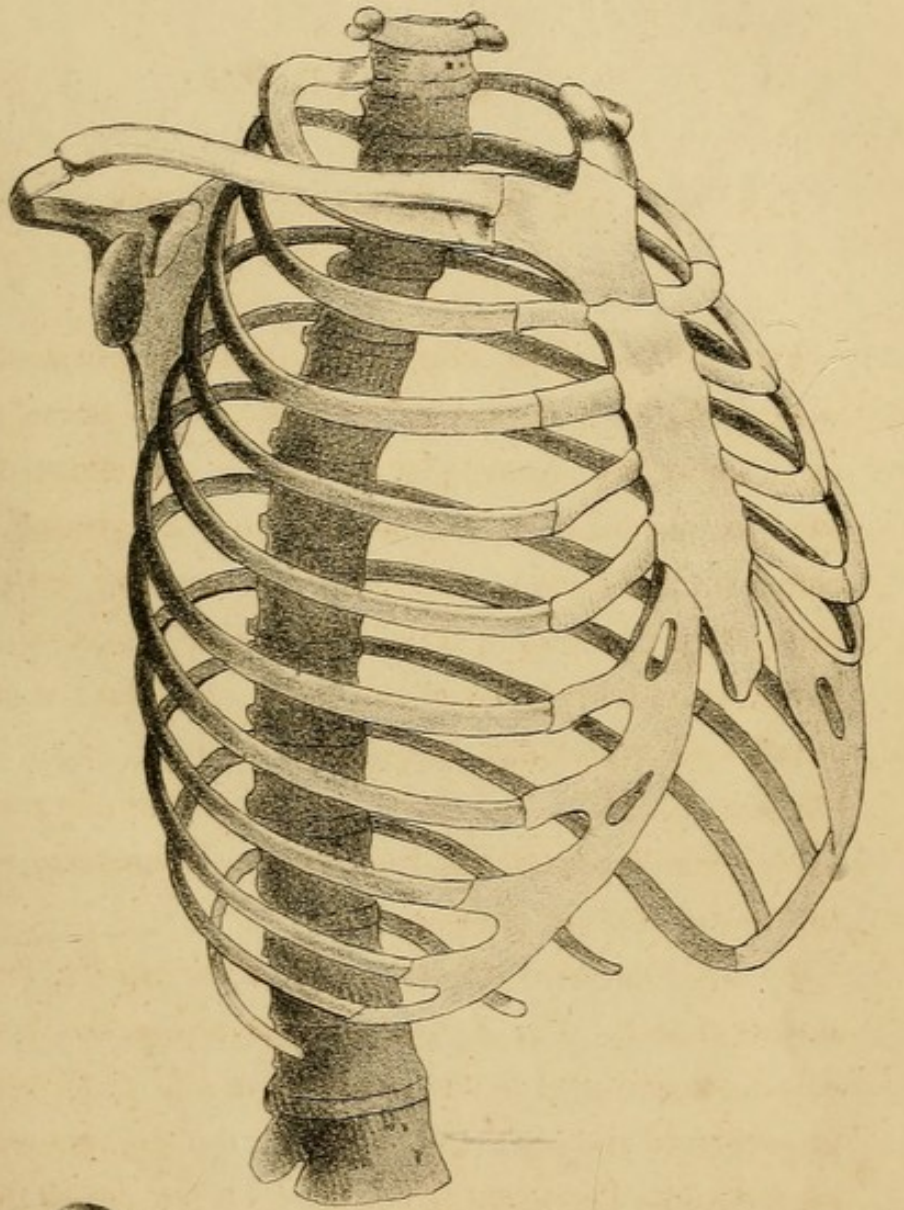
TAB. X.—THE CHEST, PATELLA, AND SHOULDER BLADE.

FIG. 1. The *spine*, *ribs*, and *sternum*, constitute the framework of the *chest* or *thorax*. Referring however to the plate, or to nature, we observe that the ribs are not continued throughout from the spine to the sternum, but intervening *cartilages* complete the form of the chest, by connecting the end of the rib to the breast bone. This is a further provision, relative to the mechanical function of the lungs, deserving notice. The muscles of respiration enlarge the capacity of the chest by elevating the ribs ; and during the momentary interval of muscular action the cartilages, from their great *elasticity*, restore the ribs to their former position.

FIG. 2. represents the true shape of the *patella*, the *anterior surface convex*. Fig. 3. the *posterior surface*, has two *concave* depressions adapted to the condyles of the thigh bone. The projection of the patella, as a lever, or pulley, removes the acting force from the centre of motion, by which means the muscles have a greater advantage in extending the leg.

FIG. 4. The shoulder-blade (*scapula*) is joined to the collar bone by ligaments, and to the thorax by powerful muscles which are capable of sustaining immense weights, and whose action gives the various directions to the arm, and enables it freely to revolve at the shoulder joint.

TAB. X.



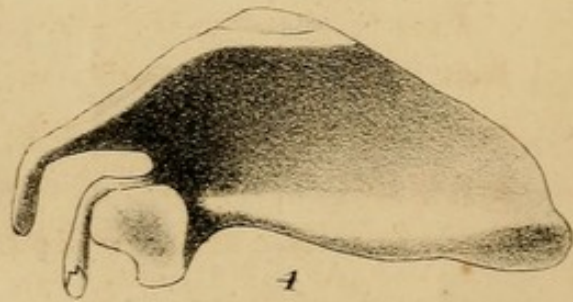
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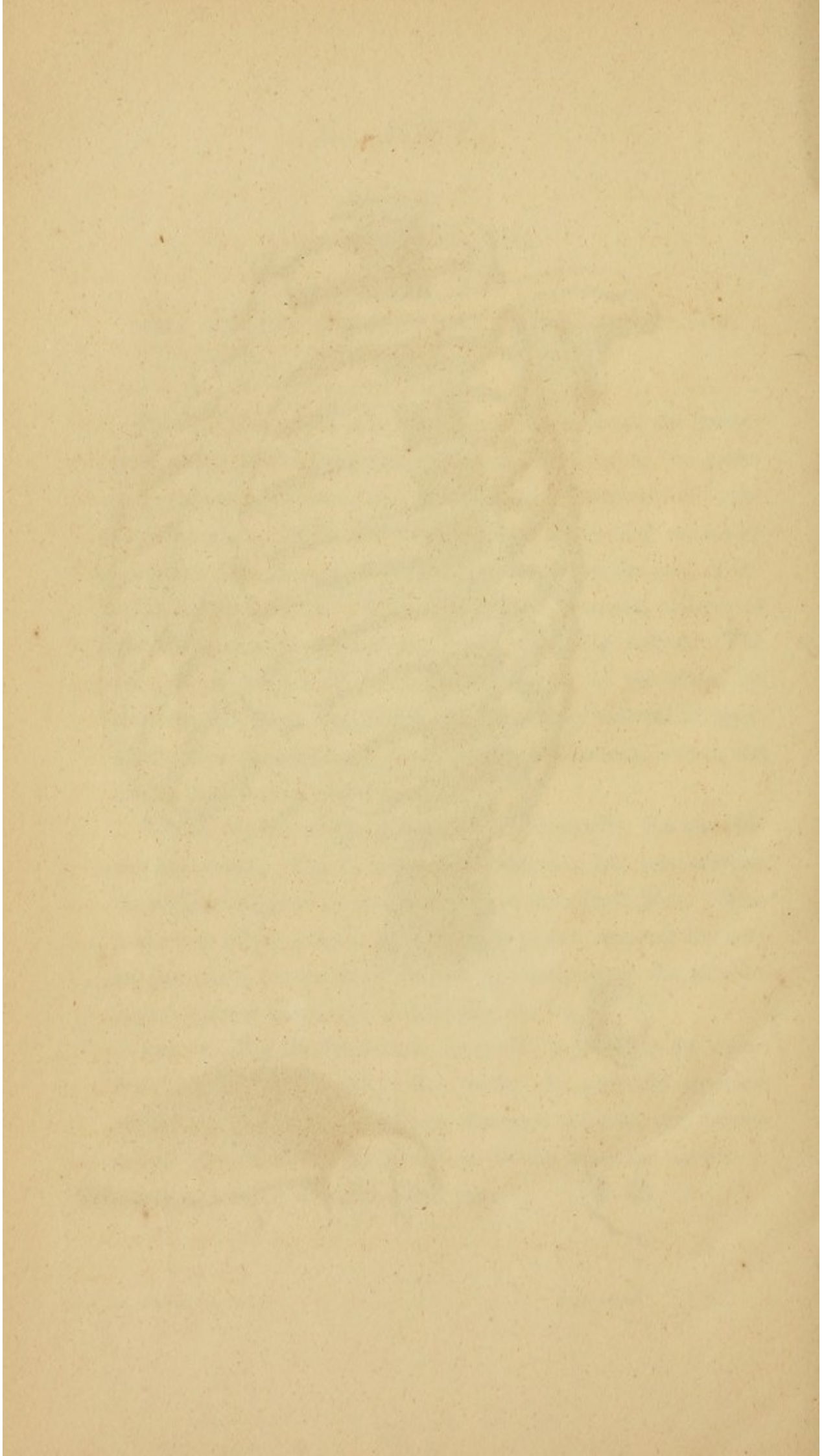
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CHAPTER VIII.

PLATE XI.—THE HIP, KNEE, AND ANKLE JOINTS.

Fig. 1. The capsule ligament is here shown in order to show the ligament of the hip, named the round ligament. It allows considerable liberty of motion at the same time that it is the great anti-vital ligament.

Fig. 2 and 3. The crowd or tuberosity ligament of the hip joint and the rest of the depression between the condyles of the femur and the acetabulum is here shown in order to show the position of the tuberosity of the hip. This tuberosity usually limits the motion of the joint and gives the femoral head a certain extent. Viewing the form of the bone we would consider it out of the socket and not expected, but the amount of its ligamentous contact is the best proof of its being an elevation of any bone in the whole body.

Fig. 3. (Continued) The tuberosity of the femur, from which the round ligament arises, is here represented as being the only point of contact between the femur and the acetabulum. It is here shown in order to show the position of the tuberosity of the hip. This tuberosity usually limits the motion of the joint and gives the femoral head a certain extent. Viewing the form of the bone we would consider it out of the socket and not expected, but the amount of its ligamentous contact is the best proof of its being an elevation of any bone in the whole body.

The tuberosity of the femur, from which the round ligament arises, is here represented as being the only point of contact between the femur and the acetabulum. It is here shown in order to show the position of the tuberosity of the hip. This tuberosity usually limits the motion of the joint and gives the femoral head a certain extent. Viewing the form of the bone we would consider it out of the socket and not expected, but the amount of its ligamentous contact is the best proof of its being an elevation of any bone in the whole body.

Fig. 4. Exhibits the position of the ankle joint; of the foot, &c.

CHAPTER VIII.

TAB. XI.—THE HIP, KNEE, AND ANKLE JOINTS.

FIG. 1. The capsular ligament is here opened in order to show the ligament of the hip, named the *round ligament*. It allows considerable latitude of motion, at the same time that it is the great safe-guard against dislocation.

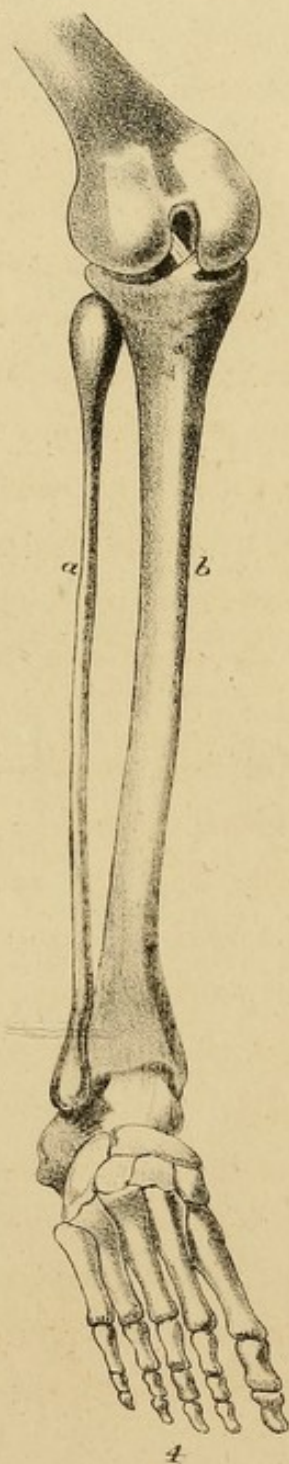
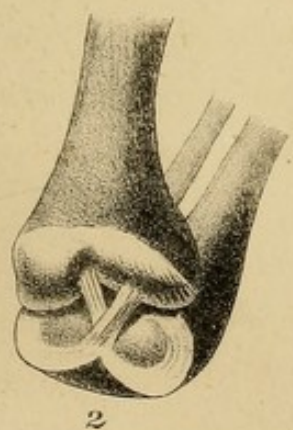
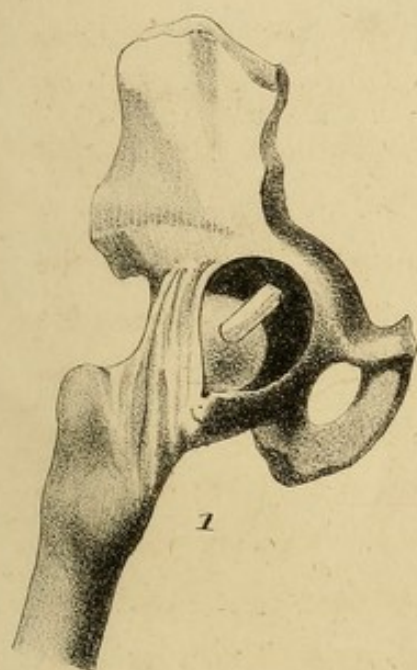
FIG. 2. and 4. The *crucial* or *internal ligaments* of the knee-joint arise from each side of the depression between the condyles of the thigh bone ; the anterior is fixed into the centre, the posterior into the back of the articulation of the tibia. This structure properly limits the motions of the joint, and gives the firmness requisite for violent exertions. Viewing the form of the bones, we should consider it one of the weakest and most superficial, but the strength of its ligaments renders it the most secure, and the least liable to dislocation of any joint in the whole body.

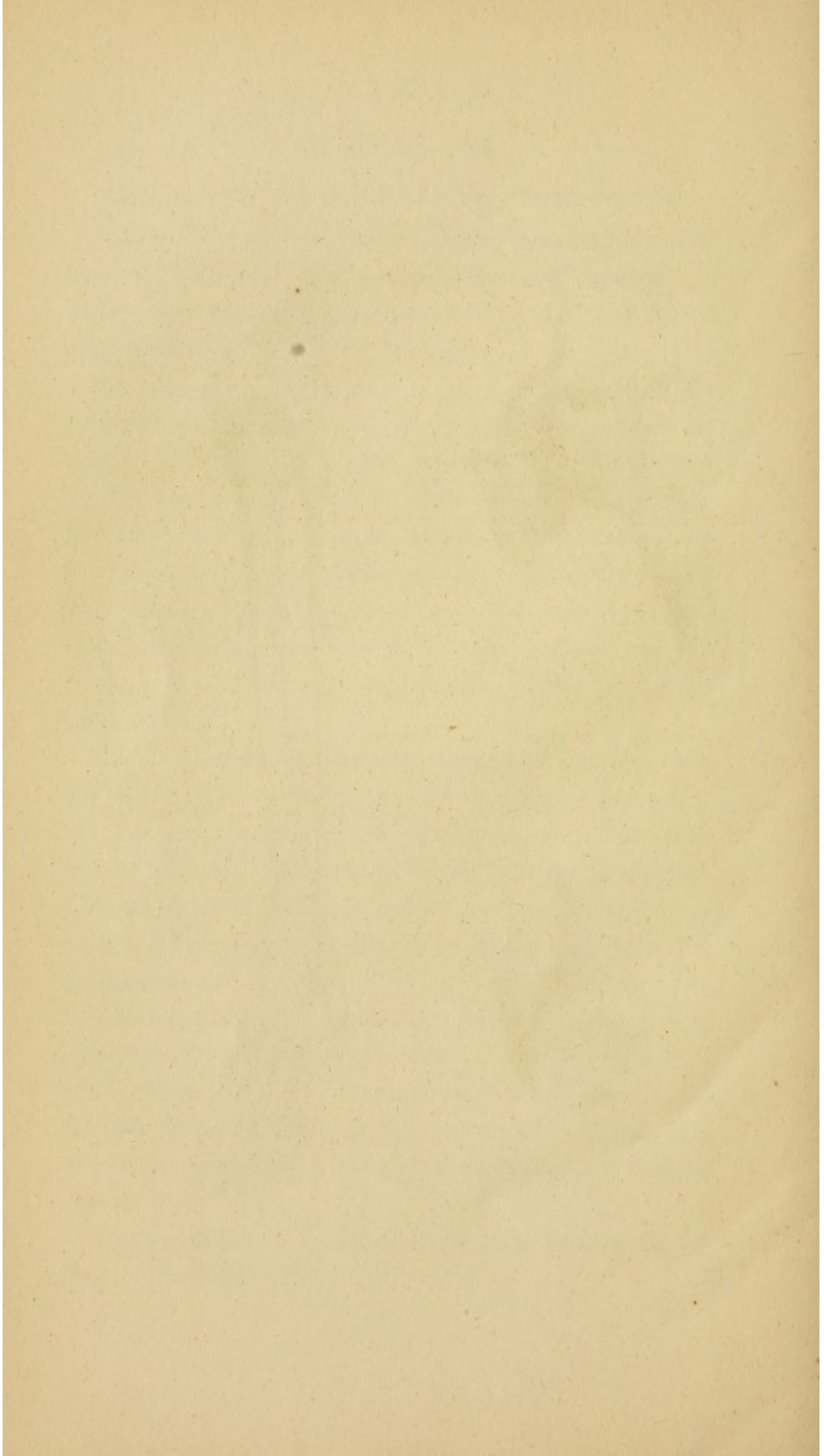
FIG. 3. One the *interarticular* cartilages of the knee, from their shape called *semilunar* ; it is also represented *in situ*, Fig. 2. The outer edge of each cartilage is thick, the inner concave edge thin ; the sockets for the condyles of the thigh bone are thus rendered deep, and the cartilages are so fixed as to allow a little play on the tibia, by which the joint moves with great freedom.

A moving cartilage is not common, but is peculiar to those joints whose motions are very frequent, or which move under a great weight. It is a contrivance found at the inner head of the collar bone and the articulation of the wrist, as well as at the knee. The obvious use is to lessen friction and facilitate motion.

FIG. 4. exhibits the formation of the ankle joint ; *a*, the *fibula* ; *b*, the *tibia*.

TAB. XI.





CHAPTER I

THE HISTORY OF THE
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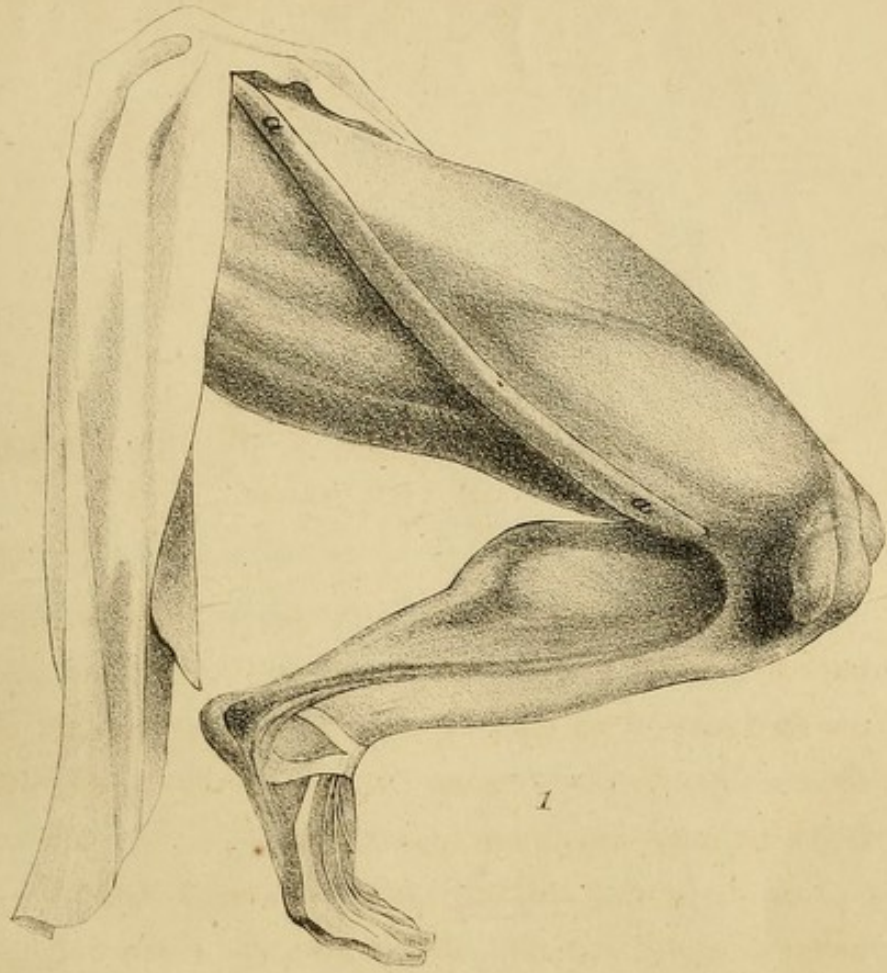
CHAPTER IX.

TAB. XII.—THE SARTORIUS, AND OBLIQUE MUSCLES OF THE HEAD.

FIG. 1. *a, a*, the *sartorius*, is the longest muscle of the whole human fabric: it is extended obliquely across the thigh from the fore part of the hip (the *anterior superior spinous process of the os ilium*,) to the inner side of the tibia. Its office is to bend the knee and bring the leg inwards.

FIG. 2. There are two pairs of oblique muscles; *a, a*, the *obliquus capitis superior*, arising from the transverse process of the atlas, and inserted into the occipital bone; *b, b*, the *obliquus capitis inferior*, arising from the spinous process of the dentata, and inserted into the transverse process of the atlas.

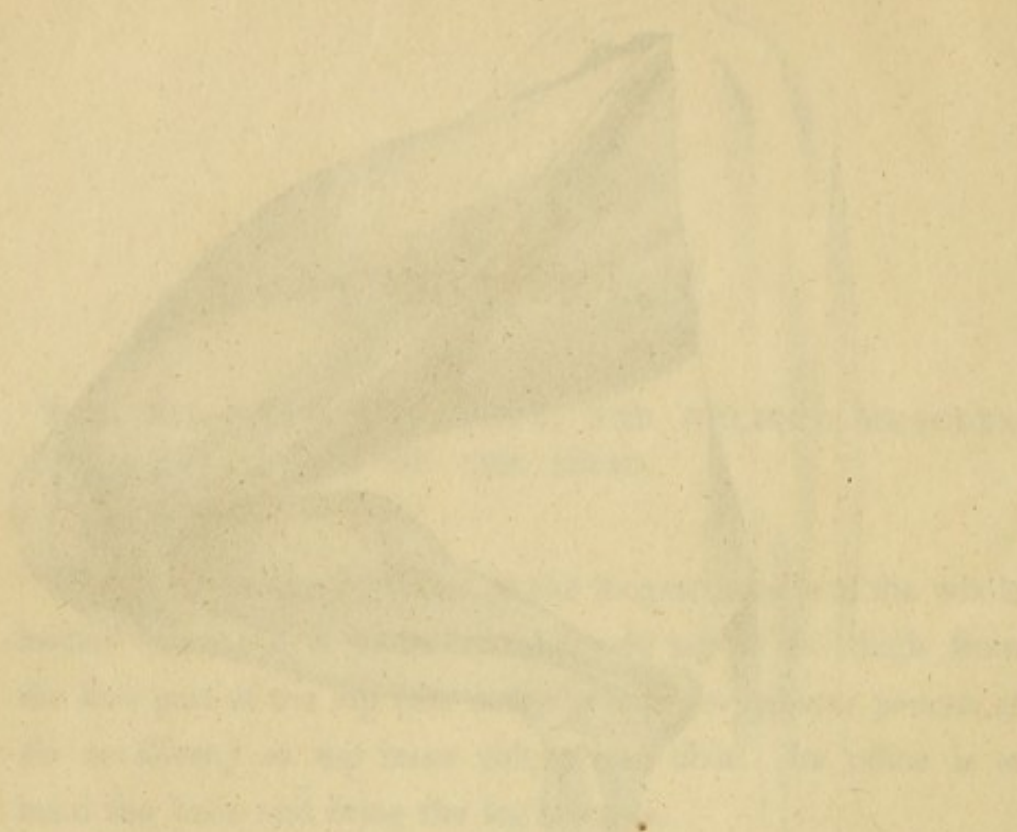
TAB. XII.



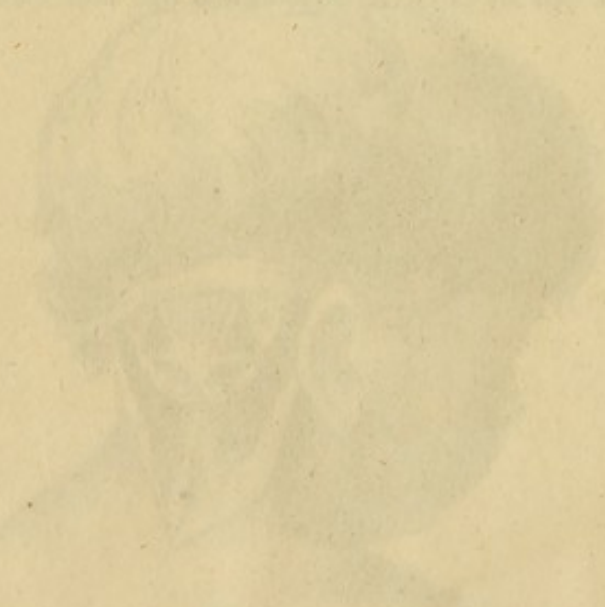
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Lith. of Pendleton.



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CHAPTER XI

THE MUSCLES OF THE ARM

The *brachialis* (musculus brachialis) arises by two heads from the humerus, one from a thick mass of bone at the end of the shaft, which is usually inserted into the upper end of the radius, the other from the supracondylar process of the humerus, and is inserted into the ulna. It is a large muscle, and is situated in the arm, and its fibres are arranged in a fan-shaped manner, and its fibres are inserted into the olecranon, which is the point of the elbow. It is a powerful muscle, and is the chief muscle of the arm, and is the chief muscle of the forearm.

Fig. 1. The *brachialis* muscle, showing its origin from the humerus and its insertion into the ulna. *Fig. 2.* The *brachialis* muscle, showing its origin from the humerus and its insertion into the ulna. *Fig. 3.* The *brachialis* muscle, showing its origin from the humerus and its insertion into the ulna.

CHAPTER XI.

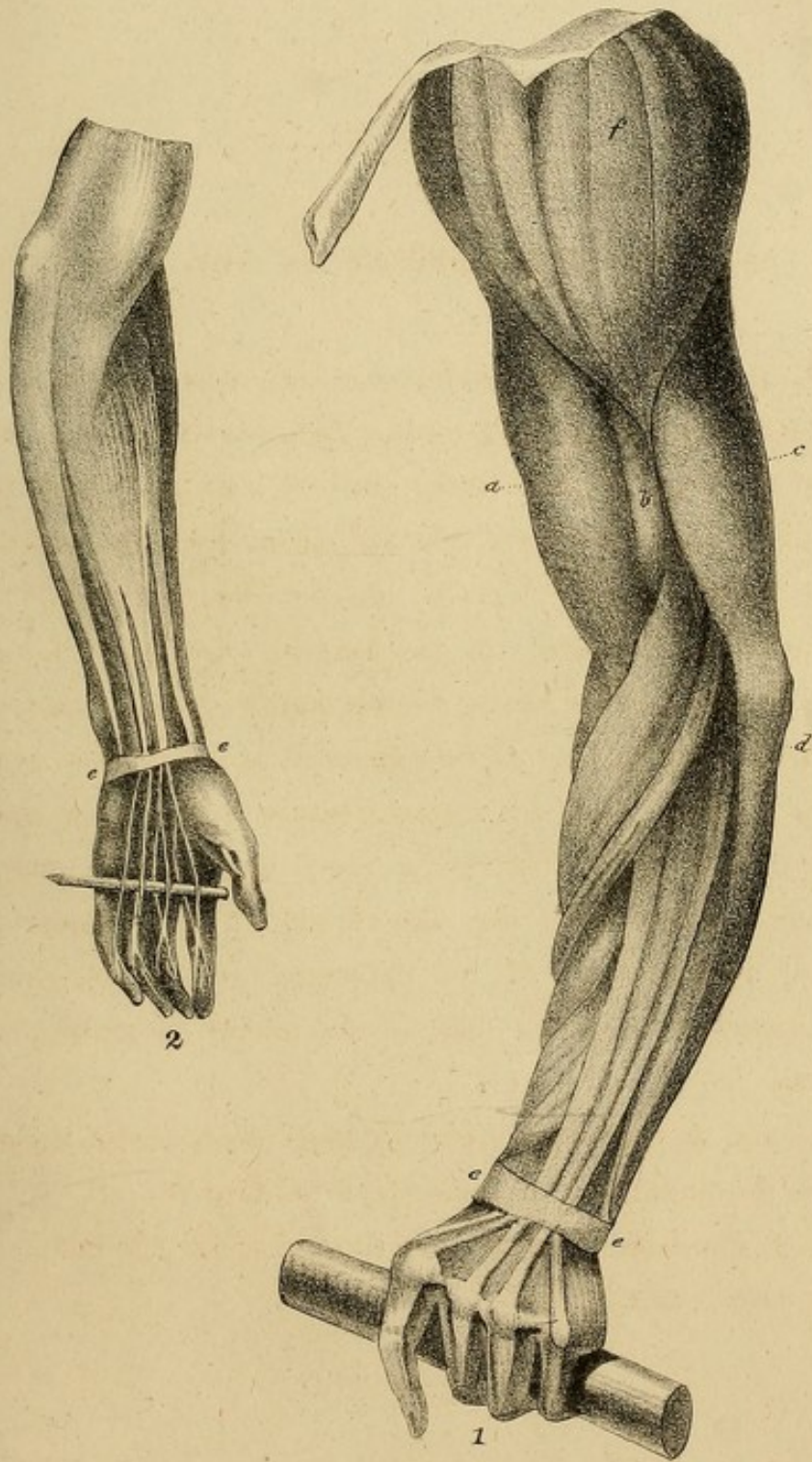
TAB. XIII.—THE MUSCLES OF THE ARM.

FIG. 1. *a*, the *biceps* (*biceps flexor cubiti*) arise by two portions from the scapula ; they form a thick mass of flesh in the middle of the arm, which is finally inserted into the upper end of the radius ; *b*, the *brachiaeus internus*, arises from the middle of the *os humeri*, and is inserted into the ulna. Both these muscles bend the fore-arm. *c*, the *longus et brevis brachiaeus externus* ; these are better named as one muscle, *triceps extensor cubiti*. It is attached to the inferior edge of the scapula, and to the *os humeri*, by three distinct heads, which unite and invest the whole back part of the bone, becoming a strong tendon which is implanted into the elbow. It is a powerful extensor of the fore-arm. *d*, the *anconæus*, a small triangular muscle, situated at the outer side of the elbow : it assists the last muscle.

FIG. 1. and 2. *e, e*, the *annular ligament* of the wrist, under which pass the tendons of the muscles of the fingers.

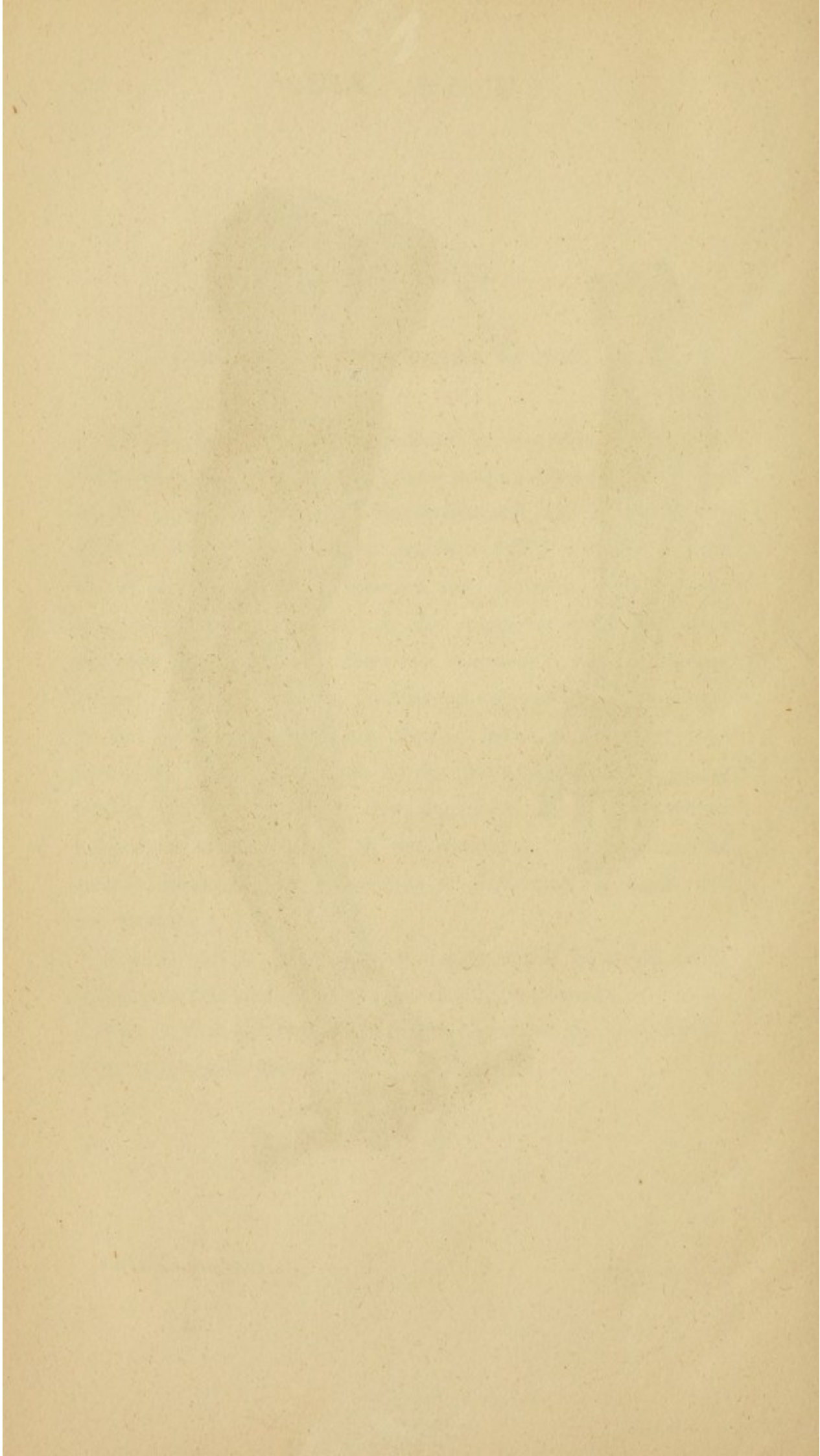
FIG. 1. *f*. the *deltoid muscle* ; the muscle at the shoulder by which the arm is raised.

TAB. XIII.



Swett Del.

Lith. of Pendleton.



CHAPTER IX

THE MUSCLES THAT RAISE THE EYEBROW
AND ASSISTING OR COUNTERACTING MUSCLES

Fig. 1. A front view of the muscle named *Levator palpebræ superioris*. Fig. 2. A profile of the same in its natural position. The muscle arises within the orbit, and is inserted by a broad tendon into the upper eyelid.

Fig. 3. Exhibits a couple of *Levator palpebræ superioris* muscles, as they exist in a dissection, showing the origin and course of the muscle, and the position of the vessels which supply it. The muscle is shown in its natural position, and is surrounded by the *Levator palpebræ superioris* muscle.

CHAPTER IX.

TAB. XIV.—THE MUSCLES THAT RAISE THE EYE-LIDS, AND SPHINCTER OR CIRCULAR MUSCLES.

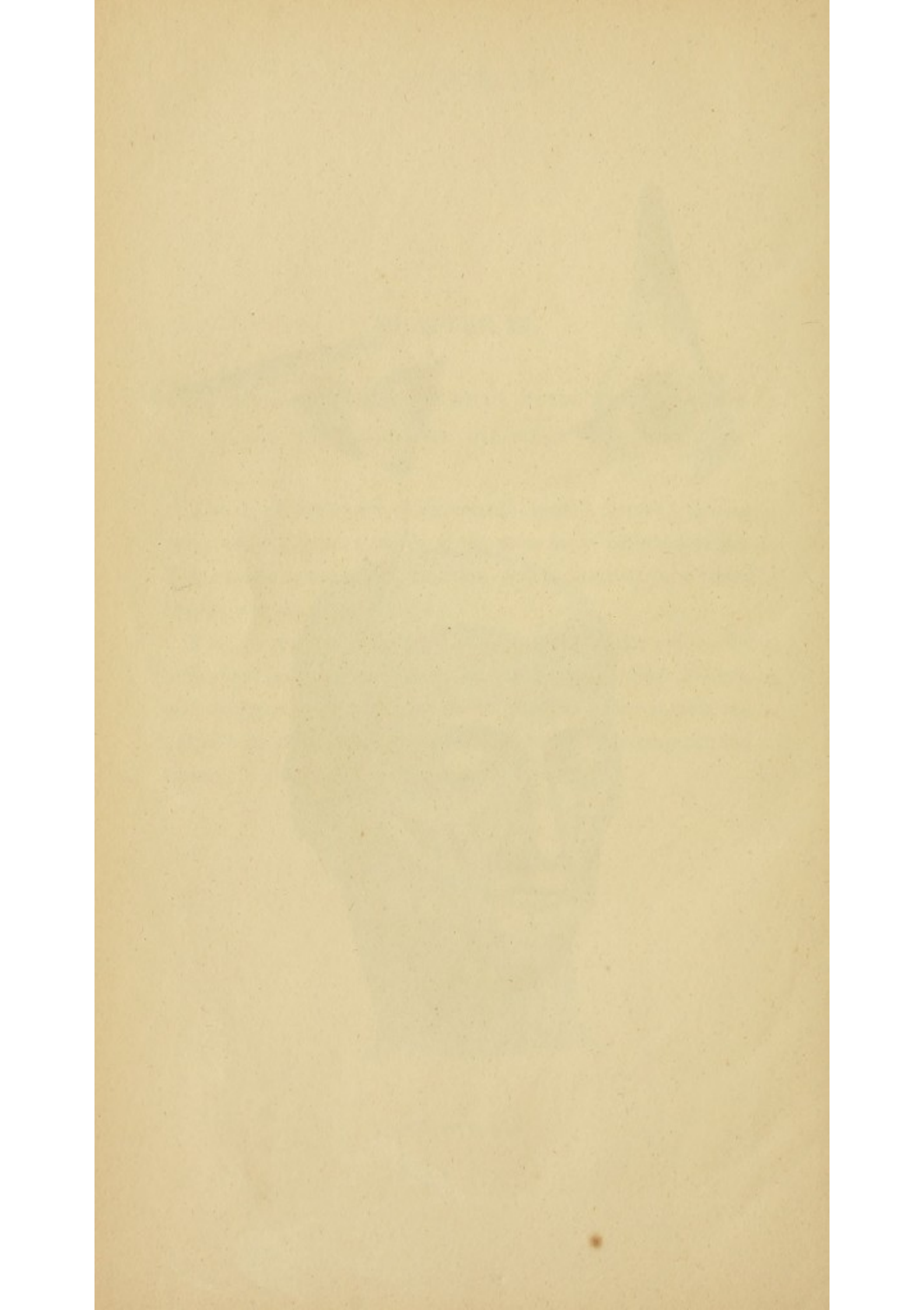
FIG. 1. A front view of the muscle named *levator palpebræ superioris* : Fig. 2. a profile of the same in its natural position. This muscle arises within the orbit, and is inserted by a broad tendon into the upper eye-lid.

FIG. 3. exhibits examples of *sphincter* muscles : *a, a*, the *orbicularis palpebrarum*, encircling the eyelid ; it closes the eye, and compresses it with spasmodic violence when injured by particles of dust, &c. *b*, the *orbicularis oris*, surrounding the mouth ; its chief use is to contract the lips.

TAB. XIV.



Lith. of Pendleton.



CHAPTER IX

THE DIGESTIVE MUSCLES

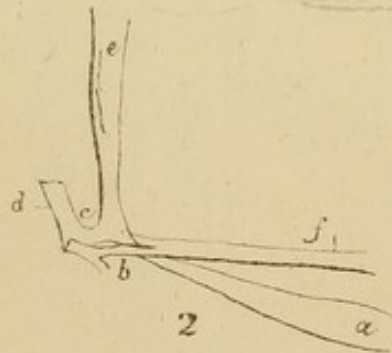
The *pharynx* is the common passage for food and air. It is situated in the neck, and is bounded above by the soft palate and below by the cricoid cartilage. It is divided into three parts: the *nasopharynx*, the *oropharynx*, and the *laryngopharynx*. The *nasopharynx* is the upper part, and is bounded above by the soft palate and below by the soft palate and the *uvula*. The *oropharynx* is the middle part, and is bounded above by the soft palate and below by the *uvula* and the *epiglottis*. The *laryngopharynx* is the lower part, and is bounded above by the *epiglottis* and below by the *cricoid cartilage*. The *pharynx* is a muscular tube, and its wall is composed of three layers: the *inner layer*, the *middle layer*, and the *outer layer*. The *inner layer* is the *pharyngeal constrictor muscles*, the *middle layer* is the *pharyngeal constrictor muscles*, and the *outer layer* is the *pharyngeal constrictor muscles*.

CHAPTER IX.

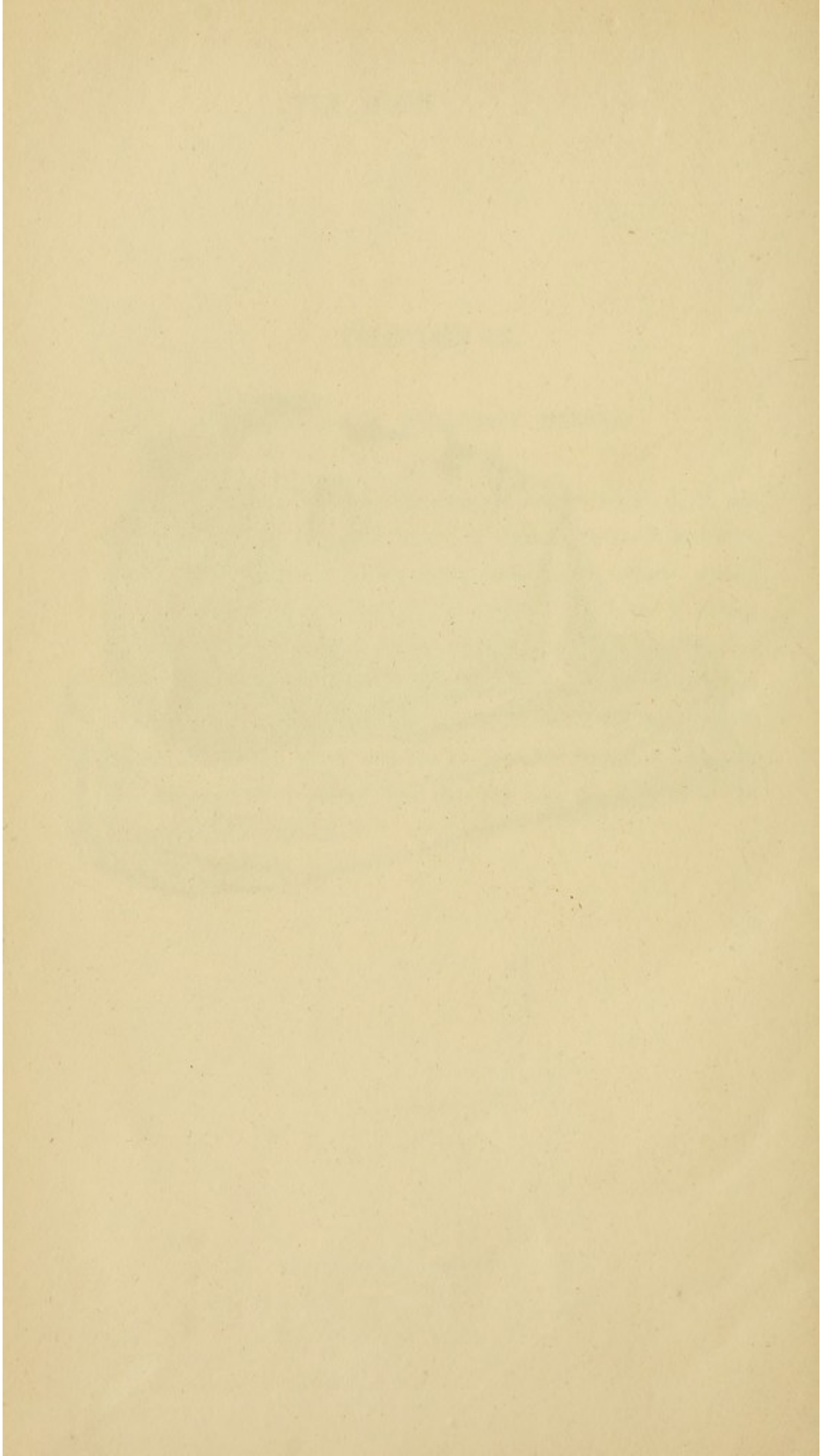
TAB. XV. THE DIGASTRIC MUSCLE.

FIG. 1. and 2. The *digastric muscle* has its origin, *a*, at the lower part of the temporal bone ; it runs downwards and forwards, and forms a strong round tendon, *b*, which passes through the stylo-hyoïdeus, *f*; it is then fixed by a strong ligament, *c*, to the os hyoïdes, *d*; it again becomes fleshy, runs upwards, and is inserted into the chin. This description differs from Dr. Paley's, and it will be found by reference to dissections or the plate, that the os hyoïdes furnishes a *stay* or *brace* instead of a pulley, and that the *loop* or *ring* is in the stylo-hyoïdeus muscle.

TAB. XV.



Lith. of Pendleton, Boston.



CHAPTER IX

TABLE VIII - THE TENDONS OF THE VOLES

Fig. 1. of the tendon of the long flexor of the toe, which divides about the middle of the foot into two portions passing through the alle in b, the short flexor tendon. This is excluded a slight contraction being by the foot, as a portion of the flexor tendon, a portion of the flexor tendon passing through a.

Fig. 2. a, b, tendons of the extensor digitorum of the toe, a tendon of the flexor of the toe. These are the tendons which remain in situ by, at the anterior flexion of the foot.

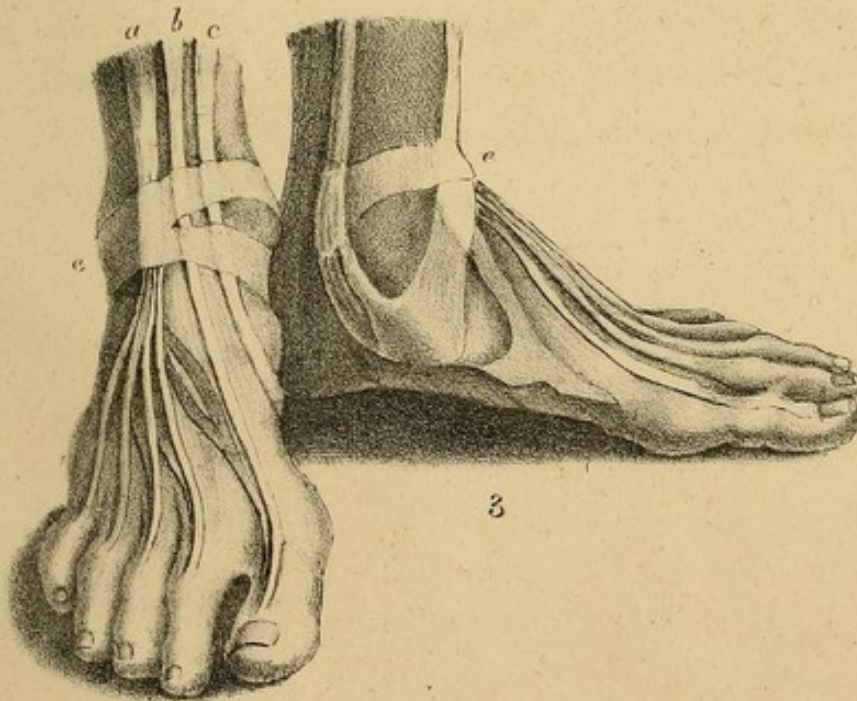
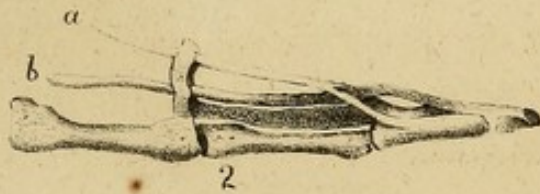
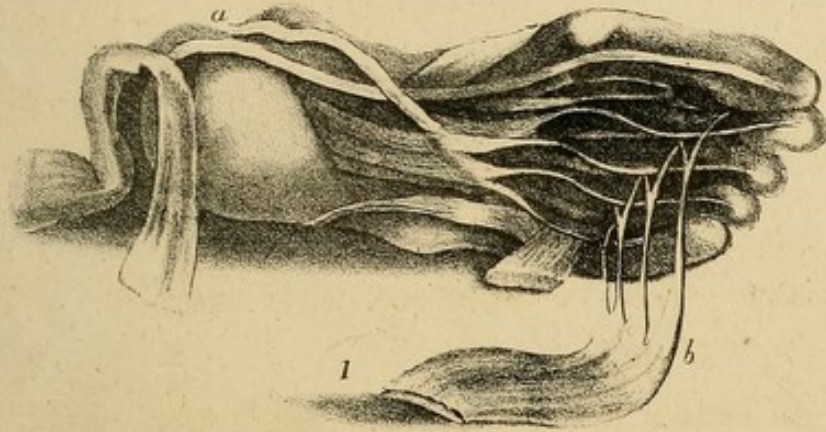
CHAPTER IX.

TAB. XVI.—THE TENDONS OF THE TOES.

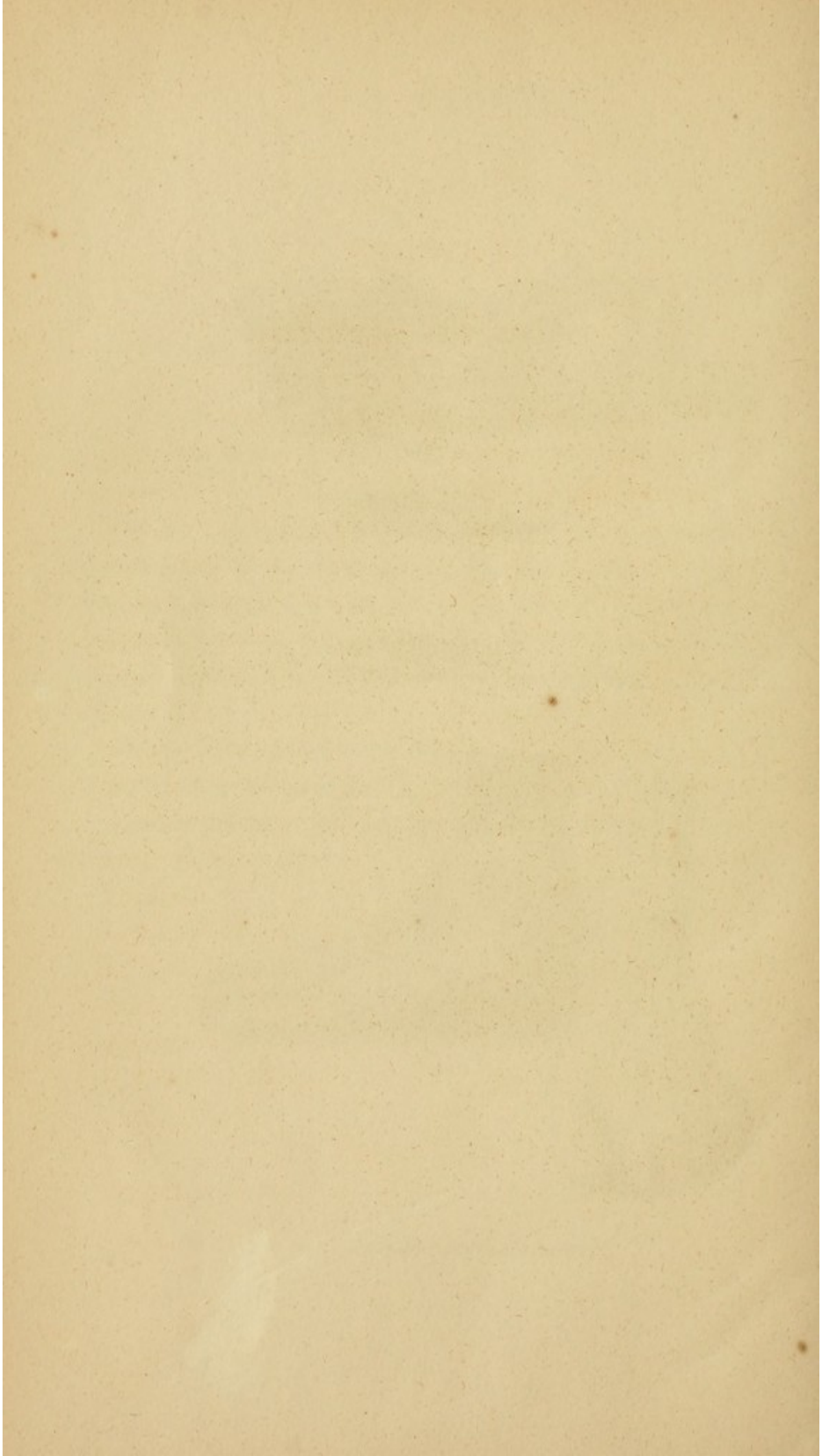
FIG. 1. *a*, the tendon of the *long flexor of the toes*, which divides about the middle of the foot into four portions, passing through the slits in, *b*, the *short flexor tendons*. Fig. 2. explains a similar contrivance belonging to each finger: *a*, a tendon of the *flexor sublimis*; *b*, a tendon of the *flexor profundus*, passing through it.

FIG. 3. *a*, *b*, tendons of the extensor muscles of the toes; *c*, a tendon of the flexor of the foot. These are bound down and retained *in situ* by, *e*, the *annular ligament* of the instep.

TAB. XVII.



Lith. of Pendleton Boston.



CHAPTER 7

THE HEART—THE HEART

Fig. 1. A section of the human heart in the sagittal and coronal planes. The ventricle is shown in the center, the atria on either side, and the pulmonary artery and pulmonary veins at the top. The aorta and pulmonary artery are shown at the bottom. The heart is shown in a sagittal section, with the ventricle in the center and the atria on either side. The pulmonary artery and pulmonary veins are at the top, and the aorta and pulmonary artery are at the bottom. The heart is shown in a coronal section, with the ventricle in the center and the atria on either side. The pulmonary artery and pulmonary veins are at the top, and the aorta and pulmonary artery are at the bottom.

Fig. 2. The valves of the heart. The aortic valve is shown at the top, the mitral valve at the bottom left, and the tricuspid valve at the bottom right. The pulmonary valve is shown at the top right. The valves are shown in a cross-section, with the aortic valve at the top, the mitral valve at the bottom left, and the tricuspid valve at the bottom right. The pulmonary valve is shown at the top right.

CHAPTER X.

TAB. XVII.—THE HEART.

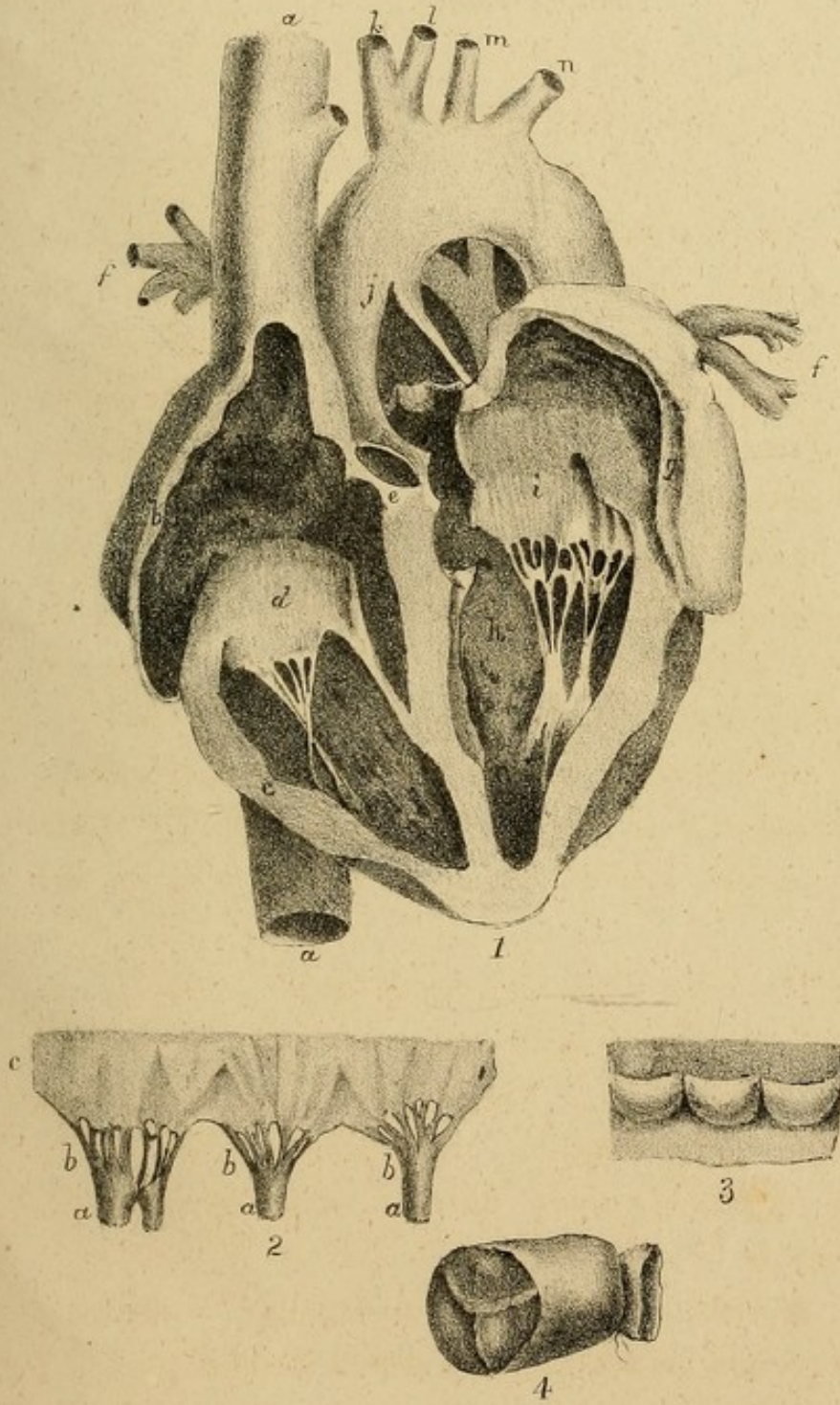
FIG. 1. A section of the human heart ; *a, a*, the *superior* and *inferior vena cava*, the veins which convey the blood to, *b*, the *right auricle* ; and thence into, *c*, the corresponding *ventricle* ; from this ventricle the blood is impelled through, *e*, the *pulmonary artery* into the lungs ; and returning by, *f, f*, the *pulmonary veins*, it is received into, *g*, the *left auricle* : it flows next into, *h*, the *left ventricle* ; which by its contraction distributes the blood through the general arterial system :—*j*, the *aorta*, the great artery which transmits blood to the different parts of the body, from whence it is returned by veins to the *cavae* : *k*, the *right subclavian* ; *l*, the *right carotid* arteries, originating from one common trunk ; *m*, the *left carotid* ; *n*, the *left subclavian* : *d*, the *valves* of the right ; *i*, the *valves* of the left ventricle.

FIG. 2. The valves of the right side (*tricuspid valves*) separated from the heart ; *a, a, a*, the *carneæ columnæ*, or muscular fibres of the valves ; *b, b, b*, the *chordæ tendineæ*, or tendinous filaments which are attached to, *c*, the valves.

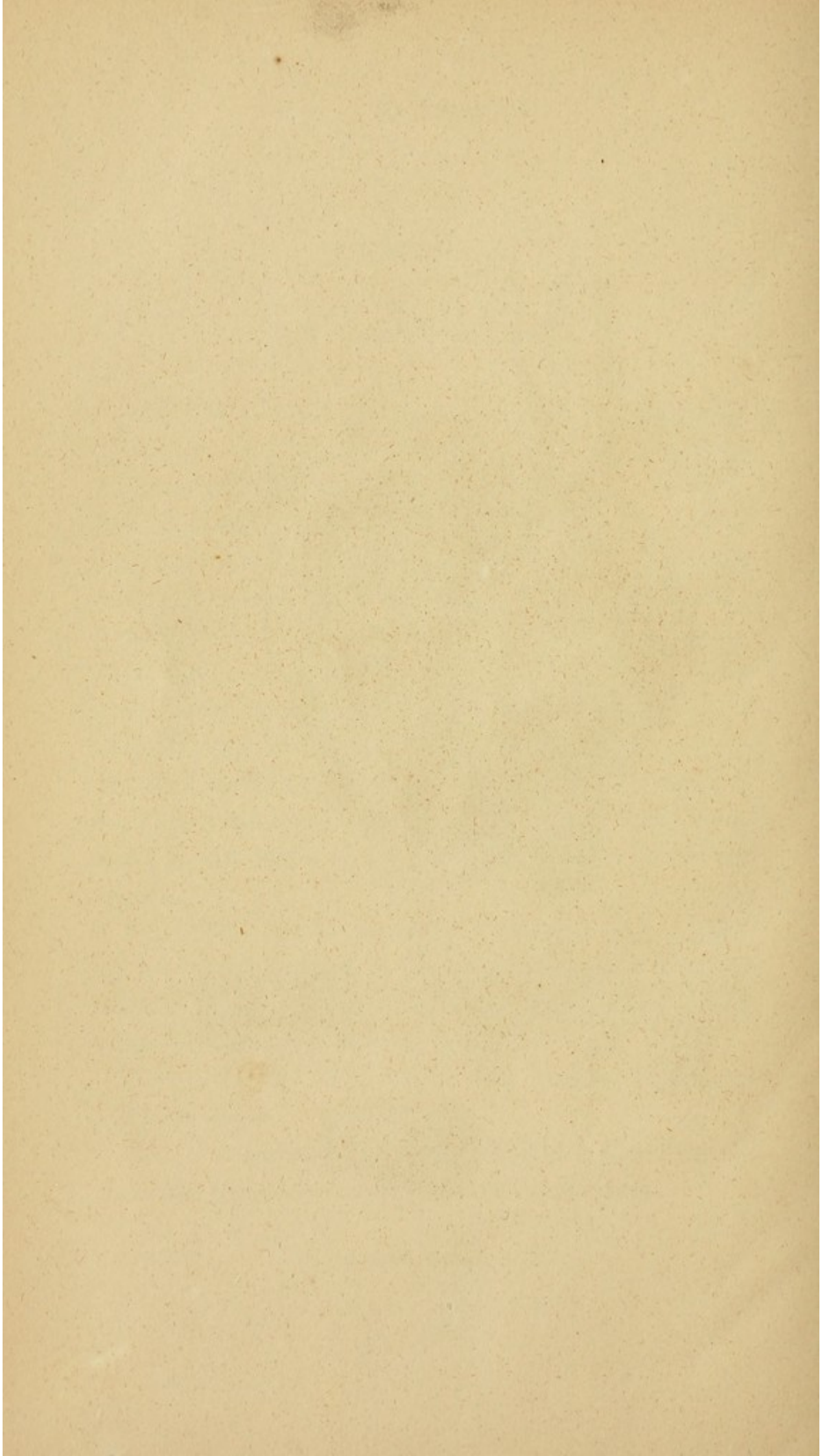
FIG. 3. exhibits the *artery* cut open, with the form of the *semilunar valves*.

FIG. 4. A portion of the artery filled, showing how effectually the valves prevent the retrograde motion of the blood.

TAB. XVII.



Lith. of Pendleton, Boston.



CHAPTER I

The first part of the book is devoted to a general introduction to the subject of the history of the English language. It discusses the various theories of the origin of the language, and the evidence in support of each. It also deals with the question of the date of the first appearance of the language in England, and the influence of the various dialects on the standard form.

The second part of the book is devoted to a detailed account of the history of the English language from the time of its first appearance in England to the present day. It discusses the various changes in the language, and the influence of the various dialects on the standard form. It also deals with the question of the date of the first appearance of the language in England, and the influence of the various dialects on the standard form.

The third part of the book is devoted to a detailed account of the history of the English language from the time of its first appearance in England to the present day. It discusses the various changes in the language, and the influence of the various dialects on the standard form. It also deals with the question of the date of the first appearance of the language in England, and the influence of the various dialects on the standard form.

CHAPTER X.

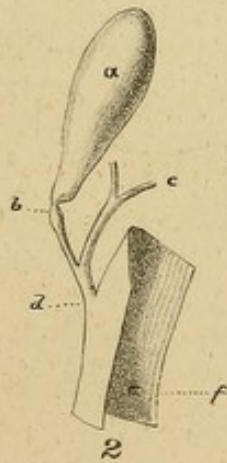
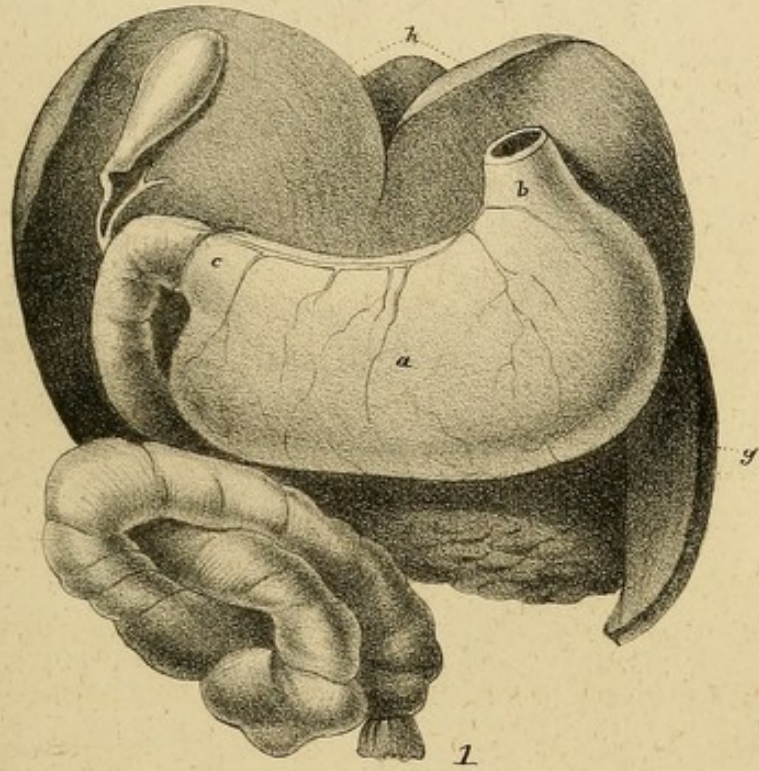
TAB. XVIII.—THE STOMACH, GALL BLADDER, &c.

FIG. 1. *a*, the *stomach*; *b*, the *cardia*; *c*, the *pylorus*. The *gastric juice* is a secretion derived from the inner membrane of the stomach, and digestion is principally performed by it. In the various orders of animated beings it differs, being adapted to the food on which they are accustomed to subsist. The food, when properly masticated, is dissolved by the gastric fluid, and converted into *chyme*; so that most kinds of the ingesta lose their specific qualities; and the chemical changes to which they would otherwise be liable, as putridity and rancidity, &c. are thus prevented.

In this plate, *h*, the *liver* is turned up, in order to show the *gall-bladder* which is attached to its concave surface; *d*, the *duodenum*; *e*, part of the small *intestines*; *f*, the *pancreas*; and *g*, the *spleen*.

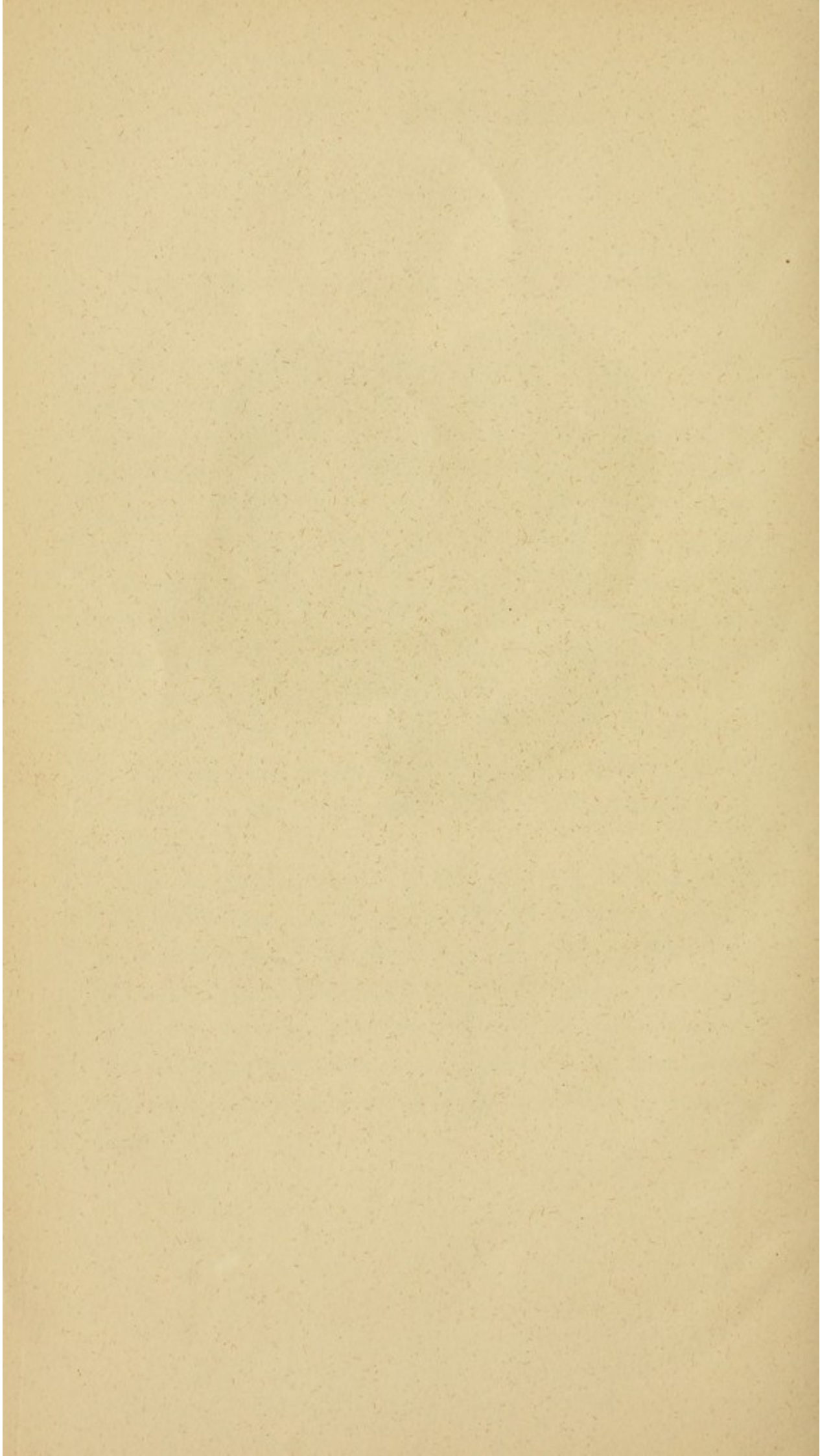
FIG. 2. explains the several ducts and their communication with the *duodenum*; *a*, the *gall-bladder*; *b*, the *ductus cysticus*; which uniting with, *c*, the *ductus hepaticus*, forms, *d*, the *ductus communis*; which, after passing between the muscular and inner coats of the intestine, opens into it at *e*. *f*, the *pancreatic duct*. The bile is said to become more viscid, acrid, and bitter, from the thinner parts being absorbed during its retention in the gall-bladder.

TAB. XVIII.



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CHAPTER X

THE HISTORY OF THE UNITED STATES

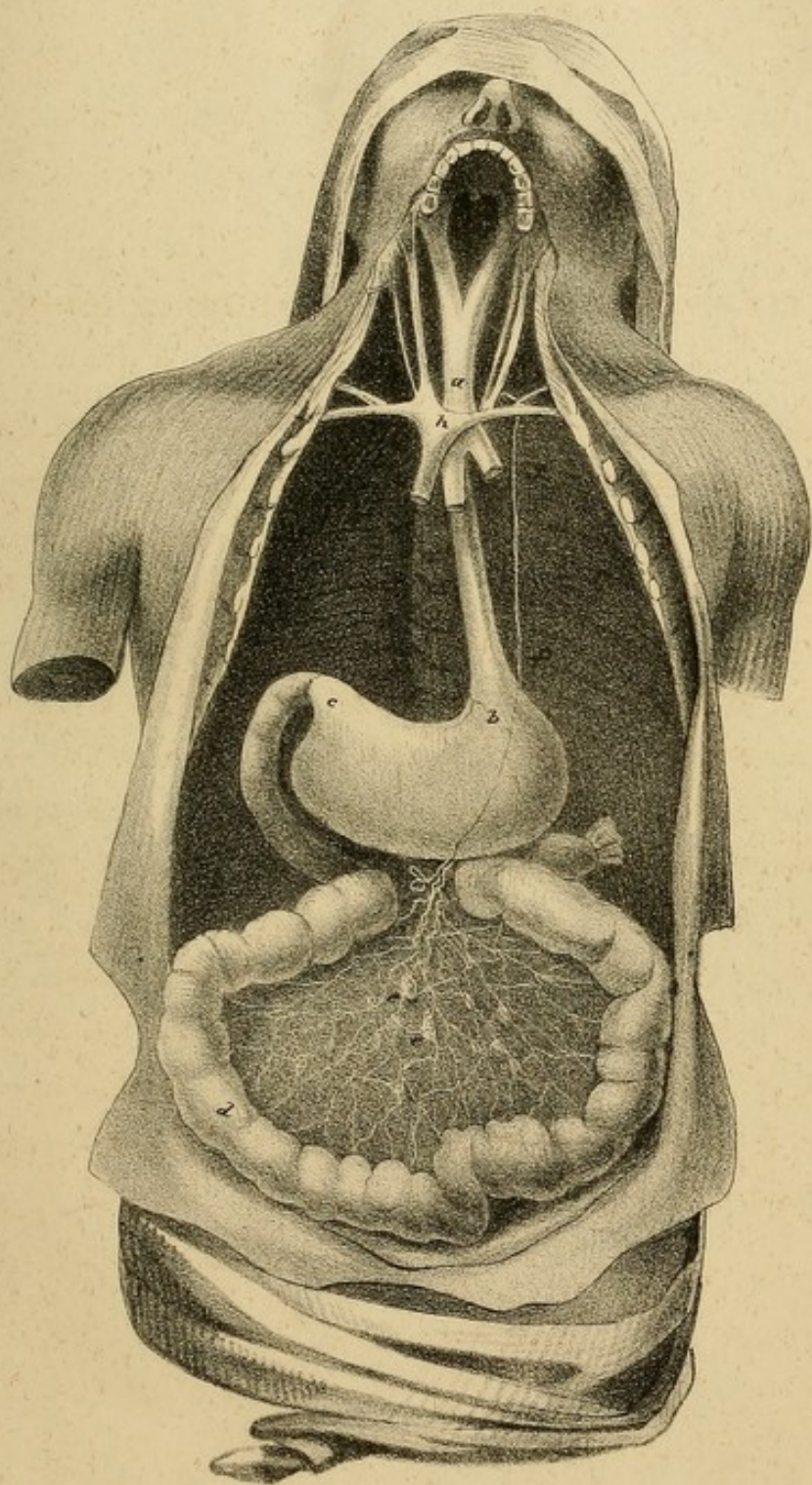
The history of the United States is a subject of great interest and importance. It is a subject which has attracted the attention of the world, and which has been the subject of many books and articles. The history of the United States is a story of a young nation which has grown from a small colony to a great power. It is a story of a people who have fought for freedom and independence, and who have built a nation which is the envy of the world. The history of the United States is a story of a people who have been the first to declare their independence from a great power, and who have since then been the first to lead the world in the struggle for freedom and democracy. The history of the United States is a story of a people who have been the first to establish a government based on the principles of liberty and justice for all, and who have since then been the first to lead the world in the struggle for a better world. The history of the United States is a story of a people who have been the first to declare their independence from a great power, and who have since then been the first to lead the world in the struggle for freedom and democracy. The history of the United States is a story of a people who have been the first to establish a government based on the principles of liberty and justice for all, and who have since then been the first to lead the world in the struggle for a better world.

CHAPTER X.

TAB. XIX.—THE LACTEALS, AND THORACIC DUCT.

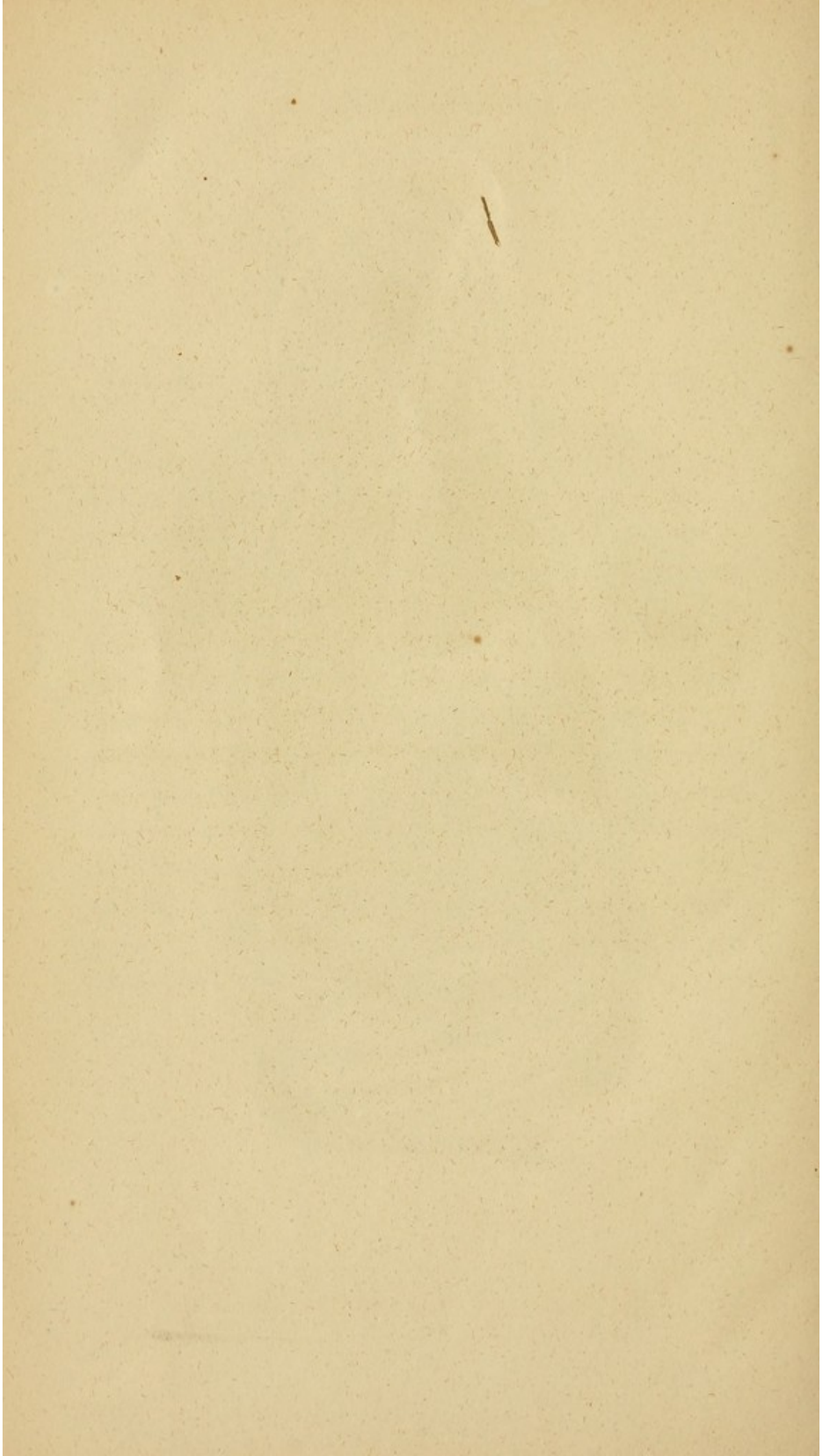
The figure in this plate represents the course of the food, from its entrance at the mouth to its assimilation with the blood; *a*, the *œsophagus*, extending from the *pharynx*, to, *b*, the *stomach*; where the alimentary matter having undergone the digestive process, escapes at, *c*, the *pylorus*, into, *d*, the *intestines*. In this plate a large portion of the latter is spread out to show a part of the absorbent system called *lacteals*: these collect and imbibe the *chyle* from the *ingesta*, and transmit it through, *e, e*, the *mesenteric glands*, into one general receptacle, *f*, (*receptaculum chyli*.) from which *g*, the *thoracic duct* ascends in a more or less tortuous direction to the lower vertebræ of the neck, and after forming an arch, it descends and enters, *h*, the left *subclavian vein*, at the point where that vein is united with the *internal jugular*. The absorbents of the right side frequently form a trunk, which enters the *right subclavian vein*.

TAB. XIX.



Swett Del.

Lith. of Pondleboro.



CHAPTER XI

THE STATE OF THE UNION

The State of the Union is a subject of great importance, and one which has attracted the attention of the public mind for many years. It is a subject which has been discussed in many different ways, and it is the object of this chapter to give a general view of the subject, and to show the progress which it has made since the first settlement of the country.

CHAPTER X.

TAB. XX.—THE PAROTID GLAND.

FIG. 1. A dissection to exhibit the *parotid gland*.

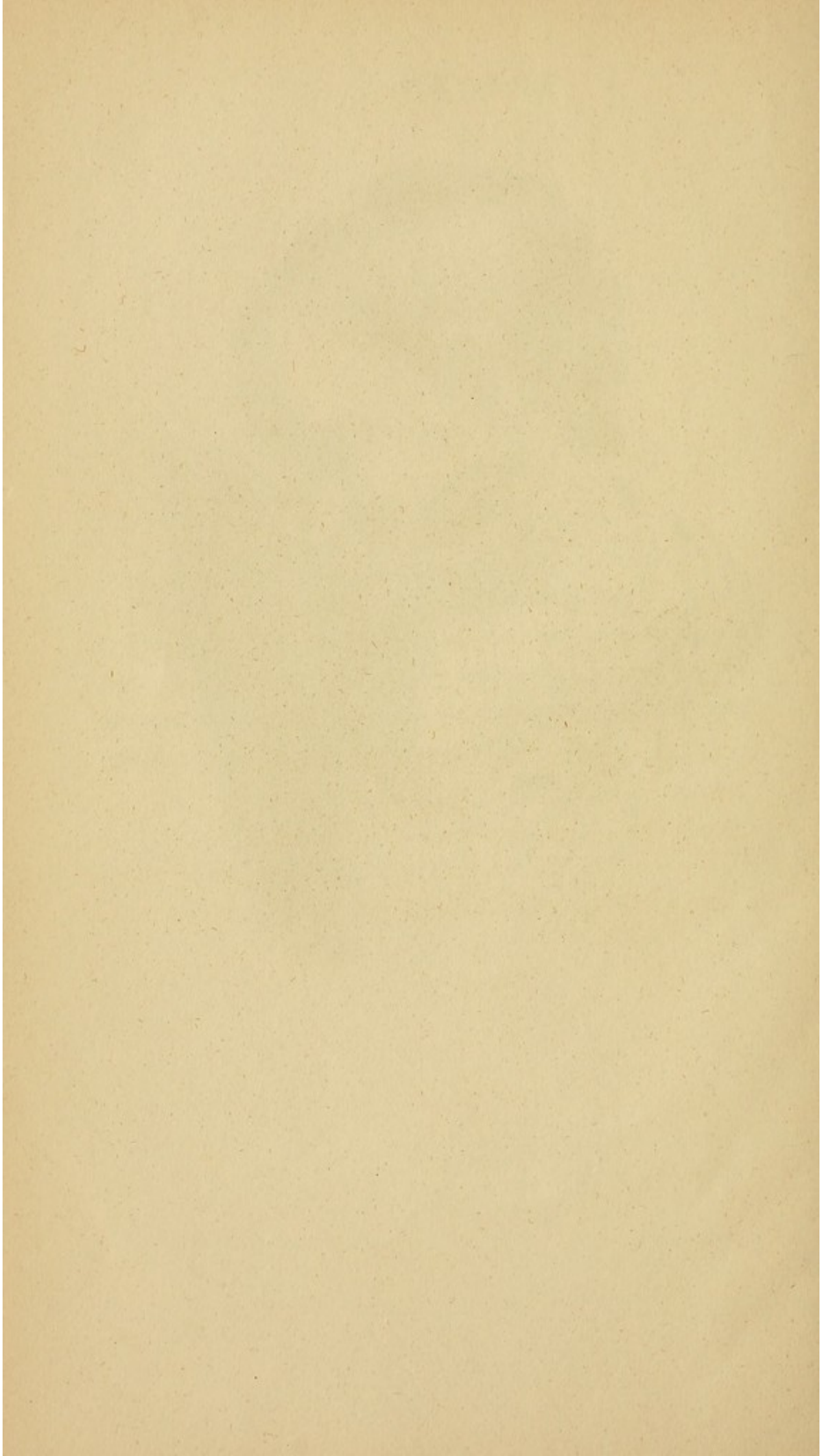
FIG. 2. explains the former; *a, a*, the integuments turned back; *b*, the *parotid gland*; *c*, its *pipe* or *duct* passing over the *masseter*, then perforating, *d*, the *buccinator muscle*, and opening into the mouth opposite the second molar tooth.

TAB. XX.



J. R. S. Del.

Lith. of Pendleton



CHAPTER X.

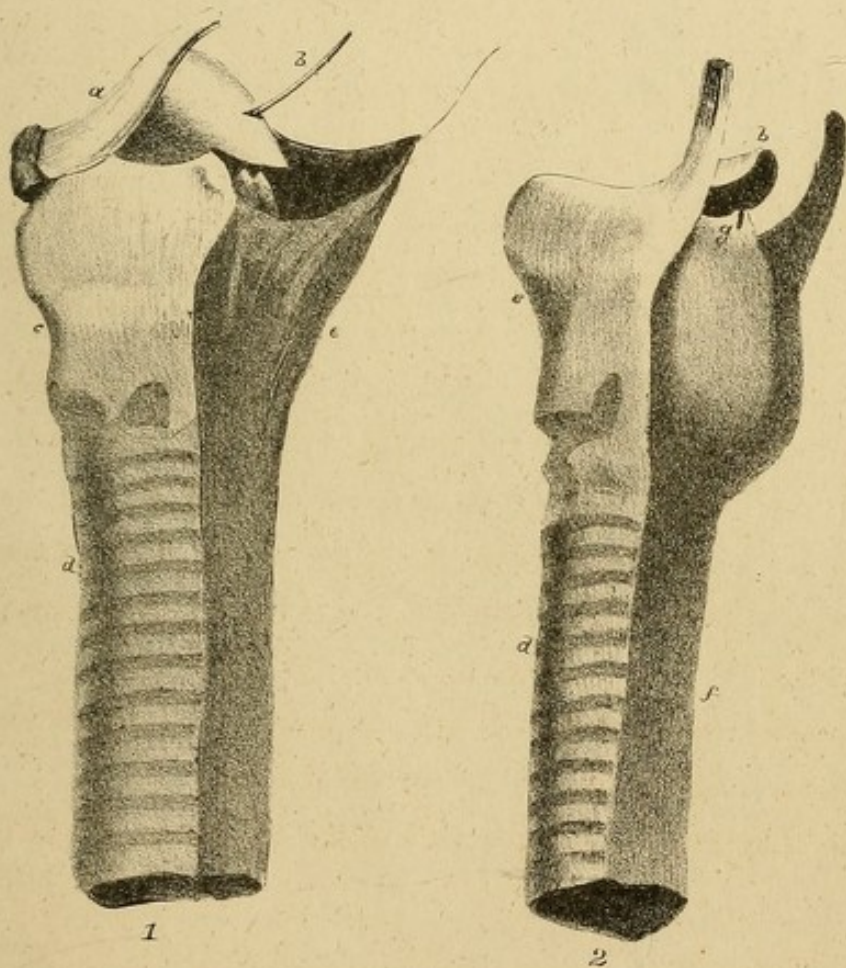
TAB. XXI.—THE LARYNX.

FIG. 1. The *larynx*, *pharynx*, &c. *a*, the *os hyoides*, *b*, the *epiglottis* pressed down, thus covering the *glottis*, or opening of the *larynx*; as it does in the act of deglutition.

FIG. 2. exhibits the *larynx*, and *trachea*; which is a continuation of the former; *b*, the *epiglottis*; *g*, the *arytenoid cartilages*; *e*, the *thyroid cartilage*, exceedingly strong, for the protection of the upper part of the air tube; *d*, the *cartilaginous ringlets* of the *trachea* or *wind-pipe*, each forming nearly two-thirds of a circle, and completed by a soft *membrane*, which, from its apposition to, *e*, Fig. 1. the *æsofagus*, accommodates itself to the substances passing into the stomach.

FIG. 3. The *larynx* or *upper* part of the wind-pipe of a bird.

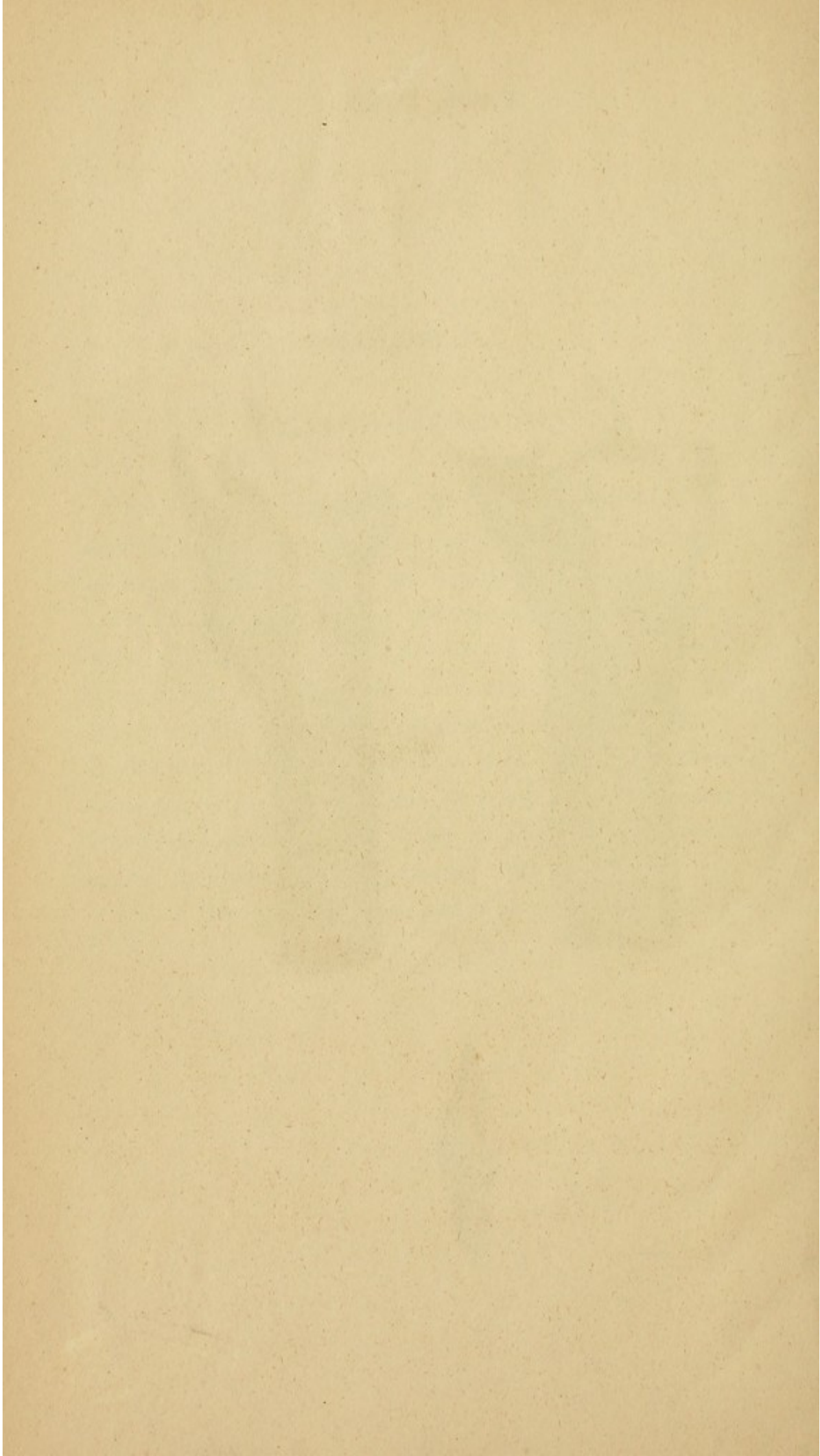
TAB. XXI.



J. R. S. Del.

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CHAPTER XI

THE HISTORY OF THE UNITED STATES

1776-1863

It is in the history of the United States that we find the most complete and accurate record of the progress of the human mind in the last century. The history of the United States is a history of the human mind, and it is in the history of the United States that we find the most complete and accurate record of the progress of the human mind in the last century. The history of the United States is a history of the human mind, and it is in the history of the United States that we find the most complete and accurate record of the progress of the human mind in the last century.

CHAPTER XI.

TAB. XXII.—PACKAGE OF THE VISCERA, AND MESENTERY.

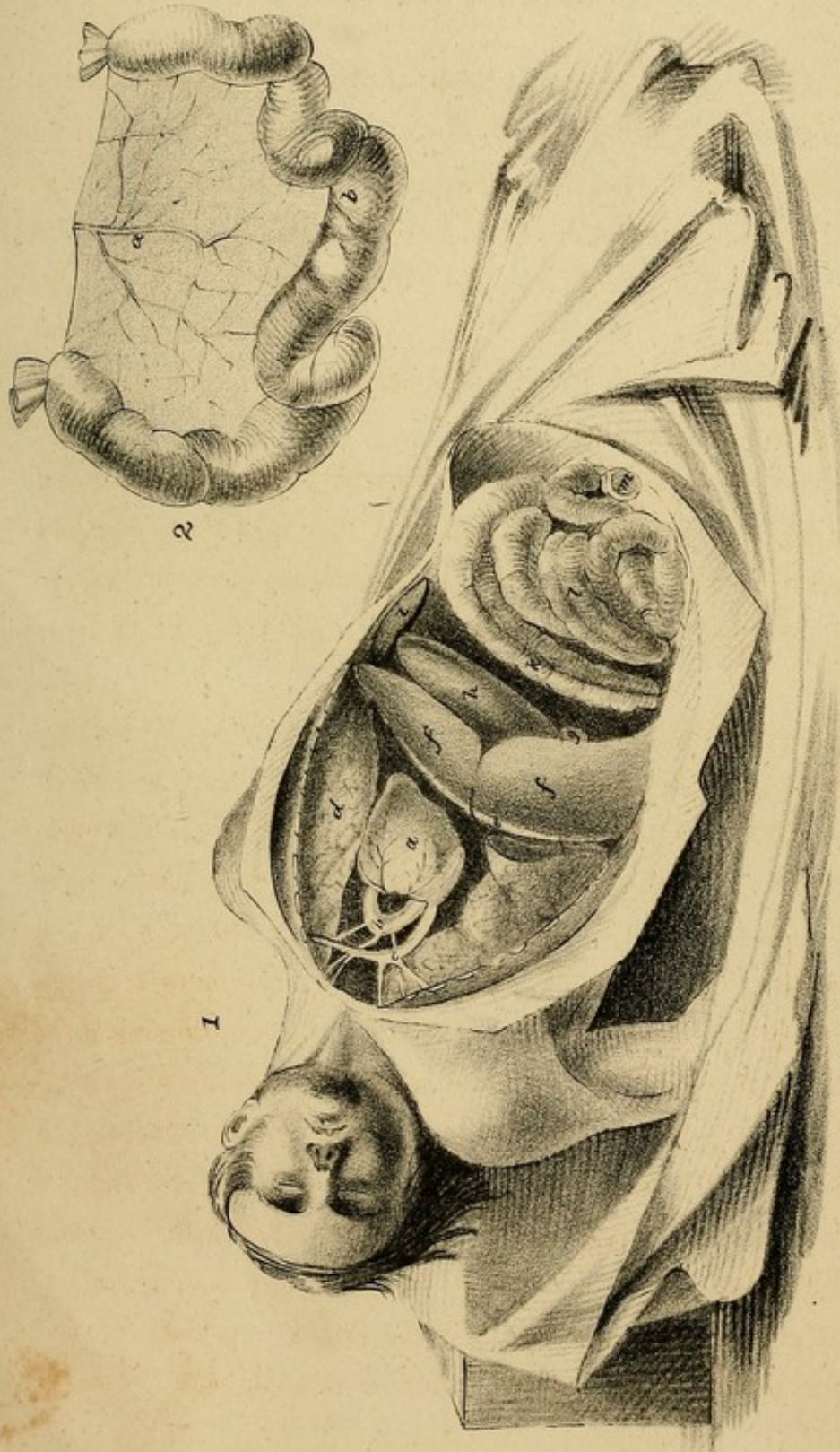
FIG. 1. In this plate the parietes of the chest and abdomen, with the omentum, are removed to show the viscera *in situ*; *a*, the heart; *b*, the aorta; *c*, the descending vena cava; *d*, the lungs divided by the mediastinum into two portions; three lobes belong to the right, and two to the left portion of the lungs; *e*, the diaphragm; *f*, the liver; *g*, the gall-bladder; *h*, the stomach; *i*, the spleen; *k*, the large intestines; *l*, the small intestines; *m*, the bladder.

The viscera of the thorax and abdomen, *i. e.* the viscera of organic life, are irregularly disposed. The agents of volition are double, but the instruments of involuntary motion, namely the interior life, are single, and at least are irregular in their form.

The several viscera are correctly described in the Theology, and sufficient is said for the purposes for which they are introduced. To the supposed use of the spleen only an objection must be taken: various hypotheses have been entertained as to its office, but none are conclusive; the most probable is, that it is a source of supply of blood for furnishing the gastric secretion, or that the blood undergoes some important change in it.

FIG. 2. The mesentery. This membrane is formed by a reflection of the peritonæum from each side of the vertebræ; it connects the intestines loosely to the spine, to allow them a certain degree of motion, yet retains them in their places; and furnishes their exterior covering. Between the laminæ of, *a*, the mesentery, are received the glands, vessels, and nerves; and its extent admits of a proper distribution of each.

TAB. XXIII.

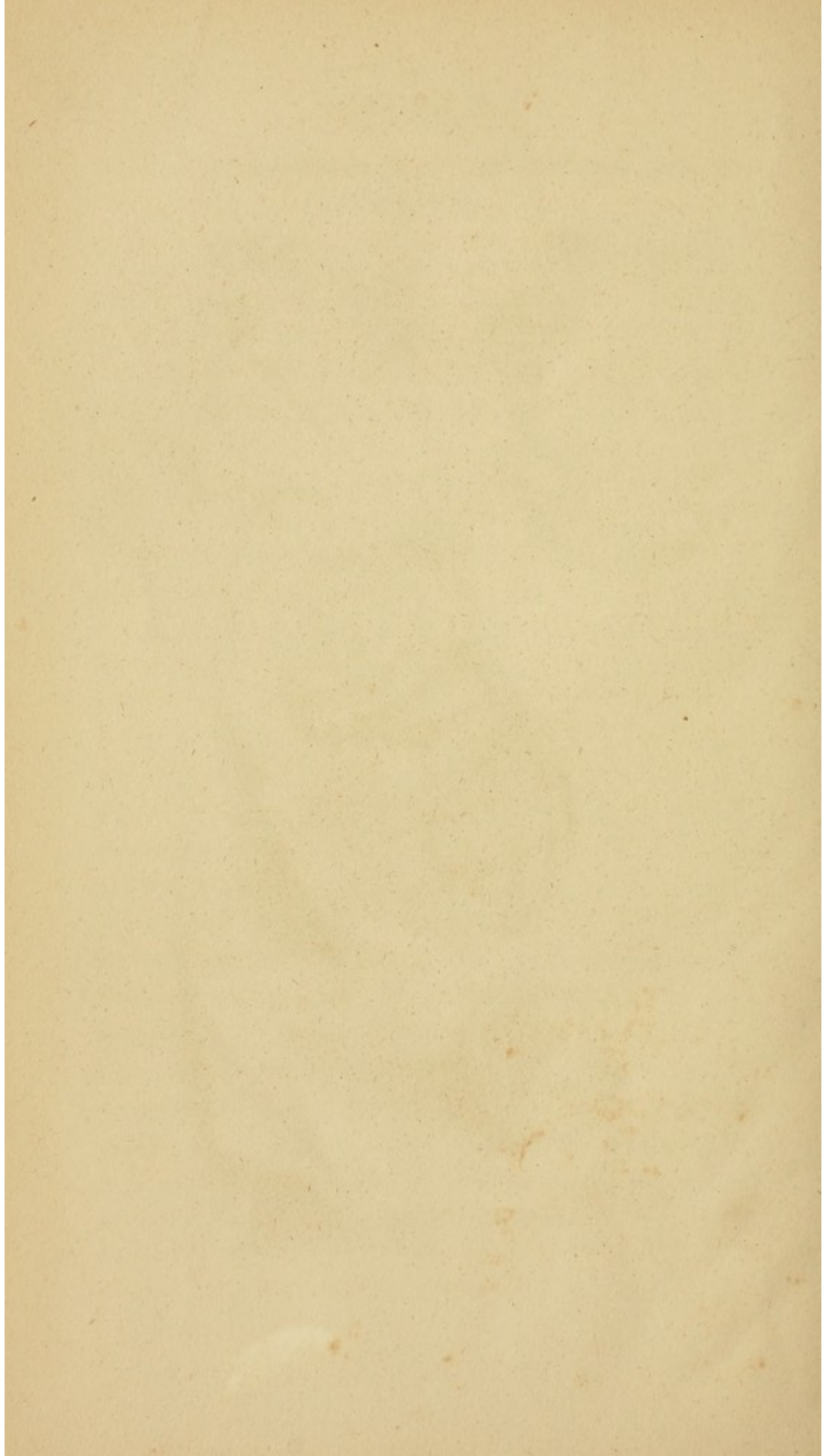


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CHAPTER XII.

TAB. XXIII.—NERVES OF THE BILL OF A DUCK,
VALVULÆ CONNIVENTES. CHAP. XIII. AIR-BLADDER
OF A FISH, AND FANG OF THE VIPER.

FIG. 1. The upper *mandible* of the duck, on which are distributed the first and second branches of the fifth pair of nerves; the former passing through the orbit to the extremity of the bill, and, together with the latter, supplying the whole palatine surface.

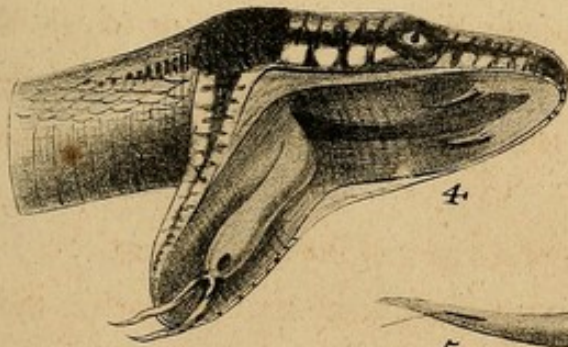
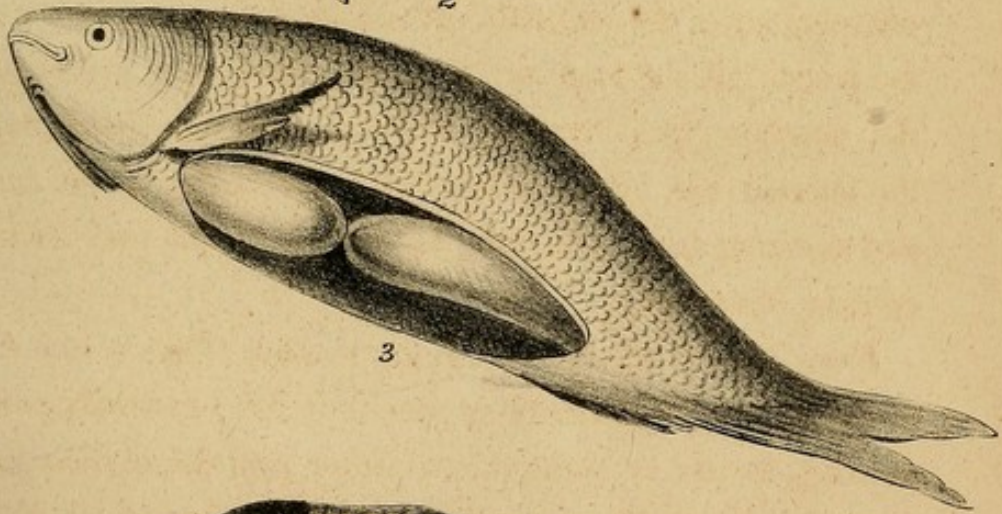
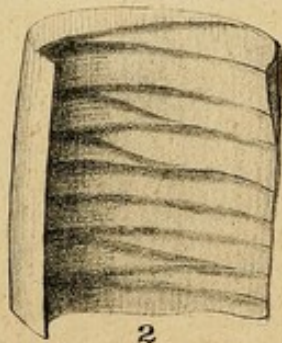
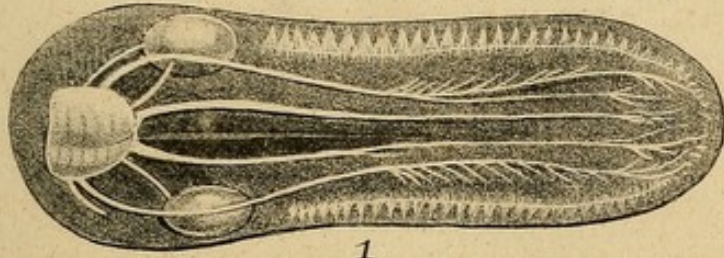
FIG. 2. A small portion of the human intestine cut open in order to show the *valvulæ conniventes*. It may be questioned, whether these extremely soft rugæ or folds of the villous coat of the intestine can in the least retard the passage of the food through its canal; nor does, as Paley supposes, the erect attitude of man require them; for, since there are as many of the convolutions of the intestines ascending as there are descending, the weight of the food can have no influence in the action of the intestine: it is certain, however, that this arrangement of the internal coat, affords *a more extensive surface of the lacteals and secreting vessels*; and this appears to be the real use of the *valvulæ conniventes*.

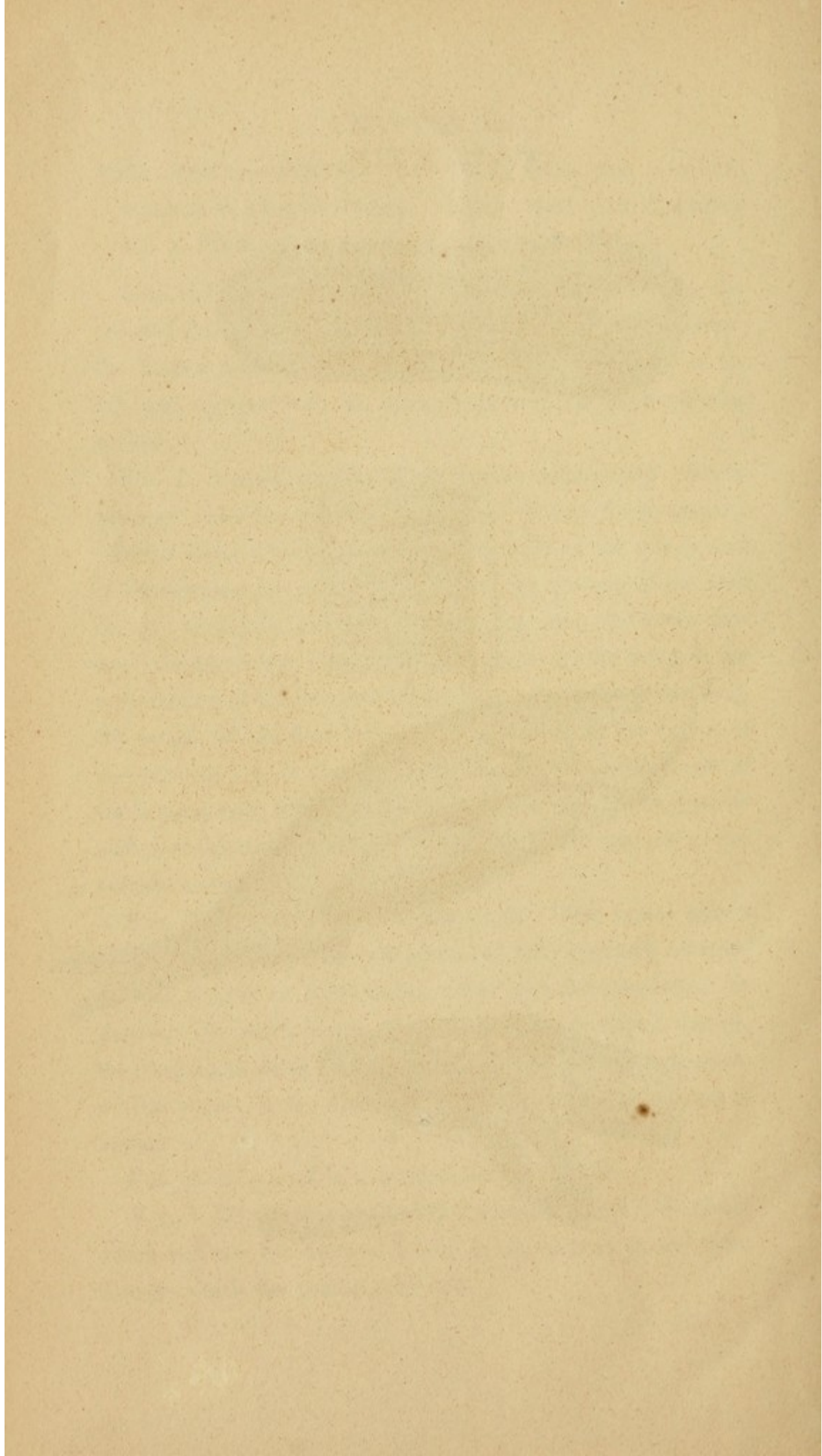
FIG. 3. The *air-bladder* in the roach. This vessel differs in size and shape, in different species of fish; generally communicating, by one or more ducts, either with the œsophagus or stomach; by which means the fish receives or expels the air, thus sinking or rising without effort: but as some are destitute of this organ, it is considered as an accessory instrument of motion.

FIG. 4. The head of a viper of the natural size.

FIG. 5. The *fang* magnified, at the root of which is the gland which secretes the venom: a hair is represented in the tube, through which the poison is ejected.

TAB. XXIII.





CHAPTER XIII

THE HISTORY OF THE

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CHAPTER XIII.

TAB. XXIV.—THE OPOSSUM.

FIG. 1. The American opossum ; (*didelphis marsupialis.*)

FIG. 2. One of the young of the opossum.

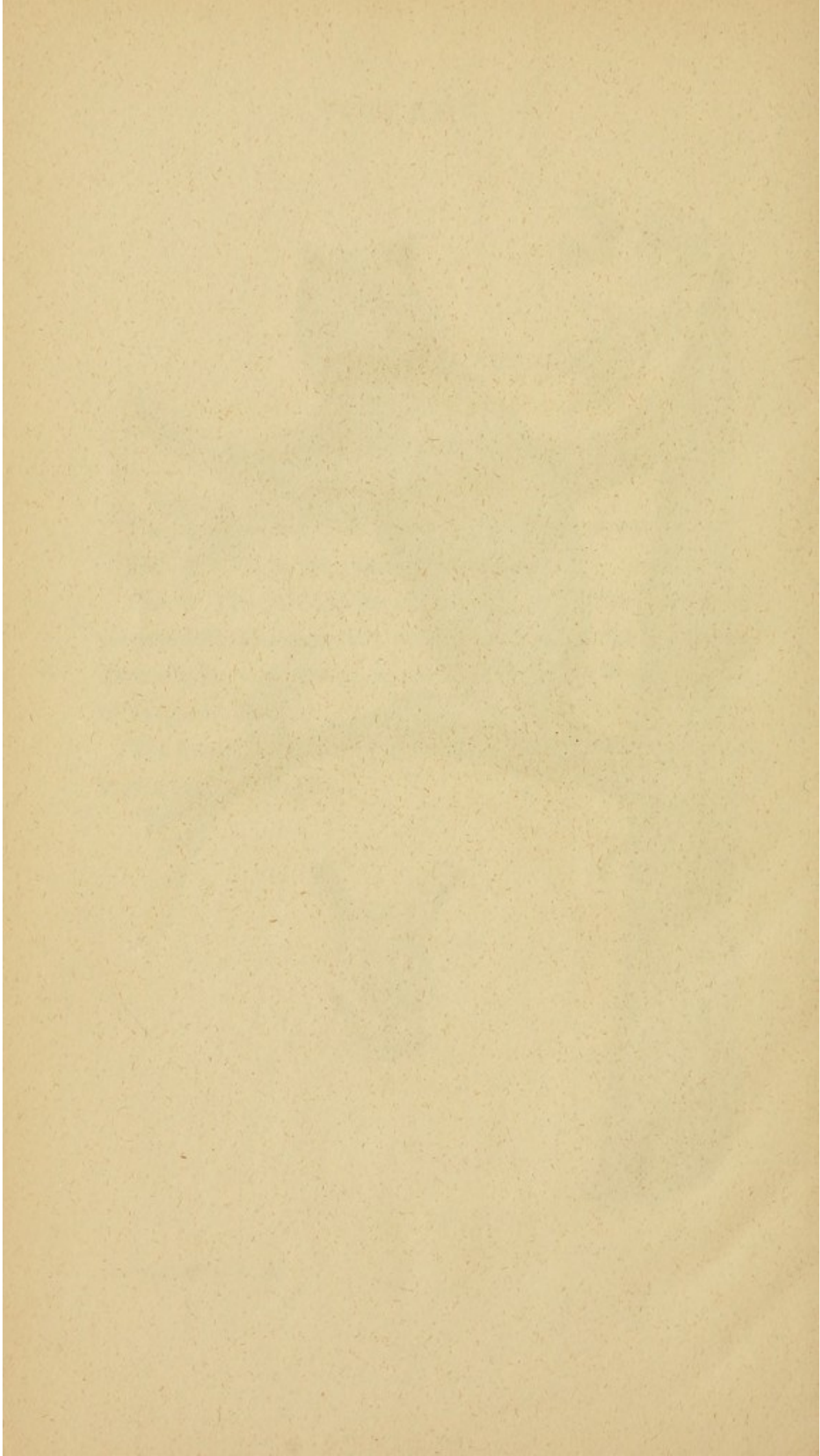
FIG. 3. The pelvis of the opossum ; *a, a*, the two bones (*ossa marsupialia*) placed on the anterior part called the *ossa pubis*.
Drawn from a specimen in the Museum of the Royal College of Surgeons, London.

The kangaroo and several other animals of New Holland have a similar structure.

TAB. XXIV.



Lith. of Pordobon



CHAPTER XVII

THE FOLK OF THE HILLS AND THE

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CHAPTER XIII.

TAB. XXV.—CLAW OF THE HERON, AND BILL OF
THE SOLAND GOOSE.

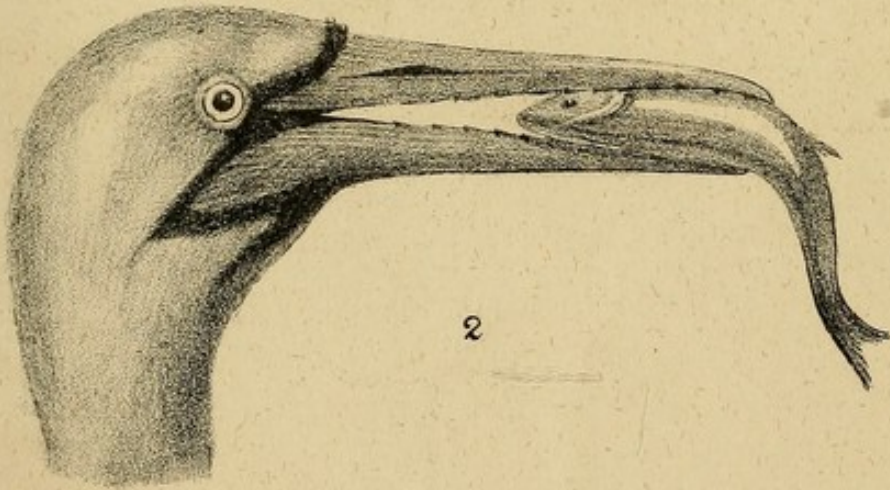
FIG. 1. *The middle claw of the heron.*

FIG. 2. The head of the *Soland goose* (*pelicanus bassanus*),
drawn from a specimen in the Ashmolean Museum, Oxford.

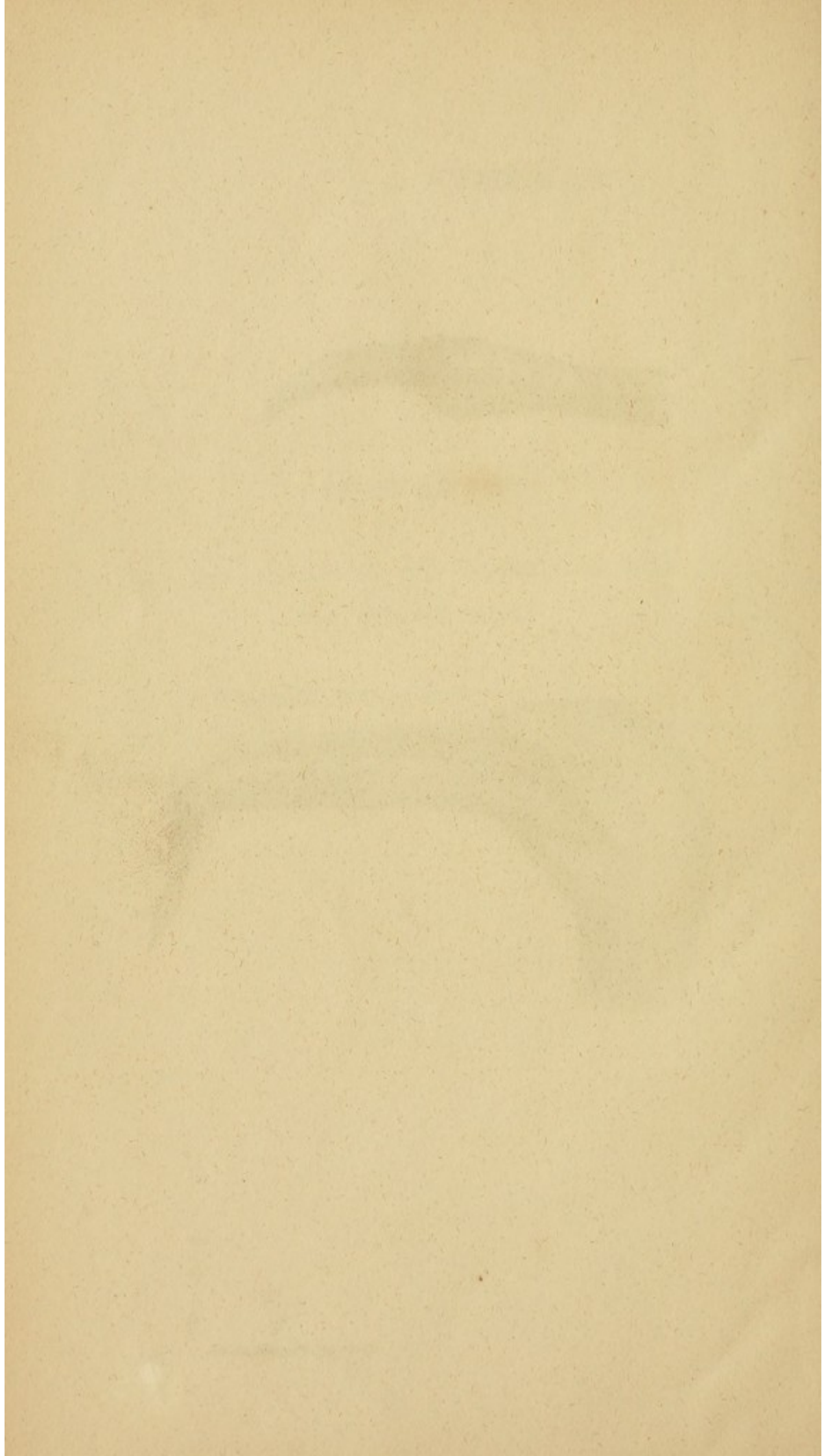
TAB. XXV.



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CHAPTER III

THE STATE OF THE UNION

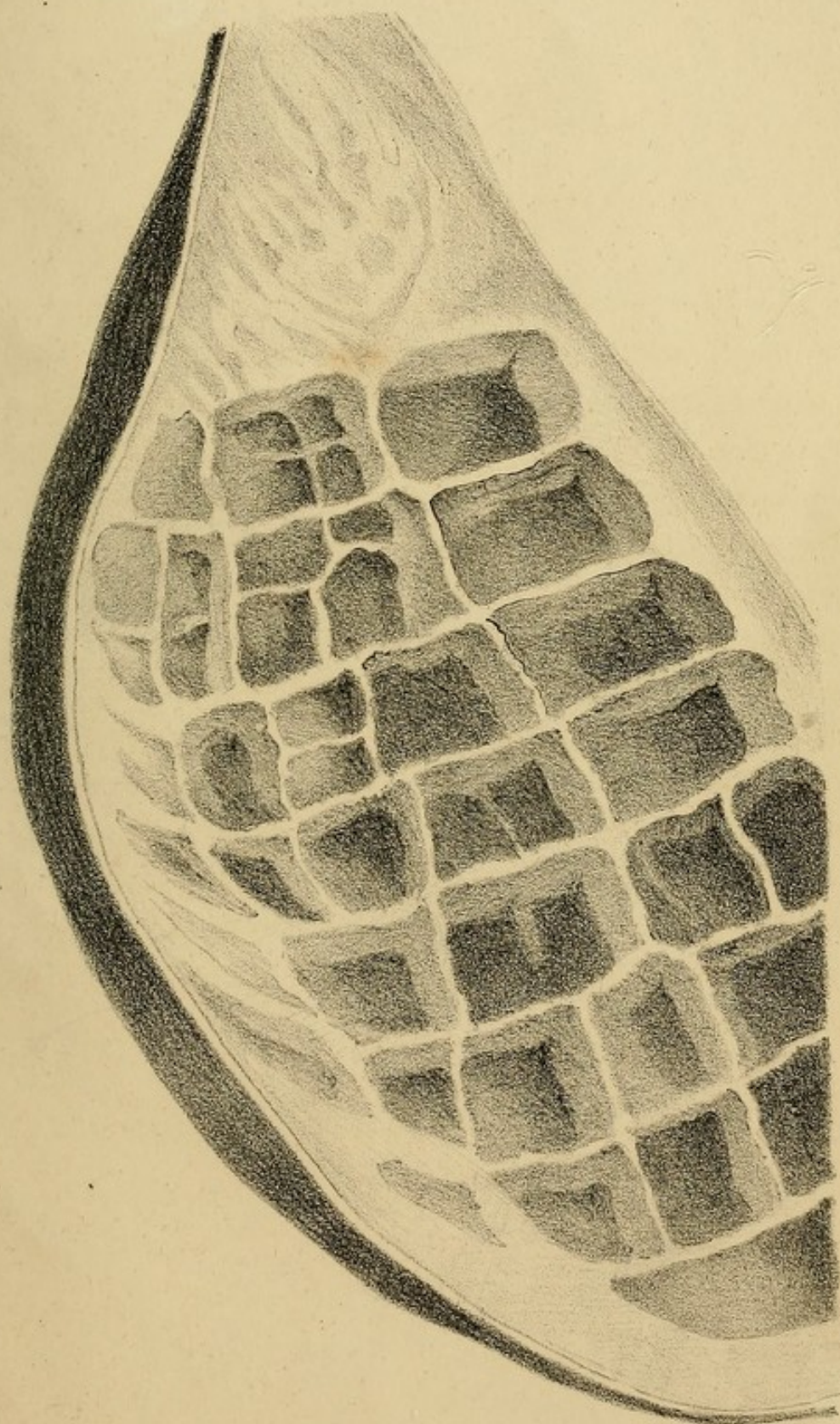
The report of the State of the Union is the most important document in the history of the United States. It is a record of the progress of the nation and a guide to the future. The report is prepared by the President and is presented to Congress. It contains information on the economy, the military, and the foreign relations of the United States. The report is a key document for the public and for the government. It is a record of the nation's progress and a guide to the future.

CHAPTER XIII.

TAB. XXVI.—STOMACH OF THE CAMEL.

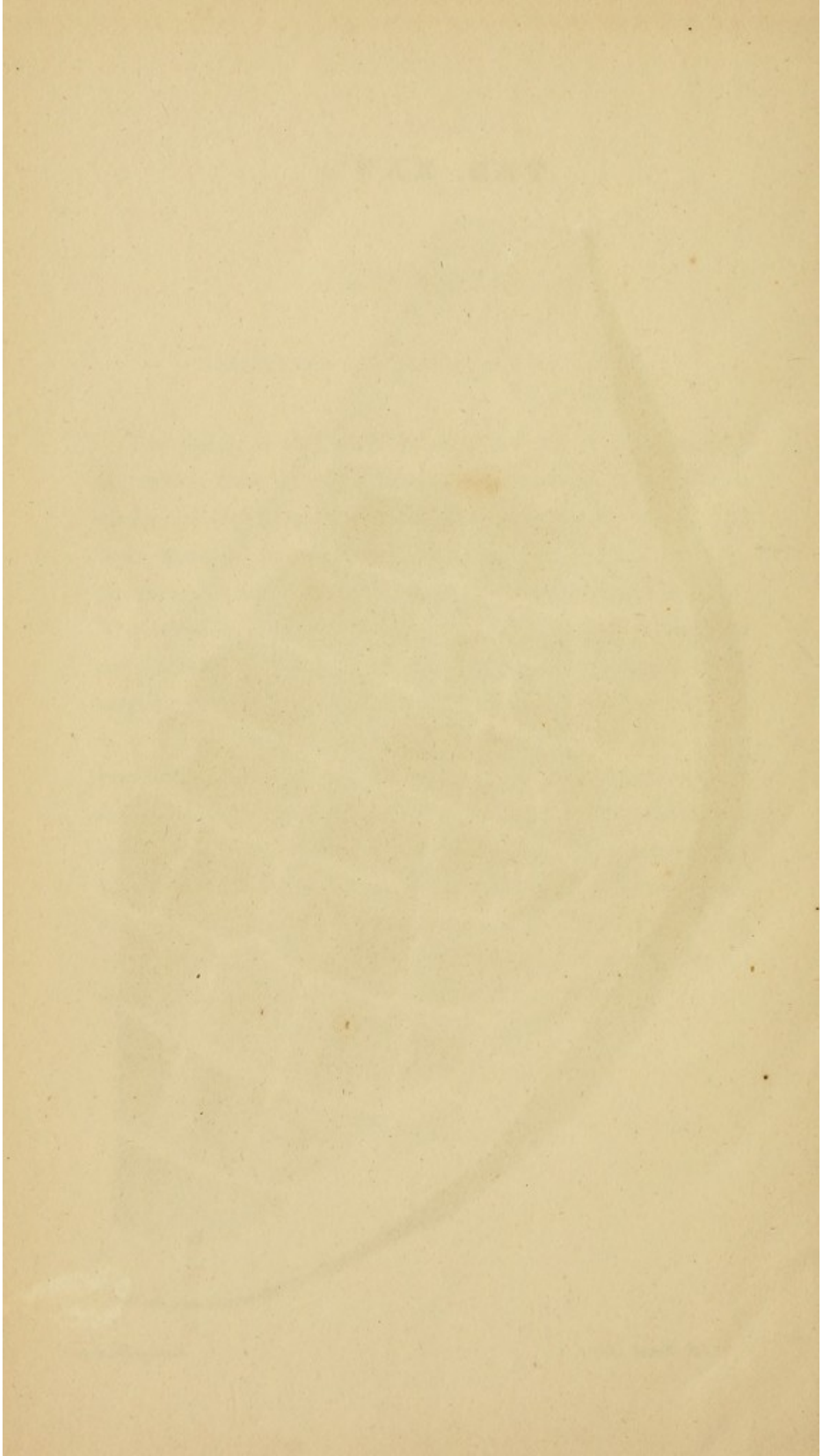
The figure in this plate exhibits the *cells in the stomach of the camel*, from a preparation in the museum of the Royal College of Surgeons, London. In the camel, dromedary, and lama, there are four stomachs, as in horned ruminants; but the structure, in some respects, differs from those of the latter. The camel tribe have in the first and second stomach numerous cells, several inches deep, formed by bands of muscular fibres crossing each other at right angles; these are constructed so as to retain the water, and completely exclude the food. In a camel dissected by Sir E. Home, the cells of the stomach were found to contain two gallons of water; but in consequence of the muscular contraction, which had taken place immediately after death, he was led to conclude this was a quantity much less than these cavities were capable of receiving in the living animal. See Lectures on Comparative Anatomy, by Sir E. Home, vol. i. p. 168.

TAB. XXVI.



J.R. Smith del.

Lith. of Pendleton.



CHAPTER XIII

THE HISTORY OF THE WOODS AND
THE HISTORY OF THE WOODS

The first part of the book is devoted to the history of the woods and the second part to the history of the woods.

CHAPTER XIII.

TAB XXVII.—TONGUE OF THE WOODPECKER, AND
SKULL OF THE BABYROUessa.

FIG. 1. The *head of the woodpecker*, (*picus viridis*.)

FIG. 2. The *tongue*, the natural size.

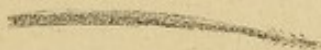
FIG. 3. The *claw* of the same bird, referred to in Chap. V.

FIG. 4. The *skull of the babyrouessa*, from a specimen in the
Anatomy School, Christ Church, Oxford.

TAB. XXVII.



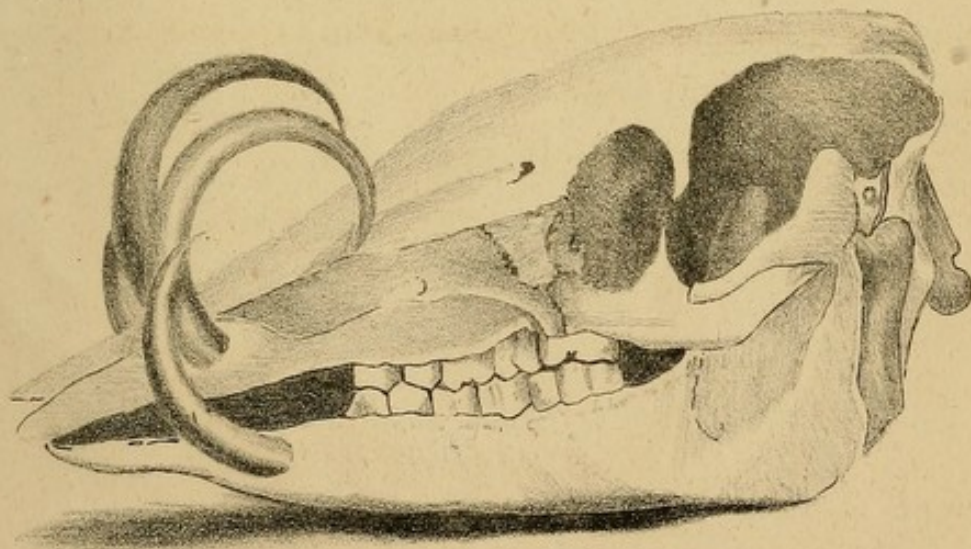
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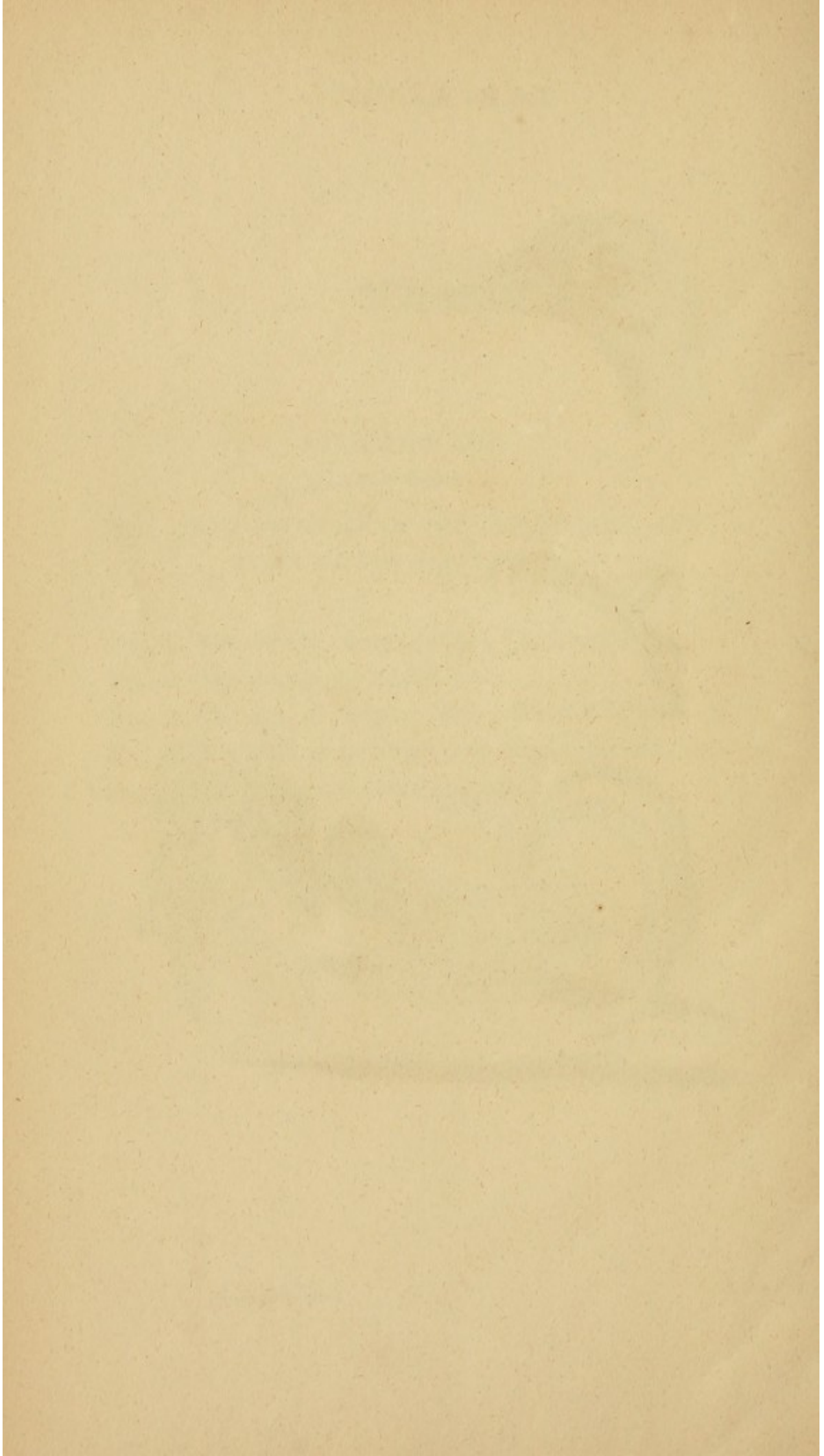


Fig. 11. The jaws and other parts of the head are removed, showing the roots of the teeth as they exist at the time of the birth; they are without roots, but are held in a socket within the jaw.

Fig. 12. In this figure the outer alveolar plate of the jaw has been removed to show the suspension of teeth. The teeth are at six years of age. The temporary teeth are all set between the ages of seven and fourteen, and are supplied by the permanent ones, which are partly formed, and stand at the roots of the former.

CHAPTER XIV.

TAB. XXVIII.—TEMPORARY AND PERMANENT TEETH.

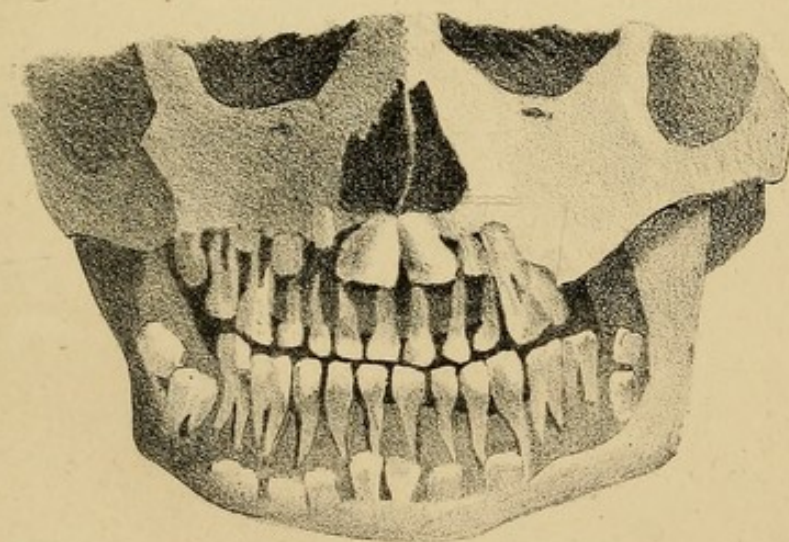
FIG. 1. The gums and outer plate of the bone are removed, showing the teeth of the infant, as they exist at the time of its birth; they are without roots, and contained in a capsule within the jaws.

FIG. 2. In this figure also, the outer alveolar plate of the jaws has been removed to show the succession of teeth. This is the state at six years of age. The *temporary* teeth are all shed between the ages of seven and fourteen, and are supplied by the *permanent teeth*, already nearly perfectly formed, and situated at the roots of the former.

TAB. XXVIII



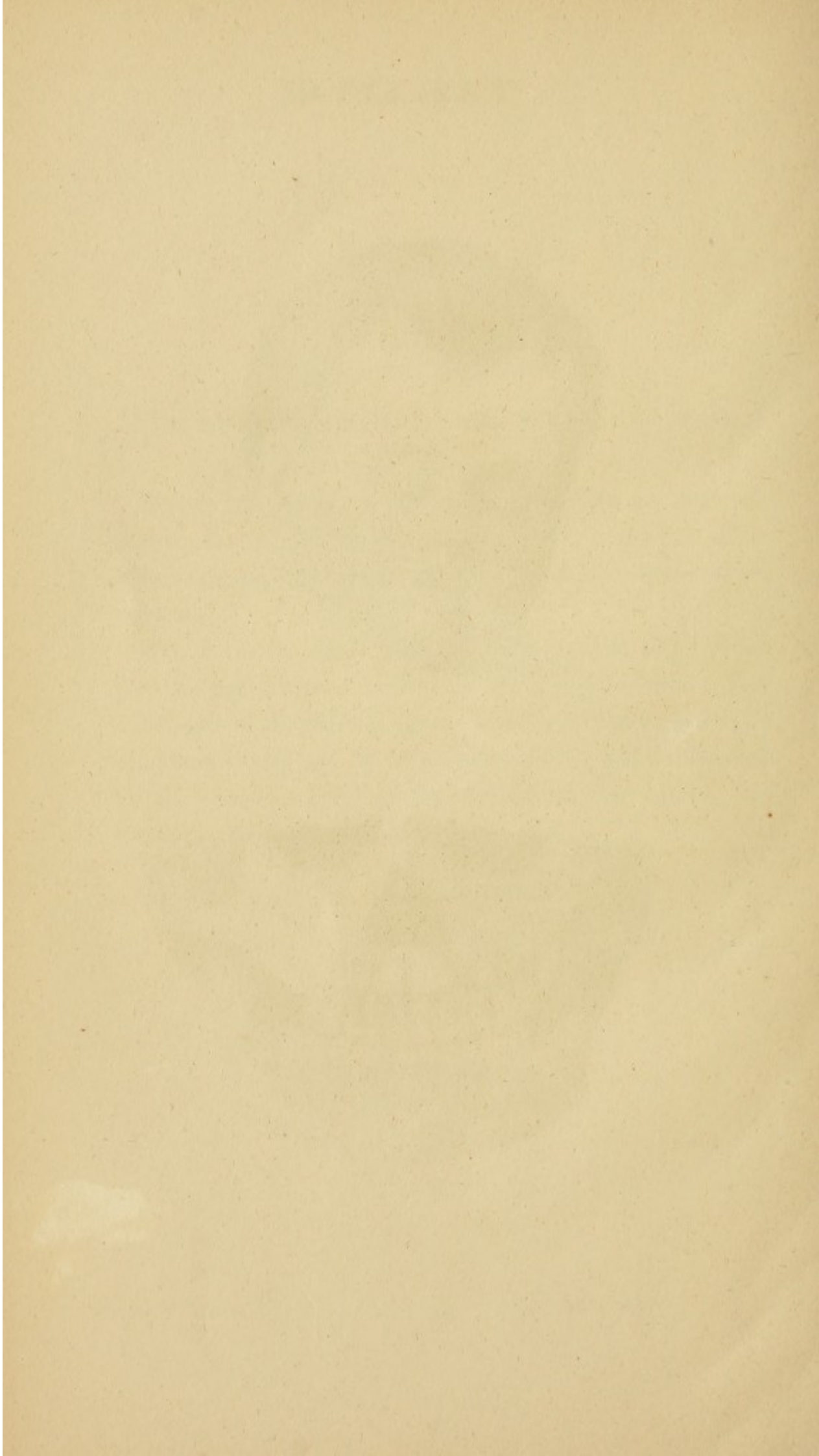
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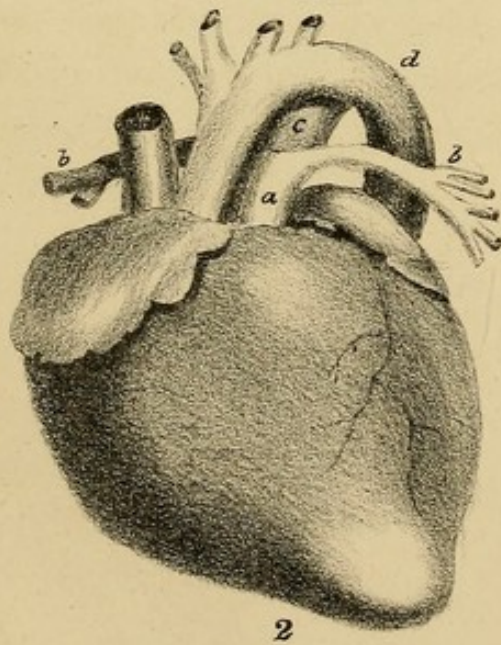
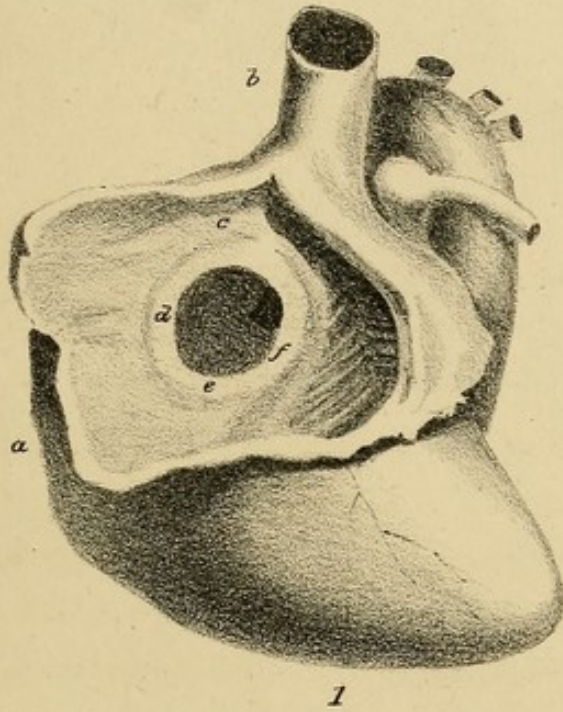
CHAPTER XIV.

TAB. XXIX.—FORAMEN OVALE, AND DUCTUS ARTERIOSUS.

FIG. 1. A view of the fœtal heart ; *a*, the ascending, *b*, the descending vena cava ; *c*, the right auricle ; *d*, *e*, *f*, mark the elevated ring of the *foramen ovale*, or the opening between the two auricles.

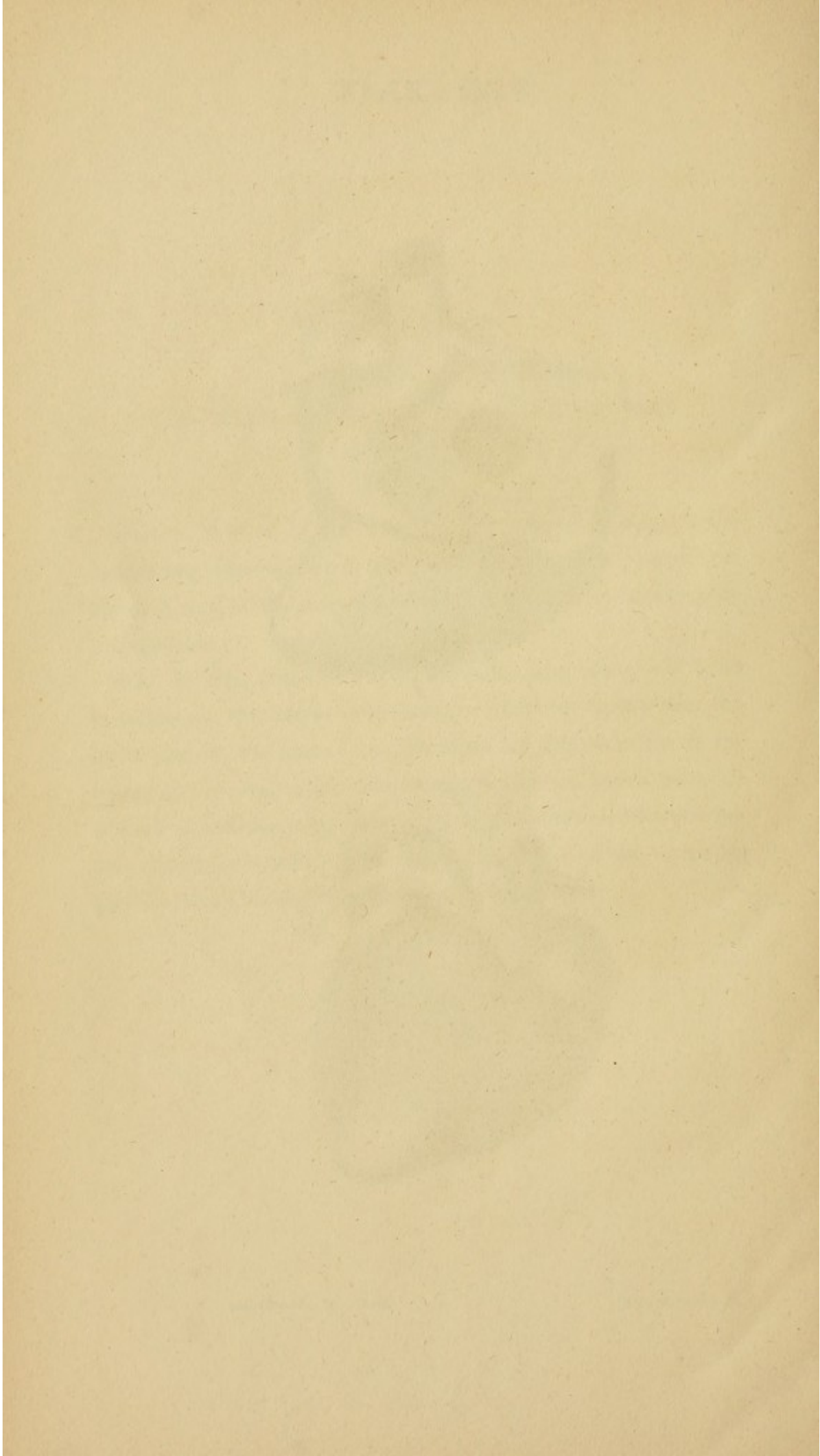
FIG. 2. The fœtal heart ; *a*, the pulmonary artery ; *b*, *b*, its branches ; *c*, the *ductus arteriosus*, or canal for transmitting the blood into, *d*, the aorta. As the lungs are useless in the fœtus, unless as a “prospective contrivance,” the heart has to carry on a single circulation only : the free communication between the two auricles identifies them as one cavity ; and the ventricles also force the blood into one vessel, the aorta.

TAB. XXIX



J. R. Smith del.

Lith. of Pondleton.



CHAPTER VII

THE STATE OF THE UNION AND THE

CONSTITUTION

The Constitution of the United States is a document of great importance, and one which has been the subject of much discussion and controversy. It is the foundation upon which the government of the United States is built, and it is the duty of every citizen to know its contents and to understand its meaning. The Constitution is a living document, and it has been amended several times since it was first adopted. These amendments have been made in order to keep the Constitution up to date and to reflect the changing needs of the people. The Constitution is a document of great importance, and it is the duty of every citizen to know its contents and to understand its meaning.

CHAPTER XVI.

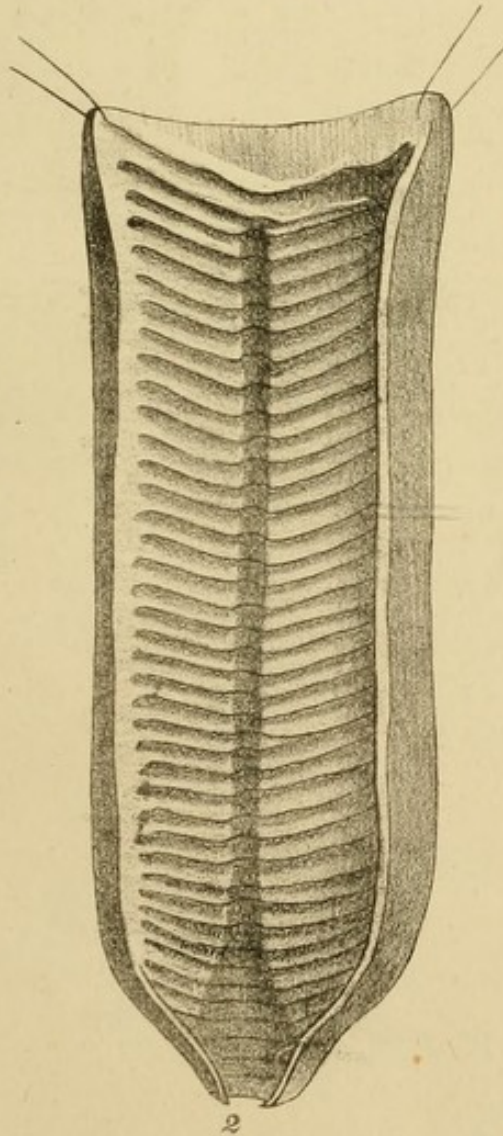
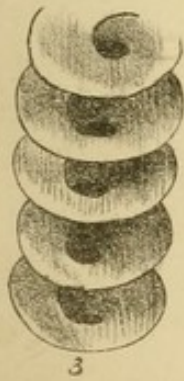
TAB. XXX.—THE CHAMELEON, AND GUT OF THE SEA FOX.

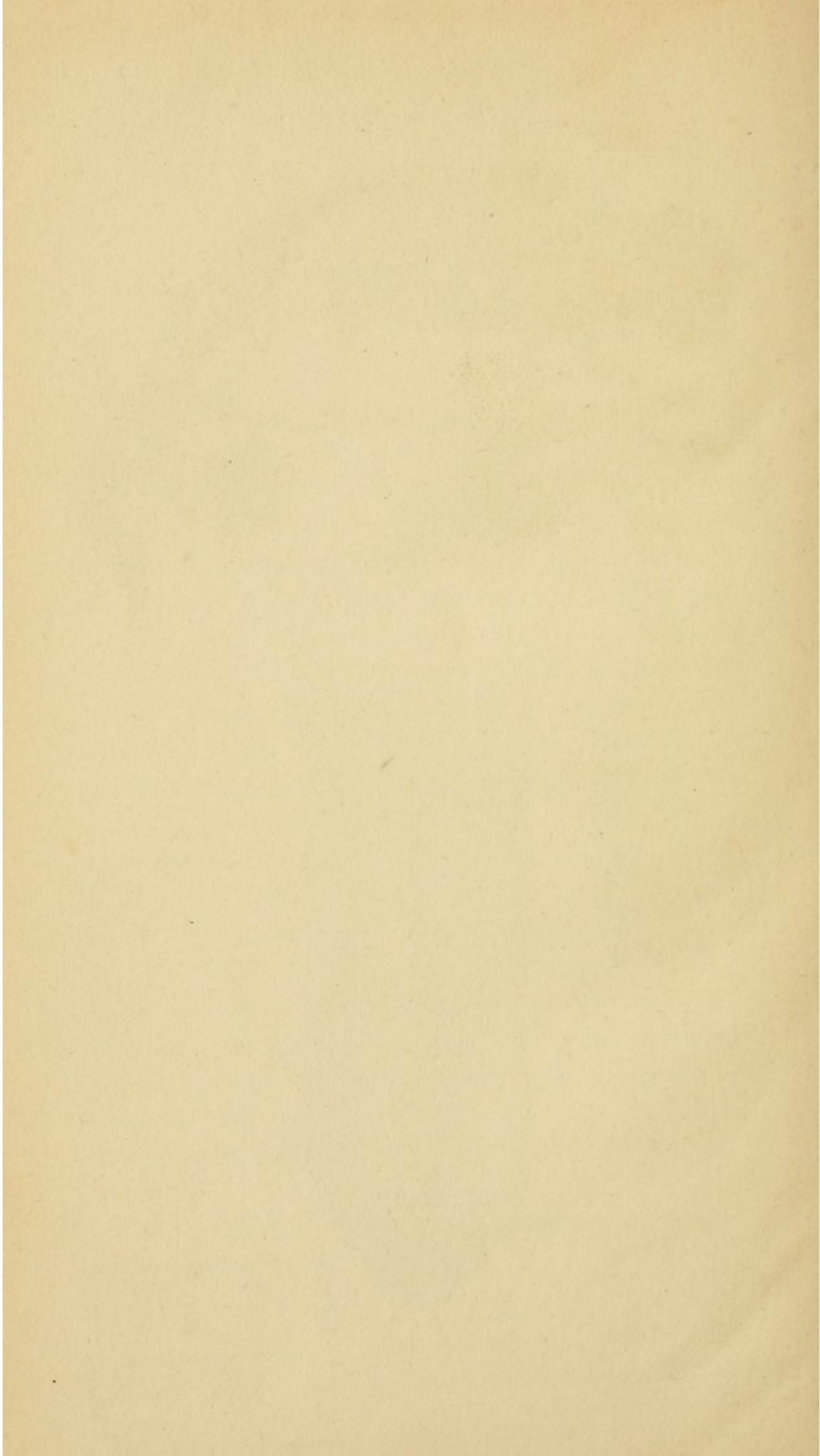
FIG. 1. The *chameleon*, drawn from one of the species preserved in the Anatomy School, Christ Church, Oxford. The eyes of this creature are very peculiar: they are remarkably large, and project more than half their diameter. They are covered with a single eye-lid, with a small opening in it opposite the pupil. The eye-lid is granulated like every part of the surface of the body, with this difference, over the eye the granulations are disposed in concentric circles which form folds in that part to which the eye is turned: and as the lid is attached to the front of the eye, so it follows all its movements. The neck is not “inflexible,” but its shortness, and the structure of the cervical vertebræ exceedingly limit the motion; this however is admirably compensated by the not less singular local position than motion of the eye, as the animal can see behind, before, or on either side, without turning the head.

FIG. 2. The spiral intestine of the *sea-fox* cut open; taken from a preparation in the museum of the Royal College of Surgeons, London. The sea-fox is not, as Paley supposes, a “quadruped;” but a species of shark (*squalus vulpes*.) The convoluted intestinal tube is found in some genera of fish, only. In this specimen the internal membrane is converted into a spiral valve, having thirty-six coils, so that the alimentary substances, instead of passing speedily away, by proceeding round the turns of the valve, traverse a very considerable circuit: an extensive surface for the absorbents is thus provided.

FIG. 3. The valve removed from the intestine in a dried preparation showing its real form.

TAB. XXX.





CHAPTER II

THE NATURE OF THE HUMAN MIND

The first part of the human mind is the body, which is the seat of the senses and the source of all our knowledge. The second part is the soul, which is the seat of the intellect and the source of all our reason.

The third part is the will, which is the power of choice and the source of all our actions. The fourth part is the memory, which is the storehouse of all our experiences and the source of all our wisdom.

The fifth part is the imagination, which is the power of forming images and the source of all our art and science. The sixth part is the conscience, which is the voice of God within us and the source of all our morality.

The seventh part is the love, which is the power of affection and the source of all our happiness. The eighth part is the fear, which is the power of awe and the source of all our reverence.

The ninth part is the hope, which is the power of expectation and the source of all our ambition. The tenth part is the despair, which is the power of hopelessness and the source of all our misery.

CHAPTER XIX.

TAB. XXXI.—THE WINGS OF THE BEETLE, AWL, STING OF THE BEE, PROBOSCIS, &c.

FIG. 1. is an instance of the horny and gauze wings in one of the most beautiful of the beetle class of this country, the *scarabæus auratus*, or rose chafer ; showing the expanded *elytra*, *a, a* : the true wings, *b, b*.

FIG. 2. A specimen of the *elytra* covering half the body in the *ear-wig*, (*forficula auricularia* :) one of the *elytra* is extended, and the membranous wing unfolded.

FIG. 3. The *awl* of the *æstrum bovis*, or *gad-fly*, highly magnified.

FIG. 4. One of the *hooks*.

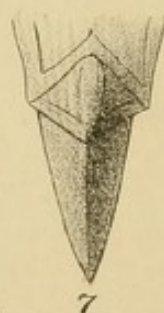
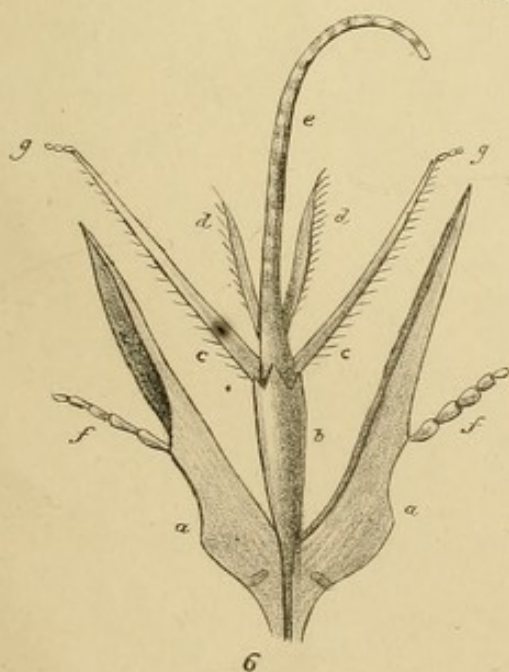
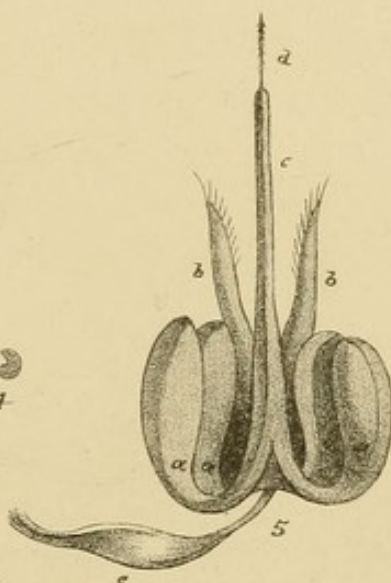
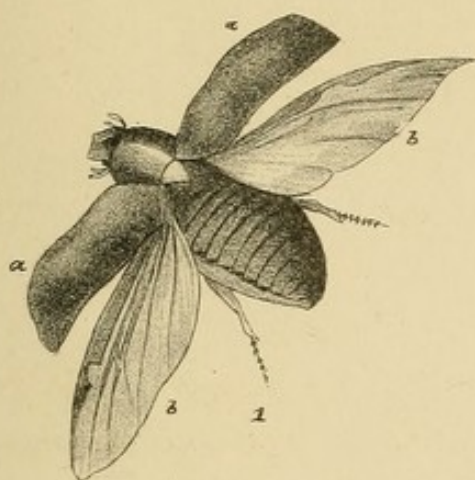
FIG. 5. The *sting* of a *bee*, drawn from nature as it appears by means of a magnifier of very high powers ; *a, a, a, a*, the apparatus for projecting the sting ; *b*, the exterior, *c*, the interior sheath of, *d*, the *true sting*, which is divided into two parts barbed at the sides ; *e*, the bag which contains the *poison*.

FIG. 6. The *proboscis* of a *bee* extended ; *a, a*, the case or sheath ; *b*, the tube ; *c*, the exterior, *d*, the interior fringes ; *e*, the tongue ; *f, f*, the exterior, *g, g*, the interior palpi.

FIG. 7. The appearance of the *proboscis* when contracted, and folded up.

FIG. 8. The head of a *butterfly*, showing the *coiled proboscis*.

TAB. XXXI.



CHAPTER III

THE CAPSULE, THE SEED, THE FRUIT,
AND THE ROOT

FIG. 1. The capsule or seed vessel of the poppy (Papaver somniferum); it is divided to exhibit its internal structure.

FIG. 2. An embryo of an erect biennial, the green Amaranth; in which the point is shown that the radicle.

FIG. 3. A flower of the water-hemp (Najas). The root is a part of the leaf, and is now inverted.

FIG. 4. A portion of the root of the water-hemp (Najas), showing the root and the leaf.

FIG. 5. A portion of the root of the water-hemp (Najas), showing the root and the leaf.

CHAPTER XX.

TAB. XXXII.—THE CAPSULE, PISTIL, STAMINA, NIGELLA, PLUMULE, AND RADICLE.

FIG. 1. The *capsule* or seed vessel of the poppy (*papaver somniferum*) : it is divided to exhibit its internal structure.

FIG. 2. is an instance of an erect flower, the agave *Americana* ; in which the pistil is shorter than the stamina.

FIG. 3. A flower of the *crown-imperial*. The relative length of the parts is now inverted.

FIG. 4. A blossom of the *nigella*.

FIG. 5. A grain of barley, showing the *plumule* and *radicle* growing from it.

TAB. XXXII.



THE HISTORY OF THE
CITY OF BOSTON
FROM 1630 TO 1800
BY
JOHN H. COOPER
VOLUME I
THE FOUNDING OF THE CITY
AND THE EARLY PERIOD
1630-1680
BOSTON: PUBLISHED BY
J. B. LEECH, 15 NASSAU ST.
1850

CHAPTER XX.

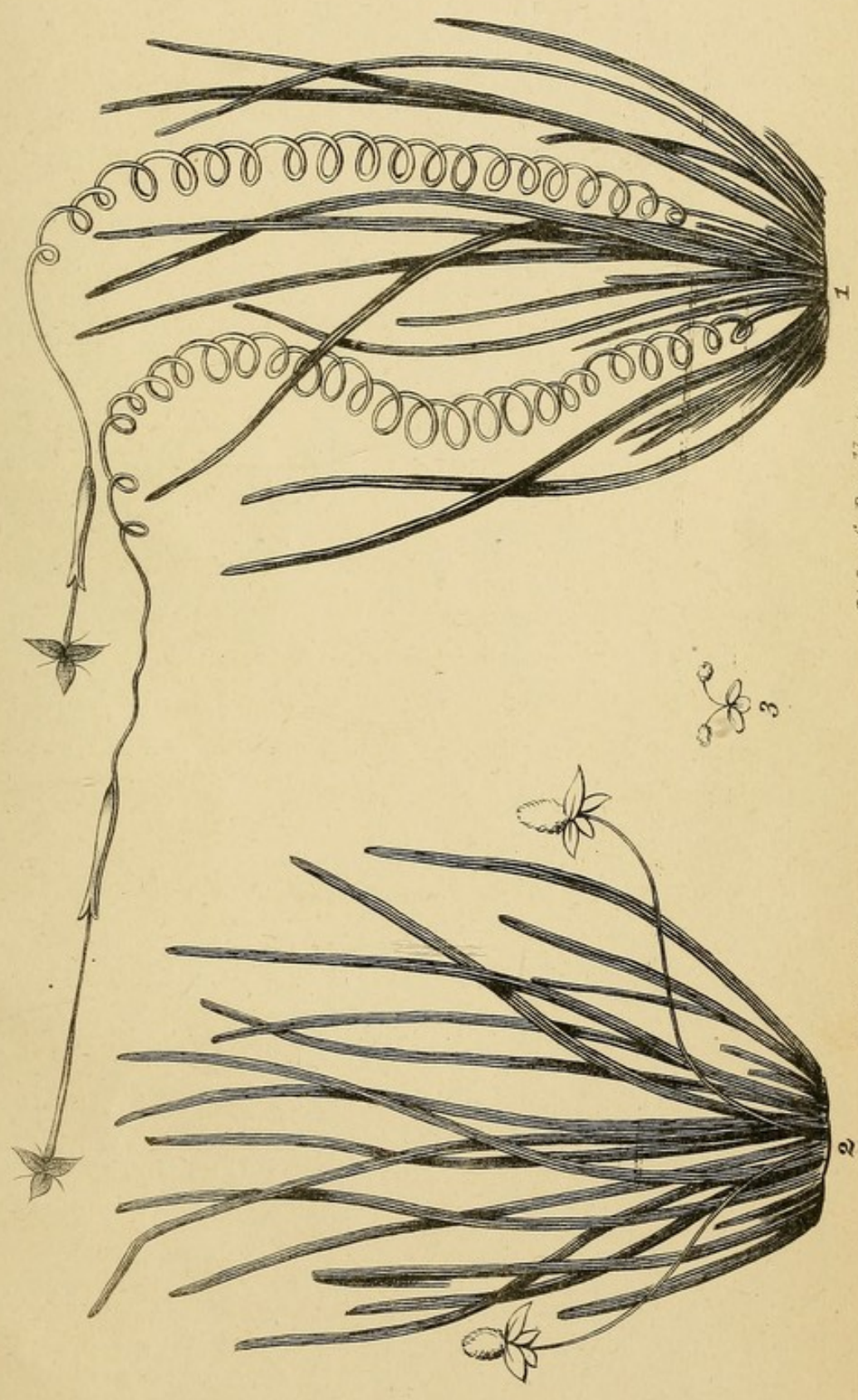
TAB. XXXIII.—VALLISNERIA.

FIG. 1. *Vallisneria spiralis*. The *female plant*, the flowers of which are purple. This is drawn from a specimen in the possession of Dr. Ogle.

FIG. 2. The *male plant*, producing white flowers; these when mature rise like air bubbles, and suddenly expanding when they reach the surface of the water, float about in such abundance as to cover it entirely. "Thus their pollen is scattered over the stigmas of the first mentioned blossoms, whose stalks soon afterwards resume their spiral figure, and the fruit comes to maturity at the bottom of the water."

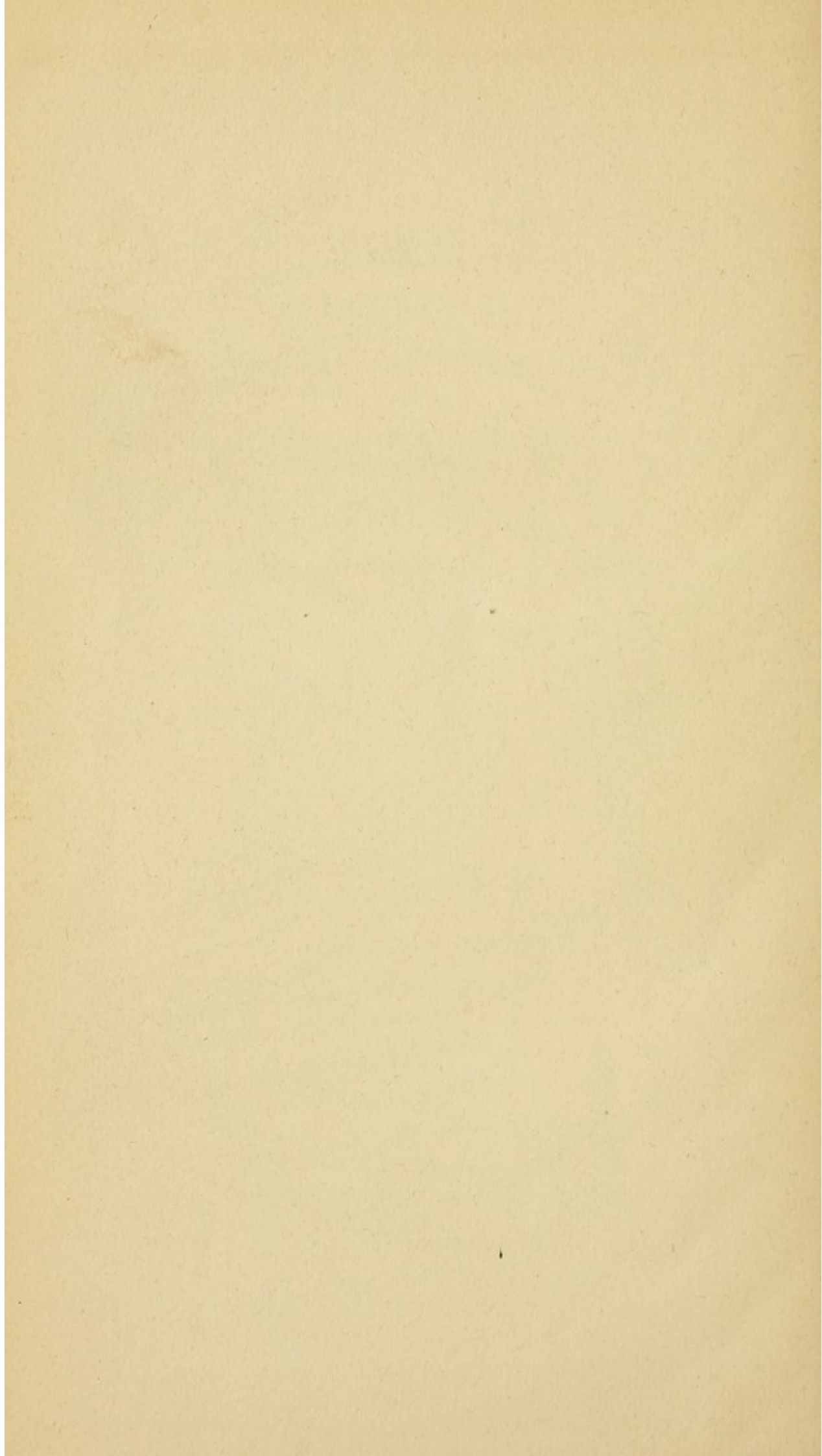
FIG. 3. One of the separated *male* flowers magnified.

TAB. XXXIII.



Litt. of Pondlobor.

Swatt Det.



CHAPTER XX

TABLE XXII — THE GREAT BRITAIN

The first is a table of the principal cities and towns in Great Britain, showing the population of each in 1851, and the number of houses and streets. It also gives the names of the principal churches, and the names of the principal public buildings. The second is a table of the principal rivers and canals in Great Britain, showing the length of each, and the number of bridges and locks. It also gives the names of the principal ports, and the names of the principal public buildings. The third is a table of the principal public buildings in Great Britain, showing the names of each, and the names of the architects. It also gives the names of the principal public buildings, and the names of the architects. The fourth is a table of the principal public buildings in Great Britain, showing the names of each, and the names of the architects. It also gives the names of the principal public buildings, and the names of the architects.

CHAPTER XX.

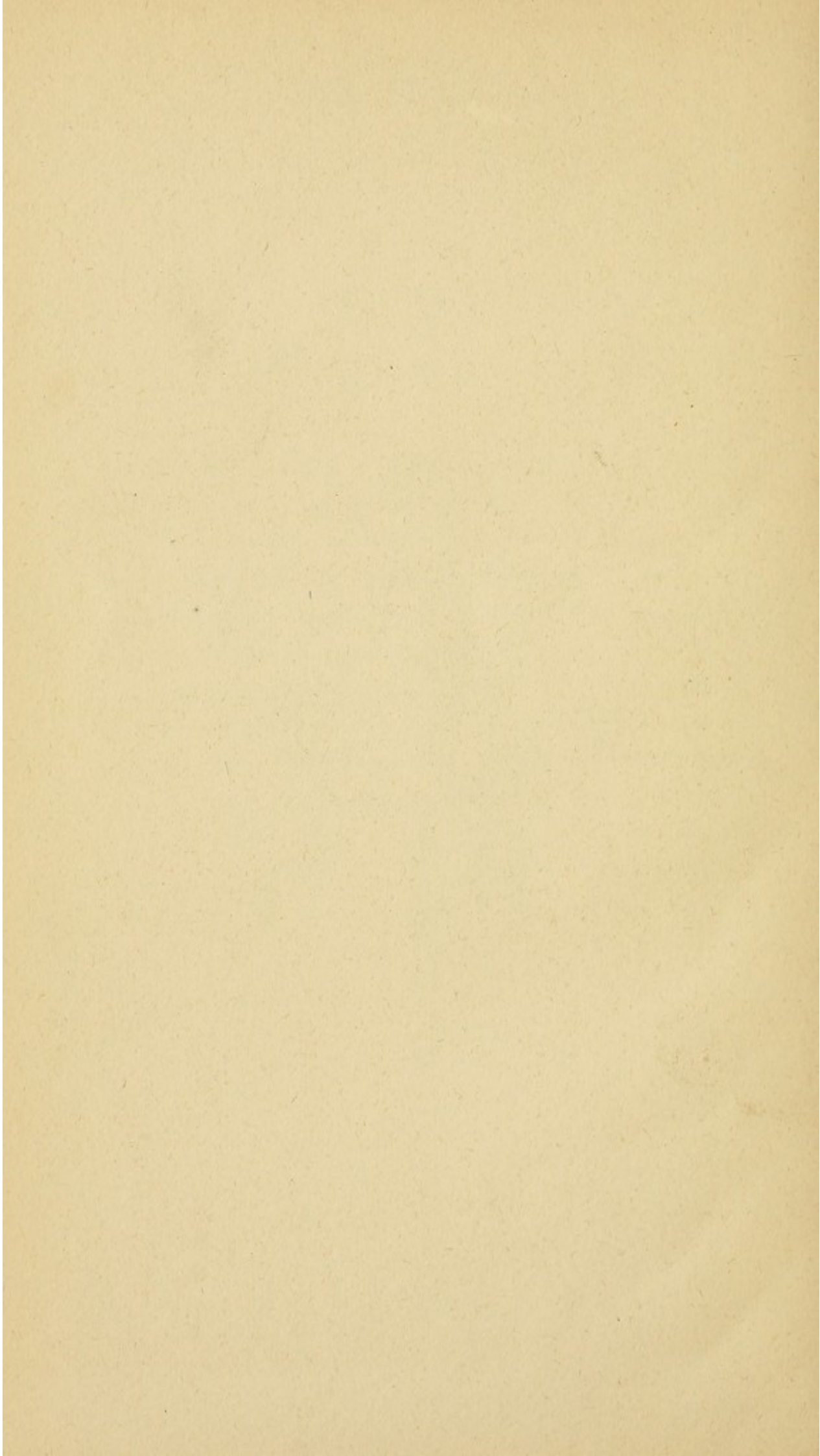
TAB. XXXIV.—CUSCUTA EUROPEÆA.

This plant is a native of our own country, and is found in hedges, on clover, or on beans, where it proves exceedingly injurious to the crop. It flowers from June to August. The drawing was taken from a specimen which grew in the Physic Gardens, Oxford. It is represented twining about some nettles on which it annually attaches itself.

“Of all the parasitical plants, the dodder (*cuscuta*) tribe are the most singular, trusting for their nourishment entirely to those vegetables about which they twine, and into whose tender bark they insert small villous tubercles serving as roots, the original root of the dodder withering away entirely, as soon as the young stem has fixed itself to any other plant; so that its connexion with the earth is cut off.” *English Botany*, p. 55.

TAB. XXXIV.



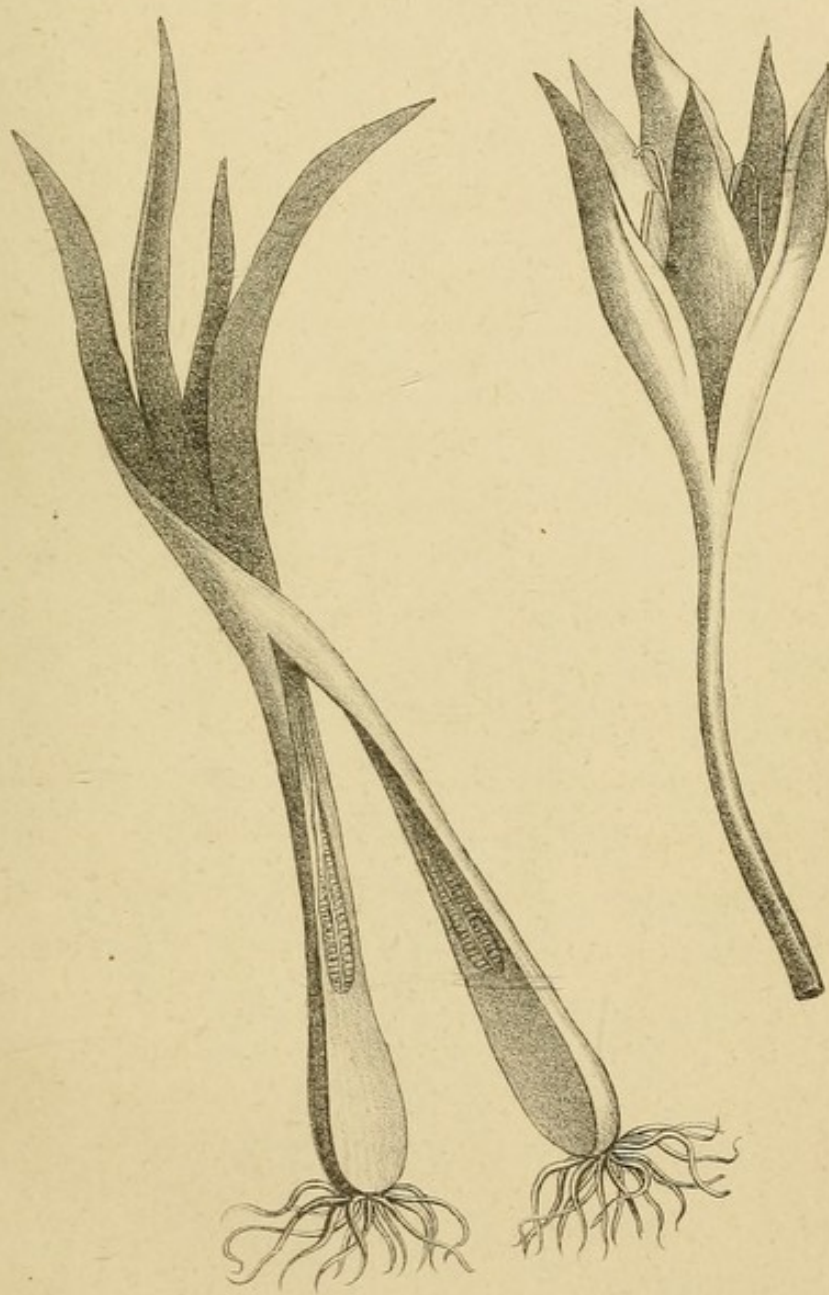


CHAPTER XX.

TAB. XXXV.—THE AUTUMNAL CROCUS.

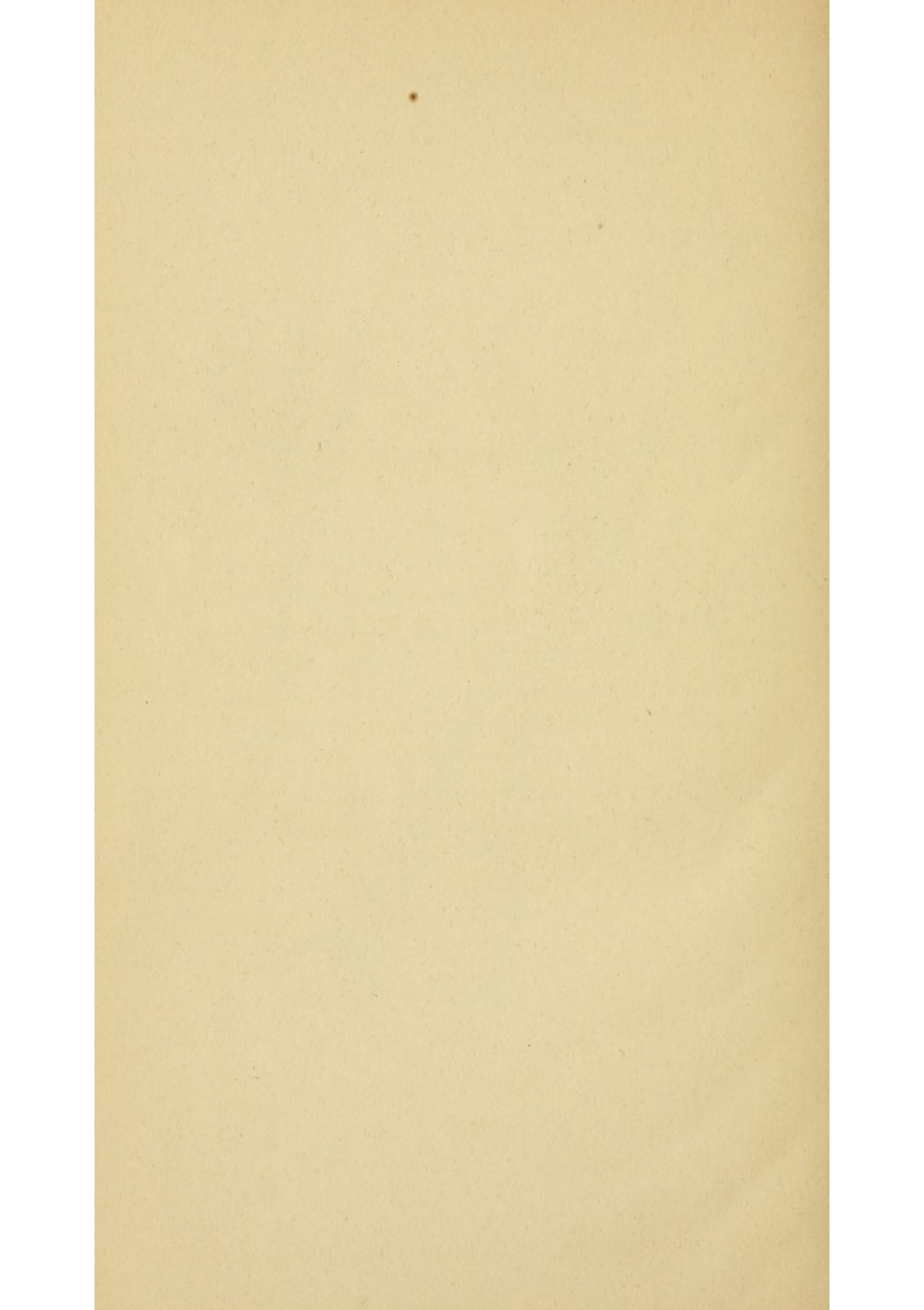
The *colchicum autumnale*. This plant before us exhibits a mode of fructification scarcely paralleled among British vegetables. The flowers appearing very late in autumn, the impregnated germen remains latent under ground close to the bulb till the following spring, when the capsule rises above the surface accompanied by several long upright leaves, and the seeds are ripened about June, after which the leaves decay. See British Botany, vol. i. p. 133. The plant is represented as it appears in *spring*; the root is divided to show the *seed vessel* near the bulb. The flower is remarkable for the length of its tube.

TAB. XXXV.



Swett, Del.

Lich. of Pendleton.



CHAPTER II

THE HISTORY OF THE UNITED STATES

The history of the United States is a subject of great interest and importance. It is a subject which has attracted the attention of the world, and which has been the subject of many books and papers. The history of the United States is a story of a people who have grown from a small colony to a great nation. It is a story of a people who have fought for freedom and independence, and who have built a great and powerful nation. The history of the United States is a story of a people who have been the envy of the world, and who have been the subject of many books and papers. The history of the United States is a story of a people who have grown from a small colony to a great nation. It is a story of a people who have fought for freedom and independence, and who have built a great and powerful nation. The history of the United States is a story of a people who have been the envy of the world, and who have been the subject of many books and papers.

CHAPTER XX.

TAB. XXXVI.—THE *DIONÆA MUSCIPULA*.

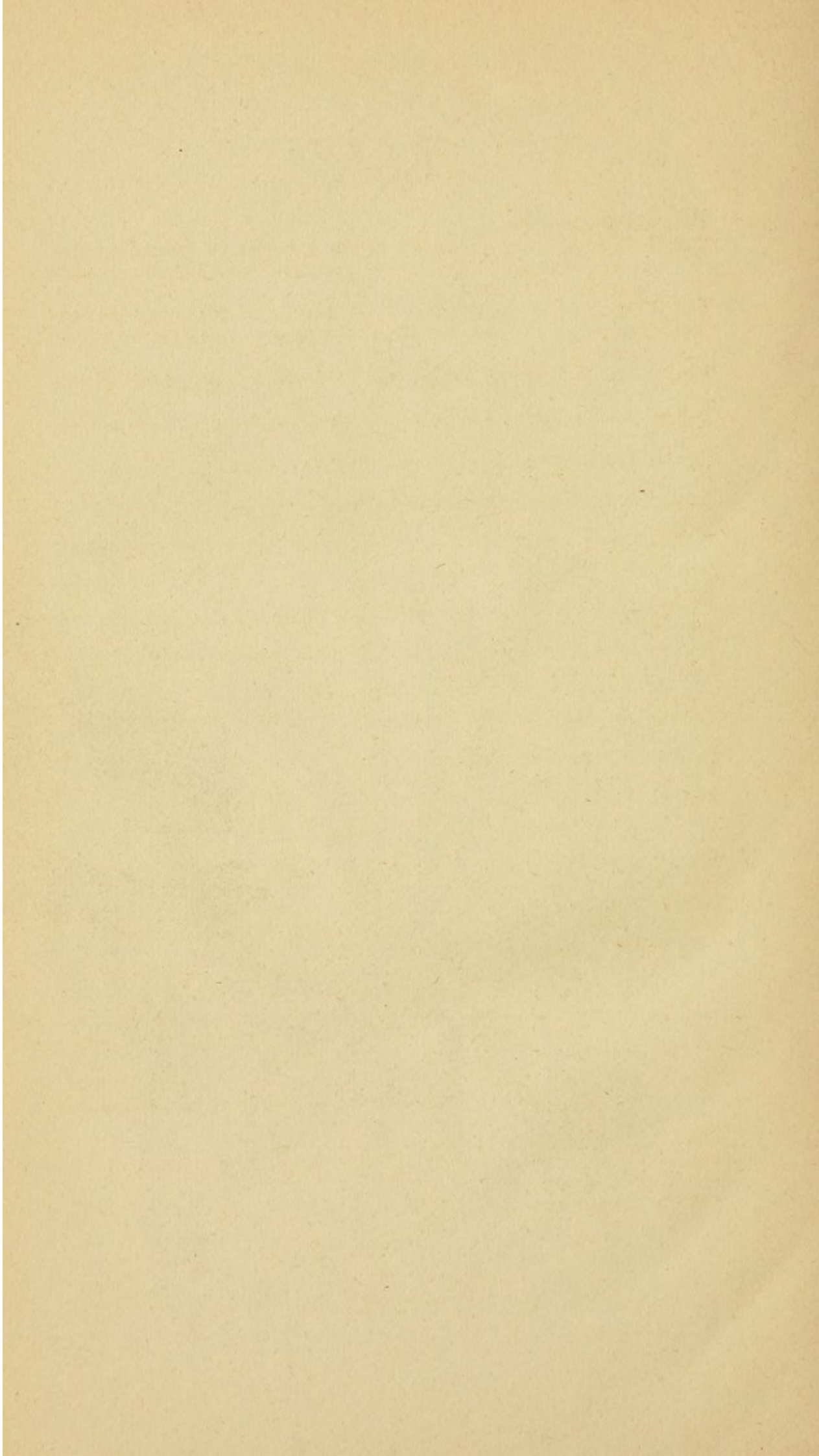
Venus's fly-trap. Some parts of this plant are so remarkable as to deserve a particular description. It is a native of North Carolina; the root perennial; leaves all radical, supported on long fleshy and strongly veined footstalks, leaving a small portion of this next the leaf naked: the leaf itself consists of two semi-oval lobes jointed at the back, so as to allow them to fold close together; they are fleshy, and, when viewed through a lens, glandular, sometimes of a reddish colour on the upper surface; the sides of both lobes are furnished with a row of cartilaginous ciliæ which stand nearly at right angles with the surface of the leaf, and lock into each other when they close. Near the middle of each lobe are three small spines, which are supposed to assist in destroying the entrapped insect. In warm weather the lobes are fully expanded and highly irritable, and if a fly or other insect at this time light upon them they suddenly close, and the poor animal is imprisoned till it dies. See Curtis's Botanical Magazine, No. 785.

TAB. XXXVI.



D. Johnson del.

Ditch of Pondalton



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